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Editorial

Considering the ever more difficult economic situation, the AR editorial board's decision to publish the magazine in both digital and printed versions has proven to be a good one. The former enables greater availability in English as well as production in colour, while the latter allows for a better overview and is in many respects more practical. So we are presented with two versions which, of course, entails more work, but authors find them ever more attractive.

Efforts made at congresses by myself and my colleague Zupančič to recruit new authors have slowly but surely produced results. Unfortunately, this also means more work because an increasing number of submitted contributions never get published after being reviewed.

The current issue comprises eleven articles, eight of which are scholarly ones.

Our colleagues **Gašper Mrak, Alma Zavodnik Lamovšek** and **Alenka Fikfak** deal with the theme of settlement patterns in the Slovenian countryside in an article entitled **SUSTAINABLE SPATIAL DEVELOPMENT IN THE COUNTRYSIDE – SETTLEMENT PATTERNS IN THE SLOVENIAN ALPS**. Alongside new emerging concepts of spatial interventions that not only involve issues of environmental protection but also cultural, economic and political aspects of sustainability, the main problems associated with investigating the development of settlements in the Slovenian Alps are as follows: How to enable the co-existence of traditional settlement patterns in the pristine protected areas? How to ensure the co-existence of traditional rural architecture with contemporary structures designed for a large number of visitors? And how to combine all of these components with a story of attractiveness? Some answers may be found here.

Jernej Markelj, Manja Kitek Kuzman and **Martina Zbašnik-Senegačnik** write about assessment methods for sustainable built environments which have evolved on the basis of local characteristics and legislation. Their article, entitled **A REVIEW OF BUILDING SUSTAINABILITY ASSESSMENT METHODS**, offers a review of some of them: BREEAM, LEED, DGNB and SBTool.

Andreja Benko, a trainee researcher, writes about planning procedures in our most common type of residential building construction in her article called **CONSTRUCTION PROCEDURE OF SINGLE-FAMILY HOUSES IN SLOVENIA**. She analyses the relationships among the designer, the investor and other participants in the procedure. Key evidence of a good work performance is shown in the time plan for the construction and design stages.The optimum design procedure is demonstrated through a stage-sequential model which provides the fastest way to achieve the objective.

Peter Šenk depicts the dualities between an infrastructure system and the units or components plugged into it. With the title **THE PLUG-IN CONCEPT: TECHNOLOGY AND AESTHETICS OF CHANGE**, the article primarily discusses town planning.

After returning from the United States, our young colleague **Srđan Nađ** again turns to its architecture. His article entitled **AMERICAN MULTI-DWELLING ARCHITECTURE OF THE SECOND HALF OF THE 19TH CENTURY AND FIRST HALF OF THE 20TH CENTURY** nicely shows the evolution and directions of design in the first half of the twentieth century when the issue of dense settlement in limited spaces had to be tackled. It mainly depicts the city of Chicago where between 1924 and 1929 several quality housing complexes were built which deviated from the housing construction practised until then by applying consistent ground plan designs.

Our colleague **Luka Jančič** deals with the issue of representation. His article called **THE IMPACT OF MULTILAYERED TECHNOLOGIES ON ARCHITECTURAL MODEL PRODUCTION AND USE** presents a few examples along with the issue of materialising abstract designs. The examples given may also be used for the analysis, assessment and development of ideas about spatial design.

Our colleagues from Niš, **Biljana Arandjelović** and **Ana Momčilović-Petronijević**, deal with vernacular architecture. Their contribution has the title **THE TYPOLOGY OF TRADITIONAL SLAVIC BUILDINGS, THE CASE OF SERBIA**. After their arrival, the Slavs primarily made use of local materials and simple techniques which, unfortunately, do not last long: timber, earth and stone. In doing so, they used locally available timber which they exploited down to the very last piece by applying wood joinery techniques and technologies.

A group made up of A**lenka Fikfak, Milan Dinevski, Petra Ježek, Nace Nagode, Gašper Skalar Rogič, Urša Suhadolnik Vovko** and **Jakob Šuštar** wrote an article entitled **THE CULTURE OF THE SETTLEMENT SPACE IN SLOVENIA**. They conducted a survey on the topic of the culture of the settlement space, which primarily refers to the visual image among perceptions of the settlement space. Their contribution presents the results of research which involved spatial management professionals and senior students from the Faculty of Architecture at the University of Ljubljana.

Kornélia Kissfazekas wrote an article featuring modern content for Hungary: **TRANSFORMATIONS OF HUNGARIAN TRADITIONAL TOWN CENTERS IN THE ERA OF SOCIALISM - TWO CASE STUDIES**. The article relates to two towns: Kecskemet and Szeckzard. The solution in Szeckzard is a better one because it acknowledges the existing conditions and the town's size, whilst Kecskemet came into being as a typical political town and is, above all, oversized.

Our former professor **Blaž Vogelnik** suggests quite a few specific solutions in his article **A PROPOSAL FOR RECONSTRUCTING THE RESIDENTIAL TOWERS ON ROŠKA STREET**. These towers are undoubtedly the riskiest buildings in Ljubljana in terms of seismic safety. He proposes the rehabilitation of these structures following a philosophy which leaves the building interiors untouched and implements all the necessary reinforcements outside the structures themselves.

Larisa Brojan, a trainee researcher, presents the work she did for her doctoral thesis in the United States in an article called **A REPORT ON INVESTIGATIONS CARRIED OUT AT THE UNIVERSITY OF MASSACHUSETTS, AMHERS (USA)**. Straw bale construction is more widespread in both the United Kingdom and the United States than we imagine in our country. But interest in straw bale construction can also be seen in Slovenia; in the past three years at least six buildings have been constructed by utilising a structural system with straw bales filling in between.

Editor

Ob vse težjih ekonomskih razmerah dobiva odločitev uredništva AR, da izhajamo v dveh oblikah: v digitalni in v tiskani, svoj prav. Po eni strani je dosegljivost v angleškem jeziku večja, digitalizacija omogoča barvne postavitve, po drugi pa je papirna verzija vendarle preglednejša in za marsikaj uporabnejša. Tako smo priča dvem verzijam, ki prinašata seveda več dela, a sta za avtorje vse mikavnejši.

Napori, ki jih vlagava s kolegom Zupančičem na kongresih - za nabiranje novih avtorjev - prinašajo rezultate, a počasi, čeprav zanesljivo. Žal pa je pri tem tudi več dela, saj je vse več prispelih člankov, ki v tisk po recenzentskem postopku ne pridejo.

V tokratni številki je enajst člankov, od tega osem znanstvenih.

Kolegi **Gašper Mrak, Alma Zavodnik Lamovšek, Alenka Fikfak** so obdelali temo poselitvenih vzorcev slovenskega podeželja z naslovom **SUSTAINABLE SPATIAL DEVELOPMENT IN THE COUNTRYSIDE – SETTLEMENT PATTERNS IN THE SLOVENIAN ALPS**.

Ob vedno novih trajnostno naravnanih, etičnih in odgovornih konceptih prostorskih posegov, ki ne vključujejo samo vprašanja varovanja okolja, ampak tudi kulturne, ekonomske in politične vidike trajnosti so glavni problemi pri raziskovanju razvoja poselitve v slovenskih Alpah: kako omogočiti sobivanje tradicionalnih poselitvenih vzorcev v neokrnjenih varovanih območjih? Kako zagotoviti sobivanje tradicionalne podeželske arhitekture in sodobnih objektov, namenjenih večjemu številu obiskovalcev? In kako združiti vse te elemente z zgodbo o privlačnosti? Nekaj odgovorov je tukaj.

Jernej Markelj, Manja Kitek Kuzman, Martina Zbašnik-Senegačnik pišejo o metodah vrednotenja skladno grajenega okolja, ki so se razvijale na osnovi lokalnih značilnosti in zakonodaje. **A REVIEW OF BUILDING SUSTAINABILITY ASSESSMENT METHODS** prinaša pregled nekaterih: BREEAM, LEED, DGNB in SBTool.

Mlada raziskovalka **Andreja Benko** piše o postopkih načrtovanja pri naši najbolj razširjeni gradnji v članku **CONSTRUCTION PROCEDURE OF SINGLE-FAMILY HOUSES IN SLOVENIA**. Razčlenjuje odnos med projektantom, investitorjem in ostalimi udeleženci v postopku. Pri tem je ključni dokaz uspešnosti mogoče prikazati na časovnici graditve in faz v projektiranju.

Optimalnost postopka projektiranja se kaže v modelu zaporedja faz, ki nam omogoča najhitrejšo pot do cilja.

Peter Šenk opisuje dvojnosti med infrastrukturnim sistemom ter nanj priključenimi enotami ali elementi. Članek ima naslov **THE PLUG-IN CONCEPT: TECHNOLOGY AND AESTHETICS OF CHANGE** in govori predvsem o urbanizmu.

Mladi kolega **Srđan Nađ** se po povratku iz Združenih držav spet vrača k njihovi arhitekturi. Članek **AMERIŠKA VEČSTANOVANJSKA ARHITEKTURA V DRUGI POLOVICI 19. IN PRVI POLOVICI 20. STOLETJA** dobro prikazuje razvoj in usmeritve projektiranja prve polovice dvajsetega stoletja, ko so bili soočeni s problemom goste poselitve na prostorsko omejeni površini. Opisuje predvsem Chicago, kjer je bilo med letoma 1924 in 1929 zgrajenih več kakovostnih stanovanjskih sklopov, ki z doslednim načrtovanjem tlorisnih zasnov odstopajo od dotedanje stanovanjske gradnje.

Kolega **Luka Jančič** se ukvarja s problematiko predstavitev. Članek **VPLIV SLOJEVITIH TEHNOLOGIJ NA IZDELAVO IN RABO MAKET V ARHITEKTURI** predstavlja nekaj primerov in problematiko materializacije abstraktnih zasnov, ki lahko služijo ne le kot predstavitve, pač pa za analizo, ocenjevanje in razvoj idej v oblikovanju prostora.

Kolegici iz Niša, **Biljana Arandjelović** in **Ana Momčilović-Petronijević** se ukvarjata z vernakularno arhitekturo. Z naslovom **TIPOLOGIJA TRADICIONALNIH SLOVANSKIH ZGRADB, NA PRIMERU SRBIJE**. Slovani so ob prihodu uporabljali predvsem lokalne materiale in preproste tehnike, ki žal niso prav dolge življenjske dobe: les, zemljine in kamen. Pri tem je bil uporabljen lokalno dosegljiv les, ki so ga s tesarskimi zvezami in s tehnologijami izkoriščali do zadnjega kosa.

Skupina, ki jo sestavljajo **Alenka Fikfak, Milan Dinevski, Petra Ježek, Nace Nagode, Gašper Skalar Rogič, Urša Suhadolnik Vovko, Jakob Šuštar**, je napisala članek **KULTURA NASELBINSKEGA PROSTORA V SLOVENIJI**. Izvedli so javnomnenjsko raziskavo na temo Kultura naselbinskega prostora, ki se je nanašala predvsem na vizualno podobo doživljajskega prostora naselij. V prispevku so predstavljeni rezultati raziskave, v katero so bili vključeni strokovnjaki s področja urejanja prostora in študentje višjih letnikov Fakultete za arhitekturo Univerze v Ljubljani.

Kornélia Kissfazekas je napisala članek z moderno vsebino na Madžarskem: **SPREMEMBE MADŽARSKIH TRADICIONALNIH MESTNIH JEDER V ČASU SOCIALIZMA - DVA PRIMERA**. Govori o dveh mestih: o Kecskemetu in o Szeckzardu. Slednja rešitev je boljša, ker upošteva predvsem okoliščine in velikost mesta, medtem ko je Kecskemet nastal kot značilno politično mesto, predvsem predimanzionirano.

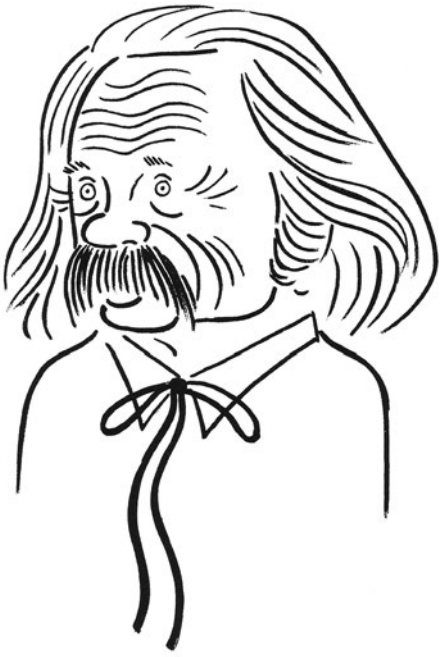
Naš bivši profesor **Blaž Vogelnik** predlaga kar nekaj konkretnih rešitev v članku **PREDLOG KAKO REKONSTRUIRATI ROŠKE STOLPNICE**, ki so zagotovo najproblematičnejše ljubljanske stavbe v pogledu potresne varnosti. Predlagal je sanacijo teh objektov v smislu filozofije, kjer ostane notranjost stavbe nedotaknjena in vse potrebne ojačitve izvedejo izven samega objekta.

Mlada raziskovalka **Larisa Brojan** predstavlja svoje delo v Združenih državah, kjer je opravljala del obveznosti za svojo doktorsko nalogo. **POROČILO O OPRAVLJENIH RAZISKAVAH NA UNIVERSITY OF MASSACHUSETTS, AMHERST (ZDA)**. Gradnja s slamo je tako v Združenem kraljestvu kot v Združenih državah kar razširjeno, bolj kot si to predstavljamo pri nas. A zanimanje za gradnjo z balami slame je navzoče tudi v Sloveniji, v zadnjih treh letih je bilo zgrajenih vsaj 6 objektov, kjer je kot polnilo uporabljena bala slame.

Urednik

V spomin / *In memoriam*

Niko Kralj



Karikatura: B. Pečar

Profesor Niko Kralj je bil profesor na naši šoli dolga leta. Vodil je predmet Elementi projektiranja 2, seminar, diplome. Na zagrebškem Sveučilištu je predaval v okviru programa Razvoj in upravljanje oblikovanja, kjer sem dosegel magisterij tudi sam. V okviru Ljubljanske univerze je postavil Institut za oblikovanje. Vseskozi pa je sodeloval tudi v industriji, za svoja dela je dobival visoke mednarodne nagrade.

Kar nekaj nas je, ki smo izšli iz njegove šole.

Spominjamo se kakih posebnih reči, redko si ustvarimo sliko celote. Ko smo se nekateri kolegi po mnogih letih spet srečali ob odkritju spomenika Dušanu Moškonu, smo se šele zavedli kako daleč je od tistih časov, ko smo v drugem letniku prvič srečali mladega docenta Nika Kralja, ki se je vrnil iz Združenih držav in začel svojo učiteljsko pot na naši šoli. Navduševal nas je s svežino predavanj, pa predvsem z množico diapozitivov, s katerimi nam je širil obzorja, ko še ni bilo Interneta in so bile možnosti za potovanja omejena. Zdaj se spomnim kako nelagodno sem se počutil, ko mi je mlajši kolega pripovedoval, da so hodili leta kasneje na moja predavanja zaradi lepih slik. Zdaj, ko o tem razmišljam, ugotavljam, da je to pravzaprav poklon Niku Kralju. Tega sem se naučil pri njem.

Občudovali smo ga, ne da bi se tega zavedali. Kako naj si drugače razlagamo ideje, da bi mladi zagnanci narisali stol, ki bi se mu reklo 'prince', ker je on narisal 'rexa', kralja. Pri tem pa je treba priznati, da genialnosti tega projekta še dolgo nismo razumeli. Narediti udoben in dober stol v dragi izvedbi ni nobena umetnost. Ampak bili so drugačni časi, tako tehnika kot tehnologija sta bili omejeni, treba je bilo narediti 'nekaj' iz tistega 'malo', kar je bilo na voljo. Naredil je tridimenzionalno kompozicijo iz elementov v dveh dimenzijah, izrabil cenene, a plemenite izvedbe lesa, naredil cenen, lahek, udoben, lep in dragocen kos pohištva. Zdaj razumem milijone plagiatov, ki so jih proizvajali po svetu. To je klasika v najžlahtnejšem pomenu. Sam še vedno najudobneje sedim v 'rexu'.

Vedno smo se imeli za vsaj malo pomembnejše, ker je imel 'naš profesor' žabo, ki je bila takrat čudež tehnike in oblikovanja. In leta kasneje, ko sem po kakih nujnih poteh smel za njeno krmilo, sem potem drugim ponosno razlagal o servo volanu - pa čeprav je tresel kot bi imel tresavico - , pa o električnih zavorah - čeprav si rabil kar nekaj časa, da si se navadil za silo udobno zavirati. In ko sem svojemu mehaniku navdušeno razlagal o lučeh, ki škilijo in kažejo pot, je rekel: če bi bilo to res kaj posebnega, bi jih imeli vsi. Danes, kakih petdeset let kasneje jih spet uvajajo.

Kot mlad asistent sem bil ponosen, da je imel profesor Kralj imenitne fotoaparate. Takrat si Nikona ni mogel privoščiti vsak. Dovolil mi je, da sem imel na polici njegovo zlato škatlo aparata, ki sem jo vedno poželjivo gledal. Danes tudi sam uporabljam Nikone. In če prav pomislim: to ni le poklon kvaliteti, v katero verjamem, je tudi poklon Niku Kralju.

Diplomo sem risal v Studiu Kralj, v njegovem seminarju, a pri pedantnem Dušanu Moškonu. Kralj je bil takrat v Izraelu in morali smo počakati, da se je vrnil. Ampak ni ga bilo dve leti in še več in nihče ni vedel kdaj pride. Diplomo sem imel narisano, za denar sem delal na Inštitutu za oblikovanje v Križankah, s končanjem študija pa sem kar čakal. Ko je potem nenadoma prišel, je profesor Moškon, takrat še docent, uredil, da sem diplomiral naslednji dan. Ni mi žal.

Po vseh teh letih zdaj razumem, da za toliko stvari dolgujem Niku Kralju tudi sam.

Marsikaj se je spremenilo, izboljšalo ali nadgradilo. Spomini ostajajo, a bodo odšli z nami, ki smo profesorja še poznali. Njegova dela bodo ostala.

Borut Juvanec

* Tekst temelji na zapisu, ki sem ga pripravil za publikacijo Niko Kralj (Jasna Hrovatin, Visoka šola za dizajn, Ljubljana 2010)

Članki / *Articles*

Gašper Mrak, Alma Zavodnik Lamovšek, Alenka Fikfak

SUSTAINABLE SPATIAL DEVELOPMENT IN THE COUNTRYSIDE – SETTLEMENT PATTERNS IN THE SLOVENIAN ALPS

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TRAJNOSTNI PROSTORSKI RAZVOJ PODEŽELJA – POSELITVENI VZORCI V SLOVENSKIH ALPAH

izvleček

V članku želimo prikazati prepletanje različnih obstoječih enot namestitve v prostoru, ki izhaja iz preteklosti in je hkrati odraz novosti sodobnega časa. V zadnjih letih se pod vplivom globalizacije in socialnih in demografskih sprememb nenadzorovano spreminjajo želje in potrebe tako prebivalcev kot tudi obiskovalcev alpskega prostora. zato je treba ponuditi nove oblike preživljanja prostega časa in se prilagoditi vedno spreminjajočemu povpraševanju. Vedno bolj se opušča tradicionalna organizacija poselitvene strukture na podeželju in se prilagaja sodobnemu načinu življenja, drugačnim poselitvenim strukturam, družbenim in demografskim spremembam. Ti novi posegi so v drugačnem sozvočju z naravo, kot je bilo to v preteklosti. Predstavljene so nove oblike preživljanja prostega časa, kot so zeleni, ruralni, podeželski turizem itd. Vedno več je trajnostno naravnanih, bolj etičnih in odgovornih konceptov prostorskih posegov, ki ne vključujejo samo vprašanja varovanja okolja, ampak tudi kulturne, ekonomske in politične vidike trajnosti. Glavni problemi pri raziskovanju razvoja poselitve v slovenskih Alpah so bili: kako omogočiti sobivanje tradicionalnih poselitvenih vzorcev v neokrnjenih varovanih območjih? Kako zagotoviti sobivanje tradicionalne podeželske arhitekture in sodobnih objektov, namenjenih večjemu številu obiskovalcev? In kako združiti vse te elemente z zgodbo o privlačnosti?

V območju alpskega prostora je pomembna raznolikost razpršenih poselitvenih vzorcev za nadaljnji razvoj trajnostno naravnane stanovanjske gradnje in poselitve in hkrati omogočanje različne in pestre ponudbe preživljanja prostega časa.

ključne besede

trajnostni razvoj, Alpe, Slovenija, razpršeni poselitveni vzorci, eko turizem, primeri dobre pakse

abstract

The paper aims to show the idea of intertwining of various existing accommodation entities within space, originating in the past and standing for an apparent novelty in modern times. In recent years, under the influence of globalisation, with social and demographic change, the needs and wishes of inhabitants and visitors of the Alpine Space have been changing unpredictably. We need to offer new forms of spending leisure time and adapt to the constantly changing demands. The traditional organization of settlement structure in rural space is being abandoned and adapted to a new way of living, different settlement patterns, social and demographic shift etc. These new interventions are in a different relationship with nature than they were in the past. New forms of leisure activities have been implemented, such as alternative, green, rural tourism etc. More and more the concept of sustainable, more ethical and responsible spatial interventions is prevailing, which does not only include the issues of preserving the environment but cultural, economic and political ones as well.

The key issues in studying the development of settlement in the Slovenian Alps were: How to enable the coexistence of traditional settlement patterns in the untouched protected landscape? How to ensure the coexistence of traditional rural architecture and modern architecture intended for a larger number of visitors? And how can these elements be connected in the »story about attractiveness«? In the area of the Alpine Space, the diversity of dispersed settlement patterns is important for further development of sustainability-oriented housing and human settlement while offering different and diverse leisure activities.

key words

sustainable development, the Alps, Slovenia, dispersed settlement patterns, ecotourism, example of good practice

"… Sustainable development stands for answering the demands of today's generation without endangering the capabilities of (future) generations to answer their own demands [World of Commission on Environment and Development, 1987]. The sustainability does not define the final situation (the state of being developed) but only the circumstances to be taken into consideration in making development-related decisions …" [Strategy of Spatial Development of Slovenia – SPRS, 2004: 8]. This thought is also the main guiding principle of this article, which represents the idea of intertwining of various existing accommodation entities within the space that originated in the past and stand for an apparent novelty in modern times.

Introduction

The needs and wishes of visitors and common users of wider space are unpredictably changing, guest's demands are growing, they are seeking diversity, undiscovered features etc. That is why the offer of activities to meet these demands must constantly adapt, change and take on new forms of spending leisure time. In the spirit of globalisation and glocalization a desire and demand has developed for untouched nature, cultural, historical and archaeological sites, first-hand experiences of practices and traditions of local communities, recreation and healthy living, etc. The location of accommodation (sleeping accommodation) frequently represents only the starting point in discovering unknown places.

The images of "a home in the country"were once connected with buildings of solid construction, classic materials, providing durability, safety and comfort. In the population's general cultural consciousness the images of a "rural home combined with a growing number of buildings around the courtyard"are still embedded deeply.

Great structural changes in the agricultural branch and also in other economic branches have had a fatal impact on the settlement system , on the style of settlement patterns and building typology (and it continues today). The current organization of settlement structure in rural space is in different relationship with nature than it was in the past with the erection of rural homes. The changes in the production system of settlement space, based on mixing and complementing of agrarian and non-agrarian functions, influenced the changes in previous settlement patterns and of their constituent parts – "rural homes"– by introducing new shapes [Fikfak, 2001]. The new spatial organization, in contrast to the hierarchically closed spatial order of towns and villages, is not a chaotic disorder. It is a new, complex, spatially and temporally open system where the historical sediment does not exclude introduction of new shapes.

We can find positive/negative development orientations in new

and old (traditional) patterns. Gradually they can be formed into new, quality connections with an existing spatial identity: multi-layered forms of settlement patterns where settlement structures mosaically intertwine with each other. New settlement patterns must surpass the present wild growth and expansion of settlements and replace it with an appropriate structuring of new spatial forms in relation to the rural environment and the existing built form, which is part of the cultural landscape.

With the new principle of density, inner settlement structures as well as countryside settlements will be arranged. The outer, dispersed space will regulate itself, based on the infrastructural net, allowing self-organization, arranged on the principle of unplanned structures. These systems function as creative processes producing intertwinement: a variety of intertwined patterns which are stable or instable, definitive or indefinitive, but always interesting and dynamic, moving and vibrating with life.

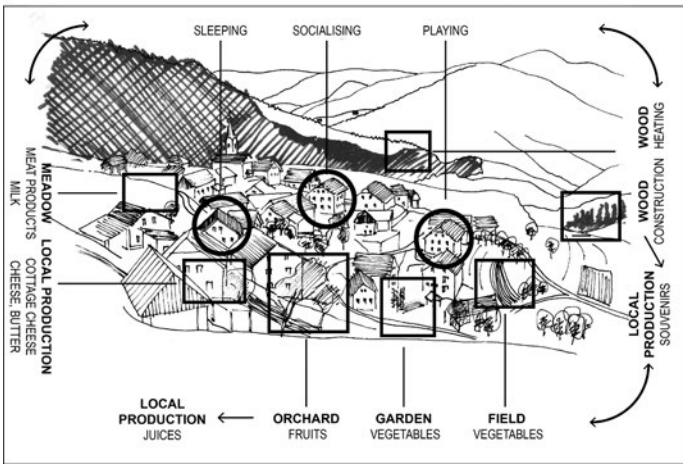
Intertwinement of sustainable forms of settlement, tradition and activities in rural areas

In the decades of the growing environmental and cultural awareness and many public discussions six basic ideas developed; these ideas are defined by Jacobs [1999] as the integration of environment and economy, concern for the future, environment protection, intergenerational justice, quality of life and the principle of cooperation. The consequence of spreading the awareness on preservation and protection of natural environment, increase of cultural sensitivity, is that settlement development in space and the expansion of settlements involves a growing attention paid to the introduction of sustainable principles.

On the other hand a great deal of interventions may also have negative impacts on the space and environment: they are mostly demonstrated through the mass nature and large scale tourist capacities. Owing to high tourist consumption, they do tend to have favourite economic effects but at the same time they are the reason for the degradation of the space, the degradation being the most pronounced when saturation arises and its bearing capacity is exceeded. Bearing capacity means "the degree of development which is still allowed without detrimental consequences for the resources, to wit, environment" [Hudman and Hawkins, 1989: 238–239]. The findings and critiques of negative impacts which the development of human settlement and establishment of degradation within the space "…have led to the calls to a more environment-aware and culturally acceptable forms of tourism as well as to changes in tourist practice and development of alternative forms of tourism" [Bajuk Senčar, 2005; Smith and Duffy, 2003].

Tourism is a form of the biggest peaceful migrations of people and at the same time a way of life, which affects their understanding and experiences about their journeys [Kovač, 2002: 4]. It is a phenomenon of a society of plenty and consumerism and one of the forms of leisure activities [Pogačnik, 2008]. Furthermore, it is a highly dynamic activity of both, modern economy and society, and it attains a high growth rate. Tourism has to do with the consumption of goods and/or services which are unnecessary in their essence. They are used because they bring positive and satisfying experiences that differ from those we otherwise experience in everyday life. Tourism has numerous other impacts on economic and social development of individual areas, which is the result of the consumption by tourists. Moreover, there are numerous impacts on the landscape [Jeršič, 1990: 11] and at this point its potential function having to do with environment protection need to be emphasised. It is based on natural and cultural sites which need to be preserved by means of special protection regimes and procedures of care [Ibid.].

As an alternative to a traditionally strong mass tourism, new forms of activities have emerged, attracting and motivating modern people in their use of free time. Since 1990, new forms of leisure activities have been implemented such as alternative, green, rural tourism etc., however ecotourism is the expression most frequently used. It emphasises the contact of the host with the guest as well as that of the guest/tourist with the environment. It is not only the intensity of the experience of the nature and environment that counts: the new form of leisure time activities should involve educational elements, research and presentations/explanations as well [Fikfak, Rozman, 2009]. Consequently, ecotourism means journeys to natural areas but with a responsible attitude towards nature which at the same time stimulates well-being of local population [TIES, 1990]. Ecotourism is a concept of sustainable, more ethical and responsible tourism which does not only include the issues of preserving the environment but cultural, economic and political ones as well [Holden, 2006]. It is about a concept which does not interpret sustainability as an objective in its own right but as an oriented philosophy which includes the interaction of individuals with environment and space (Figure 1). An ever growing number of tourists chooses for their holiday destination culturally and traditionally rich rural areas which enable direct contact and experience of space.



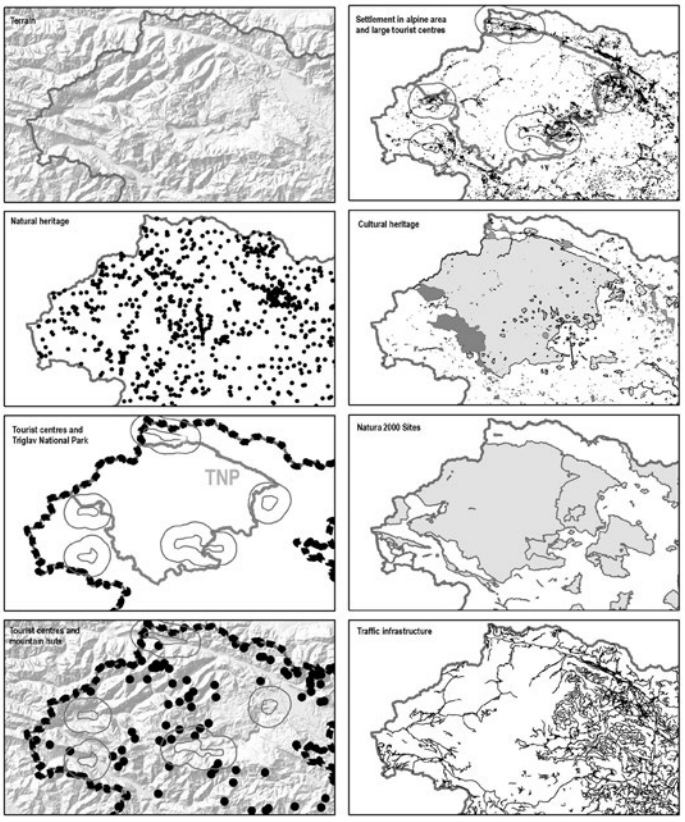
Slika 1: Trajnostni krog. Razmišljajmo trajnostno tudi v zasnovi in shemah enostavnih konceptov turističnih nastanitev.
Figure 1: Sustainable circle. We should be thinking in terms of sustainability also within the concepts and schemes of simple settlement.

The research was aimed at the search or analysis of spatial criteria about strategic shift in development of settlement patterns and

with the related activities:

- what is the spatial shift in modern sustainable concepts of land planning;
- the identification of quality elements that influence the design of new living patterns in view of revitalization of the existing patterns for tourist use;
- what are the elements or factors of traditional architecture that are offered as an existing quality by current settlement area;
- the identification and understanding of living culture and leisure activities and with changes in contemporary way of living which is reflected in the design of new interventions in the landscape.

In light of the above problems and bases the following goals and outcomes of the study were outlined: outline of distinctive features of the analysed area – Triglav National Park (TNP) (Figure 2), valorisation of the built area, development of settlement patterns in view of promotion of sustainable tourism development, evaluation of quality traditional architecture with the purpose of accommodation use and, finally, the conclusions and perspectives for organisation and management of a wider Alpine rural area. The key research question was: Can the traditional spatial dispersion of settlements in areas of difficult accessibility provide a new opportunity for spatial development with sustainable orientation, which can through seemingly diverse settlement patterns allow for quality preservation of natural landscape or built-up cultural landscape?



Slika 2: Analiza in valorizacija prostora z različnih vidikov.
Figure 2: Analysis and valorisation of space from different perspectives (TNP).

Sustainable development: the concept of requirements and limitations

The attitude towards sustainable development is not only about how the society and individuals manage waste, their behaviour in the protected areas, their use of drinking water and other natural resources, it is about and above all about understanding the process of spatial planning and management [Zavodnik Lamovšek, Fikfak, 2010: 10]. Kajfež Bogataj [2010] defines sustainable urbanisation as a long-term developmental perspective which enables and allows intertwining of various planning strategies. In our modern time of global industrialisation and information society, the novelty in the attitude towards sustainable development is above all in the changed manner of thinking which does not follow the consequence of an action but enables us to make a transitory assessment and therefore a disclosure of the impact of the planned activity on our environment. We need to think about its impacts and consequences, change it if necessary in order to preserve to the highest degree possible not only local but world resources as well [Lemon, Percy, Wright et al., 2004]. The idea has been simplified to a certain extent, yet with the definition of sustainable development [World Commission on Environment and Development, 1987: 43] a novelty introducing two key concepts emerged [see also Plut, 2007]:

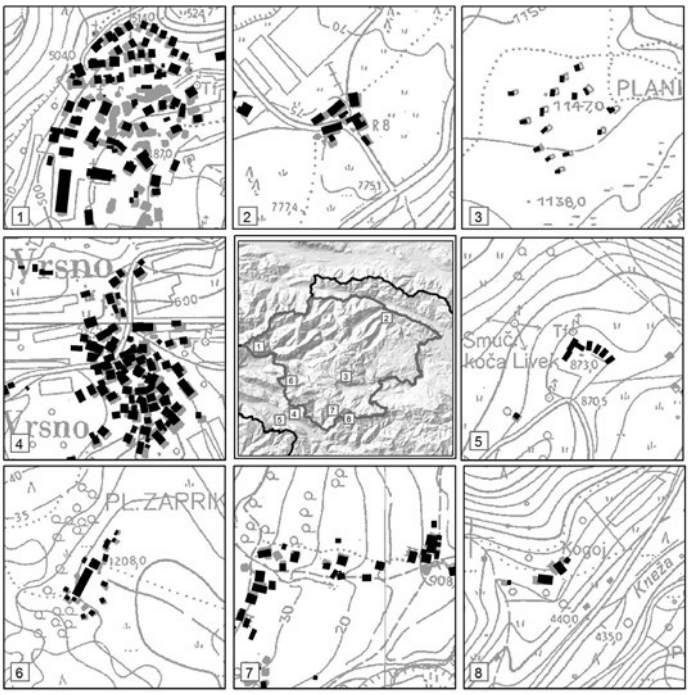
- the concept of requirements, economic and social security, intergenerational justice (responsibility), and
- the concept of limitations on the basis of which we need to exploit the spatial and envrionmental capacities to such an extent as to enable us to satisfy not only present but future requirements as well.

The search for the balance between the preservation of the natural environment and the requirements of man and the preservation of cultural heritage at the level of the settlement system is a process which continues and complements the idea of life in a green cultural landscape. The classic rural settlements with traditional farm systems, village settlements and rural culture of living, is a form of culture which is rapidly declining in this age of technology and global enterprises. The main goal of several strategic documents is to combine various activities in the rural hinterland that will stimulate the conservation of traditional settlement types while adding new values to the settlements following the principles of protecting the existing identity of a region and settlements. Through development, rural settlements shall connect to towns with central functions and shall implement activities into their environment for the general user. The farming activities, however, shall be either specialised, or have the function of the cultural region keeper.

A method for identification of dispersed settlement patterns in the Alpine Space

During the recording of space usage we limited ourselves to the analysis of settlement patterns in view of the presence of the following physical structures: i) isolated (individual) farmstead, ii) isolated building, iii) hamlet, iv) village, and v) town or city. In this way in the Triglav National Park (TNP) area different settlement patterns (Figure 3) and their relationships were

mapped. At this stage, the morphological characteristics of the settlement pattern were not part of our investigation. Based on the field work, the recorded settlement patterns were inserted into the topographic map at scale of 1 : 5000. In producing the map, all urban and central settlements were excluded as well as areas exclusively serving one activity (clusters of self-catering houses, sport and recreation zones, business zones etc.), which are not related to the traditional rural space and living. The field work was also accompanied by interviews of local residents, since the goal of the study was to identify the interrelations of the settlement patterns and how the different auxiliary tourist activities help to conserve the settlements in remote areas. We were especially interested in the criteria that were being considered by individuals when starting a new business (e.g. rural tourism), establishing new mountain huts, starting new production, door-to-door food sales and similar.



Slika 3: Različni poselitveni vzorci in medsebojni odnosi.
Figure 3: The recording of different settlement patterns and their relations. The nucleation is presented as a single pattern. The study of relations with the neighbouring patterns, the distance between them, the distance between the same patterns etc. agreed with the visual assessment: the system of dispersion in space of different patterns which complement each other. Settlements on map: 1. Sedlo, 2. Zgornja Radovna, 3. Planina Blato, 4. Vrsno, 5. Livek – Nebesa, 6. Planina Zaprikaj, 7. Tolminske Ravne, 8. Kneške Ravne (Kogoj).

In interpretation of the results we became aware of the importance of people's attitude towards their living environment in relation to the conservation and setting up of new patterns preserving the traditional landscape settlement. On the chosen study areas several tests were performed using GIS computer tools and the proper criteria tool for an easier evaluation of the results obtained, while the following conclusions were made: the visual assessment of space provides equally important information, complementing the analysis of distances (Roberts, 1996: 24, Waugh, 1990: 340–42, Prosen et al., 2008) between the analysed physical structures (i–v). In doing this, we took into account the terrain characteristics, solar illumination radiation, orientation etc., which were analysed by using the Digital Terrain Model (DTM). In view of quality, visual assessment of space is the one that, together with the information gained during the interviews, gives us the information about usage, volatility and quality of space.

The analysis following the methodological approach mentioned above was performed in the areas of Kobarid and Bovec municipalities. Interestingly, both areas are partly within, and partly outside, the TNP area. At the same time, both municipalities as a whole are part of the Alpine Space.

The quantitative analysis using the GIS tool and, on the other hand, visual field assessment and interviews gave similar results. Importantly, there is no rule in the repetition of identified dispersion of some patterns, but rather it depends on the geographical position in relation to the central settlement and organization of built forms along the main road.

Structural changes and development of the Alps

On the European scale, the Alps represent an interesting space for examining demographic, social, cultural and economic changes. Owing to their geographic distinctive features, difficult accessibility and passability in both directions, namely North–South and East–West, the Alps have historically represented a special region within the European space. Recently, The European Commission [Internet 1], and other international organizations such as CIPRA (French abbreviation for Commission Internationale pour la Protection des Alpes) [Internet 2] have concerned themselves with the quality of life in the Alps, introducing equal employment opportunities, resilience of towns, with demographic changes and topical problems in the Alps; together these organisations have found that the Alps are our common living space, a place of our leisure activities, that it is in the Alps where our future lies and it is there where we must cooperate. In the centre if its endeavours, CIPRA emphasises the principle of sustainability so that life in the Alps will be attractive also for the next generations and promising from the points of view of ecology and society. CIPRA, founded in 1952, operates as a non-governmental non-profit organisation. Its seven representative bodies, one of which is Slovenia, and about one hundred member organisations and institutions make CIPRA an important pan-Alpine network. The basic motive for the way of thinking and operating is the Alpine Convention [Internet 3] that owes its origins to an initiative by CIPRA.

In 1991, most of the Alpine countries and the European Union signed it as a legally binding document. This document is a guarantee for trans-border cooperation among the countries, regions and local communities in the Alps. The protocols and documents of the Alpine Convention demonstrate that cultural landscape is an important part of the documents on sustainable use. Thus the Mountain Farming Protocol [1994] provides certain international level measures for preservation of mountain agriculture, convenient for individual areas and environmentally acceptable. It recognizes and ensures the essential contribution of the agriculture to preservation of settlement and sustainable

economic activities, in particular through the production of characteristically quality products, to the protection of natural living space, prevention of natural disasters, maintenance of the amenities and recreational values of natural and cultural landscape and culture within the Alpine space. The aim of the Mountain Forest Protocol [1996] is the preservation and, if need be, spreading and improvement of the stability of mountain forest as sustainable living space. The Tourism Protocol [1998] contributes to the sustainable development of the Alpine space with such tourist activities which are acceptable to the Alpine Space. The development of the Alps-friendly tourism requires balancing of its offer, i.e. high quality having a priority over mass tourism. In addition, as its by-product, agriculture in the Alps creates a cultural landscape which is important for preservation of biotic diversity.

Structural changes have caused the Alps to be losing their traditional rural peasant image and lead to an ever growing urbanisation [Bairoch, Batou, Chèvre, 1988, Mathieu, 1998; in: Batzing et al., 1996: 336]. Certain areas have given in to the implementation of new economic activities. However, on the other hand the process of such urbanisation has had an impact also on vacating and closing down of less attractive, more poorly geared and less accessible areas of the Alps. Even to this day it has been repeated over and over again that "the parallel product of the Alpine agriculture is an untouched and consequently aesthetically attractive landscape"[Jeršič, 1999]. It is the agricultural use that has substantially contributed to a finely broken down, diversified and ecologically variegated Alpine landscape which – from the point of view of human settlement – has nevertheless remained within the limits of a rational soil use. Along with these structural changes new urban programs and new urban built patterns are moving in the rural area, hence the agriculture has become a trade- and economy-orientated branch and is no longer solely orientated into food production.

The contrasts between the development and protection-related interests are best expressed in the area of valuable natural and cultural features and in certain most frequently visited areas of the Alpine Space. In the vicinity of larger towns excessive loading occurs [Pogačnik et al., 2009]. Broggi [1998: 120, in: Plut, 1999] has established that the Alpine landscape is threatened by a major change as soon as within the time limits of one or two generations. He has raised several basic questions [Ibid.]:

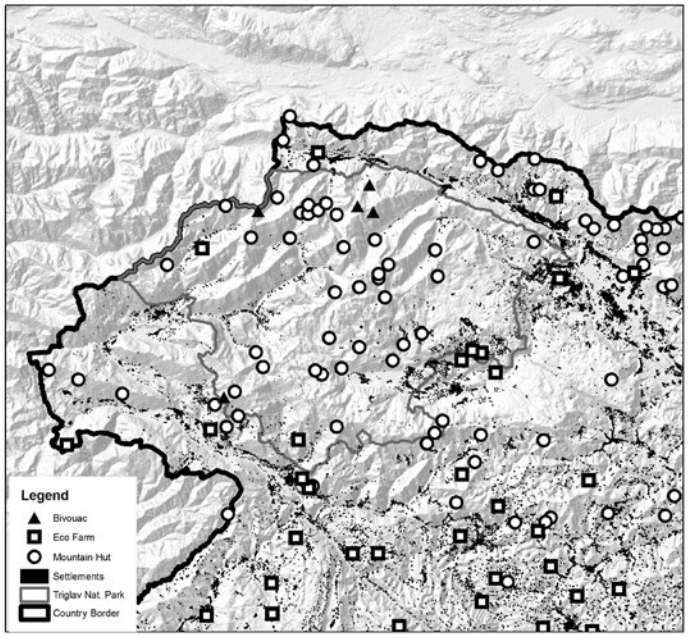
1. The question concerning the future of the Alps: will the Alpine Space be vacated in the future and become an area of wilderness?
2. The question concerning the preservation and survival of Alpine agriculture, in particular on larger surfaces, and
3. The question concerning the costs of landscape care (will higher costs be borne by everyone or by tourism only?).

The Alpine Space will undergo major changes also from the point of view of climate changes. The weather phenomena are becoming more and more extreme which is why the structure of forests will change, changes will occur in the methods of farming and the cultures that will thrive in the changed climate conditions; furthermore, adjustment at all levels of living will be required. The measures against the climate change impacts, which are put into operation, include: over the last 20 years artificial snow packing which – through retaining and supplying sufficient quantities of water – has also negative impacts on the environment; planting trees along the edge of ski slopes and a planned creation of natural shadow; planning ski runs on north-facing slopes (which is not considered the most popular measure by the skiers longing for the sun); machine-grading or bulldozing, arranging and adjusting of ski runs (on several ski slopes throughout Europe this particular measure has proved to be very harmful since the modified terrain has shown severe erosion-induced damage of the terrain, etc. [Abegg et al., 2007: 37].

Under the Alpine Convention, on the basis of cadastral communities the surface of the Slovenian Alps comprises 7,336 km2, which represents just over a third [36.2%] of the territory of the state [Plut, 1999]. In the Slovenian Alps, 1,186 km2 of the territory, to wit, 14.3% of surfaces [Ibid.] are under protection. The protected areas of the Slovenian Alps represent as much as 89% of all protected surfaces of the state, which on the one hand emphasises the extraordinary nature-protection meaning of the Slovenian Alps while at the same time, in view of the landscape variation of Slovenia, it represents a major non-equilibrium [Ibid.]. The Strategy of Spatial Development of Slovenia [2004] states for mountain areas, where the entire Slovenian Alpine Space belongs, that ecologically-oriented tourism, ecological farming and the use of renewable energy sources are spurred; for this, as a rule, there are more opportunities in these areas, and a support is ensured to mountain and hill communities [Ogrin et al., 2011].

The relief is one of the main factors which have had an impact on the emergence of settlements in the area of the Slovenian Alps. The majority of rural settlements in this area is characterised by their being stuck at the edges of valleys, sunny slopes and slightly sloped river terraces at foothills and main roadways (Figure 4). As an example we have provided several characteristics of the cultural landscape of Zgornje Posočje (a part of the Slovenian Alps) which also belongs to remote rural areas. In this area the settlement structures emerged in the form of dispersed settlements on less favourable positions (Drežnica, Vrsno, Krn, Livek), on higher terraces (Ladra, Smast, Libušnje, Kamno) and in secondary valleys (Lepena, Bavšica, Trenta) between approximately 250 m and 960 m above sea level (Strmec). The consequences of natural disasters (earthquakes, natural hazards) and social impacts (wars, industrialisation, changes in agricultural management) contributed over time to the image of cultural landscape which, owing to mass discontinuation of farming and emigration of young population, became more and more vacated. Consequently, the number of abandoned villages grew, life on isolated farms stopped, they were either left to ruin or taken over by non-locals. Discontinued, overgrown and unutilised agriculture areas sometimes obtained with difficulties slowly but persistently kept changing the image of the landscape. In more recent time, the risk of the existence and preservation

of architectural heritage, non-awareness and disorganisation, in the same way as in other environments, have been affected by the desire for something new, which also includes tourist development that brings foreign impacts into the landscape.



Slika 4: Karta razpršenosti naselij in objektov v Julijskih Alpah, Slovenija.
Figure 4: The map shows the dispersion of settlements as well as visitor orientated attractions throughout the Alpine Space.

The main findings of studying the settlement system of the rural space in the Alps are:

- The dispersed system enables farming and controlling of a wider area, without the need to control large distances, however it influences the maintaining of social contacts (a good example being farms in the United States).
- More nucleated patterns may result in the reduction of distances between neighbours, so that small hamlets, individual farmsteads can function as part of settlements, while at the level of observed physical structures they are still part of a dispersed pattern.
- The nucleated pattern of settlement represents those situations where most of the dwelling units are concentrated, functioning as a unified pattern.

Concept of human settlement in the Slovenian Alps area

The key issues in studying the development of settlement in the Slovenian Alps are as follows: How to enable – within an alpine landscape – the coexistence of traditional settlement patterns in untouched protected landscape?

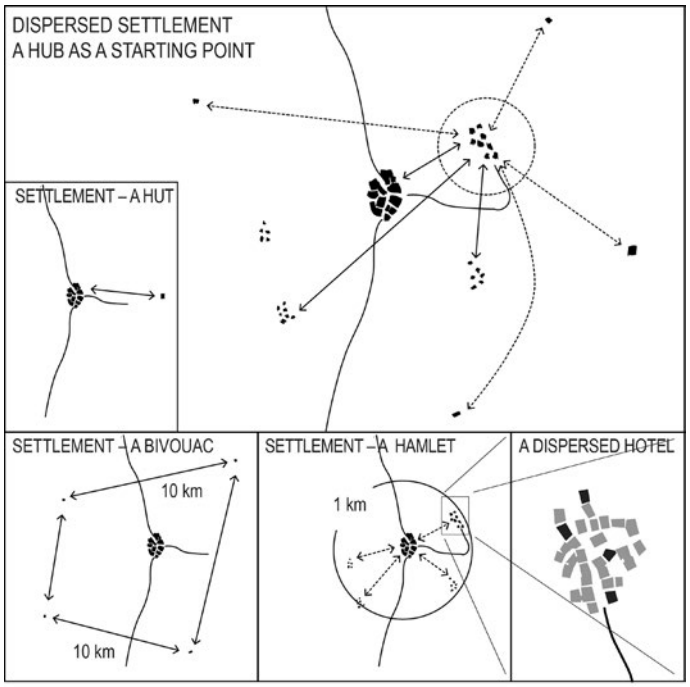
How to ensure the coexistence of the traditional rural architecture and modern architecture intended for a larger number of visitors? And how can the elements be connected in the "story about attractiveness", which will serve as a foundation for preservation of traditional settlement patterns and allow the development of new forms of settlement?

In examining rural space and planning new activities affecting the environment for the purposes of sustainable development of settlement the following question is raised: Which locations at the local level are the most important for settlement? How does the settlement process react to social change and to what degree do the sustainable principles influence the development of activities? How are the principles of spatial development with spurring sustainability-related values transposed into the development of built patterns? How does all of this unfold in the Alps that are "… a value and a challenge at a worldwide level, a wish of every mountaineer or traveller"[Internet 5].

Dispersion as an element of sustainable human settlement

In the out-urban space of the area of the Slovenian Alps several types of settlement structures (Figure 5) can be observed in which activities intertwine and, built at the same time, they depend on the vicinity and impact of central settlements and available infrastructure of the space [summarised after: Gabrijelčič, Fikfak, 2002: 23–24]:

- Rural tourist areas: hilly areas, well geared with tourist infrastructure, cause peasant emigration of young people and frequently disrupt the existing agricultural production foundation and the traditional settlement pattern. Exaggerated growth of tourist capacities often leads to local over-settlement and excess loading of the environment with the simultaneous vacating of the fringe areas. The existing settlements with their architecture and high quality ambient are an important part of tourist offer. Central settlements, to wit, urban structures which have been changed due to the pressures of urbanization belong among these structures.
- Remote rural areas: They comprise certain hilly and mountainous areas where forests and agriculture prevail including scarce, dispersed settlement. In many areas of this type we face decreasing numbers of population or even complete vacating of areas which are becoming the objective of sustainability-oriented tourist development of rural countryside.



Slika 5: Vrste naselij v kombinaciji z razpršenimi prostorskimi strukturami.
Figure 5: Several types of settlements combine the dispersed space structure.

From the point of view of the development of modern forms of tourism we are mainly interested in the remote rural areas where dispersed settlement prevails. The latter is defined in the Strategy of Spatial Development of Slovenia [2004] as a spatial form, to wit, a concept which defines a large number of small settlements dispersed in the space, which are classified as to their type into fragmented, dispersed and scattered settlements as a part of the autochthonous settlement. Furthermore, we can ascertain that the planning of rural countryside [Prosen, 1992, 2003, Gabrijelčič et al., 1997] from the point of view of dispersed settlement within the Slovenian space is a poorly researched area which has above all to do with the development within the settlements and the issues of settlement of open space. The emergence of dispersed settlement is frequently mistaken for dispersed individual buildings which are perceived as a form of negative spatial development [Drozg, 1996]. Dispersion as a settlement pattern represents the situation in the space where farms, hamlets and towns are dispersed throughout the entire area. This system enables farming and management of a broader area without the necessity of managing substantial distances. More nucleated patterns may have an impact on distances between neighbours being reduced so that smaller hamlets, isolated farms function as a part of a settlement; they are, however, at the level of an entity still in the form of a dispersed settlement pattern [Fikfak, 2008]. The discussion on dispersion (Figure 5) can be concluded with the thought that within the space there is no an entirely homogeneous pattern, whether nucleated or dispersed, since the former would mean that everyone would be living in a single facility, while the latter would mean that the space would be settled in a perfect uniform manner.

Various forms of rural traditional settlement in the area of the Slovenian Alps represent a system which avails all the potentials for balanced spatial development with the introduction of modern forms of sustainable activities. At the same time the relationship between the protected areas (for instance, the Triglav National Park), rural countryside, settlements of central character, to wit, small- and medium-sized towns within the area of the Alps and large cities on the fringes of the Alpine Space brings about a special settlement system which enables and stimulates sustainable development of the landscape.

In researching human settlement in the rural countryside in the area of the Alps we have focused only on the areas which are located outside urban settlements and protected areas. In defining the settlement patterns which are a building block of the so defined area investigated in the Alpine Space we have come to the conclusion that the present diversified forms of settlement (defined in: Fikfak, 2008; rural settlements, villages, hamlets and isolated farms and other minor settlement structures – Figure 4) outside the areas of central settlements and their urban agglomerates are still based on historic and autochthonous settlement patterns. In the area of the Slovenian Alps urbanisation has been changing above all due to the impact of structural changes in the economy, which is space-wise best reflected in the difference among the south hillsides of the Alps which are the most endangered as far as development is concerned, and the broader development in the areas of central settlements which were under the pressure of development of all types of tourism. The space- and development-related questions of the Alps are described in more detail in a publication with the same title which is basically a summary of the results of the project DIAMONT [Internet 6].

For the purpose of studying the settlement patterns in the countryside within TNP the following spatial analyses were made:

- in the selected areas within the Alpine Space at scale of European cities (the definition of the relationship: the Alps periphery–border metropolitan cities–protected areas within the Alps area–countryside or the space in-between);
- formation of standards and a field analysis of the selected areas within the Slovenian Alps and the analysis of urban settlements or towns with central character;
- quality sustainable factors of tourism in rural areas and its relation to settlement – for narrow or wider area;
- limitations and influences on development, redevelopment and recultivation of degraded areas, which negatively influenced the settlement process by reckless settlement development and other forms of tourism, and;
- analysis of qualities and deficiencies for organisation, use or living in the countryside within the areas with large potentials for establishment of principles of sustainably orientated settlement.

The entire area of the Alps shows the presence of many and variegated forms of settlement patterns which preserve the traditional autochthonous form. They change according to the location, purpose and form of living and stimulate the sustainable manner of research, use and experience of a broader tourist space. Below, we present some examples of settlement forms which derive from tradition; however, despite the fact that they belong to the type of remote rural areas they have undergone modern activities affecting the environment and the development in the form of sustainability-oriented rural development (resulting in architecture which, however, does not always abide by the principles of sustainability). These individual elements that are spatially dispersed represent focus points of interest and development.

A modern tourist settlement, confirming the continuation of the idea of the typology of traditional settlement patterns – example of good practice

In this environment a hamlet called Nebesa ("nebesa" is Slovene for "Heaven"), in Livek, Slovenia, with tourist contents emerged as a continuation of the dispersion of settlements.

The distinctive feature of Nebesa is that it is located at the crossroads between the Venetian Slovenia and Goriška brda, i.e. between the Alpine world and the Mediterranean, between the Alpine pastures, dairy-farming and vineyards. The tourist complex with accommodations (project by architects R. Klanjšček, K. Pavlin, A. Lavrič, 2001–03) was built where a ski cabin used to be. Its planning and design follow the pattern of dispersed construction of high mountains but in so doing they take into consideration the exceptional surroundings which enables us to swim to Krn, sail to the Gulf of Trieste, ski the Kanin mountains or test ourselves on the fronts of World War I [Internet 7]. The complex with its unmistakable views into the width of the space, built in the 21st century at the location and on the foundations of the previous century, undoubtedly continues the historic concept of dispersed settlement of small settlements in the broader surroundings.

Klanjšček adds: "In view of the concept and position we have followed the example of traditional cottages for pasture and dairy-farming"[Internet 8]. A member of the panel and professor at the Faculty of Architecture in Ljubljana, Aleš Vodopivec, says in the rationale that with the Livek settlement Klanjšček "returns to the roots of our architectural heritage", that it is a "modern, technologically advanced architecture which is locally recognisable without imitating historic elements"and a "critical commentary of the world of spectacular images and fashion trends"[Ibid.].

Within the context of development of dispersed settlement the Nebesa settlement has a special meaning. The distinctive feature of the location with simultaneous opening of "heavenly"views into the space continues the story of the past, one of preservation and protection as well as that of space management. It is for this very motive that a special rhythm of life is led in this complex, which keeps its distance from mass tourism; each individual has their own individual ambient which is complemented by the story of the local character being intertwined with the system of hiking trails and cycling routes. In this way the complex, which still survives despite its modest six facilities, is connected with tradition and hospitality of the near space (connection with the farms). In evaluating the activity we most certainly cannot ignore the issue of sustainability as a phenomenon of the comprehensiveness of the activity at the level of architecture. The exceptionality of the location has an impact also on the peculiarities of the climate and disadvantages which are brought into the living by the activity. Many critiques assess this aspect as a negative one; however, the skill of building up by means of modern technologies and improving the infrastructure partly impacts the visual appearance of the complex.

Example of promoting balance in the cultural landscape by the typology of constructing mountain bivouacs

An example of spatially dispersed settlement in the area of the Alps is represented by the facilities which in the past were used as shelters to shepherds and for the activities of mountain pasturing. This has become a seasonal activity and it resonates in the architecture of the mountains which left a special cultural character on mountain pastures. Shepherds' bivouacs originate in traditional farm architecture of mountain valleys which – under the influence of the factors of mountain nature (wind, snow, ice) and special requirements of mountain pasturing cattle breeding – developed into a peculiar type of architecture of the mountains. We find that an equal architecturally functional solution has evolved in traditional examples of shepherds' bivouacs which we today recognize in various areas of the mountains and among which there was no information connection. It can be deduced that the principles of the mountains-related architecture are universal whether we have in mind the mountains of Bohinj, those of the French Alps or shepherds' bivouacs in the Himalayas [Kajzelj, 2011: 5]. Within the space we recognise various forms of bivouacs in the mountain region in the areas of mountains, the so-called collective bivouacs or isolated posts. Collective mountains with their interesting and logical patterns of settlement are also an important stamp of the social life of the native population which was in many ways far more democratic than it is today, since the hierarchy of the placement of the shepherds' dwellings is only reflected in their relationship to the central cheese-producing facility [Ibid.]. Nowadays, the mountain-related architecture does not only represent a valuable and priceless example of urban culture in Slovenia but of all Alpine nations as well; through ecologically renewed social awareness the appreciation of the mountain world is growing. Their existence represents an important tourist category of modern mountain tourism which has a clearly classified evaluation of tourist objectives. The mountain-related culture and architecture (Figure 2) gain in importance for the very reason that they have emerged under extreme circumstances at the edge of civilisation and in isolation from outside world. The society generally considers that architecture and settlement culture of the mountains need to be preserved, protected from dilapidation and uncontrolled tourist activities. Even more important are the vision and decision by the society that mountains should be given a new use in terms of the requirements of modern age mountaineering and hiking tourism, since by doing so their existence in the future would be taken care of in the best possible way. A wilful change in the intended use of the abandoned bivouacs and cheese-producing facilities, i.e. change into tourist lodgings, apartments, sheltered or non-sheltered shelters, is a way to keep them alive, and in so doing we would provide mountaineers and tour skiers with accommodation, shelter or starting points for climbing the mountains at many important locations.

In order to comprehensively meet the requirements of those who use tourist routes and individually research the space, we need to continue the settlement dispersion by means of modern individual activities affecting the environment. There are two such examples within the space of the Slovenian Alps. One of them is the bivouac at Kotovo sedlo (project

by architect M. Kajzelj, 2004–05). In the immediate vicinity there is the peak of Jalovec (2645 m) which – in the Julian Alps – represents an important destination for mountain hikers and alpinists in winter and summer alike. The construction of an emergency shelter on this location is critical for the safety of mountaineers. The second such example is the bivouac at the ridge of Stol above Breginje (project by architect M. Kajzelj, 2002). The construction of this bivouac was meant as a promotion of cross-border connections of two remote areas, that is, the Terska Valley in Italy and Breginjski kot in Slovenia, as a project of small architecture at a strategic point of the network of broader tourist infrastructure.

A good example of a sustainable building, which follows the principles described above, is the Monte Rosa Hut (Switzerland) which has been designed by the Swiss Federal Institute for Technology (ETH Zürich) and the Bearth & Deplazes Architekten. The facility itself has been designed as a technologically sustainable facility (wood as the element of construction and low-energy concept) and it abides by the principles of dispersion of a built form which sustainably adjusts and takes care of better living conditions of the hikers. Since the hut is a three-hour-walk away from the civilisation it is necessary to ensure its being as self-sufficient as possible: this is why the facility is predominantly (90%) self-sufficient, it has an underground tank housing 200 cubic metres of melted snow and rainwater. "We begin by asking ourselves where everything we unthinkingly consume every day comes from. The answer is, of course, from a highly complex social space, a technologically advanced environment geared to everyday needs, and not a landscape viewed through the rose-tinted glasses of nostalgia or the romantic idyll of seemingly abandoned alpine huts, cottages in high meadows"[Deplazes, in: Nemetschek Vectorworks, Inc., 2011.]

Intertwining of dispersion and concentration as a sustainable concept of development of settlements?

In researching the notion of dispersed settlement, to wit, building block of sustainable tourism there is an important fact, namely, the fact originating in the definition itself of the contrast between the notions of dispersion and nucleation. If dispersion is based on the idea of individuality, nucleation originates in the idea of community [Fikfak, 2008]. Consequently, we can reasonably conclude that the idea of sustainable tourism takes into account the advantages of both spatial models:

- dispersion which continues in the idea of individual research of a space, and;
- nucleation which confirms the idea of living in a community as a model of sustainable development of settlement.

This duality which is enhanced by the sustainable model of settlement (in conjunction with sustainable tourism) is best illustrated and defined space-wise by the model of a dispersed hotel ("albergo diffuso").

Example of a dispersed hotel as a continuation of a traditional pattern

Where does the concept of the "albergo diffuso"– a dispersed hotel come from? Its origin can be traced back to a single dramatic event, namely the earthquake in 1976 in Friuli and in Posočje [Confalonieri, 2011]. Particularly in Friuli people began to think that the nearly uninhabited villages could serve as new tourist destinations [Ibid.]. The first experimental transposition of the "albergo diffuso"into practice was carried out by the local council in San Leo in Italy (Montefeltro). There, by restructuring old but culturally important buildings in the centre of small historical villages instead of building new tourist complexes they actualised the idea of dispersed accommodation rooms, thus upgrading the idea of building a network of tourist [Ibid.] accommodations.

A dispersed hotel as a form of a "horizontal"building encourages tourist activities and is most appropriate to be developed in smaller villages which we come across in the rural countryside and whose historic and architectural features are worth preserving. A visitor is offered to live in the village – in a hotel which offers relaxing holidays through discovering culture, tradition and events, culinary delights, sports and recreation as well as the feeling of the rhythm of life in an environment away from modern rhythms of the stresses of urban life (retreating and becoming oblivious of communication technologies). A dispersed hotel protects the cultural landscape, environment and society, the characteristics which are the main obstacles in sustainable development-oriented in space [Ibid.]. Apartments, to wit, individual accommodation entities are located in a rural environment where the rhythm of life follows the seasons in the life in a village. Space facilities are located in renewed traditional lodgings in the village cores and have a great historic and architectural value. Basically, a dispersed hotel is a single accommodation entity but with rooms that are located in different buildings across the village, usually no more than 200 m to 300 m away from the central hub. At the same time the hub serves as reception, information office and a service centre for tourists [Ibid.]. The main topic of the concept does not demand green field investments or any other type of construction [Dropulić, Krajnović et al., 2008]. It is directed towards the use of what already exists with the purpose of increasing the value of a tradition and obtaining positive economic results within sustainable development [Ibid.]. The main purpose of a dispersed hotel is that in addition to providing an advantage of the opportunity in the surroundings it unites local community through the activities the tourists perceive as brand new and interesting, thus enhancing mostly local long-term results and the satisfaction of the tourists. We can therefore conclude that this kind of model construction and preservation of traditional culture is an innovative form of hospitality that as a form of promoting sustainable development provides the possibility and the opportunity for a balanced use of local resources. Since the development of a spatial composition of this type there is no additional environmental loading with large new

complexes (housing, social, tourism, shopping, etc.) we can say that a dispersed hotel as an idea and a concept of living is adaptable to different environments and offers sustainability-oriented space opportunity of territorial development as a traditional cultural landscape widget.

Conclusion

In the area of the Alpine Space, the diversity of dispersed settlement patterns is important for further development of sustainability-oriented housing and human settlement in space, which have different activities. This has been the central role of the research into the relationship between the local community, global impacts, consumption and tourism, which is directly related to the heritage of the space and human settlement in rural countryside, in particular in the areas which are not easily accessible. Modern guidelines to a sustainability-oriented relationship towards environment are denied by mass tourism (shopping centers, sports centers, tourist agglomerates, etc.) and, consequently, uncontrolled use of space. The characteristics of the Alpine Space provide a multitude of offers: untouched nature, the abundance of natural beauty, preserved and abandoned elements of traditionally built architectural heritage, culinary delights, cultural events and similar. At the same time it unites all the elements which follow the growing diversity of sustainable offer.

Summary

"The sustainability does not define the final situation (the state of being developed) but only the circumstances to be taken into consideration in making development-related decisions ..."[Strategy of Spatial Development of Slovenia – SPRS, 2004: 8]. This thought is also the main guiding principle of the article which represents the idea of intertwining of various existing accommodation entities within the space that originate in the past and stand for an apparent novelty in modern times.

The needs and wishes of visitors and common users of wider space are unpredictably changing, guest's demands are growing, they are seeking diversity, undiscovered features etc. That is why the offer of activities to meet these demands must constantly adapt, change and take on new forms of spending leisure time. In the spirit of globalisation and glocalization a desire and demand has developed for untouched nature, cultural, historical and archaeological sites, first-hand experiences of practices and traditions of local communities, recreation and healthy living, etc.

The new spatial organization in contrast to the hierarchically closed spatial order of towns and villages is not a chaotic disorder. It is a new, complex, spatially and temporally open system where the historical sediment does not exclude introduction of new shapes. The consequence of spreading the awareness on preservation and protection of natural environment, increase of cultural sensitivity, is that settlement development in space and the expansion of settlements involves a growing attention paid to the introduction of sustainable principles.

Tourism has many other impacts on economic and social development of individual areas, which is the result of tourist consumption. New forms of leisure activities have been implemented such as alternative, green, rural tourism etc. More and more the concept of sustainable, more ethical and responsible spatial interventions is prevailing, which does not only include the issues of preserving the environment but cultural, economic and political ones as well.

The key issues in studying the development of settlement in the Slovenian Alps are as follows: How to enable – within an alpine landscape – the coexistence of traditional settlement patterns in untouched protected landscape?

How to ensure the coexistence of the traditional rural architecture and modern architecture intended for a larger number of visitors? And how can the elements be connected in the "story about attractiveness", which will serve as a foundation for preservation of traditional settlement patterns and allow the development of new forms of settlement?

In studying rural space and planning new activities affecting the environment for the purposes of sustainable development of settlement the following questions are raised: Which locations at the local level are the most important for settlement? How does the settlement process react to social change and to what degree do the sustainable principles influence the development of activities? Various forms of rural traditional settlement in the area of the Slovenian Alps represent a system which avails all the potentials for a balanced spatial development with the introduction of modern forms of sustainable activities.

The paper aims to show the idea of intertwining of various existing accommodation entities within space that originated in the past and stand for an apparent novelty in modern times. The traditional organization of settlement structure in rural space is being abandoned and adapted to a new way of living, different settlement patterns, social and demographic shift etc. In the area of the Alpine Space, the diversity of dispersed settlement patterns is important for further development of sustainability-oriented housing and human settlement while offering different and diverse leisure activities. We need to offer new forms of spending leisure time and adapt to the constantly changing demands.

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A REVIEW OF BUILDING SUSTAINABILITY ASSESSMENT METHODS

PREGLED METOD VREDNOTENJA STAVB PO NAČELIH TRAJNOSTNE GRADNJE

izvleček

Metode vrednotenja stavb po načelih trajnostnega gradnje so v svetu v uporabi že več kot dve desetletji. Njihova uporaba se je sprva le počasi širila po večjih razvitih državah, v zadnjih letih pa poteka nagel razvoj novih, regionalno prilagojenih orodij. Metode vrednotenja stavb so se razvijale na osnovi lokalnih značilnosti in zakonodaje, zato je njihova širša uporaba omejena. V članku so preučene najbolj znane mednarodne metode vrednotenja stavb BREEAM, LEED, DGNB in SBTool. S pomočjo vsebinske analize smo preučili njihov namen, potek in ceno vrednotenja, število certificiranih projektov, različice in vidike vrednotenja ter končno oceno. Rezultat je medsebojna primerjava posameznih metod. V diskusiji smo podali predvidevanja za nadaljnji razvoj metod vrednotenja stavb po načelih trajnostnega razvoja ter v sklepnem delu pregledali stanje in možnosti za vpeljavo metod v Sloveniji.

ključne besede

metode vrednotenja stavb, trajnostna stavba, BREEAM, LEED, DGNB, SBTool

abstract

Building sustainability assessment methods have been globally in use for more than two decades. Their use initially spread slowly through the larger developed countries, but in recent years we are seeing a rapid development of new, regionally adapted methods. The use of building assessment methods is limited because they developed on the basis of national legislation and local characteristics. In this article, the most important international building sustainability assessment methods BREEAM, LEED, DGNB and SBTool are investigated. With the help of content analysis we closely examine the aim, course and cost of the assessment, the number of certified projects, different assessment schemes, aspects of evaluation and the final certificate presentation. The result is a mutual comparison of individual assessment methods. In the discussion we present some predictions for the further development of building sustainability assessment methods. In the final part we review the situation and the possibilities for the implementation of these methods in Slovenia.

key words

building assessment methods, sustainable building, green building, BREEAM, LEED, DGNB, SBTool

Introduction

The primary role of building sustainability assessment methods is to verify and present the building's characteristics with the use of selected and verifiable standards. A building is assessed on the basis of an extensive selection of criteria from various domains which try as best they can to keep to the goals and principles of sustainable development by taking into account environmental, economic and social aspects.

There are different reasons behind the development and use of these assessment methods. In the first place, there is the demand for a public and transparent recognition of the quality of projects showing good practise. As construction legislation only prescribes minimal demands, projects that surpass these legally prescribed standards and are therefore of a higher quality are not rewarded. With the use of building assessment methods it is possible to evaluate the actual quality of the project [König et al., 2010: 96]. The other reason in favour of building assessment is greater ecological awareness of investors and familiarity with the negative potential of buildings. In their complete life cycle, buildings have a large influence on the environment due to their use of raw materials, the creation of waste and emissions. Buildings use 40 % of total final energy in the EU for their functioning alone and also produce a similar portion of greenhouse gas emissions. Buildings use 30 % of raw material sources and 20 % of water. Buildings are responsible for the creation of 30 % of waste [Eurostat, 2012; Lowe & Ponce, 2008: 8]. There are an increasing number of warnings from scientists and experts concerning the reaching and surpassing of our planet's limits as a result of human activity (Rockstroem et al. 2009). The key problems connected with this are climate change, atmospheric aerosol loading, water use, the depletion of the ozone layer, chemical pollution and the loss of biodiversity. According to the Intergovernmental Panel on Climate Change (IPCC, 2007: 36-41), human activity and the emission of greenhouse gases since the industrial revolution are the most probable reasons for the acceleration of climate change and the appearance of extreme weather phenomena. The use of building assessment methods encourages a reduction in the negative effects of buildings on the environment and also has other advantages [Ebert et al., 2011: 24]:

- demands represent planning guidelines and help investors specify the desired building quality when the project is being tendered;
- the quality of living in the building is improved;
- the building incurs smaller expenses in its entire lifecycle;
- there is greater transparency in the planning process;
- the market value of the building is greater due to the proven quality;

- the quality of different buildings can be compared on the basis of the final evaluation.

Comprehensive building assessment methods have been effectively in use abroad for over two decades while in Slovenia a practically useable method does not yet exist. The purpose of this article is to examine the current situation in the field of comprehensive building assessment globally and in Slovenia. We present the development of methods on a global level and undertake a comparison of the more recognised ones. We examine the situation and the possibilities for introducing and developing building assessment methods in Slovenia.

The development of different methods

The first widely used building assessment method is the BREEAM method, which was developed in 1990 in the UK. It focused above all on the assessment of the building's influence on the environment and the use of energy. It belongs to the methods of the first generation. The Green Building Challenge 98 also belongs to this group. It was the first attempt to develop a comprehensive assessment method from which the GBTool method later developed. Another important first generation method is the American LEED, which is globally the most widespread; then there is the Japanese CASBEE, the Australian GREEN STAR and the French HQE. A building assessed with the help of first generation methods is defined as a so-called green building.

Second generation assessment methods (LEnSE, DGNB), which have been developed in recent years, deal with the building in its entire lifecycle and also include economic, socio-cultural and technical aspects. With the inclusion of more aspects in the process of assessment the building is defined as a so-called sustainable building (fig. 1).

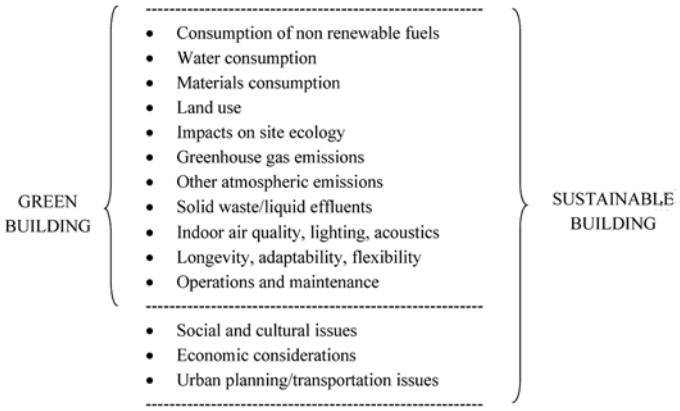

Figure 1: Aspects of assessment in first generation green building methods and in second generation sustainable building methods [Lowe & Ponce, 2008:11].
Slika 1: Vidiki vrednotenja pri metodah prve generacije za zeleno stavbo in pri metodah druge generacije za trajnostno stavbo [Lowe & Ponce, 2008:11].

Most building assessment methods are based on already existing methods, which have been upgraded or adapted to the circumstances and regulations in individual countries. Methods are adapted to the countries in which they have been developed as they follow national legislation, climate conditions, level of development and the economic status as well as other characteristics. There are large differences between them so the use of a method outside its home country is usually limited [Cole, 2010: 125].

In order to help understand the way building assessment methods have developed, we have presented an overview of the current situation in the form of a table (fig 2). The methods that have been developed on the same basis are marked with the same pattern. On the left-hand side is written the name of the country in which the building assessment method was developed and is in use. The coloured bands feature the name of the method with the date on which it was first used and the years in which the methods underwent important updates. For some methods, the names of countries in which the basic method was adapted for use in the assessment of buildings are listed under the band.

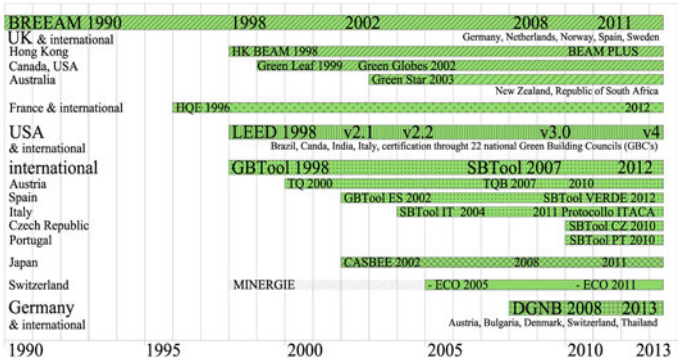

Figure 2: Table showing the development of building sustainability assessment methods.
Slika 2: Preglednica razvoja metod vrednotenja trajnostnih stavb.

During the building assessment process, individual criteria are given points, thereby producing a comprehensive final score that is simple to understand. On the basis of the final score, the building is classified in a certain class of demands that have been met and it is given a simple and recognisable certificate: e.g. a golden sign. The final presentation of the assessment result is important from the point of view of the building's promotion for the investors, as a quality guarantee for customers or users, for verification of the fulfilment of assessment demands for researchers and planners, as well as for determining the value of the property [Lützkendorf et al., 2011]. The use of assessment methods and certification of a building is usually done on a voluntary basis. In some countries, buildings that have been publically financed must be certified. In Germany, a method has been developed whose purpose is to assess new public buildings and this has helped improve their quality.

The costs of assessing buildings are different depending on which method is used, but they depend more precisely on:

- the cost of registering and certifying the project which depends on the type and size of the project;
- the cost of hiring a certified assessor or advisor to carry out the assessment and possible further analyses necessary for assessment (LCA, LCC, environmental report, Blower door test etc.);
- additional investment costs due to the quality of construction which differs from the legally prescribed

standards in comparison to a conventional building (e.g. higher energy efficiency, more efficient built-in mechanical equipment etc.).

International standardisation

Due to the existence of various different building assessment methods and the use of different criteria, the International Organization for Standardization (ISO) and the European Committee for Standardisation (CEN) several years ago began the international standardization of the field. This involves preparing a common basis for methods of assessing sustainable buildings. In this way they will also define more clearly the concept of a sustainable building [Mateus & Bragança, 2011: 1964]. In the past few years they have prepared several standards in the field of building assessment and their influence on the environment:

- standards of the ISO/TC 207 group: Environmental management which define environmental management, environmental signs, LCA and guidelines for environmental assessment [SIST, 2013a];
- standards of the ISO/TC59/SC17 group: Sustainability in buildings and civil engineering works which deal with the assessment of buildings and construction works according to the principles of sustainable development [ISO, 2013] and
- some of the prepared standards of the group CCEN/TC 350 - Sustainability of construction works [SIST, 2013b]

Standardization in the field of building assessment has not been completed as not all of the aspects of assessment have been defined.

Research projects

The aspiration to unify the definitions of different indicators, which form criteria and prepare a common basis for the methods of building assessment was responsible for connections between the institutions, which developed the methods and the research institutions. As part of various EU research projects in the past few years, new methods are being developed, which would build on the experiences of the existing and already prepared international standards to present a common methodology for further development [Lützkendorf et al., 2011]. Some of the more significant projects include:

- the LEnSE project (completed in 2007), in which a second generation method for building assessment was developed;
- the Enerbuild project (completed in 2012), in which tools for measuring the energy efficiency of buildings and a method for building assessment in the Alps were developed;
- the SuPerBuildings project (completed in 2012), in which indicators for the assessment of buildings were chosen according to the principles of sustainable development;
- the Perfection project (to be completed in 2013), in which indicators were chosen which deal with the quality of the internal environment in buildings in a comprehensive way;
- the Open House project (to be completed in 2013), in which a common European method of building assessment is being developed which takes into consideration the latest know-how and international standards. After the Open House project is completed, all the cooperating partners (including the Building and Civil Engineering Institute ZRMK and the Construction Cluster of Slovenia) will have access to tools developed in the project.

The main building assessment methods

We will now take a closer look at four of the most recognised building assessment methods in the western world, i.e. BREEAM, LEED, DGNB and SBTool. The methods have numerous similarities but nevertheless differ in various respects. They differ in the way assessment is carried out and the way information is prepared, the legal obligation for certification, the criteria dealt with and their share in the final score, the cost of certification and the possibilities of assessing different building types and different planning stages. The most widespread method is LEED with over 13,000 certified buildings and it is followed by BREEAM with over 4,200 buildings. Over 180 buildings have been certified with the DGNB method, which is the youngest. Assessment costs are lowest for the BREEAM method and the highest for the DGNB method. The estimated assessment cost that is given is based on the analysis of the assessment of newly built commercial buildings sized 6,000 – 9,000 m2, so it is necessary to emphasise that these are different for every project and depend on the size of the building, its intended use and the complexity of the project etc. Table 1 shows the main characteristics of different tools. Further down we present the course and costs of assessment for each of the methods that are dealt with, as well as different versions of the method, aspects of assessment and the final score.

building assessment method	BREEAM	LEED	DGNB / BNB
introduced in	1990	1998	2008
country	United Kingdom (UK)	USA	Germany
preparation of information	project leader, client or authorised assessor	project leader, client or authorised assessor	project leader, client or authorised assessor
assessment performed by	authorised assessor	USGBC	authorised assessor
certifying body	BRE Global	USGBC	DGNB / BMVBS
form	voluntary	voluntary	voluntary / compulsory
no. of certified buildings	> 4,200	> 14,000	> 180
no. of pre-certified projects	/	/	> 230
no. of registered buildings	/	> 41,000	> 700
no. of certified / registered residential units	> 200,000 (certified) > 1,000,000 (registered)	> 21,000 (certified)	/
no. of certified / registered residential projects	> 15,000	> 8,100	/
assessment scale (points)	sufficient (≥ 30), good (≥ 45), very good (≥ 55), excellent (≥ 70), outstanding (≥ 85-110)	certified (≥ 40), silver sign (≥ 50), gold sign (≥ 60), platinum sign (≥ 80-110)	bronze seal (≥ 50), silver seal (≥ 65), gold seal (≥ 80-100)
categories and their share in the final score	management (12 %) health and wellbeing (15 %), energy (19 %), water (6 %), transport (8 %), materials (12.5 %), land use and ecology (10 %), pollution (10 %), innovation (+ 10 %)	location and transportation (16 %), sites (10 %), water efficiency (11 %), energy and atmosphere (33 %), materials and sources (13 %), indoor environmental quality (16 %), innovation (+ 6 %), regional priority (+ 4 %)	environmental quality (22.5 %), economic quality (22.5 %), socio-cultural and functional quality (22.5 %), technical quality (22.5 %), quality of the process (10 %), quality of the location (separate)
cost of certification and registration	ca 1,000 – 2,000 EUR	ca 2,500 – 21,000 EUR	ca. 3,000 – 25,000 EUR
total assessment costs	ca 5.4 EUR/m^2	ca. 6 EUR/m^2	ca. 10 EUR/m^2
pre-certificate	possibly	possibly	✓
new construction	✓	✓	✓
renovation	✓	✓	✓
in-use	✓	✓	✓

Table 1: A comparison of different building assessment methods [Sources: Moro 2011; König et al., 2010: 99; Reed et al., 2009; BRE Global, 2013a; DGNB, 2013; USGBC, 2013; Birgisdottir & Hansen, 2012].
Tabela 1: Preglednica metod vrednotenja stavb [Viri: Moro 2011; König et al., 2010: 99; Reed et al.; 2009, BRE Global; 2013a; DGNB, 2013; USGBC, 2013; Birgisdottir & Hansen, 2012].

BREEAM - Building Research Establishment's Environmental Assessment Method

The British BREEAM method is the oldest building assessment method. It was developed by the Building Research Establishment (BRE) and has been in use since 1990 [Kajikawa et al., 2011: 236]. The latest version of the method, which also takes into account the latest standards regarding the sustainability of buildings CEN/TC 350, is BREEAM 2011 [BRE Global, 2013a]. The BREEAM method served as the basis for the preparation of numerous other assessment methods that have now become quite widespread in the world [Fowler & Rauch, 2006: 3; Ebert et al.: 25]: HQE (France), LEED (ZDA), Green Globes (Canada), CEPAS, Green Star (Australia), HK BEAM (Hong Kong), Green Building Rating System (South Korea).

Assessment procedure

A building is assessed with the help of an independent authorised assessor. The investor can decide to assess the building while it is already in the planning stage or even after it has already been built. Assessment in the planning stage is more effective as the project can be improved in cooperation with the assessor but it only leads to an interim BREEAM certificate. In order to acquire the final certificate it is necessary to carry out the second part of the assessment after construction has been completed. In order to ensure as good a result as possible BRE Global proposes to include the assessor in as early a phase of the preparation of the project as possible – when the goals of the project are being defined.

Number of certified projects

Ever since the BREEAM method was first used, over 4,200 projects have been certified in Europe [Ciampa & Hartenberger, 2012: 3]. On the web register Greenbooklive [BRE Global, 2013b] it is possible to see a list of all the buildings that have been certified since 2008. It features over 3,700 certified projects. Globally, over 200,000 units in over 15,000 projects have been certified according to the BREEAM method, but this includes projects certified through the scheme BREEAM Eco-Homes (nowadays in use under the name Code for Sustainable Homes), which was ttaken over by the public authority and is compulsory for certifying social housing projects.

Assessment schemes

Different assessment schemes have been developed for the needs of assessing different types of building [BRE Global, 2013a]:

- new construction: a scheme for assessing new non-residential buildings;
- refurbishment: a scheme for assessing the renovation of a building;
- in-use: a scheme for assessing a building that is in use;
- eco-homes: scheme for certifying residential buildings;
- communities: scheme for assessing larger scale projects comprising a whole neighbourhood in the planning phase;
- adapted schemes: meant for the assessment of buildings outside of the UK (office and commercial buildings in Europe; buildings in the Gulf states;
- international agreement: a scheme that can be adapted for the assessment of projects anywhere in the world.

In cooperation with local partners they also developed local variants of the BREEAM building assessment method in the Netherlands, Norway, Sweden, Germany and Spain.

Assessment categories

The BREEAM method assesses the fulfilment of demands for almost fifty different criteria (BREEAM New Construction scheme), which are arranged in ten categories:

- management – the whole process of managing and also preparing the project;
- health and wellbeing – criteria connected with the domestic environment;
- energy – the efficient use of energy;
- transport – criteria connected with public transport and location;
- water – efficiency of water use;
- materials – influences on the environment of the building's materials throughout its lifecycle;
- waste – efficiency in the reduction of waste connected with energy use, materials and processes;
- health and wellbeing – influence on the environment, biotic diversity and degraded zones;
- pollution – factors connected with the pollution of air and water;
- innovation – the ability to find new solutions.

Final score

The final score is the sum of the credits attained in individual categories. Depending on the number of points attained, the building is ranked in one of the following quality groups: pass (30-44 points), good (45-54 points), very good (55-69 points), excellent (70-84 points) or outstanding (85-110 points). A building, which achieves a score of excellent or outstanding, can be considered to be an example for future planning and construction of new sustainable buildings and is therefore presented to the broader public. However, the end of the construction phase does not yet mean that the building will also be used in an efficient way with minimal effects on the environment. Every new building needs several years for the most efficient functioning of technical systems and the building's optimal manner of use to be determined. Due to the optimisation of the building's functioning and the spreading of know-how concerning sustainable construction, a building that has been graded excellent or outstanding must after three years of use again be assessed according to the scheme BREEAM In use, otherwise its grade is lowered by one level.

LEED - Leadership in Energy and Environmental Design

The LEED method for assessing green buildings is in use in the largest number of different countries. It was developed in 1998 by the U.S. Green Building Council (USGBC), which is responsible for it. It is used in its original form in the USA and Canada, and in an adapted form in Brazil, Argentina, Mexico, Italy and India. Through the intermediary of local associations for green building (Green Building Council - GBC) it is present in more than 20 countries in the world [Cole, 2010: 126; Augenbroe & Malkawi, 2009: 73].

Assessment procedure
Assessment is carried out by an independent, non-profit institute for the assessment of green buildings, the Green Building Certification Institute (GBCI). The involvement of an authorised LEED expert is not compulsory, but nevertheless secures an extra point. The role of the authorised expert is to advise the client in his planning and to help prepare evidence as part of the certification process. In the beginning it is necessary to choose a variant of the method according to which the project will be assessed and to register it. The completed forms are then submitted to the GBCI, which then carries out the assessment and issues the final certificate [Kajikawa et al., 2011: 237].

Number of certified projects
By July 2013 there were 54,300 projects in over 135 different countries that had been registered with the LEED method, and over 14,000 of them have been certified [USGBC, 2013].

Assessment schemes
The last valid version of the LEED method, v.4 (2013), contains 5 variants depending on the type of project and can be applied to specific types of building:

- building design and construction:
- interior design and construction;
- existing buildings: operations and maintenance;
- neighbourhood development;
- homes – detached houses and small apartment projects.

Assessment categories
The assessment criteria are set out in eight different categories.

- location and transportation – properties of the location, proximity of services and transport possibilities;
- sustainable sites – preservation of habitat and biotic diversity of the land;
- water efficiency – economical water use, the use of effective appliances and raising the awareness of users;
- energy and atmosphere – energy efficient use of appliances within the building, the building itself and its location, and the economical use of renewable energy sources;
- materials and resources – a selection of materials, their renewed use and waste;
- indoor environmental quality – air, light, sound and the possibility of operating with appliances;
- innovation – promotion of innovations, the surpassing of LEED demands and the involvement of an authorised LEED expert;
- regional priority – the fulfilment of demands that are specific to the region.

Final score
Depending on the number of points gained in relation to the criteria, the building is given a rating in one of the four quality classes: classified (40-49 points), silver (50-59 points), gold (60-79 points), platinum (80-110 points). Information concerning the rating can be acquired in the planning phase but the final assessment and presentation of the certificate is carried out only after construction is completed. If assessment is carried out according to the LEED New Construction: Core & Shell scheme, it is possible to acquire a preliminary certificate for the purpose of marketing the project while the building is still in its planning phase.

DGNB - Deutsches Gütesiegel Nachaltiges Bauen
Together with the Federal Ministry of Transport, Building and Urban Development (Bundesministerium für Verkehr, Bau und Stadtentwicklung - BMVBS) the German Sustainable Building Council (Deutsche Gesellschaft für Nachhaltiges Bauen - DGNB) has prepared a method of building assessment that was described in 2008, when it was presented, as a second generation assessment method. The method addresses the building's entire lifecycle and does not assess only the operational phase [König et al. 2010: 101; Eberl, 2010: 2]. The assessment method focuses on environmentally friendly and energy efficient buildings that help preserve natural resources and ensure a high level of well-being for its users. Two versions of the method are in use: the building assessment method DGNB (Deutsches Gütesiegel Nachaltiges Bauen) for general use and the method for assessing buildings that are owned by the state BNB (Bewertungssystem Nachhaltiges Bauen für Bundesgebäude). The method was developed for the German building sector so it is based primarily on German standards and technical directives. In 2010, the DGNB International scheme was prepared with the intention of making the trademark present internationally. This scheme complies with EU regulations and standards [Hardziewski & Wallbaum, 2011: 32]. With the help of local agencies it has been adapted for use in Austria, Switzerland, Bulgaria and China; they also cooperate with representatives in other countries. It is possible to have a building assessed in Slovenia according to the DGNB method through an authorised Slovenian assessor [Green Building Council Slovenia, 2013].

Assessment procedure
In order to have an assessment carried out, the client must hire an authorised DGNB assessor who will first register the building. Together with the client they first determine the goals of the project – this should take place as early on as possible in the planning phase due to the increased possibility of attaining a greater quality of building and a better final score in the assessment. In the planning phase it is possible, upon assessment, to acquire a preliminary certificate for the purposes of marketing the project. The final certificate is acquired after the building is completed and after a positive review of the demanded assessment documentation at DGNB [Eberl, 2010: 2].

Number of certified projects
In the register of certified DGNB buildings which is freely accessible on the DGNB website [DGNB, 2013], over 750 projects globally had been registered with the DGNB method by July 2013. Of these, 235 have a preliminary-certificate and 200 have the final certificate.

Assessment schemes
Ever since 2008, when they began with a scheme for assessing

newly built commercial and office buildings, the system was expanded and now also has other schemes [DGNB, 2013]:

- existing buildings: commercial and office buildings, retail buildings, industrial buildings, apartment buildings;
- new construction: commercial and office buildings, the refurbishment of commercial and office buildings, buildings meant to house educational activities, retail buildings, hotels, industrial buildings, hospitals, laboratories, buildings to be let out, apartment buildings (at least units), small apartment buildings (up to 6 units), buildings for large events;
- urban districts: greater build areas, industrial zones, commercial zones.

Assessment categories

In six assessment categories it covers aspects of sustainable building with 42 criteria [DGNB, 2013]:

- environmental quality – the effect of the building on the environment is assessed as part of its whole lifecycle. Testing for greenhouse gas emissions, the use of primary energy, water consumption, effects on the environment and the use of land;
- economic quality – is assessed on the basis of an analysis of the building's costs throughout its lifecycle (LCC analysis). Emphasis is on the reduction of the building's costs and on preserving the value of the property;
- socio-cultural and functional quality – involves the assessment of the effect on the well-being and health of the users, functional characteristics and the design quality of the project;
- technical quality – involves the assessment of the building's various technical characteristics: protection against fire and noise, quality of the building's shell, ease of cleaning and maintenance, the possibility of straightforward removal, recycling or depositing of parts of the building;
- quality of the process – it is the quality of the planning and construction processes that is assessed. The primary goal is the integration of standards of sustainability in as early a phase of planning as possible, and compliance with the principles of sustainable procurement and construction;
- quality of the location – assessment of access to public transport, the proximity of important buildings and supporting services, and the appearance of the neighbourhood in which the building is located. The quality of the location is assessed independently.

Final score

Depending on the final score achieved, a certificate or seal of sustainable building is given at three possible levels: bronze seal (over 50 %), silver seal (over 65 %) and a gold seal (over 80 %).

SBTool – Sustainable Building Tool / GBTool – Green Building Tool

The SBTool method for assessing sustainable buildings, the successor of the GBTool method for assessing green buildings, has been set up by an international non-profit organisation called International Initiative for a Sustainable Built Environment (iiSBE). The organisation, whose headquarters are in Canada, brings together experts and groups active in the field of sustainable building from more than 25 countries. It strives to create a forum for the exchange of information in the field of sustainable building and prevent the repetition of work that has already been done and the setting up of common assessment standards [iiSBE, 2013]. The method for building assessment they have developed has been in a state of constant development since 1996. In 2005, the method's name was changed from GBTool to SBTool, with which they wanted to emphasise the inclusion of social and economic aspects in assessment [Augenbroe & Malkawi 2009: 71]. In contrast to the other assessment methods, SBTool / GBTool was not meant for use on the market but above all for use by researchers in preparing local assessment methods and the development of the methodology of building assessment. In the Green Building Challenge competition researchers and national groups met generally once every two years and presented their adjustment of assessment methods to local circumstances and their application to projects. In this way they stimulated the exchange of know-how and experience in the field of developing methods of building assessment [Kajikawa et al., 2011: 238].

The method is devised in such a way that it can be adapted to regional conditions such as climate, materials and construction technology while retaining a common structure and assessment terminology which allows international comparison. In developing the latest version of the SBTool method in 2012 they complied with the international ISO and CEN standards that had already been issued in this field [iiSBE, 2013]. An adapted version of the method has been developed in recent years in a number of different countries: in Italy the Protocollo ITACA, in Spain SBTool VERDE, in the Czech Republic SBTool CZ and in Portugal the SBToolH PT method [Berardi, 2011], which shows that it is possible to adapt the method to the local situation.

Assessment schemes

The method can be used in different phases of the project [iiSBE, 2013]:

1. project preparation phase: evaluation and choice of the most suitable location;
2. the planning phase: the project is assessed on the basis of plans and documents;
3. building phase;
4. operational phase: assessment of building in operation, at least 2 years after its completion.

Assessment categories

The method contains over 100 defined criteria. The method also enables basic assessment with over 50 criteria and simplified assessment that takes into consideration only 15 key criteria. The scope of the assessment depends on size, how complex the building is and on individual decisions. The criteria are arranged in 8 categories:

- site regeneration and development, urban design and infrastructure – accessibility of services, regeneration of the building plot, urban design and infrastructure;
- energy and resource consumption – non-renewable energy sources, materials, water;

- environmental loadings – emissions of greenhouse gases, waste, effect on the creation of urban heat island;
- indoor environmental quality – air, lighting, sound;
- service quality – security, functionality, effectiveness and control over appliances;
- social, cultural and perceptual aspects – privacy, accessibility for physically handicapped persons, heritage;
- costs and economic aspects – costs of construction, operation, maintenance; accessibility to customers.

Final score

The number of points allocated to an individual indicator is based on a comparison of the building that is being treated and a conventional building in the local environment. In the event of a result that is lower than a conventional building, the score for an indicator is -1, if the values of the two buildings are similar then the score is 0, if the value is higher the building gains 3 points and if it is exemplary then it gains 5 points. Points gained for different indicators are added together in the proportions of the final score they make up. The quality ratings are defined on the basis of the final score.

Comparison of assessment methods

The result of the study is a comparison of selected building assessment methods. We wanted to prepare the analysis on the basis of the latest developments in this field. As a framework for comparison we therefore took the Open House method, which is being prepared by a number of international partners and which takes into consideration the latest results from the process of standardisation. As a second generation building assessment method it comprehensively assesses the building's effects throughout its lifecycle and covers all relevant fields of sustainability. The Open House method contains 6 categories:

- environmental aspect – effects on the environment, energy use, materials, waste and water use;
- social aspect – functional, cultural and design criteria, quality of the interior environment and effects on health;
- economic aspect – costs connected with the building throughout its lifecycle, the value of the property and the possibility of marketing;
- technical characteristics – protection against fire, the durability of the surfaces and maintenance, resistance to weather;
- process and management – procedures for planning, procurement, construction and the building's operation;
- location – the possibility of public transport, proximity of other services and the characteristics of the neighbourhood.

We compared the latest versions for assessing newly constructed buildings with different systems: BREEAM 2011 New Construction Offices, LEED v.4 Building design & Construction, DGNB New Office and administrative building 2012 and SBTool 2012 Medium Assessment. We placed the individual criteria for each method in the most relevant category according to the Open House project. In this way we were able to compare how much an individual category contributed to the final score (tab. 2).

category	BREEAM	LEED	DGNB	SBTool
environmental aspect	58.3 %	60.0 %	22.5 %	67.3 %
social aspect	21.5 %	17.0 %	22.5 %	23.6 %
economic aspect	1.6 %	0.0 %	22.5 %	1.9 %
technical characteristics	4.6 %	2.0 %	22.5 %	5.1 %
process and management	10.4 %	12.0 %	10 %	2.1 %
location	3.6 %	10.0 %	separate	separate
total	**100.0 %**	**100.0 %**	**100.0 %**	**100.0 %**
additional points	+ 10.0 %	+ 10.0 %	/	/

Table 2: Comparison of the share of categories in the final score based on the Open House project.
Tabela 2: Primerjava deležev kategorij v končni oceni po projektu Open House.

In comparing the shares of different categories in the final score of the assessment it was found that despite the latest modifications there is still a noticeable difference between methods of the 1st and 2nd generation. BREEAM, LEED and SBTool put the greatest emphasis on environmental aspects - around 60 % of the final score. The economic and technical aspects have almost no influence on the final score. With DGNB, on the other hand, all the categories, except for process and management, are equally weighted and make up 22.5 % each. There is also a difference in the assessment of the location and additional points which are part of the final score in BREEAM and LEED, while in DGNB and SBTool the location is assessed separately and there are no additional points. For a clearer demonstration of the shares of points in different assessment categories we have prepared a graphical representation (fig. 3).

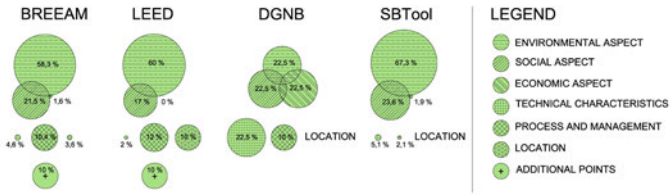

Figure 3: Graphical representation of the shares of individual categories in different building assessment methods.
Slika 3: Grafični prikaz deleža posameznih kategorij pri metodah vrednotenja stavb.

The analysis of the shares of individual categories does not yet tell us which criteria have been dealt with in individual categories so we have prepared another analysis to help better understand the similarities and differences between the assessment methods. We have based this analysis on the previous one on methods of building assessment [Ebert et al., 2011: 97], and have added to it the SBTool 2012 Medium Assessment method. We verified which criteria are dealt with during assessment and which are not (tab. 3).

We discovered that the DGNB method covers the largest stretch of criteria but does not include assessment from the point of view of preservation of biotic diversity, protection of the natural environment on the plot of land, some criteria connected with meters and electrical appliances and the direct rewarding of innovations. The LEED and BREEAM methods have deficiencies in the coverage of some economic, social, functional,

design and technical criteria. The propositions of the SBTool method cover a broader spectrum of aspects of the assessment of sustainable buildings than the LEED and BREEAM methods but nevertheless fail to include design criteria and the criteria of the processes of planning, construction and ordering.

categories	criteria	BREEAM	LEED	DGNB	SBTool
environmental aspect	strain on the environment / pollution	✓	✓	✓	✓
	materials / sources	✓	✓	✓	✓
	waste	✓	✓	✓	✓
	water	✓	✓	✓	✓
energy aspect	CO_2 emissions	✓	✓	✓	✓
	efficiency of energy use	✓	✓	✓	✓
	renewable energy sources	✓	✓	✓	✓
	energy efficiency of the building's outer layer	✓	✓	✓	✓
	technical equipment of the building		✓	✓	✓
	control over energy use	✓	✓	✓	✓
	intermediate counters and meters	✓	✓		
	equipment with electric appliances	✓	✓		✓
economic aspect	building's costs throughout its lifecycle	✓	✓	✓	✓
	preservation of the property's value			✓	
socio-cultural aspect	security and safety	✓	✓	✓	✓
	accessibility to physically handicapped persons	✓		✓	✓
	regional and social aspects	✓	✓	✓	✓
	possibility of control by user	✓	✓	✓	✓
functional aspect	effective use of space			✓	✓
	possibilities for rearrangement			✓	✓
design and innovation	architectural quality			✓	
	inclusion of art			✓	
	innovation	✓	✓		
technical aspect	fire safety			✓	
	quality of the exterior	✓		✓	✓
	cleaning and simplicity of maintenance			✓	
	resistance to the effects of weather			✓	✓
process	planning process	✓	✓	✓	
	course of construction work	✓	✓	✓	
	ordering	✓	✓	✓	
	operation	✓	✓	✓	✓
location	micro-location	✓	✓	✓	✓
	traffic connections	✓	✓	✓	✓
	comfort for cyclists	✓	✓	✓	✓
	neighbourhood	✓	✓	✓	✓
	possibility of extensions			✓	
	use of space	✓	✓	✓	
	protection of nature and the building plot	✓			✓
	biodiversity	✓	✓		✓

Table 3: A comparison of included criteria in BREEAM, LEED, DGNB and SBTool methods [extended and edited from Ebert et al., 2011: 97].
Tabela 3: Primerjava vključenosti kriterijev pri metodah BREEAM, LEED, DGNB in SBTool [dopolnjeno in prirejeno po Ebert et al., 2011: 97].

Discussion

Methods of building assessment are currently in a transitional phase. Most of the existing first generation systems will have to include additional aspects of sustainability, above all economic and technical criteria, as this is foreseen by emerging international standards [Lützkendorf et al., 2011]. Second generation methods are more demanding as assessment must include the Life-Cycle Assessment (LCA) and the Life-Cycle Cost Analysis (LCC). Usually this includes the phases of acquisition of raw materials, production of materials, construction and operation of the building during a period of around 50 years. This allows a more precise and reliable comparison than first generation methods. To create an analysis it is best to use local databases concerning materials and products; under certain conditions it is also possible to use foreign databases. Meanwhile, it is necessary to bear in mind that they contain information that has been prepared on the basis of local conditions from which the materials and products originate. However, these may differ depending on which country or region they come from. The best known databases in Europe are the Swiss Ecoinvent and the German Ökobau.dat and GaBi [König, 2011: 86]. In Slovenia we do not yet have a materials database [Šijanec Zavrl, 2010: 30]. The Slovenian National Building and Civil Engineering Institute has begun a project to prepare an Environmental Product Declaration (EPA), which will enable the use of LCA data for materials and products in Slovenia.

In some European countries, methods for assessing sustainable buildings have not yet been developed but the need for this is growing. Private investors are particularly keen for the development of such methods as the acquisition of a certificate makes it easier for them to market a property and prove that they are bound to the goals of sustainable development. In the context of public procurement, the state would also like to acquire projects that are of as high a quality as possible and to be an example to others in the field of sustainable building. The introduction of a building assessment method can take place in a number of different ways. Some countries are targeted by assessment methods that have a program of international expansion (e.g.: LEED, BREEAM, DGNB), and they are helped by local green building councils (GBC). In these cases individual demands in a method are adapted to local conditions. Some countries are developing their own building assessment methods by financing national research projects at universities and other research institutions. These assessment methods are mainly based on adapting the SBTool method or setting up a completely new method following the prior analysis of existing methods. This can lead to the creation of practically applicative methods (Portugal, the Czech Republic). The third way is being developed by international research projects, which aim to prepare a common framework for building assessment in a broader area (e.g. Open House, Enerbuild). These are also supposed to enable the adaptation of individual criteria and parts of different aspects to the final score, depending on the particularities of countries or regions. At the same time they are supposed to ensure that development partners possess all the other necessary tools and databases for the assessment. This would enable the continued development or use of a method in the local area after the research project is no longer being financed. It also occurs that in some countries (e.g. Austria, Italy, Bulgaria, Switzerland) a number of different international methods are in use because the local methods of comprehensive assessment have not been recognised or have not yet been developed. There have also been cases when the client has demanded a more sustainable building and so projects have been optimised and assessed with several methods.

In Slovenia it is possible to certify a building with internationally recognised tools (LEED, BREEAM, DGNB), however, this is not being done. There are a number of reasons for this. The majority of clients are not yet familiar with the field of sustainable construction and there is a lack of authorised experts that can carry out assessment according to an individual method. The greatest obstacle is verifying the criteria from different

methods as they are based on the regulations and laws of foreign countries.

Slovenia does not have its own comprehensive building assessment method. In 2006, the building and civil engineering institute ZRMK prepared the groundwork for the assessment of buildings containing apartments as part of a project entitled Mark of Quality in Construction, but due to the lack of financial means the project was not finished [Šijanec Zavrl et al. 2009; ZKG, 2012]. Another step in this direction is the recently adopted Green Public Procurement Order [ZeJN, 2012] and the building's "Energy performance certificate", however, these do not offer a comprehensive analysis of the building's quality. In the face of the challenge of how to improve the quality of buildings in Slovenia and the increased interest of investors for the assessment of buildings, it would be worth introducing a comprehensive building assessment to Slovenia. There are at least three possibilities for preparing a method for building assessment in Slovenia:

a) The development of a new building assessment method

As some other countries, which are comparable with Slovenia, have shown, it is possible to successfully develop a new building assessment method, which is based on already recognised models and is adapted to local conditions. It is crucial that we take into account the specific characteristic of the Slovenian environment while at the same time retaining common international indicators in the method. In some countries they have prepared their own methods by using the SBTool method as a guide. This has usually taken place within the framework of research or university institutions. The development of a new method is the most difficult task so in order for it to be done successfully a number of different experts would have to cooperate on the project and it should have suitable support from the state.

b) Further development of the Open House project

A good way of acquiring a building assessment method would be to continue to develop the Open House project, on which the Slovenian ZRMK and Construction Cluster of Slovenia are already cooperating. The method builds on existing assessment methods by respecting the latest international standards. This project also includes the development of supportive tools for assessment, which would facilitate the implementation of this method.

c) Use and adaptation of the DGNB method

In practise the DGNB method has proved to be of a good quality and has been well received. With the inclusion of the LCA and LCC analyses it makes use of the latest approaches in building assessment, is more precise than the other methods while at the same time being the most demanding and the most expensive to use. Unlike LEED and BREEAM, it covers the broadest spectrum of aspects of sustainable building and treats them on an equal basis. The DGNB method is also suitable for the Slovenian environment as it is based on DIN and EU standards, which means it can easily be adapted.

The choice of assessment method should be based on the expert opinions of different institutions and it would also make sense to include the legislator. For the successful implementation of assessment methods in the planning process it is also a recommended to have support and promotion from, for example, the Chamber of Architecture, the Chamber of Engineers and the Ministry of the Environment and Spatial Planning. It would be meaningful to integrate the prepared method into a system of public procurement as this would also give an example to the private sector.

Conclusion

Sustainable building assessment methods have shown how useful they are in creating new environmental paradigms [Conte & Monno, 2011]. With the help of clearly set out criteria of sustainable building they promote and lead to the fulfilment of international agreements to reduce energy use and greenhouse gas emissions, as well as promoting higher quality building with a greater comfort of living for users and lower costs throughout the building's lifecycle. Current trends and efforts in the EU and around the world show that in future the use of methods for assessing buildings according to the principles of sustainability will be increasingly important or even compulsory for certain projects (public procurement). In future we can also expect powerful tools for the rationalisation of the assessment process. Digital tools that are being developed on the basis of BIM (Building information modelling – computer planning with 3D objects that contain additional information; e.g. Archicad, Revit) and their integration with product databases and other tools, enable relevant indicators of how the building affects the environment throughout its lifecycle to be overseen in parallel. Building assessment according to the principles of sustainable development will be necessary in future and will become part of the planning process [König et al., 2010: 96-102], as it has become evident that it is most effective in this way. In future, research work in the field of comprehensive building assessment will focus on the preparation of methods that will be adapted to individual countries or regions and the preparation of local product databases that will be necessary for this.

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iz recenzije / *reviewer notes*

Članek z naslovom "PREGLED METOD VREDNOTENJA STAVB PO NAČELIH TRAJNOSTNEGA RAZVOJA" predstavlja pregledni znanstveni članek s področja vrednotenja nepremičninskih projektov, kamor se poleg upoštevanja celotnega življenjskega ciklusa nepremičnine v vrednotenje v zadnjem času vse bolj vključujejo tudi kriteriji trajnostnega razvoja. Z razvojem paradigme trajnostnega razvoja in njeno konkretizacijo se množica različnih metodologij grupira, metodologije same po sebi pa postajajo vse bolj aplikativne. Zato so tudi v tem članku predstavljene le najbolj reprezentativne metodologije vrednotenja stavb in analizirane njihove bistvene značilnosti. Vendar navedene metodologije niso neposredno uporabne v vseh okoljih, kar je odločujoče spoznanje za nadaljevanje raziskovanja na obravnavanem področju. Skupni so lahko cilji, med katerimi so pogosto omenjeni: zmanjševanje rabe energije, znižanje izpustov toplogrednih plinov, spodbujanje kakovostne gradnje z večjim udobjem za uporabnike in podobno. Poti za dosego teh ciljev so lahko različne, odvisne so od stanja na tem področju v lokalnem okolju in seveda tudi od možnosti, ki jih ponuja. Zato tudi avtorji članka v zaključku predstavijo nekatera izhodišča za vpeljavo tovrstne metodologije v Republiko Slovenijo.

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CONSTRUCTION PROCEDURE OF SINGLE-FAMILY HOUSES IN SLOVENIA

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ČLENITEV POSTOPKA GRADITVE PRI ENODRUŽINSKI GRADNJI V SLOVENIJI

izvleček

Pri nastajanju projektov, se prepletajo različne stroke. Ob tem je ključnega pomena ustrezno sodelovanje med projektantom, investitorjem in ostalimi udeleženci v postopku. Tako je lahko pot do skupnega cilja najučinkovitejša.

Čeprav je glede na zahtevnost, gradnja individualne stanovanjske hiše manj zahteven projekt, je na primeru graditve le-te najprimerneje prikazati časovnico graditve in faze v projektiranju.

Kljub temu, da so si projekti, ki jih arhitekt oz. projektant sprejme v izvedbo različni, si določene faze terminskega plana projekta sledijo po pretežno istem zaporedju pri večini projektov. Optimalnost postopka projektiranja se pokaže v skrbno izdelanem modelu in zaporedju faz, ki nam omogoča najhitrejšo pot do cilja v najkrajšem možnem času. To je prizadevanje tako investitorja in/ali uporabnika kot projektanta.

Optimalen postopek projektiranja se oblikuje na podlagi strokovnosti, primerni strukturi dela in aktivnem sodelovanju vseh udeleženih akterjev, s primernim usklajevanjem stroke, upoštevanjem predpisanih zakonov, postopkov, razpoložljivih financ investitorja in kulture.

ključne besede

postopek projektiranja, investitor, uporabnik, arhitekt, sodelovanje, modeli sodelovanja, enodružinski objekti

abstract

In the formation of projects, a combination of several disciplines is often used. Crucial in the process is appropriate cooperation among planners, clients and other actors in the process, since in this case the path to the common goal is faster.

Although in terms of complexity, the construction of individual residential houses is less-demanding project, it can be a case study to display the display the timelines of construction and the design phases. Despite the fact that the projects differ, phases of the specified time schedule of the project, are in most cases followed in the same order. The optimality of the design process is shown in a carefully crafted model of phase sequences, which allows us the quickest route to the destination in the shortest time. This is an effort of the investor and/or user and the designer.

The optimal design process is formed on the basis of expertise, appropriate structure, active cooperation of all involved subjects, and adequate coordination of the profession, adhering to prescribed laws, regulations, procedures and available finances of investor and culture.

key words

Designing procedure, investor, user, architect, collaboration, cooperation models, and single-family houses

Introduction

The article is focused on individual residential construction that is meant for users and for further selling facilities of investors. Problematic will be exposed through the aspect of architectural deigning and collaboration of architect with user and/or investor. Although it does not mean that procedure, which is through the work more and more formed, will not be useful in other engineering sciences, where they also deal with the users and/or investors. The main goal of the article is a review of key figures, review of optimal terminal work in time of the object construction and fragmentation of planning procedure of single-family design (that is just the phase of the scheduled work procedure of construction).

If we want that any kind of work process would be good and efficient, a thorough work preparation is needed – we have to define and choose the optimal way to the goal. Goal has to be exactly defined, clear and achievable, with realistic outline of the procedure and time determination.

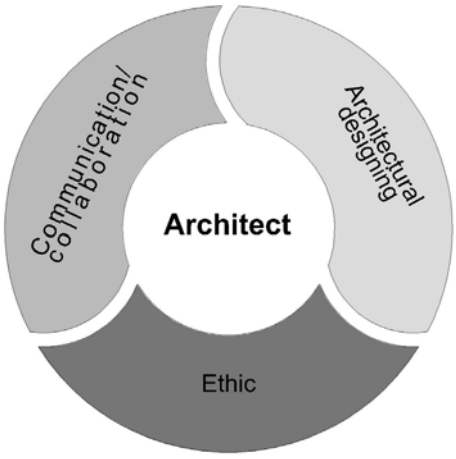
Such an approach is reasonable in any kind of project. That way we can follow the working procedure, without unnecessary leaps over or skipping certain procedure phases, which actually makes the work difficult and prolongs the whole procedure. Correctly planed work plan enables time review over work phases and points out the work course.

Two special branches of science deal with enigma of work plan – praxeology as unspecified science and theory of architectural designing as a science which is dealing with a field of architecture and is specific to the field that the article deals with.

Praxeology or the logic of action is a science about human action and work planning, which follows two main streams. The establisher of the first was Tadeusz Kotarbinski, who defined general praxeology, usable on all fields, and the establisher of the second was Austrian Ludwig von Mises, who was dealing mostly with the praxeology in economy [http://mises.org/]. In an essay with the title Characteristics of the good working plan (1966), Kotarbinski dealt with the basic facts of work well organized. In his opinion in every well prepared work plan we can expose eleven common characteristics, which are:

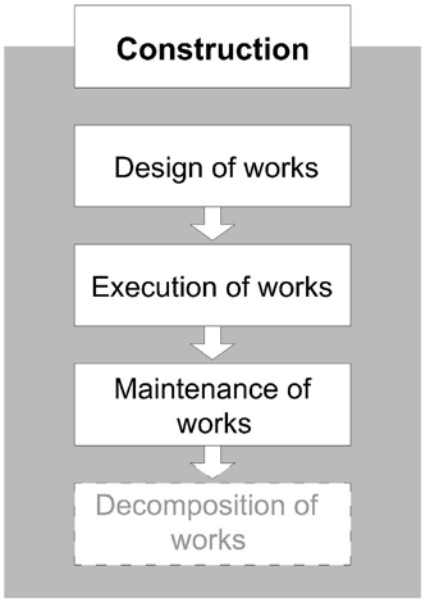
- Expedience;
- Feasibility;
- Inside coherence;
- Operability;
- Flexibility;
- Limitation at detail;
- Optimal time fixation;
- It has to have an end point;
- It has to embrace the wholeness of the problem
- Reasonability and;
- Simple to understand [Kotarbinski, 1966].

In any case it is necessary to specify criteria for optimality and proportionate them from case to case. It has to be separated between the cases, when there are only two actors involved or more. By working on a common project, there are many branches of professions, which interfere, like psychology, sociology, culturology, management etc. In architectural designing, there are even more of them – like geodesy, geology, civil engineering, structural engineering, landscape architecture etc. Of course they do not necessarily interlace at the same time during the procedure. We complement the complex matter, as is the designing for (un)known user, with different fields or branches, what depends also upon facility location, investors' claims, his lifestyle, the approving authority, relevant administrative body.
What used to be feasible to solve and edit by one person - an architect, is now virtually impossible due to the increasing number of regulations and specialization in the fields of design, that need to be participating in the building permit documentation. The architect still needs to have an overview of all professions if he wants to successfully manage and control the project. That is why he still needs to have certain knowledge of different professions (Figure 1).



Slika 1: Shema arhitektovih načel.
Figure 1: Scheme of architects' principles.

In architectural designing, all involved branches tend towards defending their own requirements and because of that the documentation is often not transparent. Transparency is the tendency of administration (administrative body) because of normed administrative procedure. Problematic of over normirming can be seen in the legislation of Bavaria-Germany, where because of many prescriptions, is almost impossible to include in project some designers' creativity.
In continuation of article it will be described the content of documentation, that is needed by construction of single-family house in Slovenia. According to Slovenian Construction act [Zakon o graditvi objektov ZGO-1, Official Gazette of RS no. 110/02] article 1, the construction means design, execution and maintenance of works.
Recently the profession is adding fourth phase - decomposition (Figure 2). Design is a special phase of construction, which comprehends designing, drawing plans, technical descriptions and reports, execution of the final documentation and also managing the procedure issuing the building permit (administrative procedure).



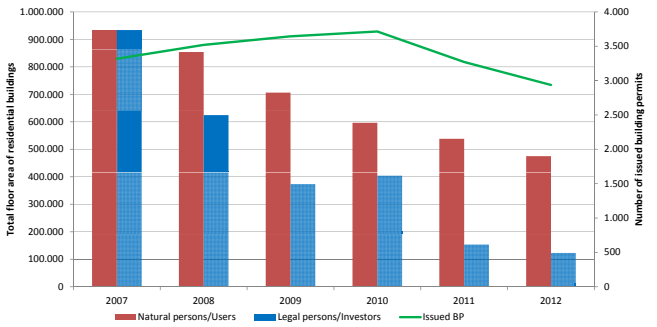
Slika 2: Shema graditve objekta s predlogom nove faze.
Figure 2: Scheme of construction.

Designing of facility: key figures
The descriptions of frequently used terms that occur in the article and their terminological explanation are taken from the current legislation and from official English translation of Slovene legislation:
1. The architect is a person that is through the study qualified for planning of facility in space. An architect by profession deals with planning, designing a space and supervision of execution. As the spectre of fields architect can work on (infrastructure, buildings, conservation, protection of cultural heritage) is wide, in most cases they specialize in certain fields. In the construction of residential architecture, the architect is mostly also the responsible design manager and coordinator of the project.
At the start of the procedure, architect as responsible design manager has to inform the project investor about legislation, possibilities and limitations from the field of construction and environment that is applicable in given area. This way the whole procedure of designing is open and transparent for both sides.
The architect has to be the strongest link among all engineers, referents on administrative unit, approving authorities and also by investor and/or user. At his work and communication he has to take into consideration also the Code of professional ethics of architects, landscape architects and spatial planners (OGRS no. 06/05), that is similar to the professionals' codes in foreign countries. The investor and/or user have to be informed also about the planned schedule, so that at the execution time there are no disagreements because of delays. That is why it is necessary that the schedule of work is made at the start of the designing construction documentation.
The matter that is important for the architect to acquaint the

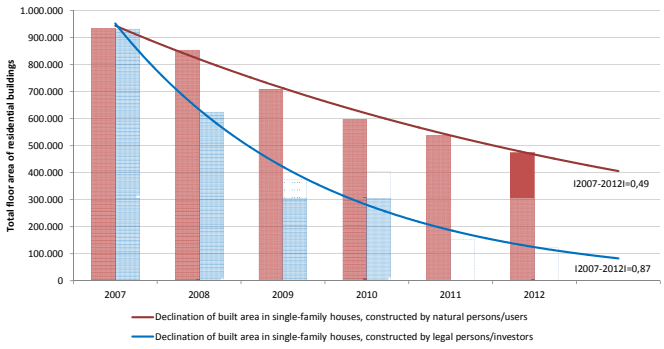
investor, are the dates that relevant approving authorities have for firstly conditions for designing and secondly for approvals, that are essential for the legal building permit. The terms are in most cases every time for 30 days and there are in many cases disagreements with the investor by designing a facility as it can prolong the finalization of documentation.

2. Investor/client in architectural designing is legal or natural person that selectively invests financial resources. The investor is not necessarily the one that orders the building, but can be just a broker. We can divide investors into two categories according to the purpose:

2.1 Investors-users who have often pre-made criteria and requires. Investors-users are specific, as in most cases they only deal with the architectural designing just once in the lifetime. The architect should follow their wishes and design reasonably. Specific in this group is in communication and wishes where the architect has to be specialised professional, who offers them advises and solves the situation. Once again we can divide them in two groups – the ones that already own the plot or the second that are buying it. In next comparative chart we can see, that the trend of construction of single-family houses from the beginning of crises 2008 is declining (Figure 3,4).



Slika 3: Skupna površina enostanovanjskih objektov in število izdanih gradbenih dovoljenj v Sloveniji med leti 2007 in 2012 [vir podatkov: Statistični urad RS].
Figure 3: Total area of single-family houses and number of issued building permits in Slovenia between 2007 and 2012.



Slika 4: Upad stanovanjske površine pri enodružinski gradnji med leti 2007 in 2012.
Figure 4: Single-family house built area deflection between 2007 and 2012.

2.2 Investors as forth-sellers of facilities that will in the future sell the facility. This group of investors is in most cases not demanding concerning the quality and appearance. They look at the project through the economic aspect. In most cases their demands are oriented in the direction, that the facility is exploited at its most and that the construction is relatively beneficial.
In investment facilities, it is particularly necessary for the architect to pay attention to yield when designing, but is also important to advise the investor on the size and structure of the program of facility. In most cases this is the task of the responsible design manager.

3. Public is the special group of participants that usually appear in acquaintance with foreseen intervention in the space or at the beginning of execution of foreseen investment. They are indirectly included in the procedure of construction (in German „die Betroffenen") and general public, that will meet with the newly built facility, although they do not live on the site of the spatial intervention. In the first place they are mostly neighbours, including the professional and laic public, which are in any way connected with the facility. If the spatial intervention is bad, the surrounding environment is usurped and degraded.
All engineers but especially the architect who is a carrier of responsible space intervention must know that every procedure in the environment is public and that those kinds of procedure will interfere also with the surroundings. Spatial Planning Act in 3rd article, paragraph 3 prescribes, that spatial designing is in public interest [OGRS no. 33/07].
It has to be known that nevertheless how much we try to include the facility into the environment, and maybe even with active public participation, we cannot assure that everyone will agree with the intervention. If we take into the consideration besides the surrounding facilities, suitable integration in the space and colour scheme, also ethical code of the architects and the professionalism, we can at least expect that the affected and the public will accept the intervention positively.

4. The coordinator is the person, who coordinates the activities of others. In the field of architecture he is a person, who is acquainted with the work process by other engineers and takes care for the whole reconciliation of the project as well as for the time schedule. In Slovene practice this person is not often represented in procedure. An architect in Slovenia is not necessarily the coordinator of the project. In the former legislation, firstly was defined, that the responsible works manager is the designer, whose works dominate – by facilities this means the architect. With the Act Amending the Construction Act [Zakon o spremembah in dopolnitvah zakona o graditvi objektov, OGRS, no. 57/12] this was amended.

5. The buyer is a legal or natural person, which buys the facility. The buyer is not necessarily the user of the facility.

6. Responsible design manager is the individual responsible for the mutual compliance of all the designs that form the project documentation and for the quality of the processing of the entire project, which he confirmed with a stamp. The stamp gets the designer, after successfully passed professional exam

on particular professional chamber after Rules on professional examinations for the provision of engineering services [OGRS, no 124/03, 56/05, 78/11]. Exams are graded according to the authorisation that the designer receives after successful completion of the professional exam, as follows: architectural design, landscape architectural design, spatial planning - license P, spatial planning license A and KA, the audit plans of architecture and landscape architecture and design exam after 100th article of ZGO-1c. After the change of 1st article of ZGO -1d, is the responsible design manager the individual who is responsible to the investor for mutual compliance of all the designs that form the project documentation.

7. Other participants – at the realization and designing, there are many more participants beside the investor and/or user, architect and engineers. After gathering project terms from the relevant approving authorities the whole documentation needs to be completed to the point, from which the whole intervention can be seen. The certain approval authority has to confirm it and write an approval to the project solutions. Whole and aligned project documentation is checked by the competent administrative body and the project gets its legal building permit, which is in Slovenia legally valid after eight days from handing over [Article 70, ZGO-1].

8. The designer is a person that drafts and prepares the plans. According to ZGO-1 [OGRS, 110/02], 2nd article, paragraph 4.2., is project designer a legal or natural person that provides project design services as a commercial activity, whereas the responsible project designer is individual responsible to the designer for the compliance of the design with spatial planning acts, building regulations and the conditions of the relevant approving authorities. A project designer that takes over project documentation for formulation must appoint a responsible project designer for all the plans that form the project. If there is only one responsible designer then he is also the responsible design manager, what is common by single-family houses design. Responsible project designer is responsible for every plan that he made and ratified it with an official stamp. He also guaranties that the plan is made according to spatial planning documents, building regulations and conditions for designing and that it fulfils all principal demands and is in accordance with the expert's detailed report. Designer, whether he is an architect, spatial planner, geodesist, mechanical engineer or electrical engineer, static or any kind of other expert from certain professional field, which participates in the project, has to be the representative of the profession and adviser to the investor and/or user.

9. User is in architectural planning a person or group of people, who uses and lives in the facility. The user can also be the investor of the project (as written in point 2.1.).

Designing

Designing is a separated phase of the process of facility construction. Project documentation is a composition of different individual projects. According to the Rules on design documentation of Slovenia [Pravilnik o projektni dokumentaciji, OGRS, 55/2008: 5965] and ZGO-1 [OGRS 110/02], article 7, 2nd paragraph, the different plans follow one after another with the specific code numbers according to the sequence:

0: Basic design documentation
1: Architecture plans
2: Landscape architecture plans
3: Construction plans and other building plans
4: Electrical installation and electrical equipment plans
5: Machine installation and machinery plans
6: Telecommunications plans
7: Technological plans
8: Excavation and basic sub works plans for underground works

Some of the projects have to include as an obligatory experts' detailed report:

- Surveying plan;
- Study on fire safety, which is made after the regulations about fire safety studies in buildings or draft for fire safety;
- Waste management plans, which are made according to the regulations about waste management, for the waste that occurs in execution works;
- Conservation plan, which is made according to the regulations of cultural heritage conservation;
- Physics study-thermal protection, made according to the Rules on thermal insulation and efficient energy use in buildings;
- Construction physics study- acoustics, acoustic protection, made according to the regulations of protection against noise of buildings;
- Study of the feasibility of alternative systems of energy supply, made according to Rules on efficient use of energy in buildings.

The composition of project documentation depends upon the type of intervention that is defined by the ZGO – 1, 2nd article, paragraph 7: execution of new works, reconstruction and removal of the works, where some of the elements are obligatory for all interventions.

At this point we have to define the terms works, building and civil engineering works that are defined with ZGO-1, article 2, and paragraph 1:

- Works are buildings or civil engineering works fixed to the ground and made of construction products and natural materials together with any inbuilt installations and technological fittings.
- Buildings are works with one or more premises into which a person can enter and are intended for residence or execution of activities.
- Civil engineering works are works intended for satisfying human material and spiritual needs and interests that are not residential and are not intended for the execution of activities in buildings.

Architectural designing and work process

For successful designing and formation of prescribed building documentation according to the rules, several professionals

from different fields of expertise that will work together need to be gathered and brought into line already at the start.
Cooperation procedure and with it also the design, must come out from realised optimal environment and should strive towards optimal target, which with minor variations is possible with a well-chosen model of the design according to the given situation. All actors should strive towards it in the shortest possible way, for the first goal, which is common to all - successful acquisition of building permit. In continuation are defined also other goals. The final goal is completed facility.
Theoretical thought of Toš says that this structure has evolved through history and did achieve a series of developmental stages. As a development stage may be marked those changes, which brought a significant quality change in the attributes structure [Toš, 2003:81].
In the case of collaboration it is crucial that the designer and investor and/or user agree and harmonize in the shortest possible time. Because we know that every person involved in the design procedure has his sub goals. It is expected, that the elementary goal is common to all, although in many cases individually interpreted. The designer has to be the one, who is able to resolve this tangle of sub goals and extract it into a single one, comprehensible and acceptable to all.
An important factor in this is mutual trust and respect between designers and investors, as it is crucial for good cooperation. Christian Norberg-Schulz writes: "Architects are reluctant to deal with the theory of design, mainly due to the assumption that the theory kills creativity. At the same time, the position of the users is such that they "reluctantly" decide for architects, because they turn out to be a necessary evil that trims their ideas about architecture" [Norberg - Schulz, 1997:13].
These problems that are partly taken from Christian Norberg Schulz, occur inter alia due:

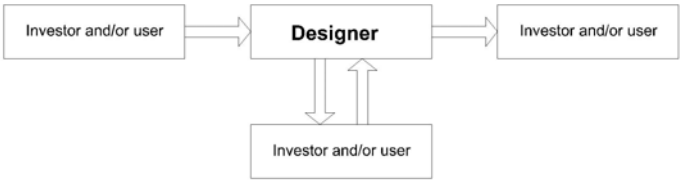
- Lack of time during the designing process, as the designer mostly has more projects to work on;
- Time limitation on investment of investors that consequently press on the designers. They give designers unsuitable time to do the project documentation, which leads to the plans of poor quality or uncompleted plans, quality declines, weaker relationships in the architectural biro, weak relationship to the investor;
- Lack of communication, which is increasingly common only over the phone, e-mail, Skype or other contemporary media;
- Lack of cultural awareness and identity of landscape. In the designing for foreign countries also because of the lack of knowledge in architectural regions and architectural landscapes, the terms that are in Slovenia defined in the Ordinance on Spatial Planning Strategy of Slovenia. With this theme also deals Schumacher in The Autopoesis of architecture (2011), where he says: "Aesthetic sensibility is a constant, universal feature of all human behaviour and action. All of this implies that aesthetic appeal can be subjected to rational analysis and criticism. We cannot trust our sensibilities blindly. They need to be subjected to a critique that queries their historical pertinence. "
- Due to the inability of presentation of designing or understanding of the design. Here is important the method of designed project presentation, what can be in the form of sketches, 3d visualisations, model or plans;
- Due to the uncritical imitation of architectural designs from other architectural regions.

Great importance in the design has also coordination and project management. Coordination of the project means the coordination of the project through the phases in accordance with a schedule of works. Project management means to be on the highest position of the group and lead the group with communication, motivation and control.
We have to highlight the project coordination and project management for the user, that in the phase of designing is not yet known, or when there is designed for the predictable unknown user for example the construction of set of single family houses, settlement… The basis for the designing procedure must be a collaboration between two (or more) persons, so that in the end of the project no one feels unrealized or tricked, what is of course the issue of the correct, appropriate and reciprocal collaboration. This relationships and relations are in Slovenia defined also with Code of professional ethics of architects, landscape architects and spatial planners (OGRS, no. 06/05), in Germany – Bavaria with Berufsordnung and in Austria with the Ziviltechnikergesetz.
At this time we have to pay attention also to the project assignment. The project assignment is a systematically ordered documentation which comprises the textual and graphical material and other necessary texts in the form of guidelines for how the project designer should formulate the project documentation, definitions of tasks and work of the project designer, responsible project designer and investor. It is important also because it partly defines the time duration of certain phases in the procedure of construction and at the same time it optimizes it. The project assignment is in most cases done by a designer or responsible design manager, but here we need to highlight the introduction of coordinator in Slovenia (point 4), who takes over the preparation and execution of the project assignment, submitted in the timeline and organizes and coordinates the participation of other designers and their work tasks.
Optimal procedure of design should consider all the possible factors that may in any way influence the designing. Designers should predict/know these factors and be able to resolve them as soon as possible. They have to follow the changes of society, the profession, standards, legislations, techniques and technology. The task of an architect or designer about this is to inform also the client about them. Important here is good knowledge of established design practice and procedures, since only upon this it can be objectively built and improved the attitude to the investor and/or user and developed a proper collaboration between them.
In the continuation of the article, there will be fragmented the construction procedure of single-family house and more in detail also the designing.

Collaboration

Collaboration requires open and trustworthy correlation between all included sides, where information needs to be objectively presented, discussed and understood by all, so that it can lead after the shortest possible route, on the basis of learning, work and agreements to a satisfactory goal. Here needs to be mentioned that the agreement is meant in the way of „win-win"situation for all parties involved. Especially in conflict resolution is the mediation strategy, which aims for an optimal solution for all the parties to the litigation.

From the field of collaboration models will these be summarized after Pocock and Hudson (1978) who claim three models of designers' behavior, according to the nature of determining the desired environment or concept of participation in the planning and are summarized by Polič (2007):



Slika 5: Prikaz modelov sodelovanja v arhitekturnem projektiranju na shemi.
Figure 5: Scheme of collaboration models in the field of architectural designing.

Designer as a leader

Designers' conception of reality is crucial according to this model; clients can just follow, irrespective of their intrinsic desires. Collaboration with the client is done no matter of the later responses to the basic offer of a designer [Polič, 2007:78].

The word client (after Polič) as used in that part of the article means investor and/or user.

Maybe this kind of collaboration is in any other discipline appropriate, but it is not for the architectural design, especially for a known user. Every person wants to arrange his/her home or business space in his/her own way so that the comfort and well-being in the room encourages creativity. With such a model approach to the investor and/or user architectural design is impossible, as the users' wishes cannot be taken into the account. This model turns out to be good only in the case of designing for the unknown/universal user, where it is not necessary to take into the consideration the users' wishes, but is important that apartments are at least designed according to the minimum norms and legislations without any personal involvement. The problem is in the fact that due to the lack of connection with the building, the environment and also with the user of the facility; these buildings often stand out from the rest of the built environment.

Designer as a copycat

This model is the opposite of the previous one. The designer is responding to the expressed needs of the client, as he is experiencing. The question is whether we dispose with the appropriate tools for detection of the desired images of the environment; as well if the needs change over time. People are often constrained by the existing experience and are not prone to innovation [Polič, 2007:78].

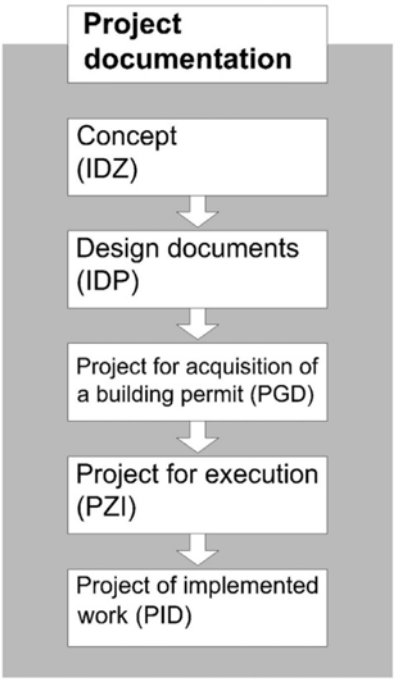
In this model, which is diametrically opposite of the first one, the architect or designer is shown just as an obedient copycat, designing and imitating the ideas of a client, even if they are not useful and reasonable.

That kind of model is very common by young designers, that still did not formulate architectural expression and commonly look toward the end of the project, not considering the convenience and comfort of designing a space. As well it can be noted by designers, which in most cases work on so called type projects for the single-family houses, as the main motivation for them is profit. Expressed can be also the economical optimisation of architectural designing, but less suitable architectural designing in the relation with the architectural region on landscape.

Comparison model can be seen in so called Michael E. Porter's Competitive Strategy, who developed his three generic strategies: lowest cost, differentiation, and focus [Porter, 2011], what can be in economy suitable, but less suitable for architectural designing.

Interaction designer - client

The third model is based on the assumption of interaction between the two parties: the designer explains the reasons for his actions; the client transfers to the designer his needs, just as he is experiencing them. On the basis of ongoing dialogue, there is created a consensus on the best solution. This approach raises a number of problems and assumes a designers' desire to serve the needs of different groups of clients, regardless of their status or power [Polič, 2007:79].



Slika 6: Shema projektne dokumentacije.
Figure 6: Scheme of project documentation.

This model, which combines both of the listed models of cooperation, is most suitable as the basis of such a form of cooperation can be arisen functional-aesthetic object according

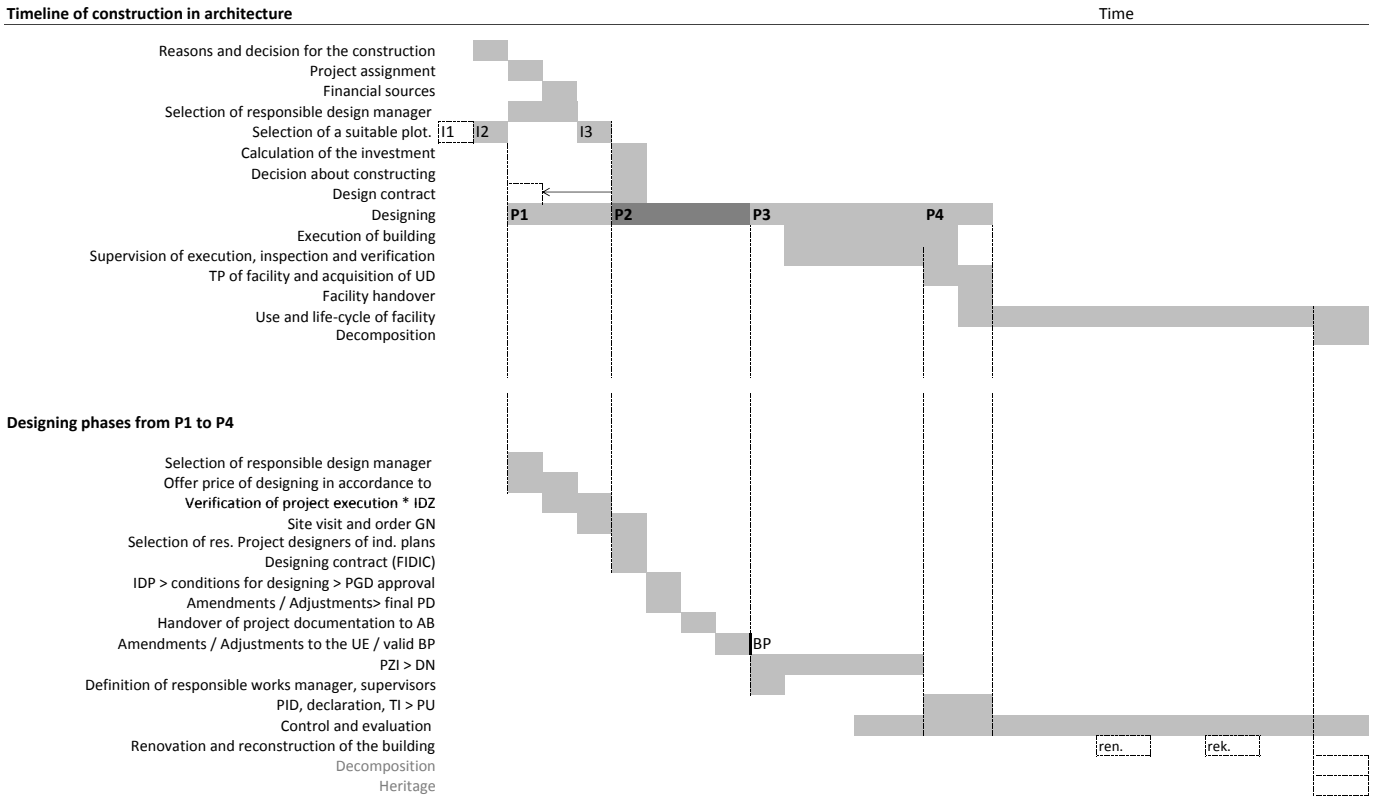
PA	Project assignment (Section Architectural designing and work process).
I1	Investor that already owns the plot (point 2.1.).
I2	Investor that is buying the plot for the purpose of construction of a building.
I3	Investor as forth-sellers (point 2.2.).
P1	The initial phase of the design (prior design) where in the current situation designers are often not included.
P2	The designing phase which is in current time most common.
P3	Continuation phase that is rarely implemented.
P4	The final phase that is also rarely implemented.
SP	Surveying plan.
IDZ	Concept.
FIDIC	Construction contracts which became applicable on the proposal of the international financial institutions. They have to be subordinated and adapted by the applicable national law.
IDP	Design documentation.
PGD	Project for acquisition of building permit.
AB	Relevant administrative body.
BP	Building permit.
PZI	Project for execution.
DN	Plans for the constructors.
PID	Project of implemented work.
TI	Technical inspection.
PU	Permit of use.

to the wishes of the investor and/or the user. But still, in the case of architecture is the building aesthetically rigid touch of the criteria of the architect, who diverse mosaic composes of high-quality, functional and aesthetically pleasing building.

Indeed, such an interaction between designers and/or users is possible on the project with the end user of the facility. This means that this model is useful in the design of single-family houses or in the case of other designers for small projects, where the contact with end users is possible. This model enables individual approach and common search for the solutions, which are optimal and customized for user. As well it requires architects knowledge about time needed to complete the design and construction expertise which is reflected in a high performance of project.

Possibilities for that kind of collaboration are proportionally smaller, as the project and the number of involved people grow in the designing procedure. The above-mentioned models highlight a very important cooperative relationship, while they put attention of the two procedures, which usually take place simultaneously, but each opens their own problematic. These are:

- Phases of scheduled work procedure, that we plan at the beginning of work after the model of good plan and
- Phases of design procedure that are part of the scheduled work procedure and are in most cases taken for granted to the project manager and designer, but not to the investor and/or user.



Slika 7: Grafični prikaz členitve postopka.
Figure 7: Scheme of graphical subdivision of phases.

Coordination by the construction of building

Basic principles and characteristics of professional work, to which we came closer at the start of the article, are same for every work and planning. Hereinafter will this procedure focus on designing of single-family house, as less demanding facility. The complexity of objects is defined in Regulation on classification of construction with regard to their complexity [OGRS, 37/08], where are in 3rd article defined the facilities, that are not classified in the demanding, undemanding or simple objects.

Correctly set schedule of work procedure has to take into account the key features that were detailed presented at the beginning of the article; in the profession it is known as Gantt chart. Timeline of construction should follow the following sequences:

1. Reasons and decision for the construction. Investor and/or user define his needs for the building. The aim of the phase is beginning of construction.
2. Content of investment. Investor and/or user define the content and circumstances of the project. Aim of the phase is determination of projects' content and the preparation of project assignment and concepts.
3. Financial assets. Investor and/or user have known budget for the financing of the project or ensured financial resource for carrying out the project to the desired goal. The aim of the phase is defined financial construction of the project.
4. Selection of responsible design manager – coordinator, over references etc. Projects' investor makes the contract of collaboration and consulting with the selected project leader. The aim of the phase is defining the appropriate responsible design manager.
5. Selection of a suitable plot. Investor and the chosen responsible design manager, on the basis of investors' wishes and needs search for some suitable plots for the desired space intervention. This is followed by the decision for the one, on the basis of the research about municipal infrastructure and other traps that can be hidden at buying. The aim of the phase is choice and decision for the right plot.
6. Calculation of the investment. Experiences by designing, managing of projects, environmental constructions etc. give the responsible design manager the option to calculate the amount of investment with possible minor deviation. The aim of the phase is pairing the investor with the height of the investment.
7. Decision about constructing. In accordance with decision of investor and/or user, the procedure can end here because of incorrect financial plan, that is not high enough for the investment, or it can continue with the purchase of the plot, that is suitable for the investors' wishes and desires as well it fits to legislation about spatial act for the field of construction. The aim of the phase is the start of construction procedure.
8. Design contract. Between the investor and the responsible designer is signed the contract. The aim of the phase is signed collaboration contract.
9. Phase of designing. The procedure of designing begins. This is also a very complex phase separated into more sub phases (collection the conditions for designing, designing of the facility, collection the approvals and finishing of the building documentation…), that are described more in detail in the phases of the design procedure. Phase of designing is one of the longest one in the scheduled work procedure and in most cases also the most demanding one due to the improper approach to the implementation of the aim and also because of the too late inclusion of designer in the whole process. The aim of the phase is the acquisition of the building permit and making of Project for execution (PZI).
10. Execution of building. After obtaining a building permit, the execution of building can start. The aim of the phase is suitable beginning and end of the execution.
11. Supervision of execution, inspection and verification. During execution, it is necessary to practice control over the work so that errors do not get potentiated. This is the job of the responsible supervisor. For larger facility it is necessary also to audit work. The aim of the phase is to monitor the construction site after the scheduled work plant, successfully completed facility and for the designers the preparation of the Project of implemented work (PID).
12. A technical inspection – is an inspection of the constructed or reconstructed works by which it is determined whether the works has been constructed or reconstructed in accordance with the building permit and whether it will fulfil the prescribed essential requirements. The aim of the phase is verification of the executed construction and artisan works at the facility.
13. Facility handover – handover and takeover of facility. This phase can be made between different subjects that are involved in the design procedure. Handover can be made:
    - Between work contractor and investor and/or user.
    - Between investor and buyer.
    - Between owner and warden of the facility.

    The aim of this phase is the handover of the building into the use of the users.
14. Use and life of the facility. This phase is the longest. From this phase we can see the quality of the facility construction; from draft, designing, to execution, takeover and to moving into the object. The aim in the phase is monitoring of facility life-cycle, facility management, maintenance, improvement and evaluation of the work.

Architects are rarely included in the last phase although the awareness of importance of this phase is rising. It is important to study, managing and monitor the facility even after facility is handed over to use as the basis, and we can all learn a lot of it.

Phases of design procedure

The structuring of the design procedure at individual phases is meaningful because of the review. Phases of design procedure

are most frequently structured in the next following order, where certain phases can be repeated:

1. Decision of the investor and/or user for the certain designer and approaching the selected one.
2. Acquaintance of investor and/or user with the indicative price of architectural designing.
3. Review of the basic acts and regulations, which are applicable in the area of the planned construction.
4. Visit of the plot and order of the land survey plan.
5. Selection of engineers in the field of electrical installations, mechanical installations and construction, and identification of the cost of each project.
6. The contract between the investor and/or user and the responsible design manager and start of the designing process.
7. Collection of the conditions for designing of the relevant approving authorities.
8. Designing of concept (Idejna zasnova - IZ) and Design documents (Idejni projekt - IP), on the basis of conditions for designing of the relevant approving authorities, legislation and spatial planning acts with active collaboration of architect with the investor and/or user.
9. Submission of the planned design documents (some can be also planned as project for acquisition of building permit) – formed by different individual projects like plans of architecture, plans of electrical and mechanical installations etc; to the relevant approving authorities. It can contain possible coordination with approving authorities about additional requirements and finally obtainment of approval.
10. Designing of plans and making of documentation to the level of project for acquisition of building permit.
11. Submission of complete composition of different individual projects for the legal building permit (Projekt za pridobitev gradbenega dovoljenja - PGD) to the administrative unit in whose area the real estate that is the subject of the building permit is located; this is then the relevant administrative body. There is possible potential coordination of documentation for the legal building permit.
12. Obtainment of the building permit.
13. Detailed designing and planning of all plans for the project for execution (Projekt za izvedbo - PZI)
14. Execution of facility and supervision/monitoring of the execution.
15. Designing the project of implemented work (Projekt izvedenih del – PIZ), statements of assurance, technical review and the issued permit of use.
16. Usage of building.
17. Control and evaluation of building in use.

In consideration needs to be taken that every project is individual and has its own characteristics that separate it from others and make it special. Nevertheless the phases in designing are very similar almost in every project, also because of the easier determination of the deadline for project finishing. Graphical subdivision of phases is shown in the Figure 7.

Conclusion

The article is focused on the current legislation about construction, which includes also single-family houses design, in Slovenia. Legislation was compared with selected German legislation, which in practice often serves as basis for foreign legislation, including Slovenian.

In the article was considered and used most common acts and rules from the field of spatial planning and project documentation. Some of the legislation that regulates the relations between investors and contractors exists still from former Yugoslavia, for example Special construction usances [Posebne gradbene uzance, UL SFRJ, 18/77].

In conclusion we can highlight specific problem of architectural and engineering profession in Slovenia, which after 22 years of Slovenia's independence, still has not accepted the Act of architectural and engineering activities, despite already prepared draft few years ago (Zakon o arhitekturnem in inženirskem projektiranju 2007). The fact is that majority of European countries have the profession defined by law, including duties, rights and obligations of architects and engineers, for example Ziviltechnikergesetz in Austria and in Germany almost every region (Bundesland) has its own Code of Architects (Architektengesetz).

Review of terminology and definition of the key players in the process of architectural design is also important from the standpoint of understanding technical terms. Based on the definition of key persons and the relations between them were defined models of cooperation, as defined by Pocock and Hudson. They are also common in architectural design.

Exposed collaboration is presented, not as active participation in the acceptation of state or municipal spatial plans, but as individual collaboration of architect with investor and/or user and with other engineers. The main part is that we, as architects know that every project is individual and that it has specific relations between the parties. Rachel Luck (2007: 220) writes about the active participation following: "While it is acknowledged that learning is a two-way process: that the participants will learn more about design and the purpose of an event, to have a better understanding of their situation, while the designers learn about the participants' situation." It is therefore obvious, the importance of active participation, which is exposed in the article as a priority, besides the division of procedure, as with the active participation we strive to energy efficiency, optimization of the time of the involved people, to procedural economy and resources with maximum performance.

At the end of the article is schedulable divided the procedure of construction and procedure of designing. Contribution of that part is in transparency of the procedure, not only for the architects, but also for investors and/or users. The table comparison in the article was made between the procedures of construction and segmented the design process. Defined were the time limits prescribed by current legislation, which are most common. The importance of the table is in the transparency of described phases in the article, with which are faced designers as well as clients and/or users in the process of construction and design of the building. The highlight is on the extension of the designing procedure and fastest in inclusion of designer and coordinator in described procedures.

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iz recenzije / *reviewer notes*

Arhitektura kot inženirski poklic že dolgo izgublja ta atribut. Zgodovinski razvoj diferenciacije poklicev ki je privedel do ločitve arhitekta in gradbenika se še nadaljuje. Arhitektura naj bi veljala za dokaj univerzalen poklic, a je že izgubila urbanizem, krajinarstvo in industrijsko oblikovanje. Specializacija pa seveda pomeni nevarnost zoževanja pregleda nad celoto.

Šole, strokovna javnost in mediji promovirajo najboljše dosežke z lepimi slikami, teksti in nagradami. Vse to privlači mlade, da izberejo ta poklic. Malo ali nič pa ni povedanega o vsem, kar je zadaj: dolgotrajni pogovori in postopki, nepričakovane omejitve in spreminjanje, nespoštovanje dogovorov in rokov med sodelujočimi, tehnološke in finančne zagate, vedno novi in strožji predpisi, negotova plačila… Že dolgo velja tudi spoznanje, da je tako za večji blok kot za enodružinsko hišo potreben projekt v obliki cca 10 cm debele mape. V njej je ena sama "mapica" delo arhitekta – tisto, kar ga edino zanima in privlači. Vse ostalo prepusti drugim – ali ker tistega (razumljivo) ne obvlada ali je daleč od kreativnega dela.

Obravnavani članek je zato že sam po sebi "nezanimivo" branje, ki visoko letečega mladega arhitekta postavi na realna tla. Opozarja na tisti inženirski del poklica, ki ga čaka če hoče samostojno nastopati in odgovarjati kot projektant, sposoben svoje kreativne zamisli tudi realizirati. Govori o tem, da mora obvladati različna orodja, med drugim tudi metode učinkovite organizacije dela, ne samo svojega, ampak velike skupine sodelujočih pri tako kompleksnem opravilu kot je projektiranje.

dr. Vladimir Brezar

Peter Šenk

THE PLUG-IN CONCEPT: TECHNOLOGY AND AESTHETICS OF CHANGE

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KONCEPT PLUG-IN: TEHNOLOGIJA IN ESTETIKA SPREMEMBE

izvleček

Arhitekturni koncept plug-in temelji na dvojnosti med infrastrukturnim sistemom ter nanj priključenimi enotami ali elementi. V kontekstu megastruktur so koncept najnazorneje zaznamovala dela skupine Archigram in japonskih metabolistov v šestdesetih in zgodnjih sedemdesetih letih prejšnjega stoletja. Z brisanjem meje med zgradbo in mestom je koncept plug-in prerasel meje arhitekture in vse bolj postajal urbanistični koncept.

V članku je predstavljen za sodobnost zanimiv kulturni kontekst, ki je pri britanski skupini Archigram in japonskih metabolistih vplival na specifičnost razvoja s tehnologijo podprtega koncepta plug-in. Z estetiko spremembe in nedokonč(a)nosti, ki je ob povsem različnih kulturnih izhodiščih imela podobne arhitekturne manifestacije, je koncept plug-in utopično napovedoval družbeno preobrazbo, temelječo na svobodi, individualizaciji in mobilnosti ter razvoju mest obljubljal prilagodljivost nepredvidljivim potrebam in željam prebivalcev, ki bi z aktivnim pristopom postali njegovi soustvarjalci.

Kljub temu da so revolucionarna šestdeseta daleč za nami, pa je koncept plug-in v komodificirani obliki (p)ostal operativen in relevanten vsaj na metaforičnem nivoju in je bolj kot v izvorni arhitekturni obliki v sodobnem prostoru prisoten predvsem v urbanizmu.

ključne besede

plug-in, clip-on, Reyner Banham, Archigram, metabolizem

abstract

The architecture concept of plug-in is based on the duality of the infrastructure system and units or elements connected to it. In the context of megastructures, the concept was most vividly characterised by works of Archigram and Japanese Metabolists in the 1960s and early 1970s. Blurring the boundary between the building and the city, the plug-in concept outgrew architectural boundaries and was slowly transformed into an urbanistic concept.

The paper presents the cultural context relevant to contemporaneity, which influenced specific development of the technology-driven concept of plug-in in the British Archigram Group and Japanese Metabolists. Based on the aesthetics of change and incompleteness, which was characterised by similar architectural manifestations despite entirely different cultural backgrounds, the plug-in concept foreshadowed social transformation based on freedom, individualisation and mobility in an utopian manner and held a promise of urban development with adaptability to unpredictable needs and desires of residents, who would become its co-creators with an active approach.

Although the revolutionary sixties are quite some time behind, the plug-in concept in its commodified form has become and remained operational and relevant at least on the metaphorical level; in the contemporary space it is evident primarily in urbanism and not as much in its original architectural form.

key words

plug-in, clip-on, Reyner Banham, Archigram, Metabolism

The plug-in concept and the employment of the term were introduced into the architectural discourse with experimental practices of the 1960s [Banham, 1965]. In the context of megastructuralism, the concept was most vividly characterised by technology-driven works by the Archigram Group and Japanese Metabolists, which foreshadowed social transformation based on freedom, individualisation and mobility and held a promise of urban development with adaptability to unpredictable needs and desires of residents, who would become co-creators of the city with an active approach.

The plug-in concept is based on the duality of the infrastructure/structure system and usually prefabricated units or elements connected to it. The relationship between the megastructure and the equipped plug-in unit, i.e. the capsule, highlights the pragmatic system of solving housing issues, simultaneously creating a new lifestyle or enabling social transformation both in the Archigram Group and Japanese Metabolists. In various projects, this liberating, almost anarchic concept, the trust in technology and an occasionally ironic undertone of the view into the technological future meet the technologically conditioned aesthetics of change, incompleteness, 'natural growth' and 'cyclicality' as elements of continuing cultural traditions.

In both pioneering practices, although arising from diverse cultural contexts, the plug-in concept was unveiled by the duality of technological operationality and the aesthetics of incompleteness within similar architectural manifestations.

The promise of technology: enabling the ever-changing city and seeking "architecture autre"

Reyner Banham, a member of the Independent Group, promoter of New Brutalism and pop and the idealist on a quest for an *architecture autre*, was examining the formal 'machine' characteristics of the modern movement through an emphatic discussion of technology in his articles from the second half of the fifties onward. He did not associate an appropriate expression of contemporary architecture with style or engineering aesthetics but strove for architecture that would develop its own aesthetics based on the technological reality and the contemporaneity of life in the twentieth century. Banham nourished the revisionist criticism of the modern movement through idealised machine sensibility, which he clearly separated from modernist 'machine aesthetic'. Similarly as Buckminster Fuller before him, Banham saw in the machine aesthetic primarily an incongruence between progressive slogans of the pioneers of the modern movement and their buildings, which, with their simple forms and smooth final surfaces, merely simulated the impact of the machine on construction, even though it was the quality of constructed buildings' final surfaces that usually depended on manual work.

The incomprehension of engineering and machine production characteristics was clearly evident in the machine aesthetic [Banham, 1955]. Moreover, his engaged historiography, sincere optimism about the future and influential work entitled *Theory and Design in the First Machine Age* provided theoretical and moral foundations for some experimental practices in the 1950s and particularly the early 1960s. Banham highlighted technological features of buildings, which affected their form, by rehabilitating overlooked movements, such as Expressionism and Italian Futurism, which historiographers had thus far only touched upon or ignored completely in reviews of contemporary architecture due to ideological inconsistencies with the image of a stable modern movement. Banham was particularly impressed by the radical futurist concept of technology that enables continual change. In the *Manifesto of Futurist Architecture*, Sant'Elia underlines changeability as a quality of futurist architecture: "... the fundamental characteristics of Futurist architecture will be its impermanence and transience. Things will endure less than us. Every generation must build its own city" [Sant'Elia, 1914: 21]. Nigel Whiteley notes the historical significance of this view, as obsolescence and transience had never before been highlighted as crucial features [Whiteley, 2002: 48], which were, in relation with the liberating technology, especially attractive for Banham's theoretical position and seeking the other architecture – *architecture autre*.

The issue of technology 1

Naturally, the faith in the liberating effects of technology in the areas of society, politics, culture and, last but not least, individual lives is not a characteristic of the post-war period, for it was inherited from the period of heroic modernism – now, at least generally, still with an optimistic view on technology, though revealing a critical response to superficial CIAM canon derivations. Banham was a modernist in the true meaning of the term, although his views were more complex than proverbial modernist blind faith but he was also incredibly optimistic about modern technology, which carried no political charge for him. He perceived technology as "morally, socially and politically neutral, though its exploitation may require adjustments of social and political structures, and its consequences may call moral attitudes in question … Technology is a commonwealth of techniques exploited to serve a disparity of human needs" [Banham, 1962: 61]. As noted by Sadler, the optimistic view regarding technological progress and a bright future, which was typical for the idealistic generation of 'experimentalists' in the early sixties as well as Banham, was so strong that it took him several years to admit his naivety [Sadler, 2005: 177; Banham, 1962: 141].

Technology, pop and consumerism: Archigram's plug-in

At the turn of the sixties, the ground for unburdened experimentalists in Great Britain was set by the avant-garde position with a non-avant-garde message, that is, Independent Group's pop culture of mass media, consumerism and leisure, the Smithsons' New Brutalism as a return to the roots of modernism with approaches typical for the spirit of the age

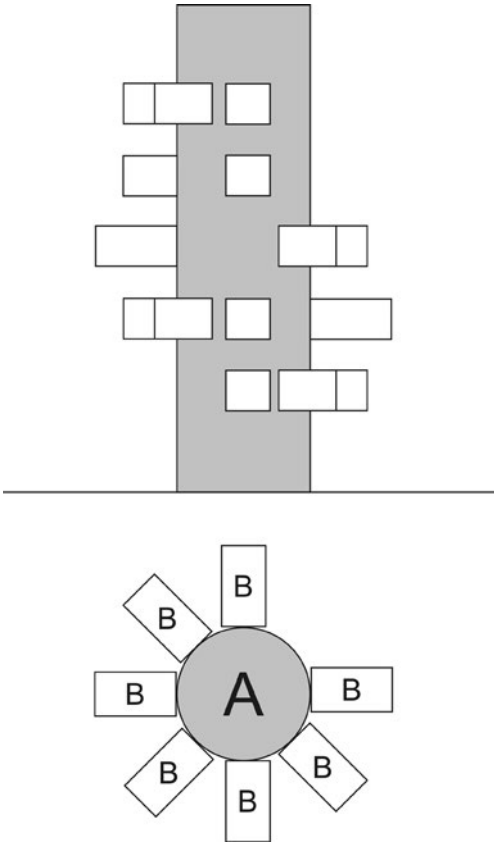

Figure 1: Plug-in concept - vertical setting: infrastructural core (A) with plug-in programme units (B). Plan and elevation. Pioneering examples of such design are Kiyonori Kikutake's Tower Shape Community, 1958, or Warren Chalk's (Archigram) Capsule Homes, 1964.
Slika 1: Koncept plug-in - vertikalna izvedba: infrastrukturno jedro (A) s priključnimi plug-in programskimi enotami (B). Tloris in pogled. Pionirska primera takšne zasnove sta Tower Shape Community Kiyonorija Kikutakeja, 1958, ali Capsule Homes Warrena Chalka (Archigram), 1964.

of the modern society and Reyner Banham's quest for the technological sensibility of an *architecture autre*. The arrival of a new style called "the look", democratisation of the avant-garde and generally accepted consumerism, which contributed to the eruption of the swinging London in the middle of the sixties, proclaimed Britain as the world leader of pop culture [Whiteley, 2002].

While in the fifties Alison and Peter Smithson and their New Brutalism aimed at re-establishing the connection with original principles of the modern movement and contextualise them in the post-war social, cultural and economic reality of new technologies, consumerism, popular culture and mobility, the nascent British neo-avantgarde of the sixties was less academic, at least with regard to establishing a modernist continuity.

The issue of technology 2

Similarly as Buckminster Fuller in the late twenties as well as the New Brutalists and the influential Reyner Banham afterwards, the London-based Archigram Group first wanted to have done with the machine aesthetic for good. In the first issue of the Archigram magazine in 1961, David Greene introduced the group's approach: "A new generation of architecture must arise

with forms and spaces which seems to reject the precepts of 'modern' yet in fact retains these precepts. WE HAVE CHOSEN TO BY PASS THE DECAYING BAUHAUS IMAGE WHICH IS AN INSULT TO FUNCTIONALISM" [Greene, 1961].
Although Archigram's architectural drawings are seemingly unrealisable due to their fascination with the future, it cannot be said that they are not in touch with reality, as they draw from everyday life and the actual phenomena of the contemporary world – from pop culture, mobility, advertising and fashion to state-of-the-art technology, use of materials and space engineering. Their designs were strongly striving for a true realisation of Le Corbusier's and modernist maxim of the machine for living-in. Since Archigram was not convinced that a building's firmitas was a crucial precondition of its utilitas and venustas, its projects destabilised the historically conditioned assumption of the Western world's architecture that architecture is a static art [Sadler, 2005: 6].
Banham's and Archigram's upfront optimism and enthusiasm about the new, though still within the functionalist ideology, was not undermined by post-war scepticism about the liberating power of technology, which was typical both for the Team 10 circle and some representatives of the older generation. Clearly rooted in the second machine age, Archigram's architecture was emotionally and technologically related to the 1960s space area. Moreover, its independent, mobile and completely furnished and equipped structures weakened Banham's sceptical attitude towards the possibility of pop architecture, which gained a new dimension and new hope for realising the *architecture autre*. [Whiteley, 2002].

Plug-in City: manifesto for the plug-in concept

Through Le Corbusier and the Smithsons, the poetics of mass production was provided with successors, while the Smithsons' introverted, 'plastic' House of the Future (1956) led to first reinterpretations on the domestic ground, this time as part of a wider system of infrastructure/structure and autonomous plugged-in living units. Its central manifestation was Peter Cook's Plug-in City, which represents the best example of early efforts by the Archigram Group and individuals within it.
In terms of development, Archigram's Plug-in City explicitly outlined the plug-in concept on the level of architectural/urban design, putting it forth as a combination of ideas by group members from the 1962–1964 period. It was based on the prototype of a massive megastructure with removable living units and had a crucial impact on the development and popularisation of the 1960s megastructure tradition [Banham, 1976: 76]. In his 'self-interview', Yona Friedman notes that when developing Plug-in City Archigram literally borrowed his idea of fixed support infrastructure and moveable elements that randomly form living units of his projects from the end of the fifties, as did Shulze-Fielitz, Emerich, the Japanese Metabolists and many others. However, he does not perceive these projects as plagiarism, but finds a source of satisfaction in them, resulting from the success of his efforts to influence a generation [Friedman, 2006: 32].
The dynamic megastructure in the scale of an entire city comprised all essential features of technological pop architecture for a pop lifestyle characterised by continual changes and stimuli, excitement, action, fun and expendability. The secret of the possibility for permanent incompleteness and formal indeterminacy or aformality was hidden in the plug-in concept, in line with which the living or programme unit called the capsule was plugged to the infrastructure frame of the megastructure when necessary or desired, similarly as into an electrical socket. This idea of mass produced construction therefore differs from the traditional idea of the endless use of mass produced, interattachable modular elements. It is no longer a building's construction elements that are plugged to the infrastructural network, but entire living units of the building/the city, which is as much an architectural as an urbanist principle. Furthermore, the plug-in concept was accompanied by the clip-on concept, which was described in more detail and compared to the plug-in concept by Reyner Banham in his essay "A Clip-on Architecture" [Banham, 1965]. Banham illustrates the clip-on concept with the outboard motor that can equip all vessels. Originally, the clip-on concept was a concept related to connecting the source of power to the living unit, but as argued by Banham, it can also be appropriately used in the reversed case of plugging the living unit to the infrastructure, which was termed as plug-in by Archigram. Banham underlines that these concepts are technically quite often intertwined within a project, adding that the aesthetic is what matters. This is still the clip-on aesthetic, "multiplied by a wild, swinging, pop-art vision" that is completely different from the intellectually rigorous systems of pragmatic picturesque technology [Banham, 1965: 535]. The duality between the more permanent (mega)structure and temporarily clipped-on or plugged-in and expendable living or programme units, i.e. capsules, is entirely in line with the functional model of the consumer society, reflecting the still-present role of architects at least in regulating, if not in designing the architecture and the city.
Nevertheless, the design of Plug-in City was not only a fantastic idea put forth by the group, but was also directly related to the Living City exhibition, which was put on by Archigram at the London Institute of Contemporary Arts (ICA) in 1963. As the first group work, the installation used constructed situations called "Man, Survival, Community, Communications, Movement, Place and Situation" to establish a basic *modus operandi* typical for the group's projects in the following years and founded on informal expression, temporariness, consumerism, fun, democracy, individuality, social, political and economic liberalism and faith in the city as a unique organism [A Guide to Archigram ..., 1994]. The exhibition aimed at showing the spirit of life, which the new generation saw as a fundamental quality.
Individual thematic sections of the Living City exhibition provided general insight into the functioning of the living city, which significantly differed from strictly planned and regulated new cities criticised by Archigram.

Image, understanding the structure and continual change of the living city

The individualism and awareness of the need for developing tailor-made relationships in Plug-in City could be understood as a democratic gesture of a city in continual creation formed by as many forces as there are inhabitants. While the ideological foundation of Plug-in City as presented at the Living City exhibition focused on man, many critics objected to Archigram's proposals due to their apparent inhumanity. In "Housing as a Consumer Product", an article published in 1966, Warren Chalk attempts to better explain their intention, pointing out that they do deal with housing for people even though they use typical 'estranged' imagery. Further on, Chalk believes that the technological society will encourage more and more people to co-create their individual environment, in which architects create conditions for liberation from the restrictions presented by chaotic situations in the home, at work and in the entire built environment [Chalk, 1966]. Therefore, we cannot overlook the fact that Plug-in City in fact looks like a plug-in city; ironically, this could also be a reflection on a contemporary megalopolis of concrete capitalist wilderness, this time as perceived by Archigram with an entirely democratic, open design concept on the verge of anarchy, while including the individual in the city's design and expendability would ensure its necessary life vibrancy.

The authors provided no in-depth theoretic discussions on designing and actual functionality of such a city, although many critics of Archigram would have appreciated this [Scott Brown, 1968], as was also confirmed by Reyner Banham when he labelled Archigram as "short on theory, long on draughtsmanship and craftsmanship" [Banham, 1999: 5]. But he was not too concerned with the possibility of a functional megastructure Plug-in City, since he believed that its visualisation was then more important for progress of technological architecture. Banham supported his thesis with an operational turnaround that establishes architecture as a leading discipline: "Archigram can't tell you for certain whether Plug-in City can be made to work, but it can tell you what it might look like", providing the potential for the aesthetics, i.e. primarily the image of architecture, to direct technology development. Banham put Archigram's set of living cells and support structures on a pedestal of technological architecture, praising the liveliness and directness of the plug-in city, which also looks this way and helps observers understand how this continually emerging and changing incomplete organism functions [Banham, 1965: 535].

Complex images of various projects were not an end to themselves and could hardly be labelled as unidimensional illustrations for mass consumption due to their utopian potential and slogans calling for a different future. In fact, the contrary could be argued. According to Sadler: "With Plug-In City, we are at the outer edge of the early sixties avant-garde, primarily motivated not to make architecture better behaved, but to make architecture change life, much like the early avant-gardes" [Sadler, 2005: 14]. Again, technological operationality and the aesthetics of change serve social goals. Moreover, Banham argues that British graphic opportunism (in ideal megastructural cities) should not be mistaken for an ideological programme since collages of colourful plans populated by young and attractive residents of the leisurely world characterised by the post-industrialism of the New Utopians provide an empirical solution to finding anyone who could inhabit them as well as a theoretical proposal for who should inhabit them [Banham, 1976: 101]. Viewed from today's perspective, the changes of the world that Archigram's megastructures proposed appear to be full of contradictions. However, much like in the case of Banham, their endless technological optimism prevailed against the possibility of critical reflection that followed in the second half of the sixties.

Technology, hidden tradition and biological metaphors: the plug-in concept by Japanese Metabolists

A plug-in architecture also developed in Japan in the 1960s, but it had different social and ideological foundations and goals.

Cherie Wendelken associates Japanese Metabolists' rejection of the existing Japanese city and familiar architectural forms with the rejection of political rigidity and restrictions, as the flexibility and adaptability integrated in designs accounted for an unconditional demand for the individual's power and autonomy; she also argues that the autonomy that Metabolists gave to the individual programme or living unit that is separated from the frame relates to traumatic personal experiences with the totalitarian regime [Wendelken, 2000: 288]. As Kiyonori Kikutake discussed the existing city, which denies its unhealthy character and demands that the individual adapts to this, in the Metabolism 1960 manifesto, he highlighted the issue of the repressive institution of the traditional city and opened up the field for experiments in which each individual would be aware of the community and would have their own living space, while adapting the city to the individual and community life would reject or surpass the intolerable situation [Kikutake, 1960].

The Metabolist group continually worked in parallel with its mentor Kenzo Tange, examining the concepts he began to develop by criticising conservatism, including his own, and in turn inspiring the older master. Their critical revisionism of functionalism attempted to establish the framework for architectural expression that would point out the uniqueness of Japanese culture and preserve it by using Western engineering, modern technology and economy. Metabolism and its Japanese name, which stands for renovation and regeneration, relate to the concepts of transmogrification and reincarnation in Buddhism; group members embraced all these meanings but also saw the term as a way to reject nostalgia [Wendelken, 2000: 287]. Despite diverse Metabolist approaches Kiyonori Kikutake and Kisho Kurakawa placed a great importance on fantastic structures and using state-of-the-art technology in their projects, whereas Fumihiko Maki and Masato Otaka focused more on practical and contextual proposals. What they have in common is the approach to architecture that constructs the city

as a living organism beyond traditional aesthetics. Kurokawa [1977] describes his own aesthetics, highly similar to the brutalist one and generally typical also for his colleagues from the group, as a tendency for a plain, austere, natural, rustic and slightly sad expression encompassed by the terms the aesthetics of metabolism or the aesthetics of time. Important elements of Metabolist projects were continual change, the possibility of infinite expansion and organic growth controlled by technology, organisational flexibility with 'the participation of the public', interchangeability of individual architectural components based on their life span, prefabrication and use of mass-production mechanisms, the importance of the liberating mobility and space of leisure, and, on the product level, designs of plug-ins and multicellular cluster structures.

Utopianism and surpassing the either-or state

Although Metabolists were aware of the utopian dimension of proposals, they did not perceive their work to be traditionally utopian as understood in the West, since their proposals depended on feasible technical possibilities of the period [Kurokawa, 1977]. The utopianism of Metabolist projects was committed to the urgency of social change. Urbanist projects by Metabolists promoted political ideals and social ambitions, demanding, as was the case for many intellectuals at the time, social features of the modern age, such as democracy, equality, liberation from land and free mobility. Often, paradoxically, they were trapped in classical utopian schemes of hierarchical organisations, central administration and regulations with the ambition of merging classical contradictions of city and country, centralisation and democracy, order and freedom, tradition and modernity [Lin, 2010: 73–74]. However, in Japanese culture conflicting pairs do not signify an unbearable situation but offer potential. Kurokawa saw this co-existence of opposites as a significant Eastern contribution to contemporaneity and a tool for conceptualising his architecture: "Coexistence in architecture does not mean the resolution of conflicts; it means the development of third space which enables conflicts to exist side by side in harmony while remaining at variance" [Kurokawa, 1977: 140].

Similarly fortified permanent concrete infrastructural cores of artificial lands are set against tiny, transient and replaceable plug-in programme or living units. The analogy is clear. As man's physical life is transient, his programme or dwelling equipment, or in the most extreme case the entire plug-in living unit – often named the capsule, is also transient, whereas the platform – (mega)structure – on which life unfolds is permanent. However, since nothing is eternal in physical nature, the infrastructure and other components also have their own, different life spans.

The issue of technology 3

Due to their focus on technological solutions and megalomanical dimensions of megastructures, which would provide fast solutions to social problems, the Metabolist group, and especially Kikutake and Kurokawa, were categorised in the sphere of utopias, visionary architectures and rhetorical avant-gardism [Frampton, 1992: 306]. Nevertheless, Kurokawa notes that their understanding of technology differs from the Western one, which relates modernisation to a conflict between technology and humanity: the Metabolist group attempted to develop a new relationship between humanity and technology, striving for complete control of man over technology [Kurokawa, 1977: 27]. Despite the technological optimism of some Metabolists, ambivalence about the modern city, the modern society and the architect's role in it is evident in works by Noboru Kawazoe as well as Arata Isozaki, who belonged to a circle influenced by Metabolist ideas but was never a part of the group. From the early sixties onwards, Arata Isozaki infused his megastructure designs with scepticism. While the pragmatically utopian project City in the Air (also Cluster in the Air) from 1961 emphatically rejected the then urban planning and legal regulations, his famous collage Incubation Process expressed ambivalence through ruins connected to technological megastructures. With this collage, Isozaki showed a dystopian view of the future of "the city as ruins" in response to Metabolist utopian concepts, distanced himself from Metabolists' uncritical technological approach that failed to predict unexpected catastrophic changes brought by wars, and rejected the idea about the possibility of social revolution by means of technology use [Lin, 2010; Nitschke, 1964: 520].

Mobility and individualisation

The connection between the plug-in concept and mobility is undoubtedly an important category that distinguishes the concept from other (permanent) cellular (megastructure) systems. Its focus on individuality and self-sufficiency radically intervenes in the society's structure and space as a sedimentary historical phenomenon, automatically transforming it into a space of ever-changing relations, a network space that was formulated by Foucault in a visionary manner [Foucault, 1967: 23]. Based on the plug-in concept, the possibility of freely movable plug-in units, i.e. capsules, enables a changing society that Kurokawa strives for as he believes in a natural organisation of the environment as a result of people's free will. Moreover, Kurokawa underscores the importance of forming the urban society and its environment, which he believes cannot be created by urbanists and architects by using technology. In "Capsule Declaration", Kurokawa is, of course, aware that a system is necessary in spatial planning, but he argues for a non-repressive system with emphasis on the individual and manifested as a self-regulating system of spatial units for individuals; space should be divided into independent shelters, where every inhabitant "can fully develop his individuality" [Kurokawa, 1977: 79].

Kurokawa's capsule city can also be understood as criticism of the modernist city of 'four elements' and a fantastically diverse conglomerate named the metapolis or an urban settlement integrated into the network city or larger urban system. Employing a geometric approach, classical urbanism strove to establish order, whereas the Metabolist approach aims at creating a dynamic, open structure of cities and

buildings. With the latter Kurokawa also wants to surpass the role of architecture as a controlling mechanism of society. In Kurokawa's own words, henceforth "architecture is no longer a device to control men: it is a means whereby men control technology and machinery" [Kurokawa, 1977: 85]. This view is parallel to Banham's endeavours for the other architecture that would direct technology development through concepts – images [Banham, 1965: 535], but Kurokawa's faith in a complete fusion of architecture (the capsule) with the organism does not reveal whether this union is entirely unconditional and whether it could happen that man would adapt to the capsule more than desired, thus opening the issue of faith in the purity of technology. Regardless of theoretical promises about autonomy, Kisho Kurokawa's designed or developed architecture of plug-ins is (permanently) connected to the infrastructure, plugged to the megastructure or a part of a larger spatial design, where its practical mobility remains only symbolic despite provided technical conditions.

Figure 2: Kenzo Tange, Shizuoka Tower, Tokyo, 1967. [photo: author]
Slika 2: Kenzo Tange, Stolp Shizuoka, Tokio, 1967. [foto: avtor]

Designs between wishful thinking and the philosophy of change

Early projects by Archigram and Metabolists at a large scale of urban designs undoubtedly blazed a trail for the plug-in concept in the context of megastructure idealism, while designs, primarily of buildings, at the end of the sixties already showed that the concept was wearing out.

By analogy with the plant stem, in early projects by Metabolists and Archigram many units are connected to the core as branches. Examples with such designs include Kiyonori Kikutake's Tower Shape Community, Kisho Kurokawa's Bamboo Type Community from the end of the fifties or Capsule Homes (1964) by the Archigram member Warren Chalk, as well as Kisho Kurokawa's buildings Nakagin Capsule Tower and Capsule House 'K' (1972). In addition to Archigram's nomadic projects, such as Blow-out Village (1966) or Free Time Node: Trailer Cage (1967), and Metabolist spiral structures waiting for random completion as in Le Corbusier's Plan Obus and
Kurokawa's Takara Beautillion, typical examples of frames and plug-in units include the concept of space frames with *ad hoc* cellular dwellings by Yona Friedman and French 'spatial urbanists' among others.

Figure 3: Kisho Kurokawa, Nakagin Capsule Tower, Tokyo, 1972.[photo: author]
Slika 3: Kisho Kurokawa, Kapsulni stolp Nakagin, Tokio 1972. [foto: avtor]

It was in fact the question of rationality of the plug-in concept related to built projects that received most criticism in the history of Metabolist realisations, although these critics were, at least

at the beginning, apologists of the movement in many ways. After Kenzo Tange's Shizuoka Press and Broadcasting Center was built in 1967 in Ginza in Tokyo and introduced an explicitly Metabolist appeal, the abyss between theoretical proposals and practice emerged. In Tange's project, the Metabolist approach of possible change is frozen in an economically still acceptable stage, while potential growth of undeveloped parts of the structure remains primarily symbolic. Is the Shizuoka Press and Broadcasting Center, about which Günther Nitschke rhetorically wondered whether it was a "prototype" or whether sets of programme units connected to the main core resulted from "wishful thinking", in fact unreasonable as it is flexible on the symbolic level only [Nitschke, 1968]? Despite all criticism first realisations can be seen as foundations that encouraged Metabolists and Tange to develop megastructural and more refined designs of plug-ins at the Expo '70 exhibition in Osaka and otherwise rare applications at the beginning of the 1970s.

The Expo '70 Takara Beautillion project, which Kurokawa designed as a three-dimensional space frame network structure with inserted and plugged-in functional elements – capsules is an illustrative example of the ever-changing and transient Metabolist architecture of the plug-in concept, which, as Kurokawa points out, showed rounded beauty at Expo '70. It took only a few days to build it, while "[d]isassembly was similarly easy to perform ...; [i]t was like the falling petals of a cherry blossom tree...", in which Buddhist aesthetics was reflected: "In Buddhism it is considered noble to fulfill one's life and pass away beautifully, in accord with nature" [Kurokawa, 1977: 101].

At the temporary Expo '70, the co-existence of opposites of the spectacle of fantastic architecture and the direct transience of individual parts inherent in projects was shown as a complete cycle of a Metabolist circle of life. The principle of the interchangeability of elements highlighted by Japanese Metabolism was supposed to be primarily of a practical, technological nature and derives "from philosophy entirely different from the use-and-discard approach sometimes justified by economics in mass consumption societies" [Kurokawa, 1977: 32], thus also significantly differing from pop and consumerist speculations of the Archigram Group. On the one hand, the beauty of transience as a result of technological pragmatism is experienced, and on the other hand, continual change and regeneration is also driven by the economic system that is based on mobility.

The decline of megastructures and use of the plug-in concept in contemporaneity

Justus Dahinden offers a typical view on utopian megastructure designs in the sixties with their faith in progress and new technology in his book *Urban Structures for the Future*, in which he enthusiastically argues for building megastructures as densely populated environments [Dahinden, 1972: 11] also enabled by systems of plug-in units.

Despite continuous criticism compact megastructures presented a risk-worthy opportunity for reintegrating social and urban structures and merging diverse social groups and activities. Both for Dahinden and the megastructure international they were an instrument of synthetic urbanism that aimed to establish unity between architecture, economy, communications and social contacts and offer an alternative to the urban crisis of a dispersed and functionally fragmented city. In contrast to the expanding automobilised suburbia, the megastructure offered a compact developed whole, which promotes a free micro-organisation of contemporaneity and unpredictable future through the idea of achieving the urban density of the past.

However, a number of mentioned positive features of these proposals also brought hitherto unpredicted and unconceived issues that critics saw as even more convincing. Such enthusiasm about megastructures and the architecture of plug-in units weakened considerably at the end of the sixties and after the May events in 1968, but some architects, for instance Dahinden, persisted with enthusiastic views even at the beginning of the seventies. Relevant questions were put forth, for example by Denise Scott Brown [1968], who was wondering who would populate dwellings in megastructures, or Jürgen Joedicke, who warned that the faith in future was too strong, as this meant that conditioning people to live in such superstructures was self-evident while architecture was interpreted beyond serving man [Lüchinger, 1981: 12]. Furthermore, architects themselves also realised that megastructures were politically problematic. Naturally, investments in high technology were related to the capital and would indirectly support the existing capitalistic system strengthened by multinational corporations. Therefore, the general public saw megastructures as a symbol of liberal capitalism with all negative connotations; as such, they were quickly incriminated and only rarely built [Banham, 1976: 209]. Despite respecting Fuller and his universalistic diapason, Archigram's work in the playful swinging sixties focused more on experiment than on truly solving the pressing issues of the world, which was not the case for Metabolists. It is thus not difficult to understand the admittedly somewhat satirical answer that Reyner Banham offered to Scott Brown's question about the established economic, social, political and other relations in Archigram's Plug-in City ("what is everybody doing up there together with everybody in those megastructures?" [Scott Brown, 1968: 230]), as he suggested that they were "rearranging the equipment for the next game!!" [Banham, 1976: 81].

If the co-existence of opposites, contradictions and indeterminacy is a characteristic of ambiguous contemporaneity, the open plug-in concept is as much utopian as it is prophetic and appropriate for interpretations and use in contemporaneity. The concept is thus relevant in the contemporary space either in its original, physical form of plug-ins in designs and projects of interior and urban furniture [Filipič, Šenk, 2012] or as an urbanist concept on the metaphorical level. Lang defines urban design based on a typology comprising of the procedural type, the product type and the major design paradigm, with the plug-in type being that kind of the procedural type that refers to the design and implementation of an infrastructure project in order to obtain

Figure 4: Studio Stratum, Plug-in Urban Furniture, Postojna, 2005–2008. [Studio Stratum archives]
Slika 4: Studio Stratum, plug-in urbana oprema, Postojna, 2005–2008. [arhiv Studio Stratum]

a catalytic effect with interventions in space [Lang, 2005]. Similarly as Banham, though not citing him, Lang classifies plug-in projects into two types [Lang, 2005: 33]. The first type includes infrastructure in a district or suburb, enables plugging buildings to the infrastructure, as is the case in Plug-in City, and can direct development, whereas the second type comprises connecting the infrastructure to existing buildings and enhances the quality of the living environment, similarly as the clip-on concept. This kind of typology therefore appears to fit the conditions of a contemporary city that has lost the illusion of perfection and finality and is perceived as a process, "a dynamic system of diverse structures and connections, which continually move from order to entropy and pass through various states and oscillations in development" [Koželj, 2007: 196]. The plug-in typology fulfils the tendency for defined infrastructure and softly organised plugged-in building tissue.

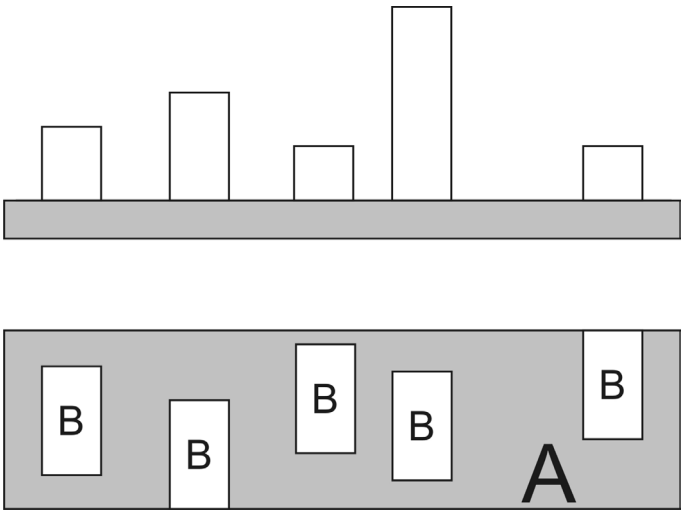

Figure 5: Plug-in concept - horizontal setting: infrastructural field (A) with plug-in programme units (B). The setting is operative in different scales - from urban furniture design to urbanism. Plan and section.
Slika 5: Koncept plug-in - horizontalna izvedba: infrastrukturno polje (A) s priključnimi (vtičnimi) programskimi enotami (B). Izvedba je operativna v različnih merilih - od zasnov urbane opreme do urbanizma. Tloris in prerez.

Conclusion

Examining contexts of both protagonist groups that deal with the plug-in concept, a system of contradictions that co-exist in projects was identified. Archigram's openness and playfulness was undoubtedly influenced by the ideological openness of the Independent Group, which rejected the "either-or" dualism and promoted the "and" principle of inclusion, while this openness can also be related to blurring the boundaries of contemporary visual culture and merging high culture with pop, the rough world of general everyday culture saturated with consumer goods. On the other hand, the co-existence of opposites in Japanese culture, as well as in Metabolists, represents the potential for developing new entities that maintain diversity and allow these conflicts to co-exist in harmony.

Heterogeneity and multilayerdness is also typical for two

demands that are self-evident for contemporaneity and were already highlighted in the pioneering period – individualism and mobility as also being enabled by the plug-in concept.

The concept's technological operationality indicates a possibility for solving housing issues, simultaneously underlining the need for adapting the housing typology to an individualised society of the future in both pioneering examples. Moreover, the redefinition of society is radical in both cases and foreshadows atomisation into individuals, who thus gain the opportunity for individual fulfilment (through a lifestyle or spiritual fulfilment) but are also more perceptible for manipulations of the information or consumer system.

In both examples, structures have interfered with existing power relations of land ownership, which control urban development possibilities, and introduced alternative spatial designs with dwelling mobility. The anticipated alternative system of managing plug-in units, which also promotes a free and flexible choice of location for the dwelling, has proven to be problematic as such management is enabled by technology that could be designed as neutral in a utopian manner. At the same time, free mobility has rendered (mega)structure management into a matter of the structure of power and control. Moreover, surpassing the dualism of utopia and everyday life in projects facilitated the merging of the two into an attractive, though not entirely reflected conglomerate wrapped in the aesthetics of change and incompleteness.

It can be concluded that the system has commodified the utopian aesthetics of change into an operational and inevitable technological reality, which is attractive but systematically conditioned in contemporary space. In contemporaneity, the plug-in concept, with the infrastructure and plug-in system, enables the operational principle of a participatory planning of the material world characterised by the proverbial principle of forming conditions and not conditioning forms. Although the revolutionary sixties are far behind, apart from the examples of use in interior design and urban furniture, the plug-in concept in its commodified form has become and remained operational and relevant at least on the metaphorical level, being evident primarily in urbanism and not as much in its original architectural form.

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AMERIŠKA VEČSTANOVANJSKA ARHITEKTURA V DRUGI POLOVICI 19. IN PRVI POLOVICI 20. STOLETJA

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AMERICAN MULTI-DWELLING ARCHITECTURE OF THE SECOND HALF OF THE 19TH CENTURY AND FIRST HALF OF THE 20TH CENTURY

izvleček

Konec 19. in začetek 20. stoletja je bil razvoj ameriške večstanovanjske arhitekture zaznamovan s prehodom iz standardne gradnje samostojnih družinskih in vrstnih hiš v novo stanovanjsko tipologijo, ki je odgovarjala vsem novim urbanističnim pravilom in zahtevam sodobnega načina bivanja v mestih. New York je bilo prvo ameriško mesto, ki je bilo soočeno s problemom goste poselitve na prostorsko omejeni površini.

Razvite so bile tlorisne zasnove "U, E, H", ki so bile v obdobju veljave urbanističnega pravilnika iz leta 1916 najbolj uporabljane. Urbanistični pravilnik iz leta 1916 je prinesel v newyorški urbanizem še eno novost, in sicer vertikalne zamike zunanjega gabarita objekta. Posledično s tem so se začeli graditi objekti s stopničastim gabaritom z bistveno večjim številom etaž.

Rešitve, razvite v newyorški stanovanjski arhitekturi, so druga mesta povzemala in pod vplivom lokalnih specifičnosti naprej razvijala. Najbolj zanimiv je Chicago, kjer je bilo med letoma 1924 in 1929 zgrajenih več izjemno kakovostnih stanovanjskih objektov, ki z doslednim načrtovanjem tlorisnih zasnov objektov in zasnov stanovanj močno odstopajo od tedanje stanovanjske gradnje v New Yorku.

ključne besede

tenement , "U, E, H" tlorisne zasnove, večstanovanjski objekt, tloris stanovanja, stanovanjski hotel

abstract

At the end of the 19th and beginning of the 20th century, the evolution of American multiple-dwelling architecture was marked by the passage from the standard construction of single-family standalone homes and row houses to a new housing typology which corresponded to all of the new urban planning rules and requirements of the contemporary way of life in cities. New York was the first American city to face the problem of dense settlement in limited spaces.

The »U, E, H« ground plan designs were developed and were most commonly used during the period when the Building Zone Resolution adopted in 1916 by New York City was in force. The Building Zone Resolution introduced another novelty into New York town planning, i.e. the setting back of exterior walls above a determined height. Consequently, this gave rise to buildings with stepped profiles and many more storeys.

The solutions developed by the New York residential architecture were adopted by other cities and further developed in line with specific local influences. Chicago is the most interesting of these cities; between 1924 and 1929 several quality housing complexes were built there which strongly deviated from the then housing construction in New York by the consistent ground plan designs of structures and apartment designs.

key words

tenement, "U, E, H" ground plans, multiple-dwelling building, apartment ground plan, residential hotel

Hipoteza

Konec 19. in začetek 20. stoletja je ameriško večstanovanjsko arhitekturo zaznamoval proces iskanja nove tipologije večstanovanjskega objekta, ki bi ustrezala prihajajočemu obdobju goste pozidave v vseh večjih ameriških mestih. Premožnejši sloj prebivalsta New Yorka je bil tisti, ki je zagnal ta proces. Investitorji in arhitekti pa so bili tisti, ki so poskusili ponuditi ustrezne rešitve na trgu povpraševanja, sočasno pa so nove oblike nepremičninske ponudbe usklajevali s spreminjajočimi standardi in zakonodajo s področja urbanizma in gradnje. Vzporedno z razvojem nove ponudbe na newyorškem nepremičninskem trgu je mogoče spremljati razvoj večstanovanjske arhitekture tudi v Chicagu, ki nekatere rešitve povzema iz New Yorka, hkrati pa ustvarja svoje specifične rešitve, ki jih omogočajo posebnosti Chicaga.

Metoda

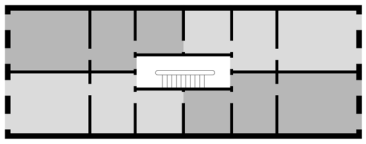
Raziskava temelji na podrobni analizi večjega števila stanovanjskih objektov. Analiza obravnava funkcionalno zasnovo objekta, tlorisno zasnovo posamezne enote, konstrukcijo, sociološki in zgodovinski aspekt. V ožji izbor in predstavitev so bili vzeti objekti, ki zaradi svoje zasnove, značilnosti in kakovosti jasno prikazujejo faze v razvoju večstanovanjske arhitekture.

Uvod

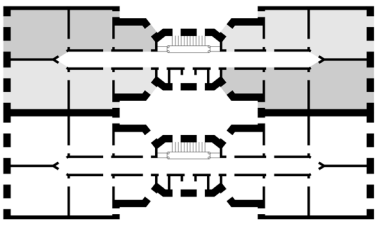
Že od samega začetka ameriška stanovanjska arhitektura temelji na tipologiji prenešeni z evropskega kontinenta, predvsem območja Anglije, ki je med prvimi naselila ameriški kontinent. Angleška stanovanjska tradicija je v Ameriko prinesla stanovanjsko tipologijo samostojnih enodružinskih in vrstnih hiš. Zaradi prostorske neomejenosti ameriškega, skoraj neposeljenega kontinenta, je razvoj mest temeljil na tipologiji enodružinskih in vrstnih hiš. Kasneje je v večjih mestnih središčih prišlo do pojava prostorske stiske, zato so se iskale rešitve v drugih stanovanjskih tipologijah, ki bi prebivalcem omogočile gradnjo stanovanjskih objektov v spremenjenih prostorskih razmerah. Primer tega je "shotgun house", ozka podolgovata enodružinska hiša, značilna za urbane predele zvezne države Louisiana. S pomanjkanjem novih zazidljivih površin v centru mesta so se soočala tudi druga večja mesta kot so Boston, Philadelphia, Chicago in New York, kjer se je razmeroma kakovostna tipologija enodružinskih vrstnih hiš transformirala z delitvijo na posamezne bivalne enote, ki so ustrezale tedanjim potrebam. Vsako mesto je pod vplivom svojih specifičnih, družbenih, prostorskih in finančnih, vplivov razvijal lastno specifično večstanovanjsko arhtekturo. Pri tem imata New York in Chicago najbolj specifične rešitve.

Tenement, objekt z najemniškimi stanovanji

V 19. stoletju je New York doživljal zaradi hitrega razvoja veliki primanjkljaj novih zazidljivih parcel. Rešitev je bila intenzivna gradnja vrstnih hiš, namenjenih tako bogatim kot revnim prebivalcem mesta [Riis, 1890]. Sprva se je vrstna hiša izkazala kot odlična rešitev, vendar z intenziviranjem gradnje in sledenju visokemu faktorju pozidanosti je prihajalo do resnih težav. Objekti so postajali vse bolj ozki in podolgovati, osnovni bivalni pogoji (osvetlitev in prevetritev prostorov) pa pogosto niso bili zagotovljeni (Slika 1). Problem je bil najbolj izrazit v tako imenovanih "tenement" (izraz, ki označuje zgradbo v New Yorku sestavljeno iz najemniških stanovanj) objektih [Riis, 1890], namenjenih predvsem najbolj revnemu sloju prebivalstva, kjer je praviloma le en prostor stanovanja imel okno.



Slika 1: Tenement objekt pred pravilnikom "New York State Tenement House Act" iz leta 1901.
Figure 1: Tenement building before 1901 Tenement House act.



Slika 2: Tenement objekt po sprejetju pravilnika "New York State Tenement House Act" iz leta 1901.
Figure 2: Tenement building after 1901 Tenement House act.

Po nekaj letnih ostrih kritikah na bivalne razmere v mestu je bil leta 1901 sprejet nov pravilnik "New York State Tenement House Act" [Laws of 1901...], ki je v večstanovanjskih objektih zahteval umestitev notranjih atrijev (Slika 2). Le ta so v veliki meri pripomogla k izboljšanju bivalnih pogojov v tovrstnih objektih. Kljub pozitivnim spremembam se je težko izogniti dejstvu, da je tovrstna tipologija stanovanjskih objektov vsebovala omejitve, katerim se ni bilo možno izogniti. Zgolj povpraševanje na nepremičninskem trgu po luksuznih bivalnih enotah je investitorje in arhitekte usmerilo k iskanju novih tipologij, ki bi zagotovile visok nivo bivalnih pogojov. V nasprotju z bogatimi revnejši sloj prebivalstva ni imel možnosti si zagotoviti boljših bivalnih pogojov. Revnejši sloj prebivalstva, kljub neštetim spremembam v urbanih parametrih, je ostajal v bivalnih enotah izredno nizke kakovosti bivanja. Šele po drugi svetovni vojni so se zgodili večji premiki na področju gradnje velikih stanovanjskih kompleksov, ki so zagotovili primeren dom tudi revnejšemu sloju. Stanovanja nižjega cenovnega ranga so bila vedno grajena z zagotovitvijo minimalnih pogojev, ki so jih določali zakoni in pravilniki, zato je bil njihov razvoj pogojevan z zakonskimi spremembami [Hawes, 1993]. Prav zaradi tega se nadaljnja vsebina osredotoča zgolj na luksuzna stanovanja, ki so zaradi narave delovanja nepremičninskega trga generator razvoja novih rešitev in s tem novih stanovanjskih tipologij.

Kareji

The Dakota, New York, NY

S koncem 19. stoletja je nastopilo v mestnih središčih obdobje velike prostorske stiske in s tem naraščanje cen kakovostnih enodružinskih hiš, zato se je povečalo povpraševanje po luksuznih stanovanjih, katera bi zagotavljala visok nivo bivanja. Kot odgovor na trenutno situacijo je Edward Clark, lastnik tovarne šiviljskih strojev Singer, leta 1884 dal zgraditi po projektu arhitekta Henry J. Hardenbergh znameniti stanovanjski objekt, imenovan The Dakota [Historic American Buildings...].

Slika 3: Stanovanjski objekt The Dakota, tloris tipičnega nadstropja.
Figure 3: The Dakota, typical floorplan.

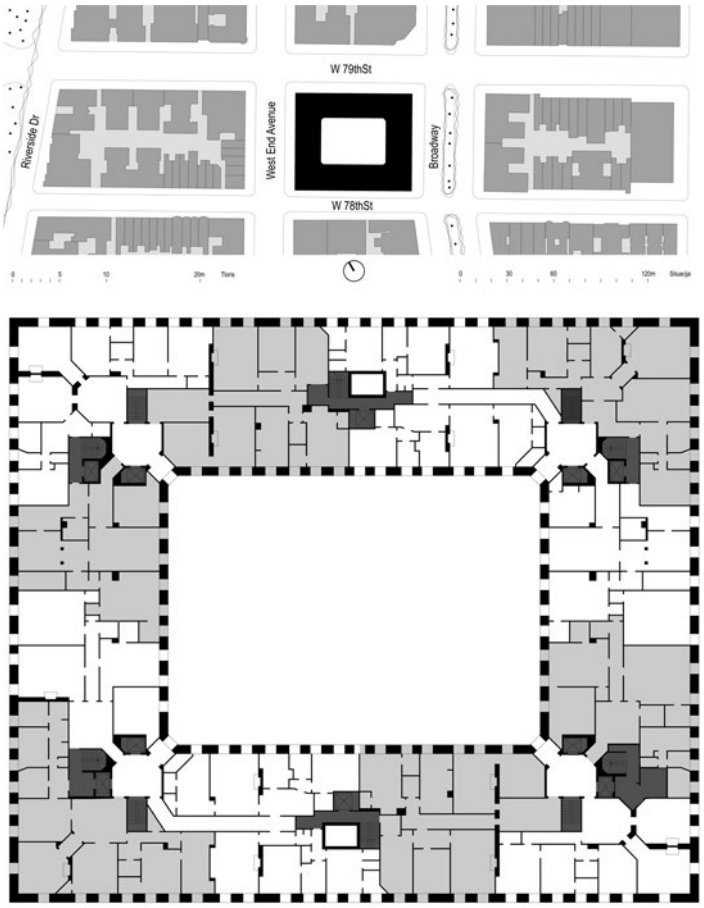
The Dakota, kot večina tovrstnih dotedanjih objektov, je bil v osnovi ‘apartment hotel’, objekt namenjen bivanju za daljši čas. Sistem delovanja objekta je bil precej preprost: lastnik, kot pravna oseba, je oddajal stanovanja, ki so bila praviloma popolnoma opremljena, za daljši čas, najemnikom pa obenem nudil hotelske usluge, kot so čiščenje, dostava hrane in podobno. Pozitivna stran takšne oblike najema je bila, da je bil najemnik izvzet iz plačila nepremičninskega davka, obenem pa je ohranil vso fleksibilnost, ker ni bil vezan na dotično nepremičnino, v kateri bi morebiti imel vloženo premoženje. Takšen sistem je bil bistveno bolj prilagodljiv in je sledil življenjskim potrebam najemnikov. The

Dakota je bil zgrajen v delu mesta, imenovanem Upper West Side, ki je bil tedaj precej ruralen. Za to območje je določal pravila in pogoje gradnje tedaj veljavni urbanistični načrt iz leta 1811. Za čim večjo izkoriščenost zazidalnega območja je Hardenbergh formiral stanovanjski objekt okoli osrednjega atrija (Slika 03, Slika 04), ki je poleg zasebnega vstopnega dvorišča zagotavljal osvetlitev in prevetritev prostorov stanovanj, orientiranih na atrij. Po vertikali je objekt razdeljen na tri dele: servisni del vključuje klet in pritličje, kjer so kurilnica, shrambe, kuhinje in restavracija v pritličnem delu. V nadstropjih so stanovanja, v podstrešnem delu pa prostori oskrbnega osebja in posamezni skupni prostori namenjeni stanovalcem (telovadnica, otroški vrtec, ...). Po nekaj letih je bil objekt The Dakota prvi v New Yorku, ki je nudil visoko kakovostno bivalno okolje primerno urbanim zahtevam. Vsa stanovanja imajo dvojno orientacijo, dnevni prostori in glavna spalnica so obrnjeni navzven, jedilnica, servisni prostori in manjše spalnice pa gledajo na notranje dvorišče. S svojo funkcionalno zasnovo Dakota v veliki meri spominja na evropske dvorce 17. in 18. stoletja, kateri so v kleteh imeli servisne prostore, v nadstropjih bivalne prostore, podstrešja pa rezervirana za služabnike. Tovrstna funkcionalna rešitev se je na primeru Dakote pokazala kot popolna rešitev.

Slika 4: The Dakota. [vir: West 72nd street facade, Library of Congress Prints and Photographs Division]
Figure 4: The Dakota.

The Apthorp, New York, NY

Drugi objekt karejske zasnove je The Apthorp zgrajen leta 1908. Objekt je zasnovan zelo podobno kot Dakota, vendar ima večje število manjših in manj luksuznih stanovanj (Slika 05, Slika 06). Pri objektu Apthorp je izrazito izražena višinska omejenost gradnje v kareju. Pri klasični karejski zasnovi objekta je bila optimalna višina objekta z deset do dvanajstimi etažami s primerno širino atrija. Le v teh pogojih je bilo mogoče v vseh stanovanjih vseh etaž zagotovljati sorazmerno ugodne bivalne pogoje v smislu prevetritve in osvetlitve, še posebej v najnižjih etažah. V New Yorku je postopoma prišlo do pojava, da je karejska gradnja onemogočala gradnjo objektov z več kot 12 etažami [Hawes, 1993]. Problem karejske gradnje v New Yorku je netipična oblika urbanega bloka, ki je glede na svojo širino izredno podolgovat, kar onemogoča klasično karejsko gradnjo posameznih objektov na obodu bloka, kot se je to prakticiralo v Evropi. Poleg tega so newyorški urbani bloki deljeni na veliko število manjših parcel, kar še dodatno otežuje karejsko gradnjo. Iz predhodno navedenega je jasno, zakaj je bila karejska gradnja v New Yorku bolj izjema kot pravilo.



Slika 5: Stanovanjski objekt The Apthorp, tloris tipičnega nadstropja.
Figure 5: The Apthorp, typical floorplan.

Objekt Apthorp je eden od treh zgrajenih objektov karejske gradnje v celotnem New Yorku. Ta objekt zajema skoraj vse splošne značilnosti newyorških večstanovanjskih objektov, grajenih konec 19. in začetek 20. stoletja, zato je mogoče podati naslednje ugotovitve:

1. Kljub izredno preprostemu in jasnemu volumnu objekta ter velikokrat dosledni in logični postavitvi vertikalnih komunikacij, je tlorisna zasnova objekta in stanovanj izredno kaotična in nejasna.
2. Notranji prostori redko sledijo členitvi in hierarhiji fasade.
3. V tlorisni zasnovi stanovanj je poudarek na sprejemnih in glavnih bivalnih prostorih, kot so sprejemni prostor, dnevna soba, jedilnica, knjižnica/delovna soba. Ti prostori so najbolj skrbno oblikovani, predvsem v zasledovanju ustreznih proporcijskih razmerij in oblik. Preostali

prostori stanovanja so snovani manj skrbno, večkrat nerodno in nepremišljeno.

4. Zaradi nekakovostnih zasnov tlorisov stanovanj z nerodnimi in nepraktičnimi postavitvami zidov mnogokrat prihaja do neustrezno ali nezadostno izkoriščenih delov stanovanjskih prostorov.

Slika 6: The Apthorp. [vir: Hawes, 1993]
Figure 6: The Apthorp.

Kljub inovativni in izredno kakovostni zasnovi objektov karejske gradnje ter izredno velikemu povpraševanju po teh stanovanjskih enotah, je bila dostopnost do parcel, primernih za karejsko gradnjo, omejena, zato so se postopoma opuščale karejske zasnove in iskale druge rešitve, odgovarjajoče velikostim parcel in dimenzijam urbanih blokov.

Vpliv newyorškega urbanizma na zasnovo večstanovanjskih objektov

Istočasno, ko so se v New Yorku ukvarjali z iskanjem novih rešitev v stanovanjski gradnji goste in strnjene pozidave, se je v Evropi odvijal razcvet karejske gradnje znotraj urbanega bloka. Zato se na tem mestu zastavlja vprašanje, zakaj se karejska gradnja v Ameriki ni obnesla, v Evropi pa je vidno prosperirala. Odgovor na to zadrego je povsem preprost. Urbani bloki v New Yorku so precej ozki in podolgovati, v Evropi pa so praviloma kvadratne oblike in večjih dimenzij, prav plansko načrtovani za gradnjo v karejih. Odgovor na precej nerodno obliko urbanih blokov v New Yorku je moč najti v pregledu na razvoj newyorškega urbanizma. Osnutek za newyorške urbane bloke je bil izdelan leta 1811 z urbanističnim načrtom "The Commissioners' Plan of 1811" (Slika 07), ki je določal mrežo ulic za celotni otok Manhattan. Razlog za precej nenavadne dimenzije urbanih blokov je relativno težko najti, ker se strokovna literatura osredotoča zgolj na načrtovanje mreže in dimenzioniranje ulic, ne pa na same dimenzije urbanih blokov. Konkretnih in smiselnih razlogov za dotične dimenzije blokov do tedaj ni bilo nikjer podanih, vendar iz preučevanega je mogoče podati povsem enostavne ugotovitve. Gradnja na Manhattnu pred letom 1811 ni bila kontrolirana, raster ulic, njihove dimenzije in vrsta gradnje so bile prepuščene posameznim graditeljem oziroma investitorjem. Konec 19. stoletja je bila povprečna širina bloka cca. 140 do 200 ft (42 do 60 m), kar je bilo primerno za tedaj prevladujočo stanovanjsko tipologijo gradnje, ts. enodružinske in vrstne hiše. Širina urbanih blokov po planu iz leta 1811 je praviloma znašala 200 ft, iz tega je mogoče sklepati, da so načrtovalci za izris mreže nadaljnjega razvoja mesta preprosto prevzeli že obstoječe zarisane dimenzije in jih prenesli v nov plan. Glavni načrtovalec urbanističnega načrta iz leta 1811 je bil po izobrazbi geodet, brez formalnega znanja s področja arhitekture ali urbanizma [Allen, 2008]. Poleg neustrezne dimenzije blokov, ki bi omogočala preprosto gradnjo visokih objektov visokega bivalnega standarda, originalni načrt plana ni imel, niti ni predvideval večjih odprtih površin. Ta zadrega je odraz nezainteresiranosti planerjev do ustvarjanja kakovostnega mestnega okolja. V zasnovi mesta je bil poudarek na ureditvi sistematične mreže ulic. Med večje odprte površine je bila vključena le ledina za vojaško vadbo in parade, danes najbolj prepoznana zelena urbana tvarina v mestu New York je Central Park, ki je nastal šele pol stoletja kasneje po sprejetju plana, in še to, njegov nastanek izvira v povsem utilitarnih potrebah, zagotavljanju pitne vode. Kasneje se je poleg ogromne vodne ploskve, rezervoarja za vodo, razvila ogromna parkovna površina. Na podlagi zapisanega bi se lahko zaključilo, da so zarisane dimenzije standardnega urbanega bloka po vsej verjetnosti produkt slučajnosti in ne strokovnega premisleka.

Slika 7: Del karte New Yorka iz leta 1827, detajl. [vir: Anderson, H., "A Map of the City of New York," in CU Libraries Exhibitions , Item #3611, https://ldpd.lamp.columbia.edu/omeka/items/show/3611 <avgust, 2012>]
Figure 7: Map of New York in 1827, detail.

Plan iz leta 1811 je predvideval neomejeno delitev posameznega urbanega bloka na posamezne parcele in prosto pozidavo znotraj njegovih dimenzij. Sprva so se znotraj blokov gradile enodružinske in vrstne hiše z vmesnim zelenim pasom v osrednjem delu bloka. Dimenzije blokov so bile optimalne za to tipologijo stanovanjske gradnje. Pri katerikoli drugi vrsti stanovanjske gradnje je zeleni vmesni pas izgubil svoj namen

in je bil predmet pozidave. Pri tem je potrebno omeniti tudi drug aspekt obravnave urbanega bloka. Z združevanjem dveh nasprotnih parcel, z ene in druge strani ulice, so bili dani osnovni pogoji za boljše rešitve katerekoli stanovanjske ali poslovne gradnje. V Evropi se takšna oblika gradnje, združevanje dveh nasprotnih parcel v urbanem bloku, ni obnesla zaradi same oblike in dimenzij bloka. Po metodi združevanja dveh nasprotnih parcel znotraj bloka je bilo realiziranih izredno malo takšnih rešitev. Iz tega je mogoče sklepati, da so dimenzije urbanih blokov v New Yorku dokaj nerodne in s tem posebne, kar je zahtevalo dodaten razmislek o učinkoviti izrabi parcele za pozidavo. Torej lahko zaključimo, da je splet nespretnih okoliščin pri načrtovanju zasnove urbanističnega plana leta 1811 je doprinesel k razvoju novih stanovanjskih tipologij konec 19. stoletja.

"U, E, H" tlorisne zasnove

Kot odgovor na zgoraj opisane probleme newyorškega urbanizma se vzporedno z gradnjo objektov Dakota in Apthorp pojavljajo stanovanjski objekti zasnovani v obliki črk U, E, H in kombinacijah le-teh. Tlorisne zasnove objektov so bile narejene z odstranitvijo ene stranice kareja in s tem je bil formiran objekt v obliki črke U okoli osrednjega atrija, odprtega na ulico. Takšna tlorisna zasnova objekta je omogočala visok faktor pozidanosti, odprt atrij pa osvetljeval in prevetraval prostore, orientirane na atrij. Z multiplikacijo tlorisne zasnove v obliki črke U so bile formirane še zasnove v obliki črke E in H ter njim podobnih kombinacijah. Te tlorisne zasnove objektov so omogočale gradnjo objektov z več kot dvanajstimi etažami, neomejeno ponovitev tlorisnih etaž v višino. Pri U, E, H zasnovah je bila možna naslonitev objekta neposredno na fasado sosednjega, kot v primeru objekta 41 Central Park West. Objekti s takšno tlorisno in vertikalno zasnovo so danes že klasika, za tisti čas pa je bila to novost. Najbolj značilna in klasična primera tovrstne stanovanjske tipologije sta 41 Central Park West in Ansonia.

41 Central Park West, New York, NY

Značilen predstavnik večstanovanjskega objekta, formiranega okoli odprtega atrija, je 41 Central Park West. Objekt po ničemur ne izstopa, zato se ga lahko smatra kot klasičen primer "U, E, H" stanovanjske tipologije. Stanovanjski objekt 41 Central Park West je bil zgrajen leta 1907 in je delo arhitekta Williama W. Wilkinsona. Objekt je bil načrtovan za višji srednji razred. Zasnovan je v obliki črke "U" okoli centralnega atrija (Slika 08, Slika 09), ki je odprt na južno stran, kjer ima na nivoju ulice vlogo zasebnega vstopnega dvorišča. Na severni strani objekta je formiran manjši notranji atrij, ki ga deli s sosednjim objektom. Vertikalne komunikacije in tlorisna delitev sta klasični, vendar razmeroma nelogični, ker ne sledita zasnovi in členitvi volumna objekta/fasadnega ovoja. Sprejemni prostori v stanovanjih so, kot je bilo za tisti čas običajno, skrbno oblikovani ter dekorirani z različnimi profilacijami, štukaturami in drugimi dekorativnimi elementi. Objekt 41 Central Park West je primer gradnje, ki teži k zagotavljanju kakovostnih bivalnih prostorov, vendar pretirana nedoslednost v sami fazi projektiranja in veliko število nefunkcionalnih prostorov škodi razmeroma dobri tlorisni zasnovi.

Slika 8: 41 Stanvoanjski objekt Central Park West, tloris tipičnega nadstropja.
Figure 8: 41 Central Park West, typical floorplan.

Slika 9: 41 Central Park West. [vir: http://assets.stribling.com/images/listing_photo/photo/7680/size_1125x750_1299642_41_CPW_11C_bldg_facade.jpg <avgust. 2012>]
Figure 9: 41 Central Park West.

The Ansonia, New York, NY

Če je stanovanjski objekt 41 Central Park West tipičen predstavnik stanovanjskega objekta tistega časa, je objekt Ansonia, zgrajen leta 1899, popolno nasprotje. Že na samem začetku je težko reči, kdo je avtor tega objekta. V začetnih fazah načrtovanja objekta se je investitor William Earl Dodge Stokes postavil v vlogo "glavnega arhitekta". Najel je, po rodu francoskega, arhitekta Paul E. Duboya, s katerim se je že na začetku zapletel. Stokes je vztrajal na rabi krogov in elips kot oblik sprejemnih prostorov, vendar ga Duboy ni razumel, zato ga je Stokes poslal v Pariz, kjer naj bi si ogledal primere in dobil ideje za zasnovo objekta. Kmalu po prihodu v Pariz je Dubony doživel živčni zlom, nekaj let kasneje pa je žalostno zaključil svojo življenjsko pot v psihiatrični bolnici [Hawes, 1993: 158-159]. To ozadje nastajanja načrtov za objekt Ansonia pojasni marsikatero rešitev v zasnovi objekta, ki so za newyorške prostorske pogoje nenevadne, če ne celo bizarne.

Slika 10: The Ansonia, tloris tipičnega nadstropja.
Figure 10: The Ansonia, typical floorplan.

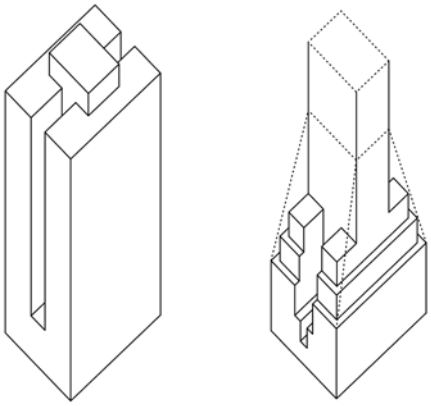
Zgrajeni objekt (Slika 10, Slika 11), ki je bil deležen neljubih pripetljajev v fazi načrtovanja, ima ovalne in okrogle sprejemne prostore in izredno široke hodnike, ki bi bili zaradi dimenzij bolj primerni za kakšno večjo palačo kot stanovanjski objekt. Poleg tega ima tudi dodatno ponudbo v smislu dveh bazenov, kopeli, dvorane za bale, restavracijo, bar in nenazadanje še Stokesovo pogruntavščino - farmo na strehi objekta [Hawes, 1993]. Ta farma je delovala samo tri leta po odprtju objekta, dokler živilski inšpektorji niso zahtevali njeno ukinitev. Pred tem je imelo dom na strehi petsto kokoši, večje število rac, ovac in medved. Vzvod za nastanek farme na vrhu objekta je bila Stokesova želja po samozadostnem objektu in farma je bila sestavni del tega.

New-York Tribune.
ILLUSTRATED SUPPLEMENT.
SUNDAY, AUGUST 17, 1902.
THE ANSONIA, IN BROADWAY, BETWEEN SEVENTY-THIRD AND SEVENTY-FOURTH STREETS.

Slika 11: The Ansonia. [vir: New York Tribune, naslovna stran priloge, 17. Avgust 1902.]
Figure 11: The Ansonia.

V tistem času je bila takšna ideja ekscentrična, danes pa se ponovno obuja ideja o "urban farming-u". Če se pusti ekscentričnost ob strani, je objekt Ansonia lep primer tlorisne zasnove stanovanjskega objekta v obliki črk E in H. Vsi prostori so primerno osvetljeni, pa čeprav dosega objekt visok faktor pozidanosti. Tudi izredno široki hodniki v veliki meri vplivajo na kakovost objekta. Namesto le doseganja zahtev požarne varnosti in osvetlitve, kot je to pretežna praksa, so hodniki v Ansoniji narejeni tako, da občutek teatralnosti, ki smo ga deležni ob samem vstopu v objekt na vhodu, nadaljuje vse do sprejemnih prostorov v posameznih stanovanjih. Tudi sama stanovanja so precej kakovostno načrtovana, raba elips in krogov je premišljena in glede na funkcionalnost teh prostorov logična ter elegantna rešitev. Čeprav je teatralnost pomemben element zasnove objekta, se na ta občutek doživljanja prostorov velikokrat pozabi in so hodniki prepuščeni neskrbnemu načrtovanju. Posledica tega so nerodni in neprimerni hodniki glede na status objekta.

Objekti "U, E, H" zasnove so se razširili po celi Ameriki zaradi svoje racionalnosti, ekonomičnosti in funkcionalnosti. Tovrstna tlorisna zasnova objektov je bila uporabljena tudi v zasnovah poslovnih objektov in hotelov.
Tovrstna tipologija tlorisnih zasnov bi se uveljavila kot standard visokih objektov, v kolikor leta 1916 ne bi bil sprejet pravilnik "1916 Zoning Resolution" v New Yorku, ki je uvajal nove pogoje gradnje visokih objektov. Visoki objekti so od tedaj morali imeti vertikalne zamike, ki bi zagotavljali primerno osvetlitev in osončenje ulic (Slika 12). Urbanistični parametri in pravila, sprejeta leta 1916, poenostavljeno rečeno, so regulirala maksimalno višino le zunanjih robov objekta, ki mejijo na ulico, centralni del parcele, notranjih 25 % parcele, pa višinsko ni bil neomejen [Dolkart, 2003]. Kar pomeni, da pravilnik ni omejeval končne višine objekta, ampak le reguliral obliko objekta. Zaradi tega tlorisna zasnova objektov v obliki črk "U, E, H", pri katerih poteka enak gabarit objekta ponavljajoče od pritličja do strehe, ni bila več možna. Postopoma so se iskale nove rešitve, ki bi ponovno omogočale maksimalno izkoriščenost parcele in funkcionalnih lastnosti objekta. Rešitev za nastale zadrege je bila najdena v obliki nebotičnika s centralnim vertikalnim jedrom. Ta tipologija gradnje visokih objektov ima svojevrstna pravila, zato se je uveljavila kot najboljša rešitev pri visokih stanovanjskih gradnjah.



Slika 12: Shemi pozidav pred in po pravilniku iz leta 1916.
Figure 12: Diagrams of building envelopes before and after 1916 Zoning Resolution.

Stanovanjski stolpi
The Ritz Tower, New York, NY
The Ritz Tower velja kot prvi pravi stanovanjski stolp. Zgrajen je bil leta 1925, je delo arhitekta Emery Roth in Carrère & Hastings (Slika 13, Slika 14). Kot večina večstanovanjskih objektov tega časa je bil tudi The Ritz Tower zasnovan kot "apartment hotel", stanovanjski hotel, čigar upravljanje je vodila korporacija Ritz Charlton [Landmarks Preservation...].
Če se pogleda preko vsega ornamentiranega okrasja, se lahko razbere, da je tlorisna zasnova objekta izredno logična in racionalna. Objekt prav tako dosledno zasleduje urbanistična pravila iz leta 1916, ki predpisujejo vertikalne zamike v gabaritu objekta, naslonjene na ulico, osrednji del objekta pa se dvigne v višino neomejeno. Takšne zahteve se jasno odražajo v tlorisni zasnovi objekta. V centralni del objekta je postavljeno vertikalno komunikacijsko jedro, ki se z višino in spreminjanjem zunanjega gabarita objekta površinsko ne zmanjšuje ter ohranja svojo velikost v pritličju vse do vrha objekta. Okoli vertikalnega komunikacijskega jedra so razmeščena stanovanja, katerih velikost se spreminja glede na etažo. Kjer prihaja do vertikalnih zamikov zunanjih fasad, so ustvarjene proste ploščadi, ki so oblikovane kot terase stanovanj v isti etaži. Terase predstavljajo dodatno kakovost stanovanjem. Slabost tega objekta je enaka vsem dosedanjim stanovanjskim objektom tega obdobja, da se preprosta in jasna zasnova zunanjosti objekta ne odraža v tlorisnih zasnovah stanovanj. V prikazanem tlorisu ene od višjih etaž je možno razbrati nelogičnosti v zasnovi obeh stanovanj (Slika 13).

Slika 13: Stanovanjski hotel The Ritz Tower, tloris nadstropja.
Figure 13: The Ritz Tower, floorplan.

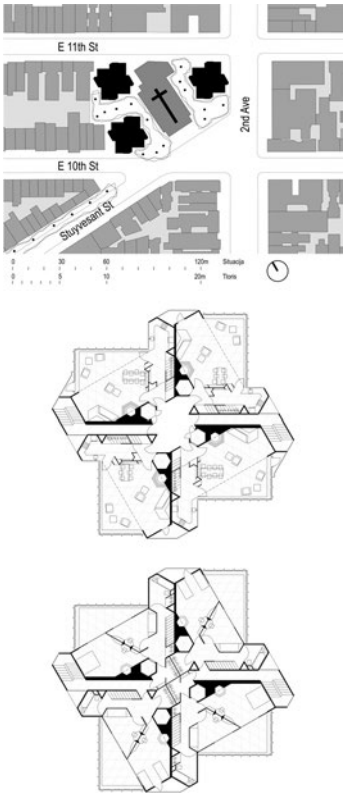
Kljub simetrični zasnovi zunanjega plašča objekta in temu dosledna pozicija nosilnih stebrov, se ta preprostost in red ne odražata v zasnovi vertikalnih jedrnih elementov objekta. Lega in oblika vertikalnega jedra na prvi pogled ni takoj jasna in deluje nepremišljeno zasnovano, kar posledično tudi vpliva na tlorisno zasnovo stanovanj. Res je, da opisana pomanjkljivost bistveno ne vpliva na samo funkcioniranje stanovanj, vendar s preprostimi in enostavnimi potezami bi lahko bil dosežen občutek elegance in visoke kakovosti objekta. S svojimi 41 nadstropji je bil The Ritz Tower takrat trikrat višji od večine večstanovanjskih objektov tistega časa in je s tem postavil nove standarde stanovanjski gradnji. Podobno kot v stanovanjskem objektu v Chicagu (1210 North Lake Shore Drive, 1242 North Lake Shore Drive, 179 East Lake Shore Drive, 5555 North Sheridan Road...), kjer so bili z dosledno tlorisno zasnovo v postavitvi zidov doseženi kakovostni prostori z veliko mero elegance. Poleg oblikovnih značilnosti je Ritz Tower pomemben še z drugega vidika. Namreč, ta objekt je eden od prvih objektov, katerega marketing sloni na imenu podjetja, ki ga upravlja. Že takrat je bil Ritz ena vodilnih znamk na področju luksuznih hotelov, z vključitvijo znamke Ritz v sklop objekta, pa so apartmajska stanovanja slovela po uslugah visokega nivoja, ki so bile nudene v sklopu Ritzove ponudbe. Ta poslovna poteza

je bila preposta in logična. Stanovalci so na ta način bili deležni enakega nivoja uslug kot v samem hotelu, vendar z dodatnim bonusom večje zasebnosti in boljše lociranosti stanovanja. V objektu so izključno apartmajska stanovanja katerih upravitelj je Ritz hotel, v Hotelu Waldorf Astoria pa so apartmajska stanovanja dodatna hotelska ponudba. S hotelsko verigo visokega cenovnega ranga in ponudbe je celoten objekt pridobil na statusu in slovesu, ki jim je zagotavljal dolgotrajno kakovost in prestiž ter prepoznavnost širšemu krogu ljudi. V današnjem času je takšen koncept še vedno aktualen in popularen. V takšne oblike sodelovanj vstopa vedno več svetovno prepoznavnih blagovnih znamk, kot so Ritz, Plaza, Four Seasons, Armani in W, ki so visokega cenovnega ranga v storitvah in ponudbi. V hotelski sklop vključujejo tudi stanovanja oziroma upravljajo s stanovanji v ločenem večstanovanjskem objektu od hotela pod svojim imenom.

Slika 14: The Ritz Tower. [vir: Hawes, 1993]
Figure 14: The Ritz Tower.

St. Mark's-in-the-Bouwerie, New York, NY

St. Mark's-in-the-Bouwerie je manjša cerkvena občina na Manhattanu, ki je v dvajsetih letih 20. stoletja posedovala razmeroma veliko parcelo s cerkvijo. Frank Lloyd Wright je preko poznanstev znotraj cerkvene občine pridobil nalogo izdelave idejnega načrta za stanovanjske objekte na tej parceli. O tem projektu je sicer relativno malo napisanega, vendar je bilo največ mogoče o tem projektu izvedeti prav od njegovega sodelavca. Po pripovedi Donalda Walkerja je Wright začel s projektom na mrzlo božično jutro leta 1927; zanj je potreboval le 10 dni za izdelavo idejnega načrta [Hoffmann, 1998: 64-65].



Slika 15: Stanovanjski objekt St. Mark's-in-the-Bouwerie, tloris spodnje in zgornje etaže stanovanj.
Figure 15: St. Mark's-in-the-Bouwerie, apartments lower and upper floorplan.

Ob tem je potrebno pripomniti, da so takšne poetične zgodbe sestavni del vsakega Wrightovega projekta, zato je njihova resničnost vprašljiva. Wright je predlagal tri objekte enakega tlorisa in različnih višin, postavljene v parkovno območje cerkve (Slika 17). Za tiste čase je bila predlagana zasnova objekta precej radikalna, zato se je potencialni investitor kmalu umaknil, svetovna recesija, ki je malo za tem nastopila, pa je dokončno ustavila projekt. Objekt so sestavljala duplex stanovanja (Slika 15, Slika 16), razmeščena po štiri na etažo okoli centralnega jedra z vertikalnimi komunikacijami. Osnovni tlorisni modul celotnega objekta je bila mreža, sestavljena iz romboidov. Po tem principu so bili zasnovani tudi tlorisi stanovanj ter vsi pripadajoči elementi. V stanovanja naj bi se vstopalo neposredno iz dvigala, v spodnji etaži naj bi bili dnevni prostori s kuhinjo, v zgornji pa dve spalnici s kopalnico. Prostor nad dnevno sobo naj bi bil dvovišinski z veliko stekleno steno. Wrightova jasna in organizirana delitev tlorisa na posamezne stanovanjske enote in velike steklene stene kaže na izjemen vizionarski pristop pri načrtovanju stanovanjskega objekta, vendar vzrok za pretirano kompleksnost tlorisne zasnove posamezne stanovanjske enote je romboidna mreža, kateri se podreja vsak najmanjši element - na primer, šestkotno dvigalo, katerega vrata naj bi se odpirala pod kotom 30°. Pretirano sledenje modulu romboidne mreže

je bila največja težava tega projekta. Kljub temu, da se projekt zaradi spleta različnih okoliščin ni izvedel in da v arhitekturni stroki objekt ostaja premalo opažen, bi si zaslužil bistveno večjo pozornost, ker vsebuje zanimive predhodno omenjene rešitve, kar ga uvršča med napredne objekte tistega časa. Kot zanimivost naj se omeni še Frank Lloyd Wrightov objekt Price Tower v Bartlesvillu (Oklahoma, ZDA), ki je bil zgrajen leta 1956. Tlorisna zasnova objekta in stanovanj je skoraj identična predhodno omenjemu projektu za St. Mark's.

Slika 16: St. Mark's-in-the-Bouwerie, perspektivni prikaz. [vir: http://www.moma.org/collection/object.php?object_id=305 <avgust. 2012>]
Figure 16: St. Mark's-in-the-Bouwerie, perspective view.

Chicago med letoma 1924 in 1929

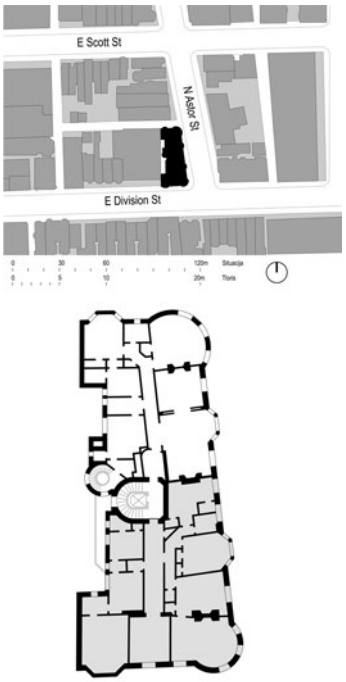
Značilnost New Yorka je prostorska omejenost, ki je imela pomembno vlogo v razvoju stanovanjske arhitekture, medtem ko so se večstanovanjski objekti v Chicagu razvijali na povsem drugačnih osnovah. Chicago se je po letu 1871, ko ga je zajel veliki požar, razvijal izredno hitro, tako mestna kot predmestna območja. Chicago v primerjavi z New Yorkom, sitsnjenim med tri reke, ni imel prostorskih omejitev, saj meji na nepregledno površino ravnine v okolici. Najpomembnejši faktorji za razvoj Chicaga so bili kakovosten urbani prostor na robu jezera, razvito poslovno središče in množica parkov, ki so nudili visoko kakovostno urbano bivanje, kar je bila stvar prestiža, ne pa nuje [Glibota, A.: 1985]. Sprva so se v Chicagu gradile vrstne in enodružinske hiše, podobne tistim na vzhodni obali Amerike, postopoma, podobno kot v New Yorku, se je povečevalo povpraševanje po manjših bivalnih enotah v bližini centra mesta. Najprej so iskali rešitve v delitvi vrstnih hiš na manjše bivalne enote, nato pa se je postopoma začela razvijati nova stanovanjska tipologija. Novo stanovanjsko tipologijo so sestavljale združene hiše v enoten, samostojen objekt. Primer tovrstne stanovanjske tipologije je urbana struktura, imenovana "Chicago Courtyards", katere značilnost je pozidava v obliki črke "U" s centralnim dvoriščem [Firley in Stahl: 2009]. Vendar tudi ta rešitev ni bila najboljša za bivanje v centru mesta, območju goste poselitve. Nastalo je še nekaj kakovostnih rešitev, vendar vse nadaljnje rešitve so bile zgolj varianta klasične enodružinske ali vrstne hiše. Prvi pravi večji večstanovanjski objekti so bili zgrajeni šele na prehodu iz 19. stoletja v 20. stoletje. Značilnost teh večstanovanjskih objektov je bila razmeroma skrbna in kakovostna tlorisna zasnova, s pomočjo katere je bila ustvarjena dodana vrednost, privlačna za kupce. Večina teh stanovanjskih objektov, zgrajenih v zgodnjejšem obdobju, tlorisno spominja na pariške večstanovanjske objekte, grajene prav v tem obdobju v Franciji. Objekti s podobnimi tlorisnimi zasnovami so se gradili istočasno tudi v New Yorku, vendar objekti grajeni v Chicagu so veliko bolj dosledno sledili francoskim principom s kakovostnim načrtovanjem. Šele po prvi svetovni vojni se je v Chicagu začel pravi razvoj stanovanjskih objektov, ko je nastopil veliki nepremičninski 'boom'. V tem obdobju so bili zgrajeni objekti, ki so svojevrstna značilnost chicagške večstanovanjske gradnje, katero je mogoče razdeliti v tri skupine:

1. Objekti, zgrajeni tik ob obali jezera Michigan ob cesti Lake Shore Drive na manjših, ozkih parcelah, katere so zaradi svoje oblike narekovale specifično vrsto gradnje, naslonitev obeh krajnih stranic na fasado sosednjih objektov. Tovrstna gradnja spominja na vrstne hiše, ki so v tem primeru večstanovanjski z lastnostmi vrstne hiše, zato se lahko to tipologijo gradnje imenuje "večstanovanjski vrstni objekt". Druga posebnost je tlorisna organizacija objekta, ki je sestavljena iz enega ali dveh stanovanj na etažo. V objektih z dvema stanovanjema na etažo so stanovanja simetrično zasnovana, podobno kot v objektu 179 East Lake Shore Drive.
2. Drugo skupino predstavljajo stanovanjski stolpi, zasnovani podobno kot newyorški, vendar bistveno bolj kakovostno.
3. Tretjo skupino pa sestavljajo objekti, grajeni na velikih parcelah severno in južno od centra mesta. Zaznamuje jih veliko merilo in število stanovanjskih enot; na primer, v objektu 5555 North lake Shore Drive je več kot 300 bivalnih enot [Harris, 2004: 338].

1200 North Astor Street, Chicago, IL

Stanovanjski objekt 1200 North Astor Street je bil zgrajen leta 1879 in je delo arhitektov Holabird & Roche. Objekt je tipičen predstavnik stanovanjske gradnje s konca 19. stoletja in podobno kot drugi objekti tistega časa povzema določene rešitve neposredno iz pariških stanovanjskih objektov [Harris, 2004: 94]. Bivalni prostori so usmerjeni na ulično stran, servisni

pa na notranjo, manj kakovostno stran. Zasnova stanovanj z organizacijo prostorov je precej kakovostna, manj kakovostne so delitve prostorov z nepotrebnimi zamiki, ki ustvarjajo številne manjše vogale (Slika 18). 1200 North Astor Street je primer slabih rešitev v večstanovanjskih objektih v Chicagu na prehodu iz 19. v 20. stoletje.

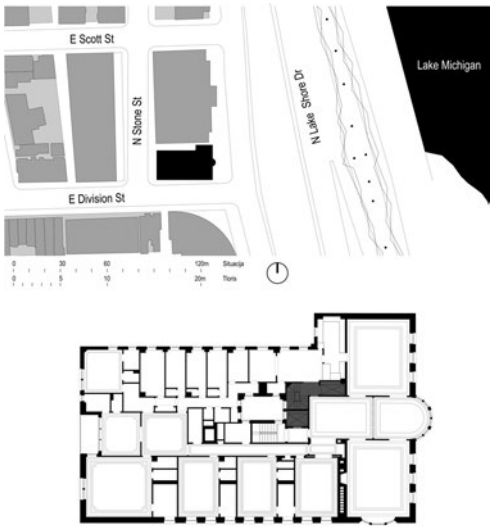


Slika 17: Stanovanjski objekt 1200 North Astor Street, tloris tipičnega nadstropja.
Figure 17: 1200 North Astor Street, typical floorplan.

Slika 18: 1200 North Astor Street. [vir: Harris, 2004]
Figure 18: 1200 North Astor Street.

1200 North Lake Shore Dribe, Chicago, IL

Objekt 1200 North Lake Shore Drive je delo arhitektov Marshall and Fox, zgrajen leta 1912 ob cesti North Lake Shore Drive, za premožen sloj chicagškega prebivalstva. Spada v skupino tako imenovanih "večstanovanjskih vrstnih objektov". Zaradi vogalne lege se objekt naslanja na sosednji objekt le na eni strani [Harris, 2004: 194].



Slika 19: Stanovanjski objekt 1200 North Lake Shore Drive, tloris tipičnega nadstropja.
Figure 19: 1200 North Lake Shore Drive, floorplan.

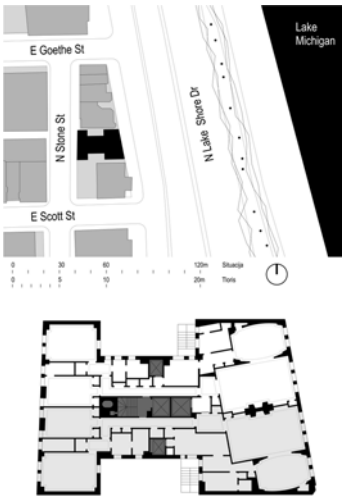
Slika 20: 1200 North Lake Shore Drive. [vir: Harris, 2004]
Figure 20: 1200 North Lake Shore Drive.

Objekt posebno ne izstopa iz tedanjih standardov tlorisnih ali fasadnih zasnov. Njegova posebnost pa je število stanovanj

na etažo. Z zasnovo enega stanovanja na etažo ter množico bivalnih in servisnih prostorov bolj spominja na manjšo palačo kot na običajen večstanovanjski objekt (Slika 19, Slika 20). Ker bivanje v centru Chicaga ni stvar nuje kot v New Yorku, ampak stvar prestiža in družbenega statusa, so investitorji gradili stanovanjske objekte glede na povpraševanje in zahteve najpremožnejšega sloja ljudi na način, da bi jim v okviru ene stanovanjske enote omogočili podobne bivalne pogoje kot v manjši palači. Druga zadeva, ki odlikuje ta in nasploh chicagško stanovanjsko arhitekturo, je urejena tlorisna zasnova. Nelogičnosti in zadrege razporeditve in izkoristka prostorov so minimalne. Vsi prostori so skrbno proporcionirani, servisni prostori so izredno funkcionalno zasnovani, zato celotno stanovanje deluje elegantno, funkcionalno in seveda logično. Vse te lastnosti enega stanovanja je težko najti v newyorških stanovanjskih objektih.

1242 North Lake Shore Drive, Chicago, IL

Stanovanjski objekt 1242 North Lake Shore Drive je še en objekt iz skupine "vrstnih večstanovanjskih objektov". Objekt je zasnoval arhitekt Robert S. De Golyer, zgrajen pa je bil leta 1930 [Harris, 2004: 196]. Ker se objekt na obeh krajnih stranicah fasade dotika sosednjih objektov je arhitekt za potrebe osvetlitve servisnih prostorov umestil dva svetlobna jaška (Slika 21, Slika 22). S to rešitvijo je ustvaril kakovostno delitev prostorov stanovanja na bočne bivalne in osrednje servisne prostore. Nepravilno obliko parcele - vzhodni in zahodni stranici parcele sta pod kotom glede na severni in južni stranici - je arhitekt izjemno dobro rešil. Vse nelogičnosti, ki jih povzroča nepravilna oblika parcele, so bile zmanjšane na minimum. Vstopni hall, kuhinja in shramba ter drugi servisni prostori zakrivajo zamik dnevne sobe, obe jedilnici z zaobljeno oblikovanim prostorom pa zakrivata kopico nepravilnih vogalov, ki se ustvarjajo na vogalu objekta. Objekt se ponaša z zanimivimi in kreativnimi rešitvami ter kakovostno tlorisno zasnovo, kar ni redkost chicagške stanovanjske arhitekture tega časa.

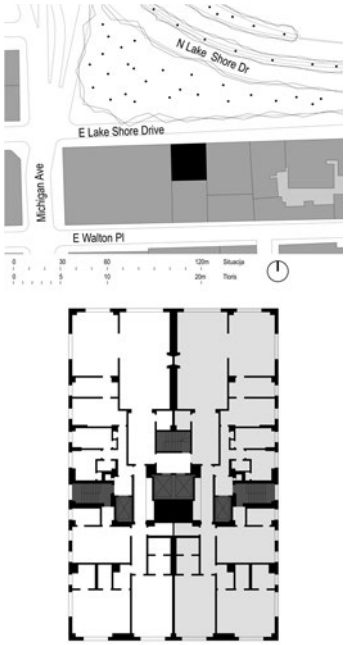


Slika 21: Stanovanjski objekt 1242 North Lake Shore Drive, tloris tipičnega nadstropja.
Figure 21: 1242 North Lake Shore Drive, typical floorplan.

Slika 22: 1242 North Lake Shore Drive. [vir: Harris, 2004]
Figure 22: 1242 North Lake Shore Drive.

179 East Lake Shore Drive, Chicago, IL

Objekt 179 East Lake Shore Drive je zadnji zgrajeni objekt ob cesti East Lake Shore Drive kot eden značilnih predstavnikov razvoja chicagške večstanovanjske arhitekture v prvih desetletjih 20. stoletja. Objekt je bil zgrajen leta 1931 po načrtih arhitekta Benjamina H. Marshalla [Harris, 2004: 148]. V spodnjih etažah se objekt s krajšima stranicama naslanja na sosednja objekta, v višjih etažah pa prehaja v stanovanjski stolp. S formiranjem stolpa v višjih etaž so bile na najbolj optimalen način izkoriščene omejitve na parceli in parcelnih mejah. Že na prvi pogled je mogoče opaziti simetrijo tlorisne zasnove, ki je v bistvu svojevrsten fenomen večstanovanjske arhitekture v Chicagu, še posebej objektov, zgrajenih ob cesti Lake Shore Drive. Na tem stanovanjskem objektu je simetrija na lep način vkomponirana v arhitekturo objekta. Druga pomembna značilnost, vredna omembe, je klasična zasnova prostorov stanovanja. Jasna delitev prostorov na bivalne, namenjene lastnikom, in servisne za oskrbno osebje je bila na začetku tridesetih let 20. stoletja še vedno aktualna. Vendar se je klasična zasnova stanovanj po svetovni krizi in drugi svetovni vojni počasi umikala zaradi spremenjenih družbenih, kulturnih in finančnih okoliščin.

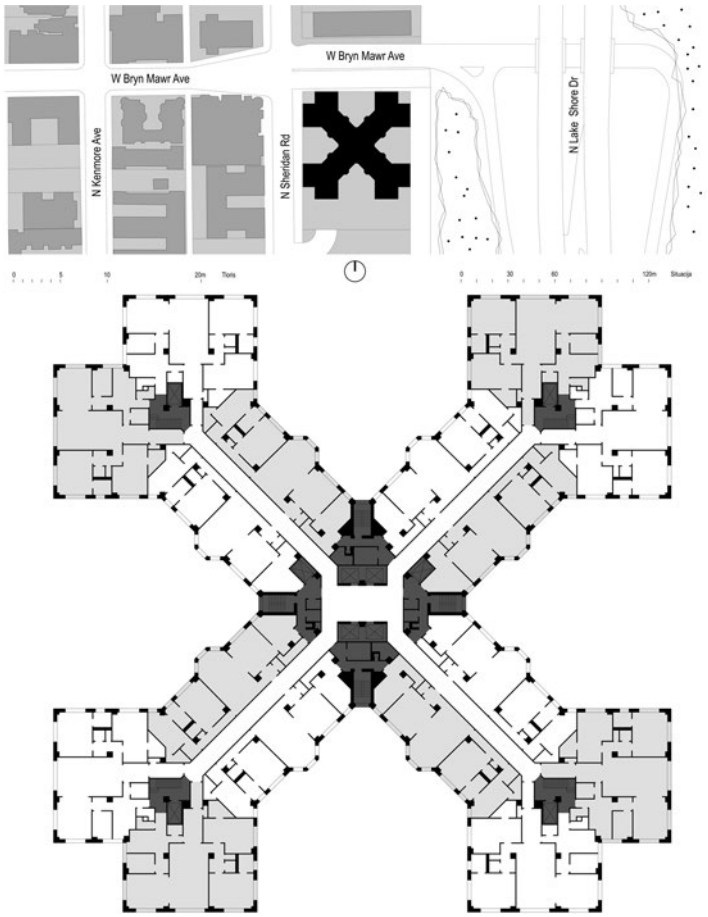


Slika 23: Stanovanjski objekt 179 East Lake Shore Drive, tloris tipičnega nadstropja.
Figure 23: 179 East Lake Shore Drive, typical floorplan.

Slika 24: 179 East Lake Shore Drive. [vir: Harris, 2004]
Figure 24: 179 East Lake Shore Drive.

5555 North Sheridan Road, Chicago, IL

Še en stanovanjski objekt arhitekta Benjamin H. Marshall-a, zgrajen v letu 1928, sodi med njegove najbolj kompleksne projekte [Harris, 2004: 338]. Stanovanjski objekt je del večjega kompleksa, ki ima poleg stanovanj razširjeno namestitveno ponudbo še v hotelu z rekreacijskimi igrišči, restavracijo in vrtom. Po velikosti je objekt eden večjih stanovanjskih kompleksov, ki se razprostira na velikih parcelah. Arhitekt je zasnoval štirikraki tloris s po 16 stanovanj na etažo. Na stikih krakov v osrednjem delu je vertikalno komunikacijsko jedro z dvigali in požarnimi stopnicami. Z inovativno zasnovo objekta so bili dani vsi pogoji za kakovostno zasnovo posameznih stanovanj z orientacijo na tri strani. Ta objekt spada v skupino večjih stanovanjskih kompleksov, ki so se gradili na velikih parcelah, razpostranjenih severno ali južno od centra mesta, kjer ni bilo prostorskih in urbanističnih omejitev. V takšnih pogojih so poskušali ustvariti idealno tlorisno zasnovo objektov in stanovanj. Med danes priljubljene objekte po bivanjskih kakovostih se poleg 5555 North Sheridan Road že več desetletij v Chicagu uvrščajo še Lake Point Tower, 860/880 North Lake Shore Drive in Harbour point Tower.



Slika 25: Stanovanjski objekt 5555 North Sheridan Road, tloris tipičnega nadstropja.
Figure 25: 5555 North Sheridan Road, typical floorplan.

Slika 26: 5555 North Sheridan Road. [vir: http://uptownhistory.compassrose.org/2010/11/another-aeriel-view-of-edgewater.html <avgust, 2012>]
Figure 26: 5555 North Sheridan Road.

Sklep

Konec 19. in začetek 20. stoletja je bil razvoj ameriške večstanovanjske arhitekture zaznamovan s prehodom iz standardne gradnje samostojnih družinskih in vrstnih hiš v novo stanovanjsko tipologijo, ki je odgovarjala vsem novim urbanističnim pravilom in zahtevam sodobnega načina bivanja v mestih. New York je bilo prvo ameriško mesto, ki je bilo soočeno s problemom goste poselitve na prostorsko omejeni površini. Populacija premožnejših je stremela h kakovostnejši ponudbi, kjer bi bili zagotovljeni dobri bivalni pogoji. Zahteva po kakovostnejši ponudbi stanovanjske gradnje, ki bi nudila boljše bivalne pogoje kot zgolj spremenjena namembnost vrstnih hiš, je bila gonilna sila razvoja večstanovanjske gradnje v Ameriki. Ob koncu dvajsetih let 20. stoletja se je postopoma začela razvijati nova tipologija večstanovanjskih objektov na ameriškem kontinentu. Sprva so iskali zglede v pariških večstanovanjskih hišah, vendar kmalu s seznanitvijo o posebnostih newyorškega urbanizma se je začela razvijati večstanovanjska gradnja prilagojena newyorškemu urbanizmu. Razvite so bile tlorisne zasnove "U, E, H", ki so bile v obdobju veljave urbanističnega pravilnika iz leta 1916 najbolj uporabljane. Urbanistični pravilnik iz leta 1916 je prinesel v newyorški urbanizem še eno novost, in sicer vertikalne zamike zunanjega gabarita objekta. Posledično s tem so se začeli graditi objekti s stopničastim gabaritom z bistveno večjim številom etaž. Pojav večstanovanjskih stolpnic je bila posledica novih urbanističnih pogojev in inženirskih dognanj. Stanovanjske stolpnice tedaj so postale standard, ki se je obdržal vse do danes. Poleg razvoja newyorške večstanovanjske gradnje je zanimiva tudi stanovanjska gradnja v Chicagu. Med letoma 1924 in 1929, ko so bili pritiski investitorjev na arhitekte največji, se je razvila stanovanjska arhitektura premišljenih tlorisov in jasne kompozicije z visoko kakovostjo, česar v New Yorku niso poznali. Zakaj je bilo mogoče v chicagški stanovanjski arhitekturi doseči prefinjene in premišljene tlorisne rešitve ni moč na poenostavljen način pojasniti. Pojasnilo bi bilo treba iskati v kombinaciji različnih spletov okoliščin. Chicago nikoli ni bil prostorsko omejen, kakor Manhattanski del New Yorka. V predmestjih se je vršila intenzivna gradnja, na primer stanovanjska soseska Oak Park v Chicagu, kjer je bila zgrajena kopica družinskih hiš po načrtih Frank Lloyd Wrighta, je postal povsem realna alternativa življenju v mestu. Vendar kljub razvoju kakovostnih chicagških predmestij, ki so imela vse elemente in funkcije centra mesta, je center Chicaga še vedno bil priljubljen za bivanje. Bivanje v centru Chicaga se je postopoma spreminjalo v družbeni status. Čeprav je bil center mesta priljubljeno za bivanje, so se morali investitorji truditi za dobro ponudbo stanovanj, ki so bila konkurenčna predmestnim hišam, kjer je bila pestra in kakovostna ponudba. Zato je moral biti vsak prostor stanovanja skrbno proporcioniran, čistih linij, ki so ustvarjale občutek elegance in statusne drže. Tako zahteven in konkurenčen trg je bil spodbuda za razvoj visoko kakovostnih tlorisnih zasnov, ki je značilnost chicagške stanovanjske arhitekture, katere vrhunec je bil dosežen ob koncu druge svetovne vojne. Nasprotje chicagški stanovanjski gradnji je bil New York, kjer nikoli niso bile razrešene zadrege v tlorisnih zasnovah stanovanj. Postale so newyorška stalnica in so se ustalile kot pravilo oziroma standard. Šele zadnjih dvajset let - od 1990 dalje - je newyorška stanovanjska arhitektura deležna nekaj dobrih in kakovostnih rešitev. Z začetkom svetovne recesije leta 1930 in druge svetovne vojne se je proces razvoja stanovanjskih objektov postopoma ustavil. Po drugi svetovni vojni se je stanovanjska gradnja ponovno okrepila, vendar na temeljih starih principov s prilagoditvami novemu času. V tem obdobju je najbolj viden arhitekt Mies van der Rohe, ki se je proslavil v Chicagu s stanovanjskimi objekti 860/880 N Lake Shore Drive in Commonwealth Promenade Apartments. Z izgradnjo teh objektov je imel Mies močan vpliv na nadaljnji razvoj večstanovanjske gradnje v Ameriki [Nađ, 2011]. Za zaključek je potrebno še omeniti, da objekti zgrajeni v obdobju od konca 19. do začetka dvajsetih let 20. stoletja so v stanovanjski arhitekturi in na sploh na tržišču prepoznani kot visoko kakovostni v svojih tlorisnih zasnovah in so zgleden primer dobre gradnje, zato uživajo svoj status še danes, ter v zameno za to dosegajo stanovanja nadpovprečne cene, kljub svoji starosti.

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Luka Jančič

THE IMPACT OF LAYERED TECHNOLOGIES ON ARCHITECTURAL MODEL PRODUCTION AND USE

VPLIV SLOJEVITIH TEHNOLOGIJ NA IZDELAVO IN RABO MAKET V ARHITEKTURI

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izvleček

Članek je poročilo o raziskovalnem delu, ki nastaja v okviru doktorskega študija in se posveča uporabi slojevitih tehnologij za potrebe izdelave arhitekturnih maket. Uporaba maket je razširjena tudi v okviru računalniško podprtega oblikovanja in izdelave, kjer makete ostajajo prva materializacija abstraktnih zasnov. Uporabljajo se za predstavitev, iskanje, vrednotenje in razvoj novih zamisli. Čeprav so novi načini izdelave običajno vrednoteni predvsem s stališča stroškov ali tehničnih vprašanj, je članek namenjen predstavitvi raziskovalnega dela namenjenega določitvi osnovnih mehanizmov tradicionalne uporabe maket s ciljem določitve načinov delovanja, uprabe in nalog maket v arhitekturi. Lastnosti slojevitih tehnologij, ki so proces izdelave maket ločile od ročnega dela, želimo ovrednotiti skozi prizmo tradicionalnih nalog maket v arhitekturi. Ugotavljamo, da je uporabnost slojevitih tehnologij odvisna namena izdelane makete in se spreminja glede na njeno funkcijo.

ključne besede

arhitektura, slojevite tehnologije, makete, digitalno podprta izdelava

abstract

The following paper is an in-progress report on the research conducted as part of PhD studies focusing on the use of layered technologies for the production of physical models in architecture. In the age of CAD/CAM (Computer-Aided-Manufacture), physical models remain widespread and are often the first materialization of abstract concepts, used not only as a way of presentation but also for the generation, evaluation and development of new design ideas. While latest modes of model production are often discussed in terms of costs and technical issues, the paper at hand focuses on a stage of our research where we aim to identify the basic mechanisms of traditional model use in order to determine the performance, use and implementation of physical models in the field of architecture. The characteristics of CAM tools and systems based on additive technologies, which have removed the model-making process from the hands of architects and model-makers, are examined through the scope of traditional physical model tasks in architecture. We find that the practicality of additive technologies is dependent on the type of physical models produced and varies according to their function.

key words

architecture, layered technologies, physical models, digital fabrication

Introduction

"In a period of absolute digital obsession, it has become obvious that no single medium, tool, software, material or technique will suffice to achieve the kind of vigor and complexity that an innovative work of architecture necessitates." [Schork, 2009: 309]

The development of informational technologies and the omnipresent use of computers in the late 20th century have changed the world dramatically. In architecture, the revolution started with the emergence of CAD software that offered an alternative to the standard set of tools used to make architectural drawings. After 2000 years of service [Sheil, 2012: 137] compasses, dividers, rulers and squares were being replaced by a single tool. In the first period of CAD use, the shift from analogue to digital means of drawing brought little reflection of that fact in the shape of buildings [Iwamoto, 2009: 5].

In the few decades that followed the advent of CAD, computers became not only the principal tool for the production of architectural drawings, but also a powerful design tool that enabled radical changes in the way architects design and build architecture.

The first considerable shifts came with the introduction of three-dimensional computer modeling tools. These were soon recognized as much more than just a method for the rapid production of perspective drawings, and started being used in ways that began to expand the use of complex geometries in architecture. As architects ventured deeper into digital design, the tools at their disposal became more sophisticated. The early days of modeling software, when programs had to be individually written for a limited number of parts, are long gone. Today's computer modeling tools offer easy-to-understand interfaces and almost intuitive handling possibilities that allow for creations of unprecedented complexity.

The increasing complexity of creations, enabled by the use of use of three-dimensional computer modeling tools, has introduced CAD/CAM (Computer-Aided-Manufacture) into architecture. As the new free-form designs proved to be very challenging for traditional/analogue fabrication techniques architects turned to processes that have been used for decades in the development and fabrication of cars, airplanes and smaller consumer goods [Dunn, 2012: 20]. The new way of materializing ideas helped energize architectural design thinking, and expanded the limits of architectural form [Iwamoto, 2009: 5].

Today, design as well as construction, the two fundamental activities and concerns of the discipline, are redefined by an increasing proliferation of three-dimensional design tools and

digital fabrication, enabling architects to conceive and produce designs that would be very difficult to develop using traditional methods [Dunn, 2010: 20].
Digital methodologies now allow architects to conceive architecture more fluidly in terms of information, and digital fabrication provides a way to produce such designs directly from digital data. The shift from analogue means to digital systems of conceptual design and material production enables a more profound interaction between data and matter [Kolarevic, 2005]. These profound changes have transformed the use of the entire array of traditional design and presentation tools. Some of them became redundant while others are experiencing a revival. Among the latter, physical models are one of the most obvious.
These objects that were initially strong candidates for extinction and replacement by their virtual counterparts [Dunn, 2010: 80] seem to be more popular than ever. It may be that their current popularity is rooted in the wide success of the very reason behind the initial speculations of their possible extinction - computer modeling software. Available software tools offer almost intuitive handling possibilities and can produce results that are very difficult to assess, evaluate and proof sufficiently based solely on a two-dimensional projection on the computer screen [Kern, 2008: 106]. CAM is often used to bring such designs into physical form as models, so that they can be examined and developed further. Among the most popular systems for such tasks are those based on layered technologies, generally known as rapid prototyping or 3D-printing machines.

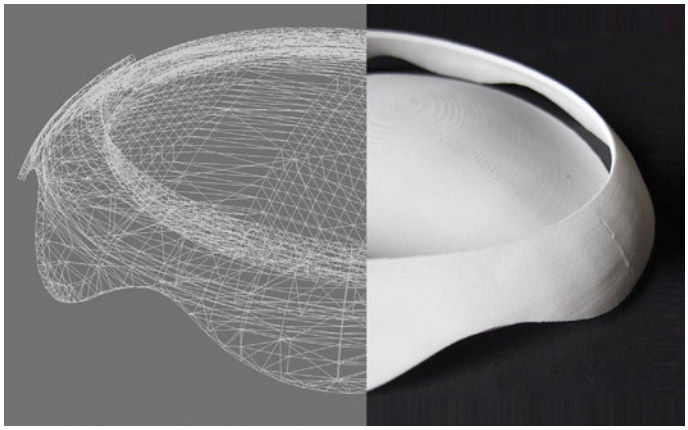

Figure 1: Layered technologies allow a rapid and accurate materialization (right) of digital 3D models (left). The process is fully automated and the final product is produced in a single production stage.
Slika 1: Slojevite tehnologije omogočajo hitro in natančno materializacijo (desno) digitalnih 3D modelov (levo). Izdelava makete poteka v enem koraku, postopek pa je popolnoma avtomatiziran.

Layered technologies are a group of additive manufacturing systems able to transform digital models into physical objects by depositing thin layers of material according to data automatically retrieved from the blueprint. This automated way of model-making allows for the rapid and accurate production of physical models during all stages of architectural conceptualization, demonstration and production and is a valuable way for establishing a continuous dialogue between the physical and digital concepts during design development.

The new relationship between data and matter enabled by digital additive technologies was first recognized as a promising way to produce architectural models over twenty years ago [Streich, 1991]. Since then, there has been a lot of discussion in the architectural community about the possibilities for transferring the means of modeling and prototyping from the mechanical engineering and manufacturing industry, where they were initially developed, to the architectural design process itself. The discussion is mostly focused on the issues of price, speed, detail and size of models produced with layered technologies in comparison with traditional and other digitally controlled ways of model production. This discourse has shown a certain tendency to separate the product from the process, and model-making is rarely regarded as an integral part of the architectural design process. Assessment of the final outcome is often performed according to production standards alone (finish, accuracy), while other non-technical (and often quite as important) qualities and aspects that influence the usability of the product are all too frequently ignored.
One could argue that an old segregation has reemerged in the context of digital fabrication of physical models, namely the division between intellectual and material aspects of architecture where, according to Starkey [2006], architectural drawings are often discussed in relation to ideas whilst architectural models are more likely to be discussed in relation to matter. The vivid discussion on models in relation to ideas characteristic for the last decades of the 20th century [Moon, 2005] has in the scope of layered technologies once again been replaced by the issues of matter and the relation to manual labor and craft, and has therefore dissociated itself from the intellectual.
At a time when it is becoming increasingly difficult to separate the physical from the digital, when the methods of design and production have converged to form part of the same process, we ought to take a closer look at the impact of new technologies not only on production but also on the use of physical models in the architectural design process itself.

Problem

The effect of technical changes affecting the design process (CAD) in combination with new manufacturing technologies (CAM, Computer Aided Manufacture) on the production and use of physical models in architecture is still largely unknown.
The industry is well informed on the comparison between traditional and layered manufacturing in the context of architectural scale models. In recent decades, the issues of price, size and speed have been meticulously researched and evaluated. Although these criteria are absolutely essential for the process of model-making, it should be noted that models are not only about economy [Morris, 2006: 9]. They are strongly connected to abstract ideas regarding the process and stages of design development that influence both their production and use. The implications of the production process are often an integral part of the model's performance and should not be judged by technical criteria alone.

Objective

"If designers do not understand the idiosyncrasies of the media and tools they employ, they will be forced to move their design in a direction that was not intended." [Schork, 2009: 309]

"Each of the traditional methods has its own individual intrinsic value, and each will retain a place in the architect's design and presentation arsenal long after rapid prototyping has been adopted by the industry." [Kirton & Lavoie, 2005]

Our research is aimed at identifying the basic similarities and differences in the production, use and performance of physical models created using traditional technologies compared to those made with layered manufacturing.

In this way, we wish to contribute to both theory and practice by shedding new light on the processes that often go unnoticed [Morris, 2006: 7]. We focus on the basic qualities of traditional physical models in order to determine how their removal from the process of model-making that occurs in automated production (and the rather predictable result of that process) is compatible with the traditional use of models in architecture. To achieve that objective we focus on the basic principles of layered technologies (which are more or less constant, not subject to continuous change like the size, price and speed of the machines) and the ways they differ from traditional means of model-making in order to determine how these principles fit into architectural design.

In our research we do not seek to establish rules, but rather examine meticulously the patterns of layered technology application in relation to traditional techniques, and the potential for new ways of physical model use in architecture. We wish to promote the critical use of these technologies by identifying the particular phases or aspect of design where they may show better results and hope that the study will contribute to an objective classification of correlations between traditional and digitally produced physical models.

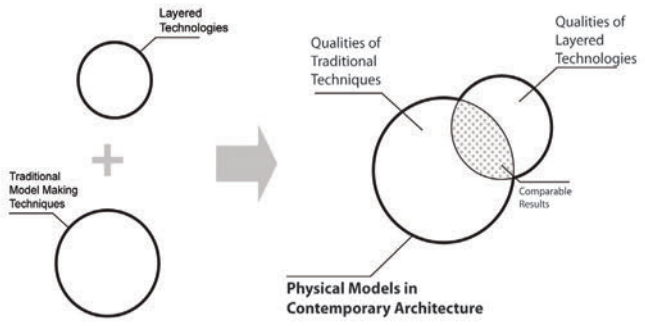

Figure 2: Research goal. We set out to establish the position and potential of additive technologies in the context of contemporary architectural model-making.

Slika 2: Cilj raziskovalnega dela je določitev vloge in potenciala uporabe slojevitih tehnologij za izdelavo maket v sodobni arhitekturni praksi.

Research questions

Initial research has shown that we should evaluate the impact of layered manufacturing on the production and use of architectural models by defining and examining the basic principles of physical model use and the possibilities of applying those principles to models made with layered technologies. To determine the effectiveness of new-technology models in performing the traditional tasks of physical models and define the potential new ways of physical model use, the following research questions were formed:

- Can layered technologies be used to produce physical models that fulfill traditional model tasks in the conceptualization and presentation of architecture?
- Is rapid prototyping enabling new ways of using physical models in spatial conceptualization?

Methodology

Research is being conducted in two stages. In the first stage we consider the practicality of layered technologies through the scope of traditional architectural model making. In the second stage we intend to determine if the shortcomings we detected during the first stage are replaced by some other qualities traditional techniques do not offer. The paper discuses the data and findings of the first stage where we focused on the specifics of the architectural design process and the use of physical objects in order to define the possibilities for the critical use of additive technologies in the process of designing architecture. The basic mechanisms, characteristics and reasons for different methods of model production were defined with the use of the comparative method. Comparative study provided us with the essential mechanisms for the successful use of physical models in architecture and the abilities of layered technologies in that context.

To determine the basic qualities, the following sub-questions were formed:

- How do models function?
- Why do architects build models?
- In which cases can the product and the process of architectural model-making be separated, and what are the consequences of such separation?

In order to answer these sub-questions, we compare a number of reports from the fields of architectural theory, model making, and the design process to determine the qualities that must be provided during the model-making procedure in order for models to be able to function in accordance with the demands of architecture.

Relations between layered technologies and digital models were established using the same method.

Abstraction

"Models are representations of objects, states, events. They are idealized in the sense that they are less complicated than reality and hence easier to use for research purposes. […] Models are easier to manipulate than the real thing, and there is a process of abstraction in which only the relevant properties are represented." [Healy, 2008: 7]

According to available sources, abstraction is the key for the successful use of models. Through the process of removing certain elements from something, the subject is reduced to a set of essential characteristics. Abstraction leads to ambiguity and requires a form of intuitive or common experience in order to be

understood. Understanding the language of abstraction allows one to see more than what is actually there.

Abstraction in architecture

"Design does not operate exclusively on the basis of resemblance, but on the basis of abstract codes and a complex instrumentality. Architecture presumes a transformation of reality, but an architect attempting to work directly with that reality will be paralyzed. The detachment of architecture's representational codes allows the designer to experiment with relative freedom. But abstraction is more than an expedient. By working with the abstract material of number, proportion and interval, the architect can structure internal relationships and move smoothly between the visible and the invisible. Invention follows, and paradoxically, a more complex appearance is produced than if appearance were the starting point." [Allen, 2009: 75]

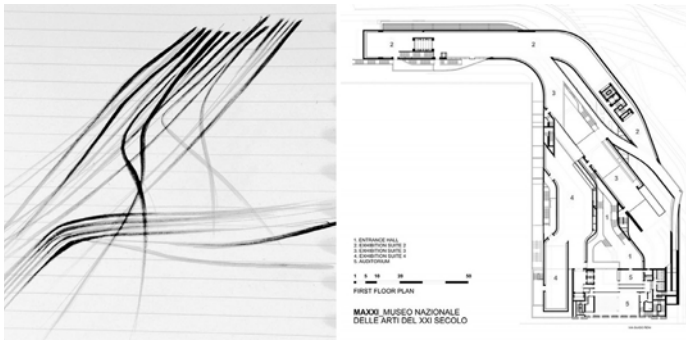

Figure 3: While a sketch and a plan are both abstract forms of display and can be equally confusing to an untrained eye, a technical drawing is a much less ambiguous form of abstraction.
Slika 3: Skica in načrt sta, kot abstrakta načina predstavitve, lahko laiku enako nerazumljiva, vendar je tehnična risba veliko manj dvoumen način abstrakcije.

In the renaissance, abstraction established itself as a principal way of architectural expression. Drawing as the primary form of two-dimensional abstraction allowed architects to influence the building process and construction indirectly, from a distance. During the centuries that followed, particularly during the period of domination of the École des Beaux-Arts, the profession became a world of two-dimensional representation [Morris, 2006: 17]. In this abstract world certain rules were established in order to avoid confusion and architectural drawing became a form of language fully understandable only to professionals.
However, the use of abstraction in architecture is not ambivalent. Two practices of use are evident. One is used in technical drawing, as a language governed by a set of strict rules that reduce the possibility of free interpretation to a minimum. A floor plan, for instance, should only be interpreted in a certain way, which makes it an unambiguous form of expression to anybody familiar with the rules. The other practice present in architecture is abstraction with no strict rules that allows for multiple interpretations and can lead to new and unexpected results and discoveries. This method is used more individually as a tool of exploration and generation of ideas. That is why freehand sketching is a popular way of development and evaluation of initial ideas [Edwards, 2008].

"The architectural model shares the mechanism of abstraction and scale reduction with the drawing. Beyond this it offers the three-dimensional quality of its representation, which gives it its particular vividness, and the possibility of freely choosing the materials for construction." [Gänshirt, 2007: 151]
Gänshirt does not specify the particular quality of three-dimensional presentation, but the statement suggests that abstraction presented in three-dimensional form is the source of the distinct functionality of physical models.

Functioning of physical models

"They (physical models) are representations of an object or architectural structure at a reduced scale; but they are also an object in their own right, full of expressive meaning." [Pascuali Miró et al., 2010:8]
It is this "object" that Healey (2008:53) refers to when he states that physical models are converting abstraction to reality and reality in this case is the object itself. On the other hand, Healey also states: "The physical model is an artifact such that its parts, their relations and its working are suitably analogous to some other system."
According to the above, models are useful for at least two reasons. As an artifact they are a materialization of an abstract idea that makes the idea more "real". As an analogy they can be used to represent future architectures, allowing architects to experiment freely well beyond the possibilities of a drawing [Gänshirt, 2007:152] and to provide laypeople with a presentation they can easily understand.
Although scale models may be important as artifacts, they are generally perceived as representations. The more generally recognizable features/qualities a form of presentation possesses, the easier it is for the observer to connect the abstraction to its referral. Models are often regarded as the most easily understood form of architectural presentation, but are as such still ambiguous.

Figure 4: Three-dimensional presentations in the form of the physical models are the easiest to understand, but can still be ambiguous.
Slika 4: Tri razsežnostne fizične predstavitve v obliki maket so najlažje razumljive, a so kot način prezentacije lahko vseeno dvoumne.

Morris [2006: 68] refers to Christian Norberg-Schulz who argues: "As the concretization, the totality is only present in the finished work, but it can be represented in different ways. Such representations are never satisfactory, as most people lack the ability to "read" drawings and models". Oswald [2008: 35] approaches the same problem from a different angle, through the specifics of modern age: "The diminishing ability of architects, clients and brokers to interpret an abstract model is a symptom of an education decline extending to perceptual skills, which atrophy trough exposure to computer images. As a result, architectural models are embellished with trees, figures and other accessories from toy land […], which tempt the decision-makers to assume a playful attitude toward understanding their own design. The art historian Walter Grasskamp coined the term "sentimental model" to describe this trend in model building. Sentimental models are open to the charge of aiming only to look pretty in themselves. Their message is misleading and misses the true purpose of an architectural model in the design process."
In that scope, it is possible that the power of conducting the basic design idea may be overpowered by the expressive meaning of the object itself; particularly when presented to laypeople.
Laypeople cannot be expected to perceive physical models in the same way as architects do because they do not share the same models of interpretation. "To share models of interpretation is to share tacit understandings, forestructures that are learned not by rules or formulae but by words accompanied by demonstration in concrete examples and by practice in specific situations. […] Evaluation never is or can be exclusively personal and private. On the contrary, evaluation is predominantly communal. These communal preconceptions are far stronger than the personal." [Snodgrass & Coyne, 2006: 121-122]
"But if the model is deemed to be as professionally encoded as drawings, why then are presentation models, for example, made in the first place? It may be that the model is not a universal object in terms of legibility, it may instead be deeply culturally determined, but that cultural filter is not a professional one." [Morris, 2006: 68]
Models function differently and are perceived different according to the "filters" applied, but because communal preconceptions are far stronger than personal ones, it is possible to manage their ambiguity.

Ambiguity
Ambiguity of the physical model is often neglected when it comes to the presentation of ideas, but it is well known for enabling creative shifts during the design process. Indeed, it is their very ambiguity that makes models such a useful design tool.
Goel [1992] argues that ill-structured, open-ended problems, like the preliminary phases of design problem solving, need "ill-structured" diagrammatic representations. Ambiguous media is said to enable lateral transformations. Further research on the subject in connection with the use of models in architecture conducted by Gürsoy [2009] found that ambiguity could be two-sided: the ambiguity of the design medium vs. the ambiguity of the design process. This study showed that the ambiguity of a design process with unambiguous media also makes way for lateral transformations. Therefore, lateral transformations are not solely the product of ill-defined representations, but can also be the product of ill-defined design processes.

Physical models in architecture
Models have always been a bit of a blind spot in architectural theory. They are often used but rarely considered [Morris, 2006: 17]. As early as renaissance, when Leon Battista Alberti pointed out the distinction between "plain and simple" and "loudly dressed" models [Elser, 2012: 16], a division has been made between the type of models used and made by architects for their own use, which are often plain and simple in their appearance, and their elaborate counterparts used to present architectural ideas to laymen.
Today, the duality between models used for the generation and evaluation of ideas, and the ones used for presentations of finished designs is as evident as ever. According to their function, those models that affect the design process are called working models, while presentation models is the designation used for those used to convey a vision of the final product – architecture. While models from the first group are generally recognized as an important design tool, the ones in the second group are often regarded as nothing more than stand-ins for the real thing [Schmal, Elser, 2012: 8], an advertising aid that is done post festum and does not affect design decisions in any way. The two groups may sometimes appear similar, but they function in very different ways.

Working model
"Investigative models, preliminary models- models used primarily for feedback or for the designer within the creative process." [Greenhalgh, 2009: 8]
For working models to be effective, they have to be available to architects at the time of decision-making, which is why working models are mostly constructed by architects themselves. As a highly ambiguous medium, they enable creative shifts to new alternatives [Gürsoy, 2009: 66] during the process of model-making, through examination of the final result, or both. In the case of working models, physical model-making is a form of sketching [Gürsoy, 2009: 66] where the process should not be separated from the product if one wishes to achieve optimal results. The power of working models to strengthen design through their production and evaluation makes them the most important group of models in architecture. [van Berkel, 2010: 757]
Before digital modeling enabled for advanced digital form-finding methodologies, experimental models were important tools in the development of structures capable of bearing loads with minimal material input. At the time when it was nearly impossible to draw the forms of such structures, scale models formed the base of spatial investigations and were used at all stages of design development [...]. To transfer the results of such tests into the form of technical drawings special methods of photogrammetry were developed [Janke, 1978: 88].

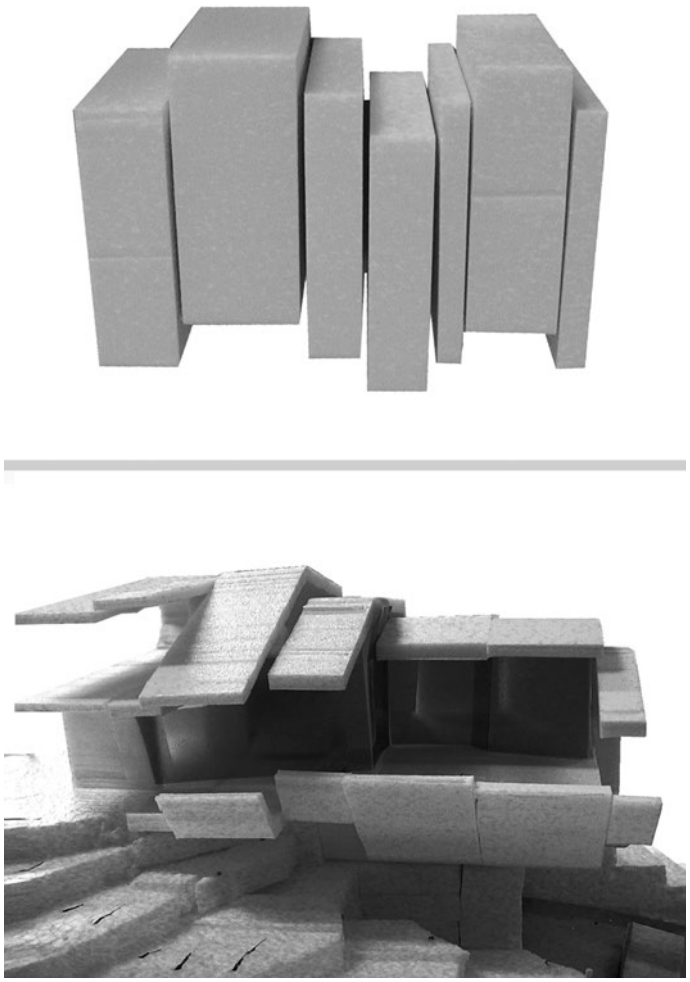

Figure 5: Highly ambiguous working models, used in initial design stages, become more defined during the design process, but can still facilitate design decisions and generate new ideas.
Slika 5: Zelo dvoumne delovne makete, ki se uporabljajo v začetnih fazah projekta, postajajo z razvojem zasnove veliko bolj določene, vendar še vedno prispevajo k sprejemanju odločitev in spodbujajo nove zamisli.

Figure 6: Colors, textures, and a whole array of other elements and effects are used in presentation models to facilitate the understanding of the finished design.
Slika 6: Razumevanje končne zasnove olajša ustrezna raba barve, teksture in ostalih elementov na predstavitveni maketi.

Presentation model

"It (presentation model) is truly an object in the world. Final models are rarely the designer's favorite models; compromises are inevitably made in the interest of legibility. Unlike sketch models, final models aggregate intention, reveal a totality." [Morris, 2006: 69]
Presentation models are produced after all the design decisions have been made in order to showcase them. They aim to represent a project or architectural idea holistically [Morris, 2006: 69], are therefore less ambiguous and often approach visual conventions of other media in an attempt to communicate more broadly.

Layered technologies

The majority of CAM systems in operation today are computerized versions of traditional tools used to process raw materials. In the shift from analogue to digital, human handlers are simply replaced by computers (CNC, Computer Numerical Control) that guide milling, routing or cutting (laser-beam, plasma-arc, water jet) heads according to a pre-planned path. The procedure is analogous to traditional processes. Results are achieved by cutting or subtraction of raw materials to create desired shapes. The fabricated parts are later assembled to form the final object.
Layered technologies represent the next stage of CAM development, where the production process is further removed from the hands of the maker. The term layered technologies is used to define a group of additive fabrication systems commonly known as rapid prototyping or 3D printing. The name derives from the principle of production that is common to all of them. They are used to produce physical objects automatically, by applying or solidifying thin layers of material according to data automatically retrieved from a digital 3D model. Most of the systems can only print one material at a time. The entire process of creating the final object is undertaken by the machine, which performs the complete job in a single production stage. The idea for this form of production may have come from NASA [Knaack, 2010: 9] as it was looking for a way to avoid the problem of carrying spare parts on long space journeys. The result was a system of production that enables the fabrication of any necessary parts on the spot when needed, from a single raw material, and creating no leftover waste.
Since the late 1980 when first such systems became commercially available, they have been adopted into a large number of industries (engineering, consumer goods, medicine, etc.). The ability to produce almost any conceivable physical shape in a relatively short time enabled massive shifts in the design processes, which affect the material culture (rapid manufacturing), enable new strategies (mass customization) and result in increased functionality that brings competitive advantages.
While architecture has never been regarded as a mass-industry, and product customization is intrinsic to the discipline, some advantages of layered technologies, such as production without the need for manual assembly from components by cutting, screwing, welding or gluing and fitting, appear promising in the context of manufacturing of actual architectural parts or even

entire buildings. Adapting layered technologies for use in the construction industry could provide the possibility to produce architecture in one go. Currently, a lot of ongoing research is being conducted in this field [Knaack, 2010; Soar and Andreen, 2012], which may bring significant changes to the way architects design and build structures, but as of this time there is yet to appear a fast current of parallel development that can be seen in other industries present in architecture and the building industry. "To date, the most significant limitation of rapid processes has been the size of objects they are able to fabricate. This factor, further nuanced by the considerable expense of fabrication machines along with the relatively long time required to make objects, has led to a reasonably narrow use in architecture." [Dunn 2012: 104] The majority of that use is still limited to the production of physical scale models.

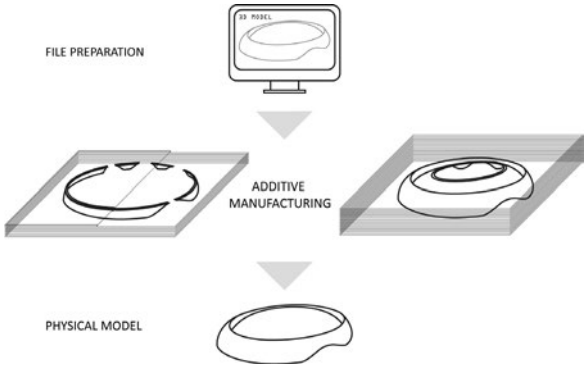

Figure 7: The layered fabrication process.
Slika 7: Proces slojevite izdelave.

Digital model

"The use of CAD has changed the design process, as many designers now think through the computer." [Greenhalgh, 2009: 9]

Thinking through the computer is taking a toll on abstraction. The traditional set of projections that was once used by architects to define objects is now being replaced by the virtual environment [Allen, 2009: 76]. Architects work directly on a virtual 3D object itself in an environment that operates in actual scale; objects are fully defined and capable of producing an endless numbers of projections of themselves. This drastic change affected both workflow and representation in architecture.

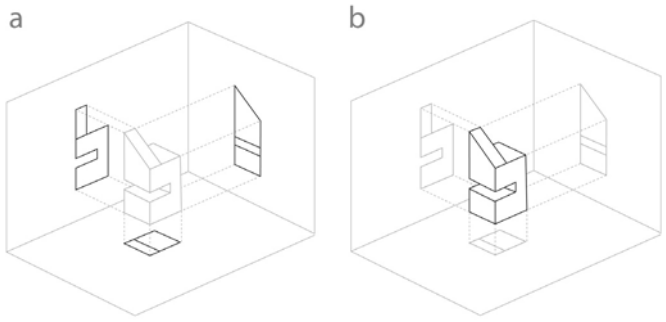

Figure 8: In computer modeling, the traditional set of projections (a) is substituted by the digital object itself (b).
Slika 8: V računalniškem okolju je osnova za delo virtualni objekt (b), ki nadomešča tradicionalne projekcije (a).

Paynter et al. [2002] state that haptic manipulation enabled by free-hand sketching and physical model-making in the early phases of the design process is disabled in the virtual environment because complex interfaces interrupt the creative process. Gürsoy [2009: 63] adds: "Independent of the complexity of the form, the objects in virtual space are always fully defined making them unable to provide appropriate support in the early stages of design where more ambiguous representations should be used. Compared to free-hand sketches and physical models, digital models are clear-cut representations. This sharpness evokes a feeling of completeness and causes the early crystallization of design ideas." Gürsoy [2009: 66-67] places digital models somewhere between working and presentation models. Design cannot benefit from their ambiguity, if they are ambiguous in some way, because they are so well defined.

Conversely, the virtual environment allows the creation of complex models and ideas and allows designers to experiment with forms without the use of the physical model. "A key advantage is the ability of software to allow the comparison of concepts without having to create additional models from the beginning." [Greenhalgh,2009: 9] As architects rely more and more on the computer's precision and unmatched potential to manage complex geometries, it is becoming increasingly evident that: "At first, computer software simplifies the production of complex forms and volumes. But it is impossible to fully understand, prove and evaluate such shapes based on a number of various viewpoints in form of 2D projections on a computer screen." [Kern, 2008: 106]

Virtual models also establish a new way of visualization. Allen states that computer renderings often presume that abstraction is a liability to be overcome, and tend to bring visualization closer and closer to reality. By doing so, they ignore the traditional distance interposed between the thing and its representation that gave architectural representation its particular power. [Allen, 2009:75]

Digital models are not affected by the abstraction and scale reduction typical for drawings and physical models. Though they appear small on the computer screen, they are created as full-sized digital representations in an environment that operates in actual scale. The potential of CAM systems can be used to materialize such designs in a number of different ways.

"In theoretical terms, the difference between printing a model and manufacturing actual elements for a construction site has been abolished. Model data is now equally suited to the production of model parts as it is to the production of parts for real buildings. […] As a result, the question of whether the digital image on the computer is still a model or the complete data set for reality is a purely academic, or rather a philosophical one." [Elser, 2012: 20]

Layered technologies in architectural model-making

The advantages of additive manufacturing, such as the ability to produce complex geometries and the absence of any need for manual, gluing, joining and fitting of the parts, appeal to architects in the context of model-making. Combined with high speed and relatively low costs of production they are the main

reason for the increasing proliferation of layered technologies within the architectural community.

Layered technologies were developed for the rapid and accurate materialization of digital models in the mechanical engineering and manufacturing industry. Their aim is to bring the physical model as close as possible to the one in the virtual environment in a fully automated manner. When used for the purpose of architectural model-making, some of their original qualities can also be viewed as drawbacks.

Architectural models produced this way include all the data from the digital model, are highly detailed and therefore provide a precise description of the design [Dunn, 2012: 20]. This is regarded as a disadvantage by some authors who caution [Oswald, 2008: 35] that a physical architectural model cannot and should not be a real life duplicate of 3D visualization; while others [Moon, 2005: 198] question the model-making process that has been completely removed from the model-maker's hands and see it as a dead end for the model as a medium, since models produced at the push of a button cannot offer the individuality and range of expression requisite for the task, nor can they adequately put to good use the creative imagination and lateral thinking of architects.

While one can agree that 3D data is today produced as part of routine project documentation, it is not objectively apparent whether it can be optimally employed directly for the production of physical models using layered technologies, as Kirton & Lavoie [2005: 23] imply. The limitations of additive systems such as minimal wall and detail thickness, which result from the technology and materials used, require a series of adjustments and modifications before physical models can be made and prevent a printed model from being an exact physical-scale duplicate of a 3D computer model of a project.

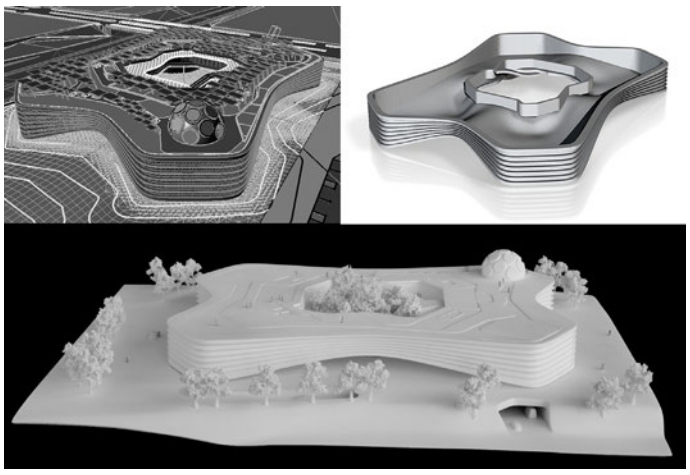

Figure 9: Digital models used to produce physical models are often heavily modified parts of the actual project model. Modifications have to be made to meet the requirements of layered production process in reduced scale. The final physical model is often a combination of the parts made using layered technologies and traditional techniques.

Slika 9: Digitalni modeli, ki so osnova za slojevito izdelavo, so pogosto močno predelane različice digitalnih modelov uporabljenih pri projektiranju in virtualnih predstavitvah. Prilagoditve omogočajo slojevito izdelavo v pomanjšanem merilu. Predstavitvene makete so pogosto kombinacija delov izdelanih s pomočjo slojevitih tehnologij in tradicionalnih postopkov.

Dramatic scale dissimilarities between the subjects being modeled in virtual environment (in 1:1) and those produced in the form of the physical model (in scale) also put some of the advantages of layered manufacturing shown in mechanical engineering and the manufacturing industry into new perspective. During the process of extensive scale reduction, which usually occurs, detail is lost - an automatic abstraction occurs. It is possible to use that fact in the advantage of the physical model and perform a conscious abstraction of the virtual model before the start of the production process. In such a manner certain qualities can be shown or emphasized, making the model comparable to those created using traditional techniques.

Another fact that has to be taken into account is that although layered technologies enable models to be fabricated in a single piece, such models are fairly rare. Most often, digital fabrication is combined with other techniques so that individual strong points of different mediums can be fully exploited.

Results

According to available reports and theory, our research has shown that models produced using layered technologies can fulfil traditional model tasks in the presentation of architecture while their practicality in conceptualization is rather limited.

We have established that abstraction is the key for the successful use of physical models. The level of abstraction is in close relation to the ambiguity of the model. Architects build models for two basic reasons; for generation and evaluation of ideas and for representation of finished design. As a consequence, two major groups of models exist:

- Working models take full advantage of ambiguity in order to advance design by allowing free interpretation of abstraction. The process of model making can be just as informative and helpful in the cognitive process and acquisition of new ideas as the end product itself.
- Presentation models are scale renditions of finished designs. Ambiguity and abstraction levels are low and used in accordance with culturally common visual convention able to provide clarity of the message and easy understanding.

We find that laboratory models do not fit in any of the groups above because they are governed by a different kind of abstraction and evaluated using scientific methods. As their use and production has little to do with visual conventions and evaluations, we feel that they should be classified as a separate group.

We also find that the lack of ambiguity associated with digital fabrication appears to be intrinsic to virtual environment as such. Layered technologies were developed to produce physical object as faithful to those in the virtual environment as possible. Consequently, physical materialization of digital designs cannot be expected to drastically change the level of abstraction or ambiguity.

Contrary to expectations, there are not many models that lead a double life, existing in both digital and physical form in architecture. In comparison to rapid prototyping in engineering

and industrial design, the process of digital model-making in architecture is quite different. One of the specifics of architectural model production is that it involves a drastic scale reduction that is in itself a form of abstraction. If the reduction of detail present in the digital model is not automatic but performed by the architect and devised in accordance with the future function of the scale model, it can have a beneficial effect on the operational power of the digitally produced physical model that should be comparable to traditional techniques.

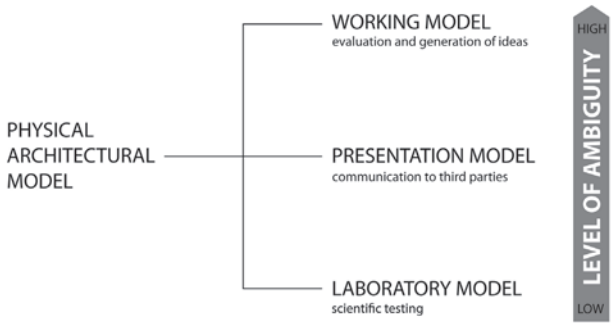

Figure 10: Different types of physical models used in architecture. General levels of ambiguity do not vary only according to the type and use of model but also according to the manner of its production.
Slika 10: Različne pojavne oblike arhitekturnih maket. Splošna raven dvoumnosti ni odvisna le od funkcije, ampak tudi od načina izdelave.

Discussion

In the part of our research discussed in this paper, we set out to define the most essential mechanisms that influence the use of physical models in architecture and determine if the same results can be achieved when layered technologies are used for the realization of architectural models.

Presentation models are materializations of a fully defined, finished design and are as such perfectly suited to be produced using layered technologies. In the case of working models, though, the process of model making is an integral part of the experience and often cannot be separated from the end product. This makes an automated process of production, such as layered technologies, less appropriate for the production of working models.

Another drawback is that the need to adapt virtual models for digital fabrication in reduced scale can interrupt the intuitive design processes and could, particularly in the early design stages, be considered as an unwelcome distraction.

One could argue that the preparation of digital data in accordance with physical model use is part of the model-making process, and can as such lead to new discoveries. But because this is done in the virtual environment, it remains subject to an unambiguous process that cannot be compared to hand manipulation.

Since our research was conducted using comparison to traditional techniques in order to determine the qualities of layered technologies, the gathered data is only relevant in the context of traditional architectural design strategies. Although the method used does not enable for the detection of potential novelties brought to the field of physical model-making by layered technologies, the results are an essential step towards the well informed and critical use of such technologies.

In order to determine the potential new uses of physical models enabled by layered technologies, a second stage of research will be carried out. Using a different method we will focus on some of the aspects we were forced to ignore during stage one.

The instrumental power of models within some of the contemporary design strategies such as those based on numerical data (parameters, algorithms, etc.) remains relatively unexplored. In stage two of our research we will focus on the possibilities for the implementation of physical models and layered technologies within the different design strategies specific to contemporary architectural practice.

Physical models remain popular because they can overcome the limitations of two-dimensional presentation of a virtual model on the computer screen. Layered technologies can produce complex geometries and delicate features much faster than traditional model-making ever could, thus forcing architects to re-evaluate the use of models. In the generative processes, certain characteristics of the virtual environment that might be perceived as an obstacle in the traditional design process now form the very base of design development. While the traditional process benefits from ambiguity, new design strategies rely only on known facts in order to produce an outcome that is the only unknown part of the process. In that context a question emerges: How can the architect benefit from a haptic experience during a "white box" design process where the only uncertainty is the result?

We intend to answer the question by studying a number of individual cases of model use in contemporary practice, focusing on the use of models in the realm of new strategies.

We believe that layered technologies are able to increase our ability to manage some more vague aspects of complex geometries that can only be assessed in physical space. We intend to show how relations in conceptualization, control and creation of architecture are affected by the integration of digital conceptualization tools with physical matter, and how they can contribute to the production of increasingly fluid architectural forms, flexible spaces, and transformative assemblies.

Further research

We would like to conclude this paper by introducing some additional research questions the study evoked. Answers to the following can be determined by future research:

- What impact does the choice of material, color and manufacturing principle (non tectonic process in the case of layered technologies) have on the use of physical models?
- Could layered technologies offer a way of reintroducing physical models to the younger generations who work exclusively in the digital environment?
- What is the connection between the production of physical models and full-scale digital fabrication in architecture?

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OPERACIJO DELNO FINANCIRA EVROPSKA UNIJA
Evropski socialni sklad

iz recenzije / *reviewer notes*

The article presents an overview of recent model-building technologies and their place in the architectural design process. It discusses them in comparison with traditional modeling techniques, and quotes a wide range of references and opinions about their roles and effects in the architectural profession.
Missing:

- A clearer, more readable structure, hierarchical headings system.
- Some of the discussion seems to belong to the conclusion (e.g., that layered technologies are better applicable for presentation models than for working models).
- A clearer writing of the problem and conclusion sections.
- A clearer definition of the next research stage.
- Mentioning that the reason that layered technology is more for presentation is that its refinement process is too specific and removed from the design itself in order to be executed by the same person who actually does the design (i.e. an architect can make a model, but not clean-up a virtual model for printing).

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THE TYPOLOGY OF TRADITIONAL SLAVIC HOUSES A CASE STUDY OF SERBIA

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TIPOLOGIJA TRADICIONALNIH SLOVANSKIH ZGRADB NA PRIMERU SRBIJE

izvleček

Tradicionalne slovanske hiše so gradili iz netrajnih materialov in s pomočjo preprostih tehnik gradnje. O tem se lahko poučimo iz pisnih virov, predvsem etnografskih in zgodovinskih, neposredno pa iz zelo redkih še obstoječih primerov v izrazito slabem stanju in ustnega izročila, kar ga je še ostalo.

Hiše, ki so jih gradili Slovani po naselitvi na Balkanskem polotoku, so bile enoprostorske. Prve hiše so spominjale na prvotne domove iz nekdanje gozdnate karpatske domovine, vsaj v tistih predelih Balkana, ki so bili bogati z gozdovi. Prvotne oblike hiš v Srbiji so bile enoprostorske hiše, ki so se za časa turške vladavine (1454-1878) razvijale naprej. Študija vsebuje kronološki pregled od najzgodnejših tipov tradicionalnih hiš do višje razvite tradicionalne arhitekture v Srbiji.

ključne besede

Srbska hiša, tradicionalno bivališče, dediščina, koča, vernakularna arhitektura

abstract

Traditional Slavic houses were built of non-permanent materials using primitive construction techniques. It is possible to learn about them from literature sources of primarily an ethnographic or historical nature, directly on the basis of very rare surviving examples, though these are in considerably poor conditions and through the remaining folklore.

Houses built by South Slavs when they settled in the Balkan Peninsula were single-roomed. Their first houses had a resemblance to the primitive homes in their wooded Carpathian homeland, at least in those regions of the Balkans that were rich in forests. The first forms of houses in Serbia were single-roomed houses, which were further developed during the Turkish rule in Serbia (1454-1878). The paper gives a chronological overview, from the earliest types of traditional houses to better developed traditional architecture in Serbia.

key words

Serbian house, traditional housing, heritage, hut, vernacular architecture

Introduction

When the Slavs arrived in the Balkans, it was a time of great population movement from northern Europe. These movements did not allow any long delays or choice of permanent dwellings. It all boiled down to the creation of temporary habitations and primitive shelters using mostly natural features (caves, semi-dugouts, dugouts, etc.). The early development of Slavic houses meant using suitable natural shelters, which required a minimum of upgrades and efforts to obtain a more or less satisfactory living habitat. The first forms of habitation constructed in this way provided only basic protection.

Having come into these parts, which were quite different from their homeland, the Slavs had to adapt to new conditions of both climate and soil. It is therefore natural that this process of adaptation affected the organization of housing areas and new settlements, which were formed in the synthesis of traditional habits and economic patterns one hand, and their newly found reality, on the other hand. Findings from some sites of this period confirm that the remains of the houses are mainly from logs. This is natural, because wood at the time was plentiful in the area. It was relatively easy and quick to build with wooden logs as opposed to building stone or rammed-earth walls.

The concept of home for most of the southern Slavs in the Balkan Peninsula related to the one room where there was a fire burning and which they entered directly from the outside, or via a porch. The same word occurs in most Slavic nations, so it is probable that all the Slavs had this first phase of housing, a single-roomed house. However, other nations also used to start their colonization with the minimum space needed for life, thus the single-roomed house is not specifically an ancient Slavic house, but a generic one connected to the primitive way of life [Cvijić, 1922].

There are no absolutely reliable data on what kind of houses the Southern Slavs built after settling in the Balkan Peninsula, but it is very likely that these were single-roomed houses similar to those that were built later, after their migration. Also, it is likely that their first houses had similarities with the primitive houses of their wooded Trans-Carpathian homeland, at least in those regions of the Balkans that were abundant with forests. But these are all assumptions. What is certainly known is that single-roomed log-houses [1] or wattle-and-daub houses [2] were very frequent in the Turkish period, and after Turkish occupation they remained as shepherds' huts or homes for poor families. There is a clear conceptual link between these and single-roomed

ancient Slavic houses: the old experience and old method of construction of the simplest houses was replicated under the primitive conditions of the Turkish times [Cvijić, 1922].

The development of Southern Slavic houses had a course slightly different from the development of other Slavic houses. Unlike the flat and swampy Trans-Carpathian lands from where the Slavs came, the Balkan Peninsula had a completely different climate and landscape. A large number of Slavs settled in the area near the Adriatic coast, in bare and rocky areas with a Mediterranean climate; here they found houses of stone, completely different in their form and arrangement, both inside and out, than the ancient Slavic single-roomed houses. Even the new houses that they built after settling there could not be wooden due to the lack of wood, so it is impossible to compare the development of the Southern Slavic Mediterranean houses and the wooden houses of the Slavs in the northern regions. The South Slavs came in direct contact with the Byzantine civilization, and they admired its architecture: it is evident in the Vardar area, in Thrace [21] and in the Maritsa Basin [22].

This was not the case with other Slavs. The types of Southern Slavic houses on the Balkan Peninsula developed, therefore, under very different natural and cultural conditions than the houses of the Russians, Poles, Czechs and Sorbs. Therefore, parallel observation of the development of South Slavic houses and the houses of other Slavs does not yield comparable data [Cvijić, 1922].

The impact of the existing indigenous nations, prevalently the Byzantine influence on the Serbian building tradition was certainly considerable but not absolute; thus, the tradition did not lose its individual characteristics. There is almost no data on the extent and intensity of these influences. However, since the eighteenth century, further development of the Slavic house can be traced in most areas, either directly via preserved buildings or on the basis of ethnographic research in Serbia.

The oldest mention of how old Slavic houses looked after Slavic settlement in the Balkans can be found in the writings of some contemporary writers, and passing travellers. Procopius (Greek - Προκόπιος, c. 500-565), Byzantine writer and historian, wrote that Slavic homes were miserable huts made of mud and wood, whose position changed frequently, and which were scattered far from each other [Deroko, 1968]. Also, according to the Strategikon, a 7th century document about military skills, which is attributed to the Byzantine emperor Maurice (born 539, reigned 582-602 AD) [Jiriček, 1922], each Slavic house had more than one entrance (until 20 years ago in former Yugoslavia, it was usual that farmhouses had two opposite doors). The Arab traveller, Harun ben Yahya, who was traveling in 880 from Thessaloniki to Spalato, visited the areas of Serbia and noted that the Slavic houses were made of wood [Jiriček, 1922].

In addition, the writings of many other travellers pointed to the poor quality of construction and materials of Slavic houses. So, this indicates that the housing architecture in the Middle Ages was most often realized in wood and earth, and in rare cases, of stone (where this material was plentiful). Slavic colonization of the country, according to the historian Konstantin Jiriček, meant returning to the status of pre-Roman times [Cvijić, 1922].

The oldest settlement in Serbia

The first shelters from the storm, which the ancient Slavs in Serbia erected wherever they stopped, were built as primitive shelters intended for housing. The construction material used was wood and earth. They were quite simple to construct, without any need of craftsmenship or technical experience [Kojić, 1973]. Dugout houses (Zemunice), Semi-dugout houses (lagumice) and huts (burdelji) are the simplest forms of old Slav settlements on the Serbian territory that can be established. Dugout houses and semi-dugout shelters are built in loess. There were present mainly in Vojvodina (northern Serbia), although there are data about their presentce in Bela Palanka, Pirot and Aleksinac (southeast Serbia). Huts [3] – are a type of semi-dugout houses with a rectangular base. There were particularly present in Negotinska Krajina (eastern Serbia).

The Naslon was used primarily as a shelter from bad weather, or as temporary protection, although in some cases it was used for family housing [Deroko, 1968]. This is the first form of habitation built on the surface of the ground (not dug-in). It consists of a series of slanted columns supported by a beam that lies on two stilts [4]. It is covered by turf. Other known forms used for housing in Serbia are Sibari, Busara and Dubirog or Savrdak. Though being different in terms of their floor plan, structure and type of cover, all the mentioned forms belong to the same type. All have a circular base for reasons of simplicity in construction of the roof structure and the easy drainage of a small conical roof.

The Sibara is one of the oldest and most primitive shelters. It has a circular layout forming a conical volume. It is created by arranging the logs (siba) to converge to one apex, while forming a circle on the ground. It is covered by turf and roofing. Sometimes it is dug into the ground for better protection from the cold [Kojić, 1949]. There are no windows, no chimneys or floors. People slept on straw, with their legs oriented towards makeshift doors that are located between two spaced logs. Over time, the area near the fire was enclosed by a low fence of woven wicker, which also represents the first hint of separating people from animals, which often stayed indoors due to the cold weather, [Vukosavljević, 1965]. It can have a diameter at its base of up to 5m, with a side inclination of 45-60°.

The Dubirog was a more developed form of sibara. This development is more reflected in the manner of construction than in the form. The most significant indication is an attempt to separate walls from the roof, which is obvious in the more advanced types [Kojić, 1949]. The walls of a dubirog are made of wicker, plastered with mud on both sides. The layout is still a circle, often made of stone walls, and the vertical plane of the walls was obtained by high curved siba (logs). It is characteristic of southwestern Serbia.

The Busara is similar to the sibara. Those are in fact structures where a layer of bark or fern is placed first over the cone of the

logs, and then earth turfs are used to fill the space between the log rows, starting from the bottom-end up, which also serves as a cover. At the top of the cone an opening was left for smoke [Deroko, 1968]. They could be found in Gornji Ibar, Lepenica (central Serbia), and around Belgrade.

In addition to circular base habitats there are also those with a rectangular layout, namely: krivulja, lubara, korka, koliba and others. The dwellings with an elongated base belong to the transitional type, where there are still no corners, but there is ridge board as a more complex type of construction.

The Krivulja or krivača is this type of shelter where the main disadvantages of sibara were rectified: the sides are vertical to a certain height, and the base is elongated [Kojić, 1949]. In this way a more comfortable height in a cross section was obtained. It is built by joining the curved logs together in pairs, which are joined at the ends around one rafter, which serves as a ridge. They are typical of southwestern Serbia, Podrinje and Šumadija.

The Lubara is similar to the krivulja in terms of its form and construction. What is characteristic is the roof cover of tree bark. Due to the nature of the roof cover, its structure was changed to become a gabled roof, because it was impossible to cover round and angled surfaces with the tree bark. The lubara is considered a precursor of the loghouse, as it has two gable walls made of logs.

Nowadays these mentioned habitations are very rarely seen in their original function – for housing. More often we see them as livestock keepers' shelters or small farming buildings. In this region there is a wide variety of forms and types of such habitats which depend, first of all, on the available material and the anticipated function of the structure.

The first houses

The first houses in Serbia appeared as a legacy of the original Slavic settlements. The first houses had only one room. They were small, with a layout of 3-4m by 3-4m. An open hearth was in the middle of this room, surrounded by stone slabs. The fire burned at all times and gave light and heat. The smoke came out through the cover because there was no special opening for it. There was no ceiling. There were no beds, but people slept on the dirt floor next to the fire, on straw or hay. The floor was made of packed clay. The door was always open for light and air. The windows were small, 30/40 cm, and often sealed with paper or animal skin [Kojić, 1949].

The hut - Koliba is significantly different from the mentioned types in that the walls are different from the roof, and therefore it occupies an important place in the development of residential buildings. The roof is on the low walls, not on the ground. This is where the first eaves appear, an important step towards the first proper house. The main supporting elements of the koliba are stilts with a ridge board and outer walls which are made of a series of columns driven into the ground [Kojić, 1949]. The logs that support the cover are supported by the ridge board and the exterior walls. The columns are woven around with wicker and plastered with a layer of clay. Such shelters were used extensively in the Morava river area and Vojvodina.

The Pletara is formed from the further development of huts. Foundations appear as a result of significant progress in the structure. In ordinary pletara huts, the walls were built of a series of wooden pillars (logs) dug into the ground, around which was wicker was woven, and they were plastered with mud. The roof covering was supported with forked poles. By raising the walls onto foundations, fixation using columns (logs) disappeared, so the need for braces in the bearing walls arose. In this system, the main forked poles disappeared, and the roof structure was supported by ceiling joists and external walls. The building thus had the appearance of a real house. Under this system, these Demijohns were primitive houses built especially in the Morava River (central Serbia) and Vojvodina (northern Serbia) [Kojić, 1949].

Serbia is divided into three large regions, according to its climatic conditions and available building materials. In regions with plenty of wood the brvnara (loghouse) [1] is dominant, while the bondrucara half – timbered constructions are representative for areas with a little less wood. Houses made of earth are characteristic for regions with a lack of wood, such as the Pannonian plain. There are also varieties of these types.

Brvnara

The Brvnara (loghouse) type of house is known in all forested areas of the Balkan Peninsula. It is a house built in the dispersed mountain villages, in livestock keeping regions. In Serbia it has been most widespread in the Raska region, in the Drina valley and Sumadija (western and central Serbia). The log cabin is most often a ground-floor building sometimes with only one room. Due to the changes in the way of life it later evolved into somewhat more complex shapes, so nowadays houses of this type can be divided into three groups: those with only one room, then those with two rooms -´the house´ [5] and the room, and the ´house´ the room and a basement, the so called ´houses on ćelica´ [6] [Rodic, 1999].

The ground level loghouse - prizemljuša, is a ground-floor house with one room. It is always a free-standing structure, without support from neighboring buildings. It is of a square layout, built without foundations on a bed of coarse stones at the four corners of the ground foundation beam. On these beams are laid horizontal stacks of logs, forming walls. The roof is high and steep and covered with roof straw, and at a later stage with shingle.

The Log house under shingles [7] which consisted of one room is the initial type of loghouse in Serbia in the 19th century. The fireplace was in the middle of the house. The door was usually positioned in the corner, and never in the middle of the wall. The height of the wall was about 2 meters. The Straw roof loghouse is also a house consisting of one room, similar to a log house under shingles, usually square in layout. In it too, there was a fireplace in the middle of the house. In the eighteenth century there were more straw roof loghouses and shingle roof loghouses [Kojić, 1949].

After the liberation from Turkish rule (1878), there was a change in the construction of rural houses, by the gradual addition of rooms. The one-roomed loghouse was divided into the house and the room. Initially, this division was done by inserting woven wicker or board partitions in order to protect the fireplace and sleeping section from the wind and draft. The next stage

in its development was the appearance of a storage room, a small department intended to accommodate a variety of things. With the emergence of a storage room, the loghouse obtains a second door positioned opposite the existing ones. The room took its regular function after the installation of windows and earthen stoves. It was used for sleeping, keeping clothing and receiving guests. The room was entered from the house and not from outside [Rodić, 1999]. The main section, the ´House´ fully retained its form, its purpose and name. The room was used primarily for ceremonies and the winter stay. The ´House´ [5] has the basic form of a loghouse. It is the focal point of the entire family life. It is the only place where a fire is burning constantly. It is the beginning of the spatial development of the house. New rooms were added around this room.

The next stage in the development of the loghouse is its development in a vertical direction, which is enabled by setting the house on sloping terrain. The structure is placed on the slope perpendicular to isohypses, thus providing another room – the cellar or storeroom, which is situated below the house. This type of house is known in literature as ´house on the ćelica´ [6].

Figure 1: Brvnara [Source: Ana Momčilović-Petronijević]
Slika 1: Brvnara.

The Brvnara (loghouse) osaćanka is the most clearly expressed type of loghouses in terms of style. It is considered the best representative of wooden architecture that developed in Serbia in the first half of the nineteenth century. It was very widespread in the Drina valley and Šumadija (western and central Serbia). It was named after Osat, a region in eastern Bosnia, from where the Osećani master builders came [Rodić, 1999]. The construction techniques of osacanka were at a high level. The only building material was oak, worked using hand tools, with precision and safety. Even the production of the surface curves was completely accurate in its appropriate diameter. A prominent feature of the osaćanka was a very high and steep roof covered with shingle [7], and the chimney was covered with a cap [8].

The Dinara loghouse is a house of mountainous and hilly regions south of the rivers Sava and Danube, and it occupies more area than any other type of house in Serbia. It was widespread all over central and western Serbia, in Bosnia, in Herzegovina and in the majority of Montenegro. It is built of horizontally laid logs cross-fixed at the corners. Its base is rectangular, with a high roof covered with wooden boards, straw, and in some areas with stone tiles. There are usually two doors positioned opposite to each other [Findrik, 1994].

The Vajat is a small structure that was used for housing a married member of the extended household family (households had many members, of several generations). It usually has only one room where there is only a wide bed, chests for clothes and a shelf [10] on the wall. There is no fireplace in the vajat. The vajat sometimes has a porch.

Wooden log churches are churches formed out of wood. In Serbia, wooden churches appeared in the early Middle Ages. They originated from the form of the ordinary house. Churches made of wood were particularly built in the Sumadija, Drina and Morava valleys (western and central Serbia) in the seventeenth, eighteenth and nineteenth centuries. During the Ottoman rule the wooden churches were hidden in dense forests and were of a modest scale. The arrangment of the space inside them basically corresponds to the fundamental requirements of the Orthodox Church canons, ie. each had a narthex, nave and altar, no crypts and no galleries.

Figure 2: Pokajnica Church near Velika Plana [Source: Ana Momčilović-Petronijević]
Slika 2: Cerkev Pokajnica, blizu Velike Plane.

The structural system was suited to the loghouse construction principles, but certain types were modeled after the existing churches built of stone. Thus, the apses had a semicircular or octagonal layout, which is not fully justified when building with logs. The interior space of the church is covered with a concave vault made of boards that were nailed to the roof from the inside, in a desire to replicate the vaults of the churches built of stone.

After the First Serbian Uprising in 1804, building began with an increased intensity, and progress was made in church building. Log churches were still constructed, but were much larger in size and with an open porch in front of the narthex. The porch

is quite a rare phenomenon in Serbian Orthodox churches and it is supposed to have been introduced by Osacani master builders [11] after the model of the Muslim places of worship, which still have similar porches. There are two types of old wooden churches: smaller ones without an entrance porch and the larger ones with a porch. Smaller churches were built under Turkish rule, and then larger ones after the liberation, mostly between 1820 and 1830.

Decoration of the loghouse cottage was very humble. Color was not applied in the decoration of loghouses, but only engraving [12] [Kojić, 1949].

The church in Takovo is preserved as the oldest pure representative of the smaller type. The prominent ones are the church Pokajnica near Velika Plana, Cvetka near Kraljevo, Dub near Bajina Bašta, Gorobilje near Požega, Pranjani near Gornji Milanovac and many others.

A good example of a wooden church is Pokajnica Church near Velika Plana. The church was built in 1818 at the place where Karadjorde was assassinated [13]. It belongs to the type of log churches built in Šumadija and the Drina valley (central and western Serbia) after the liberation from the Turks. The church is divided into the altar, nave, narthex and porch. Over the main part of the altar is the vault built of boards. The altar wall is polygonal. The windows are situated on the longitudinal walls.

Semi loghouse

Due to the increasing population, and therefore the increased intensity of construction, the areas covered by forest with material suitable for construction were gradually reduced. As early as the mid-nineteenth century the abundant timber disappeared, leading to new types of loghouses, semi-loghouses-semi-wickerhouses. Parts of the building, usually the room,

Figure 3: House Bondučara in Ravna near Knjaževac [Source: Ana Momčilović-Petronijević]
Slika 3: Hiša Bondučara v naselju Ravna, Knjaževac.

Figure 4: House on salaš [23] in Vojvodina [Source: Ana Momčilović-Petronijević]
Slika 4: Hiša na salašu v Vojvodini.

were built in post-and-pan construction filled with wicker [2], while the ´house´ [5] was still built of logs. The basic layout of the rooms remained the same as in the ´osacanka´ [11] with two rooms, but half the façade was of timber and half was painted white. The roofs still remained hipped, but were not covered with shingle, rather with tiles [14]. In the mid-nineteenth century, the ´polubrvnara polučatmara´ developed into a house with three partitions. The ´house´ [5] kept its form. There were still no windows on it. The ´room´ was divided into two parts and now there was a room for children and a small guest room. The fireplace was now positioned next to the partition wall. There were still two opposite doors as in the osaćanka. The room had two and sometimes four small windows [Kojić, 1949].

The traditional bondručara house (post-and-pan)

The Bondučara house was built in areas where there was no solid wood, but plenty of low quality wood. It was widespread in the area from the Morava River in the west to Timok in the east, and along the entire valley of the Južna Morava (southeast Serbia). This house is found in a large part of Serbia. These are ground-floor buildings of a square layout, detached on all sides. The simplest form is a single-roomed house. It then developed into a two-roomed house, the ´house´ [5] and the ´room´. While the size of loghouses was limited by the material, the layout of the bondučara could be expanded and partitioned much more freely. The simplest forms of these houses can be built in the following way: four vertical wooden corner columns are set in the ground (with a diameter of about 10-12cm, and a height of about 2m above the ground). On the top, the ends are connected to the frame of four horizontal beams that would support the roof. The eaves project out approximately 50-80 cm [Deroko, 1968].

Bondručara are houses with a skeleton of wooden battens bearing the filling of the walls. Therefore, the basic structural element of a bondučara is a skeleton of light timber for the entire building. The walls are filled with light material, such as earth and adobe. There is variation when the laths retaining the mud plaster are nailed to the wooden skeleton, or the mud mortar is plastered over the wicker. The bondučara is a house built in areas with a temperate climate. The facades are plastered with mud to protect it from the rain and sun, so they are made with wide eaves overhangs. There are no gutters. The roof coverings are tiles [14] and straw. The roof inclinations are mild. As there is not much snow, there is no need for a steep roof. The roofs are always hipped. The attic space is not used [Deroko, 1964].

The interior arrangement is similar to the loghouse. In addition to the original simple room with an open hearth in the middle, a room is added, a small pantry, and particularly a front porch.The

porch was used for the storage of tools, for drying agricultural products and as a useful transit link to the yard. The houses were in the yard and not on the street front.

Different influences can be seen on the forms of these houses, their accessories and decorations, mainly the impact of the existing feudal system, then the Byzantine-Oriental, and influences that are related to economic and cultural development, and consequently there are many subtypes of this house. In this variety of types and the influences it is possible to single out the Morava type houses [15].

The Morava house often has a square, and less frequently a rectangular base. It was built of wicker, wattle [2] or adobe [16] and covered with tiles [14]. It has a distinctive woven chimney covered with a sloping layer. The old Morava house consisted of an ajat [17], a house and a room. In the second half of the nineteenth century, another room was added to it, and at the end of the century it obtained four parts. An ajat is a kind of porch and the main feature of the Morava house [Rodić, 1999].

Houses made of earth in Vojvodina (north Serbia)

Vojvodina once used to be the Pannonian sea [18]. After the sea dried up, in this area stone was very hard to find in order to build the houses. Brick was not the solution either, because wood was necessary for its production and at that time there was a serious lack of wood in Vojvodina. That is the reason why the buildings were built of ćerpič [16], and more often of earth. The position of the walls was marked on the ground, and then the sheeting was constructed of timber boards. Compact earth mixed with water and sawdust was placed between the boards. When one layer got dry, the boards were raised to the next level, so the next layer could be created. That way the same boards were used repeatedly to build walls, with an approximate height of 2.20-2.50 m. The ceiling was usually made of vitlo [20]. The roof was almost always pitched and covered with straw [Deroko, 1968].

Conclusion

Rural house represents the reflection of natural, cultural, historical social and economic conditions, as well as the technical possibilities at the time the house was built. The oldest forms of habitation in this region represent the most simple habitats such as zemunica, lagumica, sibara, dubiroga, then busara, lubara...This forms precede the latter, more developed forms such as kolibe and pletari.. The increase in man's needs led to development of living space, and therefore, to development of new, more advanced forms of habitation. On the territory of Serbia, dominant forms were: brvnara (western and eastern Serbia), bondručara (eastern and southern regions of country) and houses made of earth (northern Serbia).

House maintains the spirit of region to which it belongs. For its construction locally available materials are used, and it is built using traditional skills and techniques. However, with the development of villages, house becomes less dependent on materials available nearby. Newly built houses are becoming more influenced by urban architecture and modernisation of living space. Nowadays, in terms of construction, there is much less connection with the tradition, and the rural houses ara being built rather stochastically. Thus, it is advisable to make the review or classification of earlier forms of habitats, in order to contribute to their conservation, at least through the documentation. Hence, it is important to retain awareness about the importance of preservation of inherited and traditional values, which origin from distant past.

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Notes

[1] Brvnara – a wooden building of logs or planks
[2] Čatma-woven wicker (wattle) that is plastered; Čatmara – a house made of wattle
[3] Burdelj – a kind of semi dug in shelter. It is a an excavated pit, sometimes covered with turf and soil
[4] Soja, soha – a forked pole which supports something with its fork (ridge board),
[5] House – the center of the entire family life, the only place where a fire constantly burns. It is the beginning of the spatial development of a house. New rooms are added around this room.
[6] Kuća na ćelici – a house built on sloped ground, whose lower part is semi-dug-in, it is used as a basement or a barn.
[7] Shingle - cleaved fir or oak planks that cover the roofs of log or post and pan houses. Board may be furrowed on one side and the other roughly dressed appropriately for the connection.
[8] Kapić - distinctive element of the chimney, which serves to protect the fire from snow and rain.
[9] Prince Miloš Obrenović (1780-1860) was the prince of Serbia from 1815 to 1839 and from 1858 to 1860. He participated in the First Serbian Uprising and led the Serbian insurgents in the Second Serbian Uprising (the founder of the Obrenović dynasty). During his rule, Serbia became an autonomous principality within the Ottoman Empire.
[10] Raf – a shelf attached high to a wall, near the ceiling, along the the whole periphery of the wall
[11] Osaćanka - log cabins that were built by Osaćani. Osaćani - master builders from Osat, a place in Bosnia
[12] Duborez – wood carving – engraving decorating
[13] Karadjordje Djordje Petrović (1768 -1817) was a Serb leader of the First Serbian Uprising against the Ottoman Empire, and the founder of the Serbian House of Karadjordjević
[14] Ćeramida - roofing of trough shaped fired clay
[15] The Morava House – a house in the Morava valley with false arches on its facade
[16] Ćerpič - adobe dried in the sun only
[17] Ajat – a kind of porch and the main feature of the Morava house.
[18] The Pannonian Sea was an open body of water that existed in the area of the Pannonian Basin for about 30 million years ago and disappeared about 600, 000 years ago. It covered the territory between the Alps in the west and the Dinarides to the south and the Carpathian and Rhodopes mountains in the east and southeast. In Serbia this is the Vojvodina area.
[19] Pleva - dry straw or hay
[20] Vitla - wooden sticks with ropes of straw wrapped around them, and then rolled in the mud and so glued to each other over the entire room, thus forming the ceiling
[21] Thrace – an area in the extreme southeastern part of the Balkan Peninsula
[22] Maritsa - the longest river in the interior of the Balkan Peninsula, which springs in Bulgaria. It flows between the Rhodope Mountains in Bulgaria and the Stara Planina (Balkan) mountains. It is the border river between Bulgaria and Greece and between Greece and Turkey (185 km). It flows into the Aegean Sea in Greece. Its river basin covers 54,000 km².
[23] Salaš – grange - field estate with the main house and auxiliary buildings for catlle keeping and land cultivation. Nowadays they are being efficiently exploited for tourism purposes.

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KULTURA NASELBINSKEGA PROSTORA V SLOVENIJI

THE CULTURE OF SETTLEMENT AREAS IN SLOVENIA

izvleček

V okviru raziskovanja in razumevanja sodobnosti podeželskega prostora v Sloveniji so študentje Fakultete za arhitekturo izvedli javnomnenjsko raziskavo na temo Kultura naselbinskega prostora, ki se je nanašala predvsem na vizualno podobo doživljajskega prostora naselij. Človekove potrebe in vrednote bivanja so danes sestavni del vseh dokumentov in predstavljajo izhodišče za oblikovanje novih bivalnih zasnov. Mandičeva [1999] razlaga osebno kakovost bivanja z Allardovo klasifikacijo človeških potreb, pogosto pa se za merjenje kakovosti bivalnega okolja uporablja Mercerjeva lestvica kakovosti bivanja.

V prispevku so predstavljeni rezultati raziskave, v katero sta bili vključeni dve ciljni skupini: strokovnjaki s področja urejanja prostora, ki so zaposleni na občinskih upravah slovenskih občin, in študentje višjih letnikov Fakultete za arhitekturo Univerze v Ljubljani. V raziskavi, ki je predstavljena v tem prispevku, smo se spraševali o vrednotah bivalnega okolja. Raziskavo o omenjeni temi je sprožila "barvitost", ki v slovenskem prostoru ne pozna meja. Ob vsakodnevnem zgražanju nad barvitostjo vseh odtenkov pa pozabljamo na drobne elemente, ki prav tako uničujejo podobo naših naselij: reklamni panoji, razne brunarice kot dodatek garaž in okrasnih elementov, stojnice ob praznovanjih in sejmih, fontane, spomeniki, raznolikost eksotičnega zelenja, Sneguljčica in sedem palčkov ipd. V okviru raziskave je bila opravljena anketa, s katero smo želeli pridobiti objektiven odnos do raziskovanja kakovosti s stališča spreminjanja bivalne kulture in uporabe skupnih zunanjih prostorov v slovenskih naseljih. Ključno vprašanje, ki se je vsebinsko dopolnjevalo v večini vprašanj, je bilo: Kaj bi povečalo kakovost življenja v naselju?

ključne besede

vrednote, anketa, slovensko podeželje, barvitost fasad, parkiranje

abstract

To study and grasp the contemporary rural areas in Slovenia, the students of the Faculty of Architecture carried out a public opinion survey on the subject of the culture of settlement areas, with a particular reference to the visual image of the experiential space of the settlements. Today, human needs and living values are an integral part of all documents, as they represent the starting-point of designing new concepts of living. Personal quality of living is explained by Mandič [1999] through the use of Allard's classification of human needs; however, Mercer's Quality of Living ranking is often used to measure the quality of the living environmentThe paper represents the results of the study, which included two target groups: The experts in spatial management and planning employed at municipal administrative offices; and the senior years' students at the Faculty of Architecture of the University of Ljubljana. The study represented here addressed the values of the living environment. The study was triggered by the 'colourfulness' that knows no limits in Slovenia. Putting the everyday indignation over the variety of all possible shades aside, it has become evident that the tiny elements that are also destroying the image of our settlements are all too often neglected: billboards, log cabins complementing garages and decorative elements, stalls during celebrations and fairs, fountains, monuments, mix of exotic plants, the Snow White and the Seven Dwarfs etc. The study included a survey to obtain a more objective approach to the studying of the quality from the viewpoints of the changing living culture and the use of communal external space in Slovenian settlements. The key question that resonated in most of other questions was: What would improve the quality of life in the settlement?

key words

values, survey, Slovenian countryside, colourful exteriors, parking

"Vsak vidni pojav predstavlja kompliciran splet različnih vzrokov"[Rihtar, Rihtar, 1996: 21], posebno še za grajeno okolje, ki je delo narave in človeka, razvito v dolgi zgodovini svojega obstoja.

Uvod

Vedno večja uporaba nove informacijske in komunikacijske tehnologije spreminja pomen prostora in prostorske oddaljenosti, ki nista več merljiva v fizičnem smislu (kilometri), temveč s hitrostjo sprejemanja inovacij in informacij. Vpliv globalizacije bo v prihodnosti vnesel v kulturo bivanja naselij velike spremembe, pri čemer se bodo preoblikovale in utrdile predvsem tiste osnovne vrednote, ki bodo zagotavljale posebnosti na lokalnem nivoju. Vse bolj se bosta izgubljali in spreminjali prostorsko nedoločljivi ekonomska in socialna identiteta, medtem ko se bosta ožje kulturna (lokalna) in prostorska identiteta vedno bolj utrjevali, saj bosta zagotavljali posebnost bivanja v skrčenem globalnem prostoru. Identiteta kraja [Lynch, 1981] je tisto, kar omogoča njegovo individualnost ali različnost od drugih krajev in služi kot podlaga za njegovo prepoznavanje kot ločeno entiteto. Kot pravi Carr [1992], pomeni prostora omogočajo nastanek močnih povezav med krajem, osebo in svetom. Pri tem se srečujemo s pojmom identitete kraja, tj. s spoznavami o fizičnem svetu, v katerem posameznik živi. Te spoznave predstavljajo spomine, ideje, čustva, stališča, vrednote, pomene, pojmovanja, vedenja in izkušnje, ki jih povezujemo z vsakdanjim okoljem [prav tam].

Prostor, kot povezovalni element, danes samo navidezno izgublja svojo socialno vlogo, saj se povečuje funkcija sproščanja mobilnosti ljudi, materialnih dobrin in idej. Po Mlinarju [1994] sta glavni merili, ki opredeljujeta vsako identiteto, diferenciacija in kontinuiteta. Namesto nekdanjih manjših in vase zaprtih kulturnih sistemov prihaja danes, vzporedno z vedno večjim medsebojnim povezovanjem, do večje diferenciacije položaja na nadnacionalnem, nacionalnem, regionalnem in lokalnem nivoju. Bivalna kultura naselij je regionalno in lokalno raznolika. Kulturo bivanja lahko razumemo kot preplet stanovanjske kulture, kulture uporabe ter organizacije prostora, na kar vplivajo elementi sistema, ki so vključeni v naslednje skupine pojmov: vrednote, simboli, tradicija in inovacije [Berce - Bratko, 1995].

Pri oblikovanju bivalnega okolja slovenskih naselij je že danes treba upoštevati naslednja nasprotujoča si dejstva: hitri prometni sistem (avtocestni križ) je približal nekoč slabo dostopne predele centralnim urbanim naseljem. To omogoča in sprošča večje možnosti zaposlitve, predvsem v mestnem prostoru, kjer je koncentracija možnosti večja. Hkrati je omogočen izhod iz

utesnjujočih stanovanjskih enot urbane prenaseljenosti: sanje po "hišici z vrtom" so danes realnost, vendar morajo biti te sanje blizu izvora hrupa (avtocestnega priključka) zato, da imamo občutek dobre in hitre dostopnosti do dela, zabave, sprostitve, kulture ... Prav zaradi boljše kakovosti izrabe prostega časa je želja po begu iz mesta tako velika, pa vendar prav tega dejavnika začne primanjkovati, če merila o kvaliteti življenja vsakega posameznika niso jasno zastavljena. In hkrati ta merila, ki so zelo osebno opredeljena, vendarle nezavedno vključujejo kriterije ocenjevanja kakovosti bivanja in ustvarjajo raznolikost in neenotnost v podobi doživljajskega prostora slovenskih naselij.

"To se pravi: človek se obdaja s stvarmi, ki potem kot njegovo okolje vplivajo na njegovo počutje in delovanje, ki pa ga motijo ali celo ogrožajo, kakor hitro so mu v breme ali pa ga preveč zaposlijo. Končno so to pravzaprav njegova lastna notranja nagnjenja in potrebe, ki jih sekundarno ali celo terciarno sam ustvarja, misleč, da bo laže živel, a se znajde v navzkrižju, da zaradi njih težje živi. Sem sodi vse, kar potrebuje v sodobni potrošniški družbi za dvig življenjskega standarda: hiša z vso mogočo tehnično, delno avtomatizirano opremo, vikend hišice v planinah ali ob morju, avtomobil, hišica prikolica, motorni čoln, zračna potovanja na druge kontinente itd. Končno namreč vse to človeka čezmerno zaposluje in ga spravlja v stalno živčno napetost, tako da mnogo "udobneje", kar brezskrbneje, živi tisti, ki si nobene teh udobnosti kot skromen podnajemnik ne more privoščiti. K vsemu temu se namreč še pridruži Damoklejev meč odplačevanja mesečnih obrokov za posojila, ki si jih je za dvig življenjske udobnosti najel." [Trstenjak, 1984: 51]

Doživljajski prostor

Prostor ni zgolj geometrija, temveč označuje kulturno področje delovanja človeka. Prvi vizualni "geografski"prostor vključuje elemente naravnega okolja, kot so fizični elementi Zemlje, morja, ravnin in hribovja. Podrobni krajinski elementi kot npr. slapovi, morje, reke, gorski vrhovi niso samo naravni elementi in doživljajsko menjajoče se podobe, temveč vsebujejo osnovo bivanja samega. Nudijo dimenzijo občutenja, ki je umetni "virtualni" prostor ne more izraziti v vsej svoji veličini. Hkrati pa pri posamezniku sprožijo odzivnost (ugodje ali neugodje), kot je npr. svežina vode in šum slapa na vroč poletni dan, vonj po jagodah na hrupni sobotni mestni tržnici, uživanje ob plamenih ognja s pogledom na zasneženo krajino. Torej geometrijska razlaga prostora ne vključuje vsega, kar človeku pomeni bivati. V ta proces so vključeni še socialni odnosi med posamezniki ter med posameznikom in družbo (kot tudi obratno). Hkrati je jasno, da "prostor" z vsemi oblikami vključuje tudi fizično neoprijemljive elemente, ki so opredeljeni kot vrednote, verovanja, simboli in pomeni – vrednosti vsakega posameznika, ki te vrednote pridobi iz okolja in jih hkrati v okolje oddaja. Ti elementi so pomembni, ko vrednotimo grajeno okolje, njegove oblike in vzorce, saj so se izoblikovali z družbo in ustvarjajo naš doživljajski prostor. Okolje (prostor) človeku ni zgolj nekaj zoperstavljenega, že pred njim danega in nespremenljivega, marveč ga človek nenehno tudi sam oblikuje, si ga po svoje razlaga, opremlja z novimi stvaritvami in vdihuje vanj svojo miselnost in čustva ter mu daje tako novo strukturo [Trstenjak, 1984: 269].

Vrednote in kakovost bivanja

Delovanje sodobnega človeka je osnovano na dveh samostojnih komunikacijskih sistemih. Prvi temelji na povečani mobilnosti človeka, ki se s pomočjo sodobnih transportnih sistemov seli za svojim delom v merilu svetovnih razsežnosti. Drugi pa izkorišča razvitost sodobnih informacijskih in telekomunikacijskih povezav (ITKT), ki omogočajo kozmopolitsko povezanost z istočasnim opravljanjem delovnih dolžnosti, ob sočasni zavezanosti domu. Tako je lahko nekdaj konservativna navezanost človeka na dom in zemljo v tem kontekstu ponovno odkrita vrednota (delo na domu, t. i. teledelo ali e-delo, ki se izvaja s pomočjo ITKT). Ob tem pa socialni stiki vse bolj izgubljajo pomen in vrednost.

Človekove potrebe in vrednote bivanja so danes sestavni del vseh dokumentov in predstavljajo izhodišče za oblikovanje novih bivalnih zasnov (celovitih naselitev kot posameznih stanovanjskih objektov ali enot). So tudi sestavni del mednarodnih konvencij in sporazumov, med njimi tudi Agende 21 in Habitata II [Šarec, 1997], s katerimi se preko razvojnih dokumentov usmerjamo k drugačnemu odnosu do prostora in človekovih osnovnih zahtev po kvalitetnem bivanju.

Pri nas je izraz vrednota uveljavil Veber in predlagal, da besedo vrednost uporabljamo na gospodarskem, vrednota pa na idejnem in naravnem področju [v Pogačnik, 2002]. Stres [v Musek, 1993: 6] pravi, da so vrednote nekaj, kar izhaja iz same besede, nekaj, kar je vredno, da je, si zasluži, da je, in kar hočemo, da je. Bajec [1994] pojmuje kulturo kot skupek dosežkov, vrednot človeške družbe in kot rezultat človekovega delovanja, ustvarjanja. Vendar je pomembno, da vrednote ne zamenjamo z osnovnimi potrebami človeka (hierarhija potreb po Maslowu iz leta 1943 [Maslow, 2001], ki je opisana v teoriji človeške motivacije).

Glede na anketo o vrednotah in prostoru pa veljajo za naše okolje (slovensko javno mnenje) naslednje vrednote: vrednote v prehodu – zdravje, družina, delo, prijatelji, domovina, zabava itd. [Toš, Mlinar, 1994].

Mandičeva [1999] razlaga osebno kakovost bivanja z Allardovo klasifikacijo človeških potreb po imeti, ljubiti in biti. Pogosto se za merjenje kakovosti bivalnega okolja uporablja Mercerjeva lestvica kakovosti bivanja [Medmrežje 1], ki ocenjuje mesta po varnosti, izobrazbi, higieni, zdravstvenem varstvu, kulturi, okolju, rekreaciji, politični in ekonomski stabilnosti in javnem prometu.

Ingelhart [v Kos, 1998: 35] je s pomočjo faktorske analize razvrstil vrednote v štiri dokaj razločljive skupine:

- tradicionalne vrednote: religija, družina, večje število otrok, nacionalni ponos, ubogljivost itd.;
- vrednote pomanjkanja: trdo delo, denar, državna odgovornost, zaupanje v znanost itd.;
- racionalno-legalne vrednote: varčnost, zanimanje za politiko, odločnost, odgovornost itd.;
- postmoderne vrednote: toleranca, ekologija, prosti čas, zdravje, prijatelji itd.

V tej strukturi je mogoče opaziti, da sta prva in četrta skupina (tradicionalne in postmoderne vrednote) praktično

popolni +/– preslikavi: delo je zamenjal prosti čas, družino prijatelji, nacionalni ponos civilnodružbena gibanja, cerkev in podredljivost avtoritetam pa svoboda, tolerantnost in kreativnost [prav tam].
V raziskavi, ki je predstavljena v tem prispevku, smo se spraševali o vrednotah bivalnega okolja. Raziskavo o vrednotah bivalnega okolja naših naselij je sprožila "barvitost", ki v slovenskem prostoru ne pozna meja. V zadnjih letih so se kot gobe po dežju razpasle fasade različnih kričečih barv, ki v okolici izstopajo in si jo podrejajo [Medmrežje 2]. Vendar ob vsakodnevnem zgražanju nad barvitostjo vseh odtenkov pozabljamo na drobne elemente, ki prav tako uničujejo podobo naših naselij: reklamni panoji, razne brunarice kot dodatek garaž in okrasnih elementov, stojnice ob praznovanjih in sejmih, fontane, spomeniki, raznolikost eksotičnega zelenja, Sneguljčica in sedem palčkov ipd. Vsi našteti in podobni elementi urbane in ruralne opreme so seveda nujni, vendar je njihovo oblikovanje, raznolikost uporabljenih materialov in stilov … prav tako preraslo v agresivnost poseganja v smislu "boriti se za svoj obstoj".

Slika 1: Primeri iz slovenskih naselij.
Figure 1: Cases of Slovenian settlements.

V odločitev o preveritvi mnenja glede urejenosti naselij so nas spodbudili tudi komentarji v "Anketa: Raje imajo umirjene fasade"[Medmrežje 3], od katerih navajamo naslednjega: "Ljudje so že malo zmešani in kar ponorijo v vseh svojih željah. Ene fasade so bile res že divje, zato je prav, da so to omejili. Ni treba, da so vse enake, a ni prav, da nas vse bodejo v oči."
Raziskovanje je bilo usmerjeno v iskanje oziroma razumevanje pomena kulture naselbinskega prostora kot vizualne podobe doživljajskega prostora naselij slovenskega podeželja, in sicer z vidika širitve trenda barvitosti, reklamiranja in spreminjanja javnega prostora. Pri tem smo se dotikali naslednjih vprašanj:

- kako se pod vplivom novih, sodobnih elementov urejanja spreminjajo slovenska naselja;
- ali v prostoru naselij prepoznamo kvalitetne elemente urejanja, ki vplivajo na oblikovanje novih bivalnih vzorcev v smislu spodbujanja konceptov trajnosti;
- kateri so tisti elementi, ki so v naseljih najbolj moteči, izstopajoči ali ovirajo prostorski in socialno-družbeni razvoj;
- kaj nam obstoječi naselbinski prostor "ponuja"kot že ustaljene kvalitete;
- kakšno je mnenje o urejenosti naših naselij v stroki in kako to dojemajo študentje arhitekture?

Na podlagi zgoraj navedenih izhodišč so bili opredeljeni naslednji pričakovani cilji in rezultati raziskovanja, razdeljeni na tri osrednje dele: kakšna je podoba slovenskih naselij, kaj pojmujemo pod kulturo naselbinskega prostora in kakšne se želje po spremembah s strani uporabnika. Ključno raziskovalno vprašanje je bilo naslednje: Kaj in kje lahko v slovenskih naseljih vidimo (kot) priložnost za razvoj kakovostnega prostora? In: Ali je vizualni, zunanji prostor nas vseh, do katerega naj bi prebivalci in uporabniki imeli več odgovornosti, ne samo zahtev?

Osnovne informacije o poteku in strukturi ankete

V okviru raziskave je bila opravljena anketa, s katero smo želeli pridobiti objektiven odnos do raziskovanja kvalitet in nekvalitet s stališča spreminjanja bivalne kulture in uporabe skupnih zunanjih prostorov v slovenskih naseljih. Pri oblikovanju vprašalnika smo se odločili, da izvedemo anketo med strokovnjaki, ki so zaposleni na slovenskih občinah (občinski uslužbenci – OU), na oddelkih za urejanje prostora in okolja (oziroma vsebinsko primerljivih organih občinskih služb). Po drugi strani nas je zanimalo mnenje študentov. S te strani smo kot vzorčno skupino izbrali študente (ŠFA) višjih letnikov Fakultete za arhitekturo Univerze v Ljubljani.
Pri pripravi postopka raziskave smo uporabili anketo, ki nam je služila kot tehnika sistematičnega opazovanja. Njena največja prednost je, da z njo dobimo veliko kvantitativnih podatkov o velikem številu posameznikov (enot), ki so reprezentativni (vzorec) za opazovano populacijo, to pa nam omogoča testiranje hipotez [Hlebec, 2012: 7]. Pripravljena je bila v pisni obliki, z vprašanji, ki so se nanašala na dojemanje vizualnega prostora naselij. Najpomembnejši del je bil priprava in oblikovanje anketnega vprašalnika, kjer naj bi bila na posreden način zajeta vprašanja in sugestije o kakovosti bivanja v naših naseljih.
Pri oblikovanju vprašanj in posameznih sklopov vprašanj so bile upoštevane naslednje omejitve [Fikfak, Zbašnik - Senegačnik, 2003: 7]:

- anketa ne sme biti predolga;
- vprašanja in izbirni odgovori morajo biti jasni in nedvoumni;

- vprašanja ne smejo biti geografsko, nacionalno ali drugače omejena;
- večina vprašanj mora tvoriti podlago za vzorčenje različnih odgovorov;
- anketa mora biti anonimna in ne sme zahtevati osebnih podatkov izpolnjevalca, po katerih bi lahko osebo poimensko locirali v prostoru.

Zgoraj opredeljene omejitve smo pri oblikovanju anketnih vprašanj dopolnili s pripombami, ki jih navaja Hlebec [2012: 11], kot so: ne dodajaj vprašanj le zato, ker so zanimiva; jezik naj bo preprost; vprašanja naj bodo jasna in kratka; poskrbi, da vprašanja na anketiranca ne bodo delovala zastrašujoče ali žaljivo … Posebej pomembno je bilo navodilo [prav tam]: "Vsako anketno vprašanje se lahko razume na različne načine! Testiraj svoja vprašanja! Spremeni jih in začni znova!"V ta namen smo bili za vprašalnik prva testna skupina avtorji tega prispevka sami.

Anketa je bila izvedena kot spletna anketa, kot brezplačna storitev Google Dokumenti. Spletna anketa je bila poslana kot povezava na naslovnike občin prek e-pošte. Anketiranje je bilo izvedeno v mesecih novembru in decembru 2012, upoštevali pa smo vse odgovore, ki so prispeli do 24. 12. 2012. Glede na te dejavnike in na kratek čas pridobivanja odgovorov je bil odziv na anketo zadovoljiv. S strani OU smo prejeli 35 odgovorov (kar pomeni 16,6 % odgovorov), s strani ŠFA pa 34 odgovorov (kar pomeni 9,4 % od števila redno vpisanih študentov v 4. in 5. letniku v študijskem letu 2012/13). Pri pripravi smo pričakovali večji odziv s strani obeh ciljnih skupin.

Vsebinska predstavitev ankete

Jedro opravljene raziskave je bil anketni vprašalnik, preko katerega smo poskušali razbrati mnenja ciljnih skupin o urejenosti oz. o kakovosti bivalnega okolja slovenskih naselij. Anketa je bila vsebinsko zastavljena iz petih sklopov samostojnih, vendar med seboj vsebinsko povezanih vprašanj. Anketni vprašalnik je bil sestavljen iz kumulativnih vprašanj, ki so bila oblikovana na način, da je bila možnost izbire skrajnih odgovorov, pri čemer je lahko anketiranec izbral eno, dve ali več kategorij ponujenih odgovorov. V zaključnem, petem sklopu so anketiranci lahko podali pisne odgovore na odprta vprašanja, s čimer smo poskušali potrditi ali ovreči izpostavljeno mnenje o nezadovoljivi urejenosti slovenskih naselij. V anketni vprašalnik so bila vključena različna vprašanja, s pomočjo katerih je bilo mogoče zaobjeti tudi sociološki vidik oziroma bivalno kulturo in navade prebivalcev.

1. Osnovni podatki o anketirancu in njegovem okolju, ki so pri obdelavi podatkov služili kot uvod v anketo in nudili možnost za ugotavljanje korelacij med odgovori. Ta del vprašanj v anketi je bil za študente prilagojen.
2. Vprašanja o podobi naselij v prostoru. Vprašanja so bila zastavljena z namenom preveriti, ali se anketiranci zavedajo pomena podobe naselij in vpliva te zaznave na ljudi. Namen teh vprašanj je bil usmerjen v ugotavljanje stanja v prostoru in zaznavanja motečih elementov.
3. Vprašanja o kulturi naselbinskega prostora so bila osrednji del anketnega vprašalnika in so se nanašala na posebej moteče objekte in njihov vpliv na prostor. Vsebina je bila zaključena v vprašanju: Ali lahko z zunanjo podobo naselja/objekta vplivamo na ljudi in njihovo uporabo prostora?
4. Četrti sklop vprašanj se je nanašal na "želje po spremembah". Sklop vprašanj se je zaključil z vprašanjem: Kaj bi povečalo kakovost življenja v naselju?
5. Zaključni del vprašalnika je obsegal mnenja anketirancev o priložnostih za razvoj prostora. V tem delu je bilo anketirancem prepuščeno, da svoje mnenje opišejo, razložijo in opredelijo brez omejitev in brez vnaprej postavljenih možnosti.

Anketiranci so odgovarjali zelo različno. Nekateri so obkrožali po več vprašanj ali jih izpuščali, nekateri pa so k vsakemu vprašanju, kjer je bilo to možno (tudi pod kategorijo drugo), dodajali opisni komentar. Kljub preprosto zastavljenemu anketnemu vprašalniku je bila odzivnost zelo raznolika. Zato smo pri obdelavi anketnega vprašalnika podrobno obdelali vsako vprašanje, z vsemi dopisanimi komentarji anketirancev, in z metodo navzkrižnega vrednotenja poskušali tudi iz odgovorov in komentarjev razbrati, ali so bila posamezna vprašanja pravilno zastavljena in nedvoumna.

Analiza in predstavitev rezultatov ankete

V tem delu bomo predstavili rezultate vrednotenja anketnega vprašalnika s poudarkom na tistih vsebinah, ki so bile posebej zanimive. Rezultati so bili obdelani po posameznih sklopih vprašalnika.

Prvi sklop vprašanj – osnovni podatki o prostoru anketiranca je predstavljal uvodna vprašanja v anketo. Vsi odgovarjajoči so ta del vprašalnika izpolnili brez pomembnejših pripomb. Kot posebnosti naj navedemo, da najmanj anketirancev izhaja iz območja Notranjske (skupina OU), medtem ko je bil iz druge ciljne skupine (ŠFA) najmanjši odziv iz Pomurske regije. To vprašanje je bilo zastavljeno na način, da je anketiranec sam vnesel podatek. Pri tem je zanimivo, da se je sicer večina držala delitve in pojmovanja statističnih regij [vir: Statistični urad RS in Geodetska uprava RS; NUTS 3], z nekaj odstopanji (združevanje primorsko-goriške, Štajerska še kot posebna enota; pomanjkanje odgovorov s strani zasavskega območja; združevanje Jugovzhodne Slovenije in Spodnjeposavske regije v Dolenjsko). S strani OU prevladujejo odgovori s strani Savinjske, Štajerske in Gorenjske (vse 17 %), s strani ŠFA pa iz območja Osrednjeslovenske (17 %). Pri vprašanju o značaju občine je s strani OU prevladoval odgovor podeželski (17 %), s strani ŠFA pa podeželsko-urbani značaj (26 %). Med osnovna vprašanja smo uvrstili tudi vprašanje, ki temelji na poznavanju stroke, in sicer o tipologiji občinskega središča. Vprašanje se je glasilo: Katerega tipa je vaše občinsko središče? Kot osnovo za možne odgovore smo vzeli Tipologijo središčnih naselij in vplivnih območij pomembnejših središč iz leta 1994 [Vrišer, 2001]. Tipologijo smo odgovoru priložili kot povezavo na spletno stran Fakultete za arhitekturo. Pri tem kot zanimivost navajamo, da OU kar v 13 % na vprašanje niso odgovorili. Ta sklop vprašanj sicer ni vsebinsko pomemben za raziskavo.

Drugi sklop vprašanj – podoba naselja v prostoru. V prvem vprašanju o zadovoljstvu z ureditvijo javnega prostora v naseljih je bila skupina ŠFA bolj kritična – 73 % je bilo nezadovoljnih, medtem ko so svoje nezadovoljstvo OU izrazili le v 52 %. V tem sklopu vprašanj je bilo pri vseh vprašanjih možnih več odgovorov. Iz analize vprašanja o tem, kaj predstavlja središče naselij v občini, so anketiranci najpogosteje označili kulturni dom (OU – 71 %, ŠFA – 35 %), cerkve, gasilski dom, trgovine in pošta. Te naštete vsebine se tudi največkrat pojavijo v skupnih povezavah. Manj je odgovorov, ki so se nanašali izključno na trg (OU – 20 %, ŠFA – 15 %) ali igrišče (OU – 17 %, ŠFA – 9 %). Pri vprašanju o namenu uporabe središčnega prostora so bili odgovori OU in ŠFA dokaj enakovredni. Osrednji prostori so večinoma namenjeni javnim prireditvam (OU – 74 %, ŠFA – 67 %) in druženju (OU – 71 %, ŠFA – 74 %). Nekaj je bilo označenih tudi elementov: tržnice, rekreacijske površine in zelene površine (pri obeh skupinah so se slednji elementi gibali v vrednosti od 8 % do 23 %). Posebno pozornost smo namenili kategoriji parkiranje, ki sicer ne izstopa (OU – 22 %, ŠFA – 34 %). Pri teh odgovorih sklepamo, da je dejansko stanje drugačno, kot bi odgovarjajoči želeli, da je, kar so potrdili odgovori v naslednjem vprašanju, ki se je glasilo: Kaj vas v prostoru najbolj moti? (graf 1) OU so kar s 74 % odgovorili parkiranje, medtem ko ŠFA s 76 %. OU ostali elementi niso motili (prevladuje ocena okrog 10 %), ŠFA pa niso zanemarili moteče vrednosti elementa urbane opreme 35 % in reklam 38 %. Obe skupini sta okoliške stavbe označili kot moteči element z vrednostjo 35 %. Pri vprašanju, ali parkiranja vplivajo na vizualno podobo naselij, so anketiranci obeh skupin odgovorili večinsko z da (OU – 68 %, ŠFA – 82 %) in dodali pisne odgovore, ki jih navajamo:

> Parkiranje deluje v prostoru kot totalni kaos. Vpliv je velik, preoblikuje javni prostor tako v trgu kot na vasi. Da, ker po dobri slovenski navadi vsi parkiramo pred vrati. Naš trg je prezaseden in nabit z avtomobili. Da, zaseda osrednji prostor. Nekoč dobro zasnovane soseske in drugi prostori izgubljajo svoje pomembne vsebine na račun večjega števila parkirišč. Da, ker parkirišča niso urejena. Da, parkirišča so prednost, namesto da bi zagotovili urejene parkovne površine. Da, na določenih območjih, kjer je parkiranje slabše organizirano. Parkiranje je vsekakor problem, saj ima v povprečju vsaka družina po dva avtomobila, bloki pa nimajo garaž. Samo parkiranje kvari podobo in veduto naselja, hkrati tudi zasedajo njegove kvalitetne površine, degradirana ostajajo prazna in neizkoriščena. A vsaj v mestnem središču bi si želela prednost pešcev, zelenja in urbane opreme, namesto tolikšnih parkirišč.
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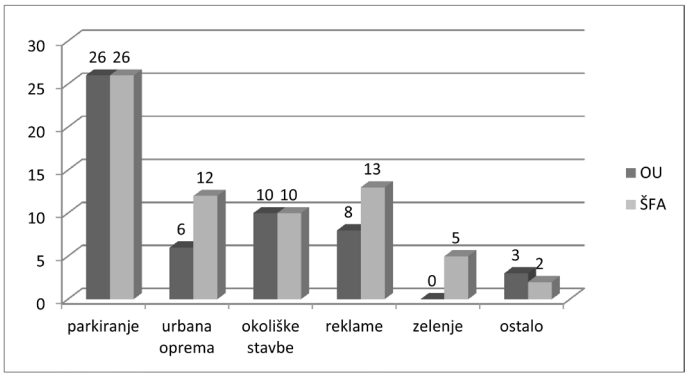
> Niti ne pretiroma, saj se občani na javnih prostorih ne zadržujejo množično, tako da je parkirnih mest načeloma dovolj.

V naslednjem koraku nas je zanimalo stanje zelenih površin. Večina je odgovorila, da zelene površine v naseljih njihovih občin ostajajo iste (OU – 40 %, ŠFA – 59 %). Sledil jim je odgovor, da se te obnavljajo. Nihče ni odgovoril, da zelenih površin ni. Kar nekaj (8 OU – 23 %, ŠFA – 15 %) jih je odgovorilo, da se zelene površine v naseljih manjšajo. Podatki teh odgovorov kažejo na trend, da se prostoru dodeli funkcija, ki prinaša dobiček, in da izginjajo neprofitni prostori za druženje, ki pa so pomembni. V zaključnem vprašanju tega sklopa smo anketirance spraševali, ali so opazili še kaj motečega v prostoru. Vprašanje je bilo oblikovano tako, da so bili našteti določeni predlogi, kaj so lahko moteči elementi, a ne v obliki označevanja. Na vprašanje so tako lahko odgovorili z enim od naštetih predlogov ali zapisali lastno opažanje glede motečih elementov. Okvirno 50 % obeh skupin je odgovorilo, da v prostoru opažajo moteče elemente, a so se odgovori glede tega zelo razlikovali. Naštevali so splošno neurejenost, kričeče barve fasad, neurejene ekološke otoke in probleme, povezane z njimi, neurejene poti in mostove, neprimerne označevalne in pritrdilne table ter njihovo pomanjkanje, tranzitni promet. Pri ŠFA je zanimivo, da so nekateri študentje pri tem vprašanju razumeli kot moteč element pomanjkanje javnih površin za druženje mladih. Pri OU pa je bila posebnost opomba, da se v nekaterih središčih sicer tudi pojavljajo moteči elementi, a le v mejah normale zahodnega sveta. Pri tem se lahko vprašamo, kakšne so te meje. Smo morda na določene elemente, kot so na primer reklamni panoji, tako navajeni, da jih jemljemo kot nekaj samoumevnega in ne vidimo več možnosti, da jih ne bi bilo? Morda zato niso več moteči? Lahko na ta način razlagamo velik delež vprašanih, ki na to vprašanje niso odgovorili?

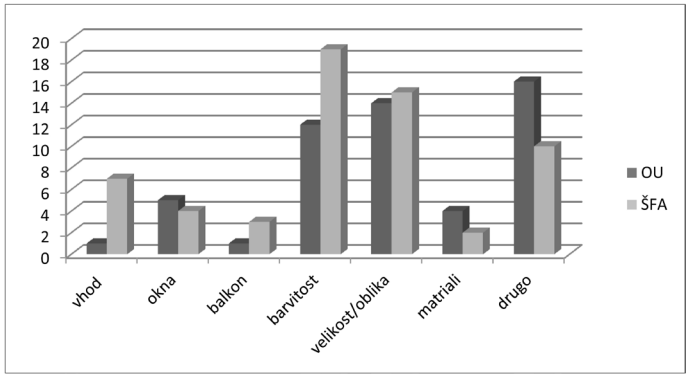


Graf 1: Kaj vas v prostoru najbolj moti?
Graph 1: What is, in your opinion, the most disturbing spatial element?

Tretji sklop vprašanj – kultura naselbinskega prostora. V tem delu smo anketirance spraševali o motečih objektih. Pri tem vprašanju je velika večina odgovorila, da v svojem okolju opazi objekti, ki jih moti (OU – 94 %, ŠFA – 97 %). Pod drugo so navedli ekološki otoki, moteč opuščeni kamnolom (oboje omenili OU). V nadaljevanju smo spraševali o značaju objekta. V večini so se odgovori nanašali na zasebni objekt (OU – 68 %). Na to vprašanje so ŠFA odgovorili drugače kot OU. Večina jih je bila namreč mnenja, da so bolj moteči nekateri javni objekti (38 %). Morda pri tem vprašanju anketirancem (ŠFA) ni bilo jasno, ali odgovarjajo glede namembnosti samih objektov ali glede lastništva. Pri vprašanju o stanju (in starosti) objekta, ki so ga v prejšnjem vprašanju ocenili kot moteč, so OU (34 %) odgovorili, da gre za starejši objekt, hkrati pa kot velik odstotek označilo novogradnje (23 %) in isto ruševine (23 %). Večina anketiranih ŠFA pa se je odločila, da so moteči objekti bolj novogradnje (47 %). Glede na prejšnje vprašanje in odgovore s strani ŠFA se to

nanaša na javne objekte, kar preseneča, saj pri javnih objektih ne gre za črne gradnje, okus posameznikov, ampak za objekte, ki naj bi bili rezultat natečajev, v skladu z zakonskimi predpisi in vedenjem v stroki. Novogradnjam pri ŠFA sledijo prenove (24 %) in starejši objekti (18 %). Pri vprašanju o objektu, ki jih najbolj moti (kar se navezuje na isti objekt kot je bilo govora v prejšnjih vprašanjih; graf 2), smo dobili zanimive odgovore: ŠFA barvitost (56 %), OU pa kategorija drugo: dotrajanost (47 %). Velikost objektov je pri OU na drugem mestu s 41 %, barvitost pa pri OU na tretjem mesti, in sicer s 34 %. Velikost objektov je pri ŠFA 44 %. Čeprav je barvitost zaznana, je kot velik problem iz komentarjev razbrati večje nezadovoljstvo zaradi propadajočih stavb in neprimernih industrijskih objektov. Propadanje objektov naj bi na občino metalo še slabšo luč kot barvitost. Sicer so tudi večkrat omenjana okna in materiali, ni pa nobene omembe problematike naklona streh ali neprimernosti velikosti in razmerij stavb v prostoru. Med vprašanji v tem sklopu je bilo izpostavljeno tudi naslednje: Menite, da bi morali biti predpisi, ki se nanašajo na zunanjo podobo stavb, bolj dorečeni? Velika večina iz obeh skupin (OU – 91 %, ŠFA – 97 %) je bila prepričana, da bi morali biti predpisi bolj dorečeni, vendar je bolj kot sam odziv anketirancev pomemben komentar:

> Velikost stavbe, obliko strehe, vse ostalo bolj v obliki smernic. S predpisi ni mogoče "zajeziti"ljudskega stavbarstva. Ljudi je treba arhitekturno izobraževati in širiti arhitekturo. Predpisi so dovolj dorečeni, le spoštuje se jih ne, saj tudi sankcij ni. Vsak predpis se da obiti.



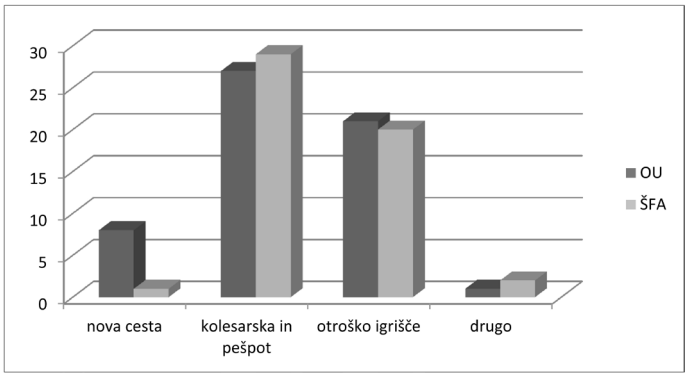
Graf 2: Kaj vas na tem objektu moti?
Graph 2: What is the most disturbing element on the structure?

Pri vprašanju: Kaj bi po vašem mnenju morali vsebovati predpisi? je večina anketirancev navedla barvo fasade (OU – 66 %, ŠFA – 59 %), vendar so tudi vse ostale kategorije (velikost stavbe, barva in oblika strehe, materiali, velikost oken, barva balkonskih ograj) zelo visoko (OU – 50–60 %, ŠFA – 30–45 %). Tudi pri tem vprašanju izpostavljamo komentar:

> Obveznost vzdrževanja. Višino stavbe in določene barve po RAL lestvici. Barva bi morala biti omejena na nežnejše barvne odtenke in mogoče več toplih barv. Čim več od predlaganega, ker na žalost še vedno vsak lastnik s svojim objektom želi čim bolj izstopati in se ne prilagoditi predpisom; nihče ne razmišlja o tem, da bi prispeval k urejenosti in lepemu izgledu celotnega naselja.

Zaključek tega sklopa vprašanj se je nanašal na zunanjo podobo naselja: Ali lahko z zunanjo podobo naselja/objekta vplivamo na ljudi in njihovo uporabo prostora? Odgovor je bil pri ŠFA pritrdilen v 100 %, pri OU v 94 %, 5 % anketirancev pa o tem ni imelo mnenja.

Četrti sklop vprašanj – vprašanja a spremembah. Vprašanja so se nanašala na področja, ki bi jih anketiranci želeli spremeniti v svojem okolju. Prvi izpostavljeni motiv je bil naslednji: Kakšne vrste prostor je po vašem mnenju potreben? Dobljeni odgovori dajejo občutek, da vsi potrebujejo vse, saj je velika večina izbrala tri stvari, ki naj bi jih občina potrebovala (komentar pri OU, kjer se vsi odgovori gibljejo med 40–65 %, razen kategorija park, ki pa je ovrednotena s 32 %). Preseneča potreba po parkirnih površinah. Zanimivo bi bilo izvedeti, če gre tu za urejene ali neurejene površine ali celo za potrebo po novih parkirnih površinah. Zanimivo je tudi, da je veliko anketirancev prepoznalo potrebe po tržnici, ob tem da vemo, da se obstoječe tržnice krčijo, veča pa se priljubljenost raznih rekreativnih dejavnosti v naravi. Pri ŠFA je bila zgodba popolnoma drugačna.



Graf 3: Kaj bi povečalo kakovost življenja v naselju?
Graph 3: What would improve the quality of life in the settlement?

Okvirno tretjina vprašanih je odgovarjala s paketom: rekreacija, javne prireditve in park. Splošen vtis je, da si večina želi javnega večnamenskega odprtega prostora, kjer bi se prebivalci lahko zadrževali in družili. Pri vprašanju: Kateri objekt bi najbolj potrebovalo vsako podeželsko naselje? je razvidno, da tako med OU (51 %) kot tudi med ŠFA (56 %) prevladuje prepričanje, da vsako podeželsko naselje najbolj potrebuje trgovino. Med pogostejšimi odgovori so tudi pošta, avtobusno postajališče in gostilna. Primerjava med UO in ŠFA je zanimiva tudi zato, ker si odgovori po krivulji sledijo (sicer različno število, vendar je mnenje obeh skupin enako). Med odgovori na vprašanje, s čim povečati kakovost življenja v naselju (graf 3) prednjačita kolesarska pot in pešpot (UO – 77 %, ŠFA – 85 %) kot tudi otroška igrišča, kar lahko kaže na opažanja anketirancev po pomanjkanju tovrstnih površin. Med UO (23 %) se kot odgovor pojavi tudi nova cesta. Odgovori na vprašanje bi morali zajemati tudi ostale, za podeželsko naselje pomembne vsebine, kot so trg, javne in zelene površine.

Zaključni, peti sklop vprašanj se je nanašal na mnenje anketirancev. Rezultate smo strnili v enotne skupine. Na vprašanje: Katere so po vašem mnenju prednosti vašega prostora? so anketiranci odgovorili: kmetijstvo in velike gozdne površine, neonesnaženost, majhnost, kombinacija urbane urejenosti centralnega naselja in bližina podeželja, dobra prometna povezanost, bližina tujih trgov, dobri pogoji za ekološko kmetijstvo in turizem, mestno jedro, razvojni potencial, storitvena dejavnost. Odgovore anketirancev smo razvrstili v pet skupin, ki jih smiselno povzemajo: naravne danosti, kulturna dediščina, javni prostor, promet in drugo. Med obema skupinama anketirancev prevladuje prepričanje, da so naravne danosti največja prednost (UO – 57 %, ŠFA – 80 %), medtem ko kulturno dediščino, javni prostor in promet smatrajo kot manj izrazite. Pri vprašanju: Kaj bi najraje spremenili v svojem prostoru? pa je mnenje zelo drugačno. ŠFA poudarjajo zelene površine (35 %) in revitalizacijo (29 %). OU vidijo probleme predvsem v prometni infrastrukturi, videzu objektov ter javnih in zelenih površinah, medtem ko študenti poleg javnih in zelenih površin izpostavljajo potrebo po revitalizaciji, tako v programskem kot arhitekturnem smislu. Vse našteto se pri OU giblje med 17 % in 35 %, kar nakazuje razpršeno in neenotno mnenje. Pri pisnih odgovorih na vprašanje: Kaj se vam zdi najbolj moteče v vašem prostoru z vidika sodobne kulture bivanja? navajamo nekaj zanimivih odgovorov:

s strani OU: Spalna naselja – prebivalce moti opravljanje kmetijske dejavnosti, ki je bazična dejavnost teh krajev. Premalo tradicionalnosti. Površinska parkirišča, motorna vozila in reklamni panoji vseh vrst. Prostor je izrazito tranziten. Gradnja in posegi v prostor z močnim poudarjanjem investitorjevega "jaza". PRIPELJI SE DO VRAT in NA SVOJEM LAHKO DELAM KAR HOČEM. "Onesnaženje"s kričečimi barvami, ki jih kljub različnim poskusom zakonskih omejitev skoraj nikjer ni uspelo preprečiti. Reklame, napisi, zlasti jumbo plakati. Preobremenjenost prostora z blokovno – večstanovanjsko pozidavo, ki se je "zgodila"v času gradbenega razcveta in je z vidika uporabnikov – stanovalcev skrajno nehumana: prevelika koncentracija – gostota pozidave, pomanjkanje javnih površin (investitorji so morda še zgradili kakšno otroško igrišče z igrali, kaj več kot to pa občine niso iztržile od njih). Zlasti se pogrešajo nove zelene površine, npr. novi drevoredi, zeleni preduhi, parki s travnatimi igrišči za igro, trgi za druženje prebivalcev, objekti javne infrastrukture, … Čedalje več domačih živali – psov, ki se prosto sprehajajo in za katere lastniki mislijo, da jih ni treba organizirano voditi, češ da živijo na deželi. Tudi v zavarovanih območjih imajo prebivalci pravico do enake kvalitete bivanja kot drugje, le načine in možnosti je treba poiskati. V območjih Nature je na prvem mestu narava. Ali gre to na ceno človeških življenj, saj ob državni cesti ne smemo urediti pločnika in kolesarske povezave?

s strani ŠFA: Starejši objekti, prenovljeni brez premisleka, s kričečimi barvami in sodobnimi materiali, ki ne odražajo prvotnega objekta. Nerazpoznavnost naselja oz. status naselja (postajamo spalno naselje s hitrim dostopom do Ljubljane). S primerno prometno ureditvijo bi lahko združili željo po zaprtem mestnem središču s čim manj avtomobili (shared-space, enosmerni promet, "park and ride", parkirišča v zaledju mesta itd.) in željo sodobnega človeka po tem, da se želenemu cilju čim bolj približa z avtomobilom. Problemi pri drugih naseljih v občini: neurejen promet, preveč razpršena gradnja, živobarvne fasade. Ljudje se ne zavedajo, kaj je kvalitetna kultura bivanja. Premalo je medijskega poudarka na temo dobre arhitekture in urbanizma. Samo mesto s kakšnim drevesom po mojem mnenju ne bi izpadlo čista betonska džungla in bi tudi kakšen od starejših prišel tja, če bi se lahko usedel v senco. Nepovezanost krajanov, nekvalitetni prostori za bivanje. Prednost pri izgradnji imajo cestna omrežja, brez sposobnosti zaznavanja in obravnavanje celote, ampak zgolj osredotočenost na lepotne popravke, ki zaradi nepravilne umeščenosti hitro izgubijo svojo veljavo, da gradbeni inženirji narekujejo estetiko in funkcionalno uporabnost objektov. Zgolj gledanje na dobiček, ne na kakovost.

Sklep

Glede na opredeljene pričakovane cilje raziskovanja ugotavljamo, da je podoba slovenskih naselij kaotična, vendar ne samo v svoji vizualni podobi. Veliko anketirancev je izpostavljajo problem kulture bivanja v povezavi z uporabo nakupovalnih središč, prometom in odnosom ljudi tako do prostora kot do skupnosti, torej ostalih uporabnikov (medsoseski odnosi, ustvarjanje skupnosti ipd.). Hkrati tudi opozarjamo, da raznolikost problemov in težav, ki se pojavljajo v naših naseljih, kaže na neenotno mnenje in razumevanje načina bivanja ter dojemanja prostora. Ugotavljali smo tudi, da je prostor slovenskih naselij z vidika urejenosti na mikro nivoju zelo problematičen (nivo posameznega objekta in parcele): razmetanost okolice, neurejenost površin, odpadki, hranjenje raznih starih naprav,… "nepospravljenost". Naslednji pomemben cilj raziskovanja je bil usmerjen v "želje po spremembah"s strani uporabnika. le-teh je veliko in se nanašajo na vsa področja, včasih tudi nasprotujoča npr. želja po urejenih kolesarskih poteh ter novih parkirnih površin. Neurejenost infrastrukture in spremljajočih dejavnosti pa je, kot ugotavljamo v vseh sklopih raziskave, priložnost za razvoj kakovostnega prostora v slovenskih naseljih. Anketiranci so slednje povezali tudi z uporabnostjo javnih površin, predvsem v centralnih območjih naselij.

Ker smo se v predstavljeni raziskavi spraševali o vrednotah bivalnega okolja, zaključujemo z naslednjo mislijo anketiranca: delati na razmišljanju ljudi, da prispevajo k urejenosti celotnega naselja, ne le svojega ""kotička". In kaj ugotavljamo o vrednotah: nihče od anketirancev si ne želi, da bi splošna vrednota postalo parkirišče, parkiranje, promet, parkirišče kot središče … Iz komentarja anketiranca: Večja kritičnost do t. i. sodobnega načina življenja, kjer dominirajo avtomobilski izpušni plini in vse večji nakupovalni vozički. Brez "mavričnega terorizma"vseslovenske barvitosti. Želijo pa si sonaravnega razvoja, ohranjanja

dediščine, spodbujanja kmetijstva, gozdarstva in ekološkega kmetovanja, razvoja raznovrstnih dejavnosti občinskega središča, tematskih poti, razvoja komunikacijskih in prometnih omrežij. V zavedanju, da je prostor skupen.

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Summary

Today, the impression has been created that space, as a connecting element, is losing its social role, as the mobility of people, material goods and ideas has been increasingly growing. In the creation of the living environment of Slovenian settlements today, several contradicting facts have to be considered. The fast communication system (motorway cross) has brought the once remote areas closer to the central urban areas. Notably, 'space' in all its forms includes physically intangible elements that are defined as values, beliefs, symbols and meanings – the values of each individual, which are both acquired from the environment and returned back there. These elements are of importance when evaluating the built environment, along with its forms and patterns, as they developed along with the society, creating our experiential space.

The study represented here addressed the values of the living environment. The study was triggered by the 'colourfulness' that knows no limits in Slovenia. Putting the everyday indignation over the variety of all possible shades aside, it has become evident that the tiny elements that are also destroying the image of our settlements are all too often neglected: billboards, log cabins complementing garages and decorative elements, stalls during celebrations and fairs, fountains, monuments, mix of exotic plants, the Snow White and the Seven Dwarfs etc. (Figure 1). All the aforementioned and similar elements of the urban and rural setting are, of course, necessary; however, their design and the versatility of the materials and styles used has turned into an aggressive display in the sense of 'fighting for own existence'. In the continuation, the research aimed to find and grasp the significance of the settlement culture, as a visual image of the experiential space of the Slovenian countryside, i.e. from the viewpoints of the growing trends of colourfulness, advertising and changing of the public space.

The study included a survey to obtain a more objective approach to the studying of the quality and the non-quality from the viewpoints of the changing living culture and the use of communal external space in Slovenian settlements. At the design stage of the survey, we decided to conduct the survey among the experts employed at Slovenian municipalities (municipal staff – OU), i.e. at departments of physical planning and development (or comparable municipal offices). On the other hand, we were interested in the opinions of university students. Hence, as a sample group, senior years' students at the Faculty of Architecture of the University of Ljubljana were chosen. The survey was created as a web-based survey, using the free Google Docs service. The online survey was sent out as a link via E-mail to the municipal addressees. The surveying was performed in the months of November and December 2012. The survey included five stand-alone sections, which contained interrelated questions. In the study represented here we addressed the values of the living environment; hence, finally, the thoughts of one of the respondents are given: ... to entice people to think and contribute to the development not only of their own 'little corner' but of the entire settlement. And: A more critical attitude towards the so-called modern way of life, dominated by exhaust gases and the growing size of shopping carts.

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TRANSFORMATIONS OF HUNGARIAN TRADITIONAL TOWN CENTERS IN THE ERA OF SOCIALISM - TWO CASE STUDIES

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SPREMEMBE MADŽARSKIH TRADICIONALNIH MESTNIH JEDER V ČASU SOCIALIZMA - DVA PRIMERA

izvleček

Pričujoči esej povzema zgodovino dveh madžarskih mest v njunem razmerju do centralističnega in institucionaliziranega razvoja v obdobju socializma. Čeprav sta obe zgodovini značilni za to obdobje, sta v mnogih ozirih vseeno enkratni.
Ker so zgradbe posebnega pomena običajno gradili v osrednjih predelih, se njihov odnos do že obstoječih zgodovinskih središč zastavlja kot pomembno vprašanje.
Zame je eden glavnih sklepov, ki izhaja iz obeh predstavljenih primerov, da v osnovi pozitivna razvojna odločitev glede ustroja mesta v nadaljevanju, tj. pri določanju podrobnosti razvojnih načrtov in arhitekturnem "detajliranju", lahko tudi večkrat spremeni svojo usmeritev. Medtem ko je razvoj v Kecskemétu zaradi svoje nesorazmernosti in neupoštevanja razmerij v okolici pomenil popoln polom, je v Szekszárdu prisotnost grajene celote sprejemljiva zaradi natančnega ravnovesja arhitekturnih detajlov, ki utrjujejo zamisli mesta.

ključne besede

državno-socialističen, centri institucij 60 / 70 leta prejšnjega stoletja, urbani kontekst, struktura, urbanistično projektiranje

abstract

Present essay summarises the history of two Hungarian towns related to centralising institutional development in the State Socialist Era, both are characteristic, although still unique in many respect.
As these buildings of special importance were built typically in central areas, their relationship with the already existing historic centres is an important question.
For me one of the main conclusions of the presented two examples is that a basically positive development decision regarding urban structure later can take different directions in the course of "refining" development schemes, and architectural detailing. While development in Kecskemét became fiasco because of its disproportion, neglect of contextual scale, in Szekszárd the presence of the building ensemble is acceptable because of the refined balance of architectural details, and it is reinforcing the urban ideas.

key words

state socialist, Institution Centres in the 1960-70-ies, urban context, urban structure, urban fabric, urban design

"I have the suspicion, that unprejudiced perception of the present and the (somewhat steady) future can only be based on such past, which is perceived without pathos or cynicism..."
György Janáky: Those Sixties (1988)

Cliché: buildings carry messages. This stands particularly for institutional or public buildings, where transmitted message is also rooted in their civic, communal character not merely in their material, physical existence.
Aging of those urban ensembles is frequently not a merely physical deterioration process, but a struggle against loss of intellectual values. As people often do, buildings also have to tackle with the adaptation to varied circumstances, being adjusted to new "rules of the game", with their capability and intellectual power, attitude, authenticity brought about by sometimes magnetic personality, calling for public appreciation, correction and acceptance among fast changing circumstances.
Maybe the comparison is astonishing, but that's the way I see the destiny of Hungarian Administrative centres built in the 1960-70-ies. They are not old enough to earn acceptance and appreciation for their plain historic or aesthetic values, but are not fresh enough, not bold enough to make their weaknesses as compensation forgivable for their fresh values. Objective criticism of administrative centres of the 1960-70-ies is impeded by their proximity in time, real values are overshadowed by the prejudice connected to the era of their creation in some way. ('pathos and/or cynicism').
Those town centres have arrived to the troublesome age of midlife crisis, where mere usefulness is not a positive argument on their side. The institution types formulated for particular communal demands of that former social order, such as community cultural centre, state warehouse, centralised offices, party headquarter, etc. have lost their relevance among changed social values and lifestyles, among new economic circumstances with their devalued spiritual content, vanishing social message and in many cases even their loss of function. Those buildings would have been entitled for a fair selection, to survive for their eternal human values – even in their 'elderly' age – should have receive appreciation for their architectural qualities, for their values in the urban structure, even when their functional value is lost, despite their constant need for reconstituted appraisal, despite the fact that their usefulness frequently questioned in our age.
The nearly 45 years of State Socialism' was a complex, constantly changing period in Hungary. During this time the priorities of town planning changed significantly and the special attention initially paid to the role of public spaces eventually much slackened.

During the beginning of State Socialism in the early 1950s, the formulation of principles and the exact expression of expectations were central tasks in all areas of everyday life. Building towns became not only a post-war need but a political question as well. Hungary wanted to become a land of iron and steel, and this required a forced rate of development.

In the middle of the 1950s socialist realist style became dominant, be it in the field of urban architecture axiality, space hierarchy, symmetry, or model of regular, closed squares encircled by buildings. There are only a few 'clearly' socialist realist buildings, most of them are rather characterised by a mixture of modernism, new modernism and socialist realism, but in the field of urban architecture certain compositional ideas of the period stayed on permanently.

Those administrative centres which have been built in the main impetus of State Socialism, in the '60-ies and '70-ies, are in a very special situation, either from professional either from the layman's standpoint. The style, which preceded the modern socialist era, (called 'socialist-realism') have earned an almost accepting status, received historic 'public esteem' simply for its age. Its articulation almost became identified with the message of block-rehabilitation carried out in the '80-ies, with its similar pitched roof appearance acceptable for the greater public, at least not carrying irritable motives.

The barren 'model made modernism' [Janáky, 1988] is rejected by the majority of people, and it is jammed between those two styles, between modern and pitched roofed, with its articulation contrasting the physical context.

New guidelines were given based not on demagogic political ideas, but on technocratic directives initiated by principles of the planning profession.

Coming closee to the '70th, the designing of space structures was no longer determined by political ideologies, but rather by aspects of urban architectural trends. New, up-to-date, internationally used principles of designing were adopted, they differed from the traditional street-square patterns of use. Informal routes offering free crossing possibilities within the urban blocks were considered as block structure. [Kissfazekas, 2013/b]

Considerable proportion of administrative centres of country towns were reconstructed in that time – they are products of that 'new' construction era which still determine the functioning of those urban centres even today, they are exactly the buildings that considerably determine actual urban- and architectural character, the aesthetics of country settlements. Their appreciation is controversial; laypeople do not differentiate between them in respect of quality, of architectural value. They do not know that the 'flat-roof-cubes and towers' typically classified as 'socialist' by them in many cases followed an accepted international architectural trend and are copied from western examples. For the general public flat roofed cube- and tower buildings are rejectable, single use facilities, planned in the age of poorness, ugly, characterless grey objects typically oozing with Eastern Bloc atmosphere.

Theoretically the union of urban design and architecture sounds evidence today; there is no debate, that the architectural product shall be assessed among contextual relations, which is the adaptation of the building to existing circumstances, and is an important factor being closely connected to the intellectual and physical content of the building. Nevertheless the sense of completeness, feeling of catharsis is quite rare. We have to admit: such buildings which are in contrast with the context still can give aesthetic pleasure. If they are not dissonant – at least not in a way that is caused by irritating stupidity, but maybe as part of inception, contrasting intentionally – a profoundly articulated building may also produce some decent and accepting emotion, sympathy with its mentality, or by its presence as a reasonable object, despite its alien appearance. And who can not mention counterexamples: disappointingly dreary buildings lacking basic sensitivity despite their 'perfect' operation, fair functioning, intensive contacts with their surroundings, urbanistically integrated, and commercially 'adjusted', seemingly optimum solutions.

'Context' is a recurring term usually used when evaluating a building in its set of relationships. The context primarily means the relationship of a building to the layout and its architectural environment, particularly in relation to the neighbouring buildings, and to the character and form of such relationships. But this context is a part of a wider, urban context, of a set of relationships which can clearly be seen only from a 'more distant' perspective, that is in the urban fabric. The complexity of the urban organism manifests itself also in the way these diverse layers of relationships interact each other.

The influence of a building or groups of buildings appearing in a city, their location and spatial situation within the urban corpus, their relationship to the urban fabric as well as their urban design, spatial and mass relations, are all different readings, varied in depth of the same text. [Kissfazekas, 2013a]

More approaches are possible, from more directions and scales, although the architectural and urban interpretation can not be separated, it still requires different ways of approach and handling, either we concentrate to buildings and examine how they fit to the surrounding urban tissue, or from a different aspect with different notions, approaching from the urban context examine the architectural 'object' in it.

Present essay follows the latter procedure, having selected two characteristic examples.

The decision on the location of certain important buildings in different time was strongly influenced by the availability of empty spaces for development. In Hungarian towns, the construction of important public buildings was generally in harmony with the urban structure, they were assigned to existing or new squares and roads, to serve as architectural emphasis. Instead of the unconditional application of compositional principles, though, many times practical considerations such as ownership or possible exchange of lands were the most decisive factors. Consequently, although public buildings of town centres became denser as time passed, following the existing spatial (characteristically central or linear) structure of the centre, they were not necessarily built in each other's immediate proximity, but in a patch-like manner, woven together with the existing old buildings.

In certain towns during the state socialist era, the development of the centre took place in a similar way, looking for the proximity

of the centre, and not necessarily each other's. The appearance of this scattered, diffuse structure of buildings within the urban corpus does not generate any conflicts in terms of the urban scale context.
However, in the majority of Hungarian towns not the 'scattered' placement of public buildings was typical, but designers thought in terms of urban complexes. [Kissfazekas, 2013a]
Although in other towns public buildings were constructed next to each other, thus they exhibited the intention to build a new town centre, developments were not coherent and they took place on the basis of a single-phase urban design concept. The buildings were lined up in each other's proximity according to independent planning. Plannings were sometimes carried out parallelly, neglecting any co-operation between designers and without any coordinating professional help. Thus, in many cases they failed to create coherent architectural complexes.
The spatial relationship in urban scale is determining when public buildings of central functions are built. These new buildings could fundamentally modify the spatial extension of city centres, as well as their external connections and internal functioning. It is especially true when not only single buildings, but a whole group of buildings appear in a city. These new developments, in many cases, bring not only their own architectural design, but as well their own structural logic and a new layout structure.

The two town centres have been selected for demonstrative precedent on the basis of the extent of work, which was exceptional in the examined period, and also for their capability to serve as a characteristic model. Their value as model in this sense does not mean that the process or the outcome should be positive, they are selected for their nature of being well documented, providing adequate data for analysis. Those town centre developments can be considered as exemplary models, where original functional mechanism was changed by the result of interventions, where lines of the spiritual forces have been rearranged or became sharper. A further common value in the examples is that they are created with efforts of strong architect personalities, going far beyond the social planning stereotypes, having sensitivity to urban issues, and high morality reflected in the elaborated workout of buildings.

Kecskemét
Historic Town Centre
Kecskemét historically was a single main centred town. The mosaic-like centre that earlier consisted of multiple interrelated squares has been opened up into a single square to the end of eighteenth century, after that change the single centred character became even more explicit, conscious.
Not only the historic/sacral places, certain built witnesses of the intellectual character of the town, namely the Cathedral, Saint Nicholas catholic church, the Calvinist church, synagogue are grouped around the main square, but also commercial and communal life has been focused to that town centre by open markets held there. This concentration of lines of forces to a single point has become clearly outlined, apparent, despite of the agglomerated urban structure, especially when 24 streets accessing from various directions should be diverted in order to relieve traffic load of inner areas in 1970.
In the second half of the nineteenth century Péter Lestár (1880-1896) and Elek Kada (1897-1913) mayors proposed a new urban vision.('Kecskemét should become the largest fruit exporter of Hungary!') [Juhász, 1998]

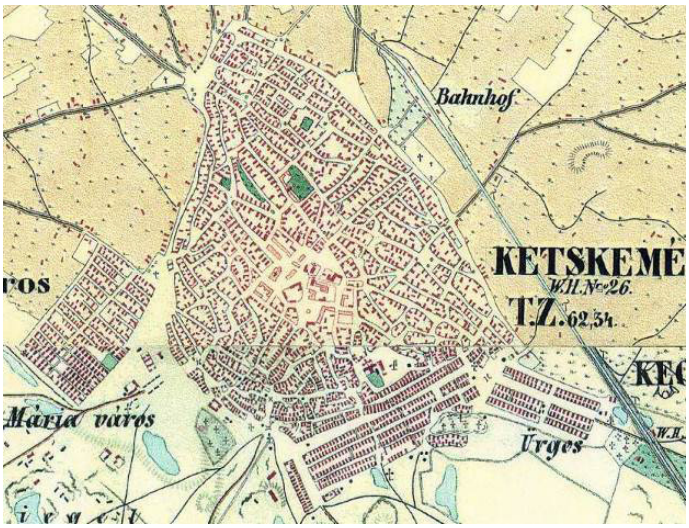

Figure 1: structure of Kecskemét around 1860 (II. military survey map (1806-1869)).
Slika 1: Ustroj Kecskeméta okoli 1860 (II. vojaški pregledni zemljevid (1806-1869)). [http://archivportal.arcanum.hu/maps/html/katfelm2b_google.html]

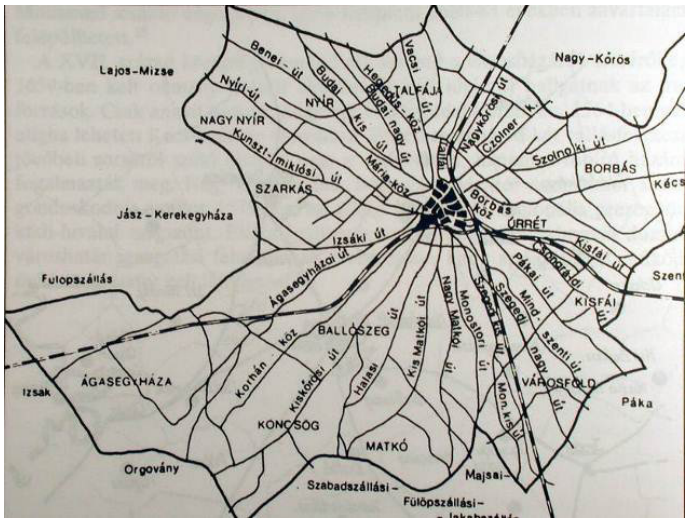

Figure 2: Roads radially starting out from town centre, in the beginning of 1900-ies (source: István Juhász: Townplanning history of Kecskemét).
Slika 2: Ceste, ki radialno izhajajo iz mestnega središča, začetek 20. stoletja (Juhász, 1998).

In the beginning of 1890-ies the newly opened spacious market square was intended to 'incarnate' the new role of the town, and by an impressive gesture they opened a new wide avenue by which that square was connected to the railway station, that symbolised the age and progress. Reinterpreted elements in the urban structure did not change the historically evolved centrality of the core. The fact, that the wide, new street has been ended directly at the main square, have even more emphasized the central position of the square in every respect.

Figure 3: Settlement centre before the square regulation by Péter Lestár.
Slika 3: Središče naselja pred ureditvijo trga, ki jo je izvedel Péter Lestár.

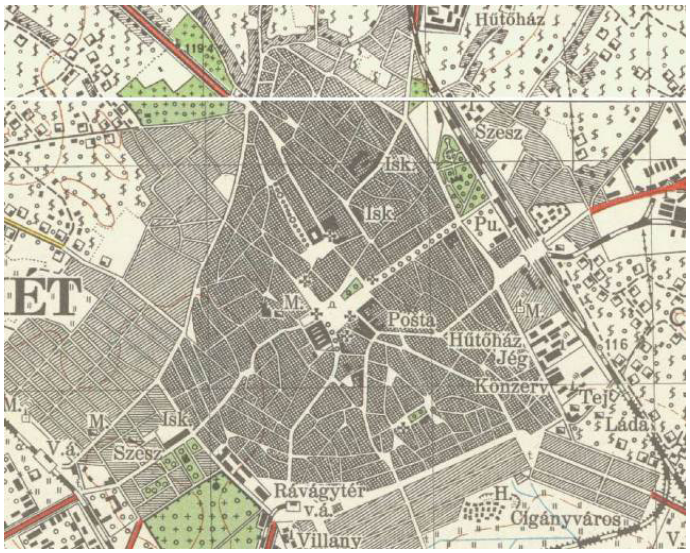

Figure 4: Urban structure of Kecskemét after the regulation of new market/ main square and opening up of new avenue (Sugár-Street then /Rákóczi Street today) leading to railway station (source: Juhász István: Townplanning history of Kecskemét).
Slika 4: Urbana struktura Kecskeméta po ureditvi nove tržnice/glavnega trga in odprtju nove avenije (tedaj Sugárjeva ulica / danes Rákóczijeva), ki vodi k železniški postaji (Juhász, 1998).

The 'new' Town Centre

After 1945 the first basic change of Kecskemét urban structure was the alteration of municipal boundaries, by which 9 self-reliant villages were detached and the administrative territory of the town was decreased to its one forth. The same time the role of the town has considerably altered, since it became the seat of the newly formulated Bács-Kiskun County from 1950, and in 1971 high level supplying and service centre by the Settlement-network-development concept.
Widening of its scope of roles have induced a large scale urban development, with intensive growth of population, by which the number of inhabitants has grown from 56.000 person to roughly 110.000 persons between 1949-1988, inducing the erection of 10 new residential projects. Those residential developments – which were inspired also by the establishment of a local prefabricating plant in 1975 – have reached the inner areas.
Services offered by the urban structure and the town itself became inadequate to the increased size of population, and this required a restructuring in the transport network of the town, also a reinterpretation of the role of the town centre, creation of a new forum saturated with 'new contents' [Juhász, 1998]. Of course that forum was marked out not only for new functional tasks, but to openly represent the altered political, communal order and new tasks inflicted by it to the town.
For the centre a general regulation plan (master plan) has been prepared in 1966 (urban design: dr. Dezsőné Korbonits - VÁTI). In the time of preparation of that plan it was already a decided fact, that the new centre with its field of administrative activities in local and county sphere will be placed to the historic town, but not directly to the existing main square, but reviving the idea proposed by Elek Kada, namely an east-west direction avenue, lead across the town. [Korbonits, 2010]

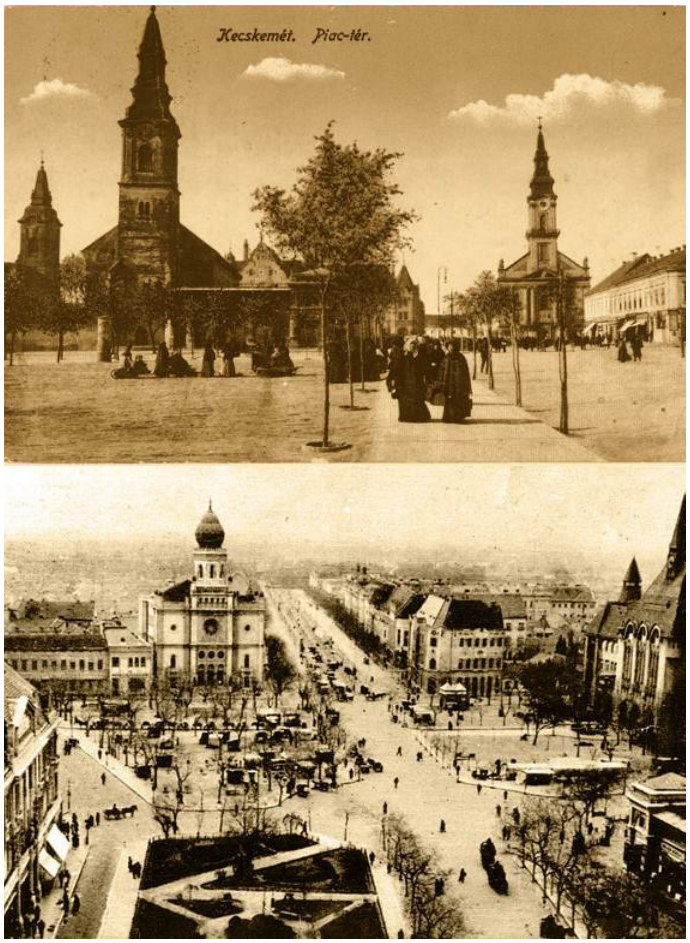

Figure 5 and 6: The main square on postcards from the nineteenth century: square viewed from Sugár Street and the estuary at Sugár Street (19-century postcards).
Sliki 5 in 6: Glavni trg na razglednicah iz 19. stoletja: pogled na trg iz Sugárjeve ulice in rečno ustje na Sugárjevi ulici (razglednice iz 19. stoletja).

That axis got new emphasis in the urban structure by widening Rákóczi Street from railway station to main square, although it 'deceased' at the Cathedral and Town Hall. There were notions even earlier to continue the urban idea of the main axis, in order to connect the east and west side of the town from the railway station, across the main square. Originally nineteenth century plans considered the continuation of the avenue the same way, led from the railway station across the main square. It could be expected, that the structural importance and architectural articulation of that new segment can not be as significant as the existing segment that leads to the railway station, because of the presence of Cathedral (Nagytemplom) and the Town Hall bordering the square from west and closing the accessing road visually.

After that decision, when Kecskemét has been promoted to county seat, a new building ensemble was needed according to the didactic, normative thinking of that era for the new role with new architectural articulation. So in the beginning of the 1960-ies there came a decision that the above mentioned axis should be cleared from the Town Hall, demolishing the mainly low intensity built area being around, and at the starting point of that axis a new public centre should be built. In that public centre a party headquarter with a County Council building was decided to be built, which completely changed the townscape and the silhouette with its twin towers, emphasizing the main square, and which is definitive even today, also a cultural house, more than one warehouse.

The probably most well-known urban design tool of the state socialist era was the application of vertical accents to accentuate residential areas and public buildings. In several Hungarian towns, including Kecskemét, appeared high rise buildings sometimes scalelessly standing out of their environment. When analysing their place in the urban structure, various, well-definable principles can be noticed. In Kecskemét the appearance of high-rise buildings was the result of the decision relating the location of administrative buildings, that is the high-rise building was not accentuated in its surroundings for reasons of spatial plasticity, but just to transmit a message. It was evident that the new buildings had to be tall, since it performed a symbolic role. The two centres organised closely to each other – historic and new – although they have been in close physical contact, had no intimate interaction in any level, and had no tolerance or acceptance towards each other.

The architectural articulation of the new centre raised many questions regarding the spatial configuration. Although the new square connected directly to the historic main square, that connection did not became organic. Because the old main square constituted a closed unit with its impressive scale, with the two public building of considerable size and destination on west side turning to it with their main façade, having the new town centre connected with a new promenade to it, but since the two large historic building turned its back to it, its role became only secondary.

The newly constructed administrative centre attached directly to main square has reinforced the centric character. But the urban, townscape and structural relationship both to the historic core, both to new town parts remained contradictory. Namely the west side of the new urban main square was not closed with a palpable space-bordering side, so it is almost leaking towards the traffic junction leading to surrounding residential districts. The most strikingly marked urban element among surrounding residential districts is the 176 apartment 'strip-house' along Petőfi Sándor Street built between 1967-69 (architect: Alfréd Peschka), with its longitudinal mass destined for accompaniment of the road leaving town. On the opposite side of the street there is the ten storey high residential district of so called Árpád-town extended to the new central square, as forced space-bordering unit, raising controversy for its scheme, scale, use of material, and for the lack of identity and basic contacts.

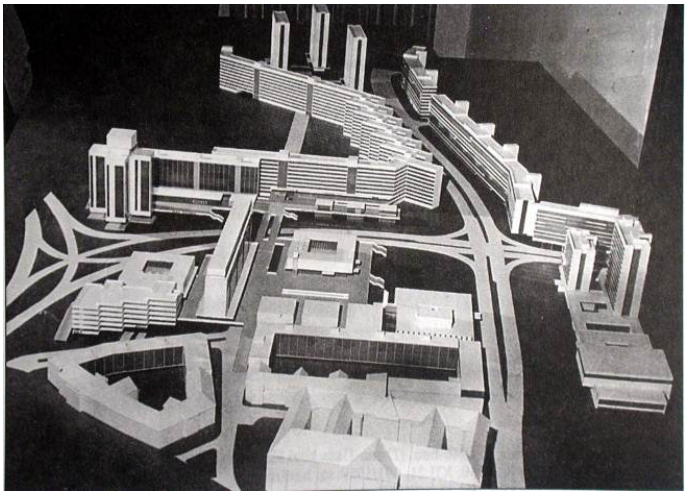

Figure 7: Mock up photo of the planned „new" town centre from the 1960-ies (source: István Juhász: Townplanning history of Kecskemét).
Slika 7: Fotografija makete načrtovanega 'novega' mestnega središča iz šestdesetih let (Juhász, 1998).

Figure 8: Structural connection of the historic and „new" town centres (foto: János Scheffer).
Slika 8: Strukturna povezava med zgodovinskim in 'novim' mestnim središčem (foto: János Scheffer).
[http://www.schefferj.ps.hu/images/Hungary/Hungary_AerialCities/KecskemetBelvaros_1024.jpg)]

While reconstruction of new administrative centre in Kecskemét was adapted to historic heritage, maintained the original concentric character of the centre, neither the system of connections of the new building ensemble, the inner structure, the scheme, nor its relation to existing part is a successful solution, from the respect of coexistence with historic buildings. Urban interventions of the 1800-ies in Kecskemét were inventive, bold, radical, also creative rooted in the understanding of the situation, some elements 'organically' amalgamated with existing urban tissue as time passed. Institutional developments of town centres after 1945 – formulated according to centralising principles, doctrines – were not integrated to existing, living urban organism, mainly because of the lost sense for local scale.

Szekszárd

Historic Town Centre

The core of historic town centre in Szekszárd is Béla Square today with the Town Hall, with county municipality and Catholic Church designed by Mihály Pollack. The small square elevated to a high point of the setting has been distinctive in the web of smaller streets arriving from all directions. However it did organised the lines of urban forces 'un-proportionately', concentrically, leading them towards low lying, more dense areas, streets have become emphasized more emphatically in eastern direction. The longitudinal square widened to the valley like a funnel became a geometrical cross-axis among streets running downwards, (called Garay Square today) that lead down from the small main square, protuberant of the topography of the landscape towards Pest-Mohács (north-south direction) main road, where it suddenly stopped, working as a main street with its proportions and with its linear character.

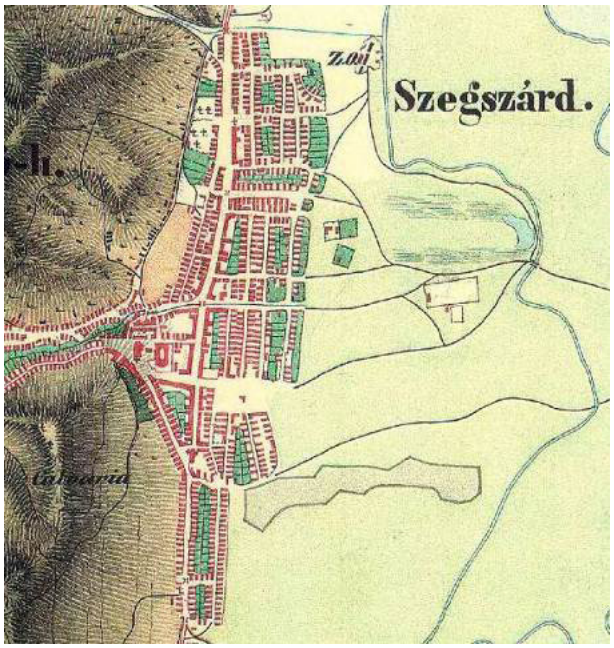

Figure 9: Urban structure of Szekszárd in the middle of 1800-ies (II. military survey map (1806-1869)).
Slika 9: Urbana struktura Szekszárda sredi 19. stoletja (II. vojaški pregledni zemljevid (1806-1869)).
[http://archivportal.arcanum.hu/maps/html/katfelm2b_google.html]

The core have been relocated to Garay Square at the end of recent century, that meant the centre of gravity for the town slightly moved eastward, towards the valley end instead of the former single pointed arrangement it spread along the east-west axis. The centre by 'sliding down' from the topographic highpoint, stretching out in a linear way to north-south direction, towards Pest-Mohács (Széchenyi) road, also prepared the way for further expansion for the centre, since commercial/service destinations appeared accordingly beside the intense traffic main road.

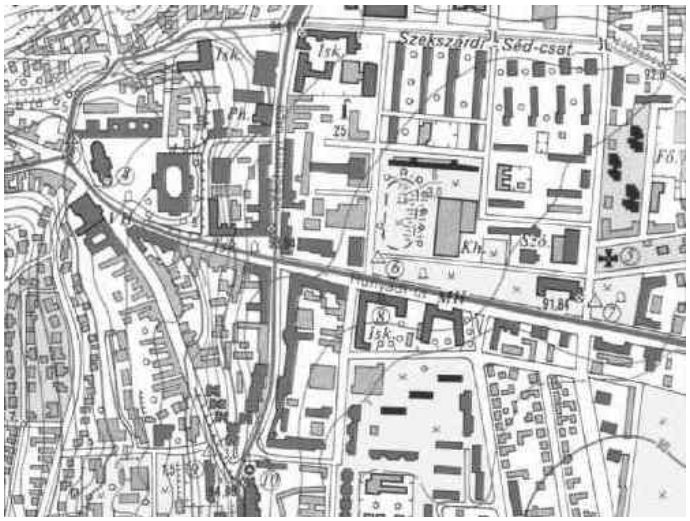

Figure 10: Direction of spread of institutional development towards Pest-Mohács (Széchenyi) road/Street from historic centre [FÖMI].
Slika 10: Smer širjenja institucionaliziranega razvoja iz zgodovinskega središča proti ulici Pest-Mohács (Széchenyi).

The new Town Centre

The town with 'modest, sleepy, lovable spirit' [Tillai, 1977] was shaken up by the change of attitude in the National Settlement-Structure-Development Framework-plan (1963). The earlier attitude was to concentrate mainly on the Capital City, in the countryside allowed only such ideas which were subordinated primarily to practical aims and industrial development. From the early '60-ies however the effort to put an end of the single-centred state control principle became a new, clearly declared ambition. In the second half of 1950-ies difficulties and advanced costs of Budapest centred development started to manifest, after which a conception was formulated to counterbalance the attraction of the Capital City by strengthening the five main country towns (Miskolc, Debrecen, Szeged, Pécs, Győr).

Economic reforms implemented from the second half of 1960-ies, and the openly declared New Economic Mechanism (1968) loosened the former rigid central planning-directive system, ensuring extended independence in decision making, and proving wider manoeuvring space for counties regarding budget used independently. In peculiar way counties started a powerful development activity first to renew their administrative centres from the budget transferred to county seats – now locally strengthening the idea of single centred principle – in order to prove that they can become 'up-to-date', and 'considerable' county administrative centres. During that time such county seat towns with earlier undeveloped centres, as Nyíregyháza,

Szolnok, Szekszárd, have reconstructed their downtown area, and also Salgótarján has become a real 'modern' centre.
One of the earliest beneficiaries of the new trend was Szekszárd town, for which a detailed master plan has been carried out in 1964. The designer, dr. Dezsőné Korbonits (VÁTI) received Ybl prize for her design merits the year after. (Schéry, eds. 1995)
The relationship of planning and erection was quite different in that respect, not like in the case of Kecskemét, although it has numerous similarities from the beginning of the process. Namely there were given the detailed plans of such institution buildings ready that would have emphasized the new role of the town centre in the time of preparation of regulation plan. Thus the urban designers got such ready-made decisions as input information, which should be decided in the course of planning by them. Despite all of this the actual designation of the place of the new centre was under discussion for a long time. The urban development plan proposed the new institutional area to be realized in a low land, earlier swamp, by reconstructing Budapest – Mohács crossing main road, exceeding the 'demarcations' line which separated the centre until then. Thus in the progress of planning the structural direction of development was relocated along the east-west axis spreading between the railway station and the historic centre, with eastward extension of the historic town centre, but its actual location was either put on north side either on south side of the street called today as Hunyadi Street.

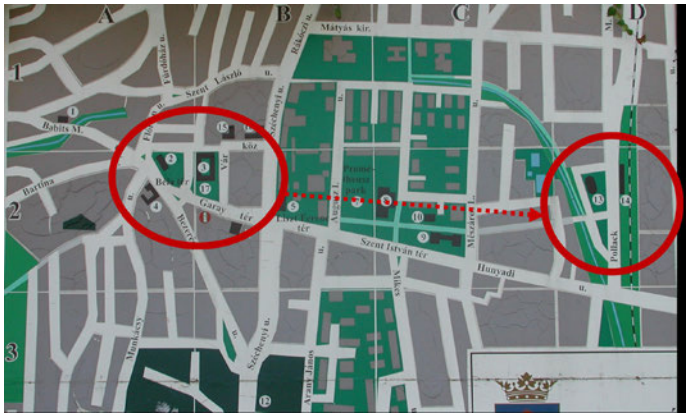

Figure 11: Structural relation of town centre and railway station (source: local map for tourists).
Slika 11: Strukturna povezava mestnega središča in železniške postaje (vir: krajevni turistični zemljevid).

Eventually urban design sticking to the original concept organised the extension of the centre onto a definitive new pedestrian main axis [Korbonits, 2010], to the promenade led across a wide town park, that connected numerous important existing administrative buildings, by a loose pavilion-like arrangement. The smooth building mass of Cultural Centre, the eclectic Museum, the romantic building of the former synagogue (today: Houses of Arts) and Hotel Gemenc closing the main axis with all different architectural character was not disturbing because of the spacious arrangement, providing functionally abounding, visually exciting experience. The park with public buildings in it is a high urban value even today, a rare gift, which beauty is enriched by the solution that density of the centre was loosened up gradually from relatively dense middle part towards suburban areas. Although buildings of various ages are located side by side, their statue-like character, independent architectural value and the green areas providing tissue-like background between them and the elements of the public space, statues, fountains planned, formulated consciously providing harmony and not chaotic overall picture.

Figures 12 and 13: Garay Square sloping slightly down to Pest-Mohács (Széchenyi) road/Street and the new urban axis connected to it.
Sliki 12 in 13: Trg Garay, ki se rahlo spušča proti ulici Pest-Mohács (Széchenyi), in nova mestna os, ki se navezuje nanj.

The town centre area of Szekszárd expanded significantly during the era of State Socialism. The newly forming central area which was built continuing the rather small central core of this town, gained an equal role with the original centre not only because of his spatial extension. It became centre with own identity and own functions, with his own 'iconic' layout and architectural design. In spite of his scale, it did not reduce the role of the historic centre. It is directly connected with the old centre, and the choice of the place proved to be right. [Kissfazekas, 2013a]
By the regulation plan the old historic and new town centre are connected spreading over the new backbone of Széchenyi Street and Liszt Ferenc Square crossing. The connection joint was intentionally emphasized by an administrative building

ensemble, after demolishing a deteriorated commercial and residential block, constructing a two storey warehouse, a mix use building and a seven storey office tower.

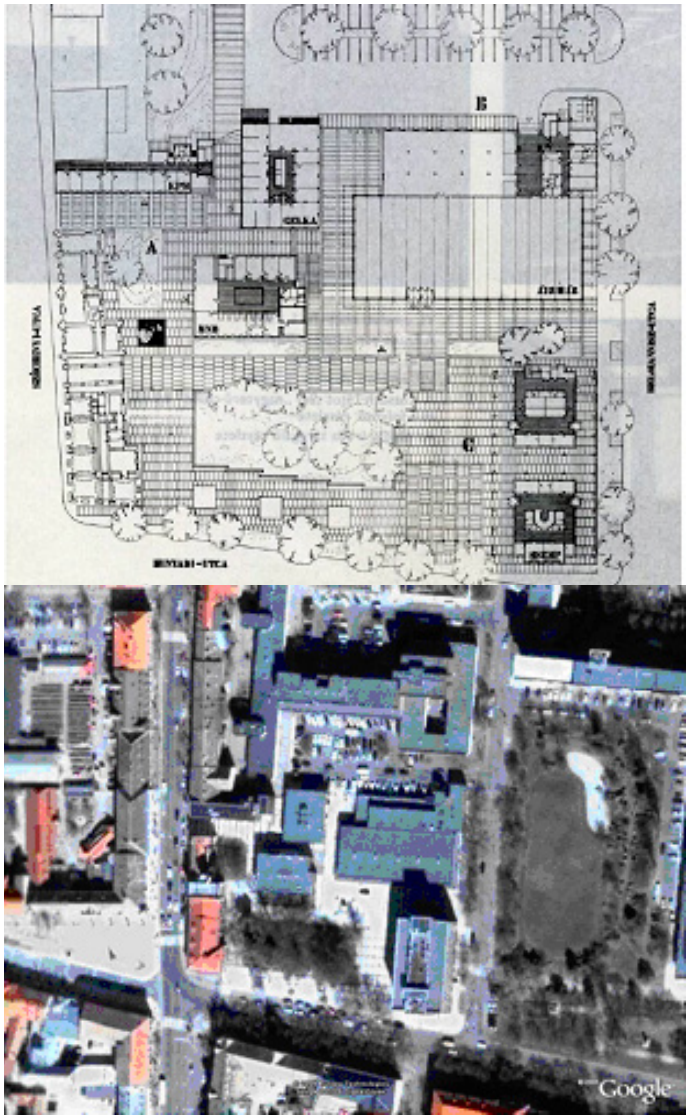

Figure 14 and 15: Master plan and satellite photo of the 'new' town centre institutional-ensemble [Korbonits, 2010, Google.earth].
Slika 14 in 15: Splošni načrt (master plan) in satelitska fotografija institucionalnega skupka 'novega' mestnega središča.

Putting aside the earlier plans already completed, new commission was given to Károly Jurcsik and partners, Lajos Bartha and Levente Varga (LAKÓTERV) regarding building designs. During the progress of building design unusual harmony and professional dialogue formed between architects and urban designers, breaking with the traditional hierarchic, rigid planning method of various levels making progress and feedback impossible. In the course of the designing process earlier design brief have changed again and after multiple preliminary stages the detailed master plan was changed too. In order to keep certain existing (neo-classical and romantic) architectural elements of the Main Street plans were further elaborated, and thanks to that carefulness the effort was successful, altering the large scale scheme with maintaining buildings inheriting historic townscape and street atmosphere, e.g. the so called August-House. The building where Franz Liszt lived has an outstanding role today simple by its location: providing decent visual closure from the Garay Square side towards the sloping historic town centre.
Architectural design works of new administrative centre has been started in 1965, then realisation followed between 1967-70. [Simonn, 2005] On the basis of the new design brief a service-house and a warehouse some mixed use offices and as a vertical accent the HQ of MSZMP (Hungarian Socialist Workers Party) and a seven floor HQ on 'pilots' for Tolna County was erected. By the homogeneity of their work architects of the administrative centre intended to frame-in, 'soothe' the presence of other buildings existing as given elements of the surrounding, built in different style and age, having different structure and applying various building material. That intention was carried out by using uniform brick cladding – for which architects were condemned as Anglo maniacs – with a unifying floor-grid, 'by use of domestic detailing' [Tillai, 1977] with the application of sporadic patches of maintained trees, in the arrangement alien to buildings configuration, and they were successful.

Figure 16 and 17: The 'new' town centre fitted to the historic urban fabric – from Széchenyi Street and the inner part of the block.
Slika 16 in 17: 'Novo' mestno središče, pripojeno zgodovinskemu mestnemu tkivu, – od ulice Széchenyi in notranjega dela kareja (block).

Pedestrian communication of the promenade placed into the park mentioned before is then led across the 'built, urban' fabric of the new, homogeneous character administrative buildings in loose, sporadic arrangement and across public open spaces, distributing pedestrian movements by the pavilion-like arrangement. One or the other elements of the new town centre come into sight as reference behind the remaining street-line of Széchenyi Street sometimes, inserted between two historic buildings, sometimes as a background because of the humble architectural attitude – not hidden, but not pushed forward – elaborately woven between existing, preceding (urban) historic units.

Though the office building and commercial building ensemble 'suffered' certain remodeling, reconstruction, it has maintained its homogeneity, outstanding high level architectural character even today derived from its selection of building material and architectural motives. The building ensemble got considerable publicity then and since compared to its contemporary competitors. Although lack of Szekszárd roots, loss of identity was criticized many times by critiques, but architectural authenticity, and quality was not questioned. Behind appreciating architectural values – despite official state acknowledgement – praising of urban quality that gave frame for buildings often fell into the background.

For me one of the main conclusions of the presented two examples is that a basically positive development decision regarding urban structure later can take different directions in the course of 'refining' development schemes, and architectural detailing. While development in Kecskemét became fiasco because of its disproportion, neglect of contextual scale, in Szekszárd the presence of the building ensemble is acceptable because of the refined balance of architectural details, and it is reinforcing the urban ideas.

The buildings of the period which the paper examines are significant elements of the centres in all, either smaller or bigger Hungarian towns even nowadays and are looking for their current role. 'Language is also a cultural code, and language usage is a social phenomenon.' If urban design borrowed the term 'context' from textual analysis, the above linguistic statement can be adapted as well, since architecture is also a means of communication. The cultural code of the state socialist public building developments in city centres is sensibly extraneous and illegible for the citizes of today. It does not fit neither into the inherited, traditional code system, nor to the visual language of our age.

Something is often missing, and it is not the aesthetic criteria, neither a genuine inventive spirit or genuine, unique pieces of art, but the coherence which is beyond functional criteria. That is what is meant by context, the term which was often ignored during that historic period.

The above two examples also prove that interrelated connection and feedback of urban design- and architectural decisions are necessary for a real quality, acceptable for the town, and it can be adapted.

In Kecskemét the development beside the existing historic centre in principle strengthened traditional urban structure directions, but the realised development scheme and architectural scale did not accomplish, did not verify the correctness of decision regarding structural development. Historic antecedents have been integrated with development directions of the '60-ies in case of Szekszárd too – as one of the possible variants. Contribution of architectural qualities to urban development intentions were necessary to bring them to perfection, refining it, elaborating it further in detail.

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Interview with dr. Dezsőné Korbonits (2008.11.07)

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PREDLOG KAKO REKONSTRUIRATI ROŠKE STOLPNICE

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PROPOSAL HOW TO RECONSTRUCT THE ROŠKA MULTI-STOREY RESIDENTIAL BUILDINGS

izvleček

Že dogo let vemo, da so "Roške stanovanjske stolpnice" brez konkurence najbolj problematične ljubljanske stavbe v pogledu potresne varnosti. Odločili smo se, da predlagamo sanacijo teh objektov v smislu "nove filozofije", po kateri se notranjost stavbe pusti nedotaknjena, in se vse potrebne ojačitve izvede izven samega objekta. Objekt v času adaptacije ostaja bivalno neokrnjen. Filozofijo: "nič znotraj – vse zunaj" smo razvili že davnega leta 1981. (in jo takrat tudi patentirali) pri sanaciji velikega hotela pri Makarski. Pri tem je bistveno to, da poleg adekvatne potresne ojačitve objekta, pridobimo nove bivalne kvadrature, ki največkrat v celoti pokrijejo vse stroške sanacije. V primeru roških stolpnic smo predvideli dodatne nove armirano-betonske stene na vsem obodu stolpnic. Te stene "stabiliziramo" s krog in krog predvideno 3 m široko konzolno ploščo v vsaki etaži, ki daje vsakemu stanovanju ca. 65 m² nove bivalne površine, kar je nekaj več, kot znaša neto površina stanovanja. Pred izdelavo novih dodatnih obodnih sten, vstavimo 15 cm debelo izolacijsko plast, ki znatno prispeva k zmanjšanju potrebne ogrevalne energije in izloči vse "toplotne mostove". Stare obodne stene povezujemo z novimi stenami z mozniki Ø 22 mm iz nerjavečega jekla (majhna toplotna prevodnost). Ker so vsi posedki obstoječega objekta konsolidirani, bomo vse nove obodne stene fundirali na Jet-grouting pilotih.

ključne besede

stanovanjske stolpnice, Roška, - potresna varnost, rekonstrukcija.

abstract

We have known for years that the residential towers on Roška Street are absolutely the most problematic buildings in Ljubljana in terms of their seismic safety. We decided to propose the rehabilitation of these structures in line with a "new philosophy" according to which the building interiors are left unaffected, and all the necessary reinforcements are implemented externally. During rehabilitation works, the building is not deprived of its habitational function. We developed the "nothing within – all without" philosophy back in 1981 for the rehabilitation of a big hotel near Makarska (we also took out a patent for it then). It is also essential to note that, apart from adequate seismic reinforcement, we gain new residential floor areas which generally cover all rehabilitation costs. In the case of the residential towers on Roška Street, we envisaged additional reinforced concrete walls for the entire perimeter of the towers. These walls are "stabilised" with a 3 m wide console slab running all around each floor, thus adding approximately 65 sqm of additional floor area to every apartment, which amounts to a little more than the net apartment floor area. Before setting up the new additional perimeter walls, we place 15 cm of insulation in between which considerably reduces the use of heating energy and eliminates all "thermal bridges". The old perimeter walls are connected to the new ones by Ø 22 mm inox steel treenails (with weak thermal conductivity). Since the existing structures are no longer settling, all of the new perimeter walls will be founded on Jet-Grouted columns.

key words

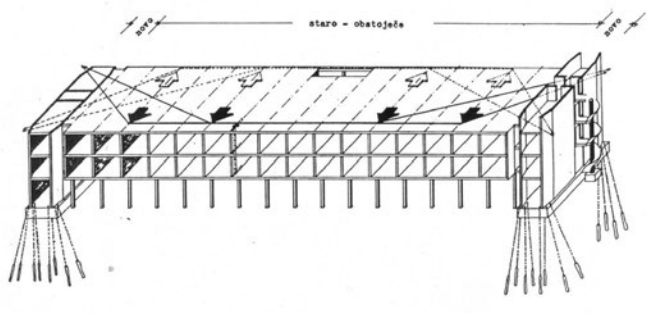
residential towers, Roška Street, seismic safety, reconstruction

Uvod

Že dolgo vemo, da so "Roške stolpnice" od povojno zgrajenih stavb brez konkurence najbolj problematične ljubljanske stavbe glede potresne varnosti. Zasnovala sta jih arhitekta Ilija Arnautovič in Milan Mihelič leta 1957 v času, ko so šele redki razmišljali o tem, da bo potrebno stavbe graditi tako, da bodo odporne ne samo proti vertikalnim obtežbam in horizontalni sili vetra, marveč tudi na mnogo bolj rušilne sile potresa. "Japonsko vedenje" o potresno varni gradnji, se je udejanilo v Sloveniji šele leta 1963, ko smo dobili predpise, kako graditi "potresno varne stavbe" - torej le nekaj mesecev pred "skopskim potresom". Ne glede na "ne védenje" o potresnih silah, sta arhitekta v principu intuitivno konstrukcijsko korektno zasnovala tloris stolpnice. Vendar so bile debeline sten in njihove šibke horizontalne povezave med odprtinami, brez vertikalnih vezi in ne nazadnje premalo odporni materiali, premalo, da bi lahko zadostili današnjim zahtevam.

Predlog protipotresne sanacije

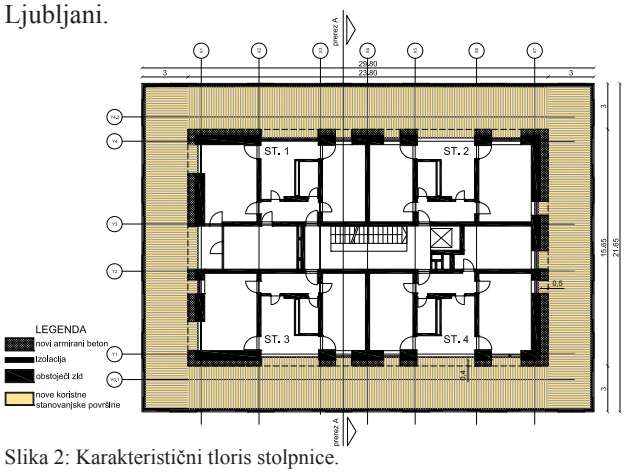
Odločili smo se, da predlagamo sanacijo "Roških stolpnic" v smislu nove filozofije sanacije potresno nestabilnih stavb, po kateri se notranjost stavbe pusti nedotaknjena in se vse protipotresne ojačitve izvede izven samega objekta. Objekt v času adaptacije ostaja bivalno neokrnjen. Filozofijo: "nič znotraj – vse zunaj" smo razvili že davnega leta 1981 in jo takrat tudi patentno zaščitili [Vogelnik, 1982]. Ta sistem smo razvili pri sanaciji večjega hotela v Gradcu na moru pri Makarski, ki je imel "mehko" pritličje (samo stebri), v zgornjih šestih etažah pa samo prečne opečne nosilne zidove. Stropne plošče so bile sistema "Monta" z robnimi vezmi – vzdolžno armiranimi s 4,5 cm² jekla 220/340. Hotel smo potresno "stabilizirali" z armirano-betonskima stolpoma na obeh čelnih stenah, ločenima od primarnega objekta – s horizontalnimi neoprenskimi ležišči v vsaki etaži. Obstoječi del hotela pa smo "ujeli" s sistemom prednapetih kablov, prav tako v vsaki etaži. Stolpa sta bila grajena na obročastih temeljih. Da smo dobili dovolj velik P/F, smo morali zaradi premajhne lastne teže stolpov "manjkajočo" vertikalno silo povečati na ta način, da smo predvideli zadostno število injektiranih sider, ki so bila sidrana s "Diwidag palicami", ki smo jih prednapeli (ponapeli), ko sta bila stolpa izbetonirana do vrha. S tem smo zadostili kriteriju P/F>M/W (po celi površini temeljev samo tlačne napetosti tudi pri potresni obremenitvi). V stolpih so bili predvideni novi apartmaji s ložami. Tako smo "potresno" sanacijo 83 m dolgega hotela dobili zastonj, saj so nove hotelske površine v stolpih pokrile vse stroške "stabilizacije" hotela. Primarnemu hotelskemu objektu smo dodali le kable, ki so tekli pod stropi v vsaki etaži in so bili kasneje zakriti s spuščenim stropom.



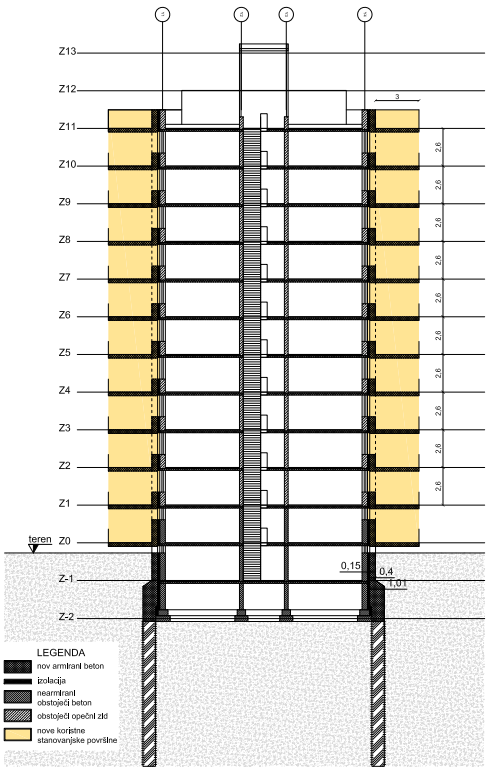
Slika 1: Hotel v Gradcu na moru - skica sistema sanacije.
Figure 1: Hotel, Gradac, scheme of conservation.

Na podoben način smo sanirali tudi stavbo "Zavoda za zaposlovanje" na Parmovi ulici v Ljubljani s tem, da smo ji dodali še dve novi etaži. Tudi hotel "Lev" v Ljubljani je bil "stabiliziran" po isti filozofiji. V natečaju za adaptacijo in dogradnjo hotela, smo predložili način ojačitve, podprtim s idejnim statičnim izračunom. Izvedbeni projekt, ki je bil delno spremenjen pa je izdelalo podjetje IZTR iz Ljubljane.
"Roške" stolpnice so bile grajene povsem solidno, če odmislimo potresno varnost, tako kot vsi podobni objekti v Sloveniji v tistem času. Kletne in pritlične etaže so grajene iz nearmiranega betona, vse gornje etaže pa so klasično zidane iz opeke - z NF zidaki s tem, da so notranji nosilni zidovi debeli 25 cm, zunanji pa 38 cm. Plošče so armirano-betonske, armirane z gladko armaturo Je 220/340, debele 13 cm. Plošče nad zunanjimi stenami niso ojačene (nimajo poudarjenih obodnih armirano-betonskih vezi), zato tudi ne nudijo zadostne togosti, da bi se pri horizontalnih obremenitvah pri velikih odprtinah lahko izoblikoval efekt "Vierandelovega nosilca". Ker je na zunanjih stenah velik del fasadnih površin zastekljen, celotna zunanja stena ne more nuditi zadostnega odpora horizontalnim silam v svoji ravnini.
Takšna stavba, grajena iz sicer masivnih opečnih zidov, s simetrično zasnovo, vendar visoka 13 etaž, ki nima armirano-betonskih vertikalnih in horizontalnih vezi in ima nearmirano – sicer betonsko kletno in pritlično etažo, bi pri potresu večje intenzitete kolabirala. Zato smo si zadali nalogo, da mora sanacija obstoječih stolpnic zagotoviti ne samo varnosti stanovalcev, marveč tudi to, da je po event. potresu stavbo možno z relativno majhnimi stroški zopet postaviti v aktivno funkcijo
Do sedaj so bile podobne stavbe, ki niso bile grajene potresno varno, pretežno sanirane na klasičen način. Vendar sanacijski posegi pri takšnih objektih skoraj vedno zajemajo sanacijo temeljev, vgradnjo novih armirano-betonskih sten, ali celo jeder ali okvirjev in nove močne horizontalne povezave med seboj. Obstoječe stavbe, ki niso bile grajene po "potresnih predpisih", običajno nimajo dovolj nosilnih sten v obeh ortogonalnih smereh, ki bi bile sposobne prenesti horizontalne obtežbe na temelje. Zato je potrebno vgraditi nove armirano-betonske stene v sam objekt v notranjosti stavbe in jih adekvatno povezati med seboj z novimi močnimi horizontalnimi vezmi. Skoraj vedno pa se posegi pri "klasični sanaciji" ne morejo izvesti, ne da bi se stanovalci začasno izselili iz stavbe. Tudi oprema stanovanj mora biti pri takih posegih v pretežnih primerih začasno odstranjena. In končno je potek takih zahtevnih sanacij dolgotrajen in izjemno drag. Lastniki stanovanj, ki so stanovanja po "Jazbinškovem zakonu" poceni olastninili, nimajo večjih prihrankov, da bi lahko plačali tako sanacijo. Prav zato ostaja toliko potresno neodpornih objektov v Sloveniji nesaniranih. Pri tem je potrebno poudariti, da je "klasična sanacija" strošek, sanacija po "novi filozofiji" pa je investicija, kjer investitor za vloženi denar ne dobi samo varnosti, temveč tudi nove prostore in s tem dodatno povečano novo vrednost (novo vrednost seveda a priori dobi objekt že s protipotresno sanacijo, ta vrednost pa se še poveča s pridobitvijo novih prostorov)
Zato za "Roške" stolpnice predlagamo racionalnejšo rešitev, podobno kot v prej opisanih sanacijah "po novi filozofiji" s tem, da bomo v tem primeru celotno obstoječo stavbo "ovili" s armirano-betonskimi stenami, ki bodo 15 cm odmaknjene od obstoječih zunanjih zidov stolpnice. Ta odmik bo zapolnjen s stiroporom, ki bo nudil zadostno toplotno izolacijo obstoječi stavbi in prekinil skoraj vse toplotne mostove, ki bi lahko nastali med konzolno ploščo & novo zunanjo steno in "zunanjim" obstoječim zidom. Za povezavo novih armirano-betonskih sten z obstoječimi "obodnimi" zidovi bomo vgrajevali v stene moznike 4Ø22/m² - pod kotom 30º sidrane v obstoječe zidove. V pasu "starih" stropnih plošč pa moznike 1Ø22/33cm s tem, da ta sidra segajo min. 100cm globoko v "obstoječe" plošče. Najmanjši toplotni most bi brez dvoma predstavljali mozniki iz nerjavečega jekla (štirikrat manjša toplotna prevodnost od običajnega jekla). Druga možnost je slabša – mozniki bi bili iz navadnega vroče-cinkanega jekla, ki so ≈ 3.50 krat cenejši od sider iz nerjavečega jekla
Seveda bomo v novem "ovoju" pustili vse odprtine, ki so na fasadah obstoječega objekta. Za "stabilizacijo" zelo "dematerializiranih" novih sten, ki morajo biti na krajših stranicah tlorisne konture debele 50cm, na daljših pa 40cm, smo predvideli obročasto nameščene konzolne plošče (plošče bodo "objele neprekinjeno krog-in krog – celotno stavbo v vsaki etaži) - debeline d=25.0 cm in širine max. b=3.00m (širina še ni dokončno definirana in bo odvisna od osvetlitve prostorov in od event. zahtev umetnostnih zgodovinarjev). To stabilizacijo obodnih sten bi seveda lahko delno dosegli tudi z zadostnim sidranjem teh sten v obstoječe stropne plošče, ki pa v našem primeru nateznih sil zaradi šibkega armiranja niso sposobne prevzeti. Poleg tega, pa moramo zagotoviti tudi zadostno togost preklad nad velikimi odprtinami zasteklenih površin, ki pa nam jo lahko zagotovi samo "konzolni obroč".
Z namestitvijo obodnega armirano-betonskega plašča smo brez dvoma globalno"zaščitili" objekt proti vplivu potresnih sil. V končni statični analizi pa bomo morali kontrolirati tudi vse lokalne elemente kot so npr. vmesni nosilni 25cm debeli zidovi. ki so uklonsko lahko problematični. Če bo analiza pokazala, da v teh zidovih obstajajo kritične "točke", bomo v takem primeru ravnali podobno, kot smo storili pri sanaciji stavbe Zavoda za zaposlovanje na Parmovi v Ljubljani.Tam smo na določena kritična mesta namestili HOP "C" profile iz ene in druge strani in jih z navojnimi palicami med seboj povezali na lokalno uklonsko še sprejemljivih medsebojnih razdaljah. Če stanovalcev z betoniranjem zunanjega armirano-betonskega plašča direktno

ne bomo "vznemirjali", je povezovanje s HOP profili v samem stanovanju bolj neprijazno. Vendar se na zelo redkih mestih v notranjih prostorih tudi to lahko v zelo kratkem času skoraj "neboleče" izvrši, ne da bi se stanovalci morali izseliti.
V vsakem primeru pa ti ojačitveni "konzolni obroči" dajejo vsakemu stanovanju v povprečju 62.50 m² nove bivalne površine, ki bo lahko uporabljena kot balkon ali lodža, lahko pa bo to zimski zastekljeni "vrt" ali pa del "povečane" dnevne sobe ali spalnice. Tudi v tem primeru bomo s financiranjem novih prostorov v "isti sapi", pokrili tudi stroške proti-potresne sanacije in toplotne izolacije celotne stavbe. Smo pa predvideli tudi zamenjavo starih oken in balkonskih vrat, kar bo "rahlo" podražilo kvadratni meter novih finaliziranih površin, ki pa ne bodo presegle ¼ cene/m² stanovanj, ki so danes na trgu v Ljubljani.



Slika 2: Karakteristični tloris stolpnice.
Figure 2: Typical plan of tower building.



Slika 3: Vertikalni prerez stolpnice.
Figure 3: Vertical section of tower building.

Temeljenje

Ker so temelji pri obstoječih stavbah popolnoma konsolidirani, se želimo izogniti superpoziciji napetosti v temeljnih tleh zaradi relativno zelo velikih vertikalnih sil v novih zunanjih stenah, ki jih v območju zadnje kleti odebelimo na 101 cm debele "temeljne stene", ki so tudi sposobne bolj enakomerno "raznesti" močno koncentrirane sile ob robovih velikih odprtin v fasadnih stenah. Te temeljne stene bomo temeljili na jetgrouting pilotih. Tako temeljenje tudi skoraj v popolnosti izključuje diferenčne posedke in posledično nedopustno "obešenje" novih sten preko moznikov – na stare obodne zidove stolpnic. Vertikalne sile v novih obodnih stenah so končno tudi zaradi širokih konzolnih plošč in seveda lastne teže tako velike (≈540.00 kN/m'), da zahtevajo zelo gosto razvrstitev pilotov okrog celotnega tlorisa stavbe. Nove temelje pod obodnimi stenami armirano-betonskega plašča stavbe pa je potrebno dilatirati od obstoječih pasovnih temeljev objekta, saj le-ti niso sposobni prevzeti nikakršnih nateznih horizontalnih sil, ki nastanejo zaradi deviacije rezultante vertikalnih sil v predelu obodne kletne stene, ki se v kletni etaži odebeli na d=101 cm. Tlačne sile horizontalne komponente na vrhu odebeljene "temeljne obodne stene" pa moramo "nasloniti" na stropno ploščo kleti. Ker moramo pri tem "preskočiti" 15 cm debelo plast izolacije, to izvedemo z mozniki, ki jih globoko sidramo v obstoječo kletno ploščo. Horizontalna komponenta zaradi le blagega naklona rezultante v kletni etaži znaša samo ± 53.20 kN/m, tako da prenos preko moznikov ni problematičen. V spodnjem delu "odebeljene temeljne stene" pa horizontalno komponento morajo prevzeti piloti (glej prerez stolpnice – slika 3).

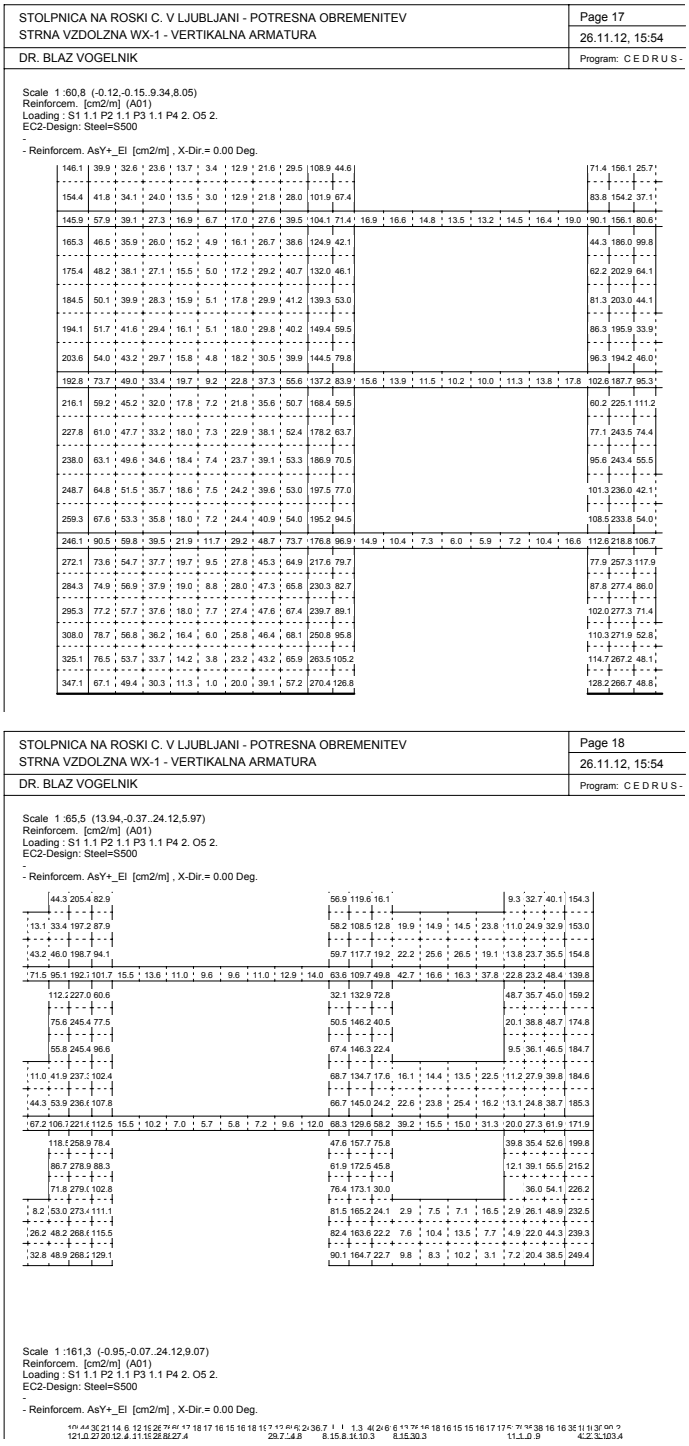
Statična analiza

V prvi fazi smo naredili potresno analizo konstrukcije stolpnice po Eurocodu EC8, kjer smo upoštevali:

- Potresni pospešek temeljnih tal 0.25g
- Vrsta tal C – srednje dobra tla γ=1.15
- Redukcijski faktor q=4.5

V drugi fazi smo obremenili posamezne stene s horizontalnimi potresnimi silami – s tem, da smo jih obremenjevali enkrat iz desne in potem iz leve strani. Pri izračunu smo za horizontalne sile upoštevali povečani faktor varnosti v iznosu 2.0. Seveda smo v istem izračunu stene obremenjevali tudi z vertikalnimi obtežbami, ki izhajajo iz lastne teže sten in konzolnih plošč - in končno tudi iz koristnih obtežb konzolnih plošč. Pri tem smo upoštevali faktor povečanja 1.1 (glej računalniški izpis: lastna teža stene S1, teža konzol P2, koristna teža konzol P3, potres iz ene smeri P4 ali iz druge smeri O5). Iz izračuna napetosti je razvidno, da se nam v zunanjih vogalih sten pojavljajo zelo visoke napetosti, ki pa tudi hitro splahnijo. Seveda imamo v teh vogalih velike prereze, saj so stene v krajši smeri debele 50.0 cm, v daljši pa 40,0 cm in pri tem sodeluje tudi vložena armatura - kot tlačna armatura. Armatura je v teh vogalih položena zelo gosto. Ker pa tudi v tem primeru velja, da je ta koncentrirana armatura del velikega prereza sten, le-ta ne bo presegala 4.0% betonskega prereza. Napetosti na betonske prereze ob velikih okenskih odprtinah se brez upoštevanja armature gibljejo okrog 14000.00 kN/m² in prav tako že po 30.0 cm splahnijo na

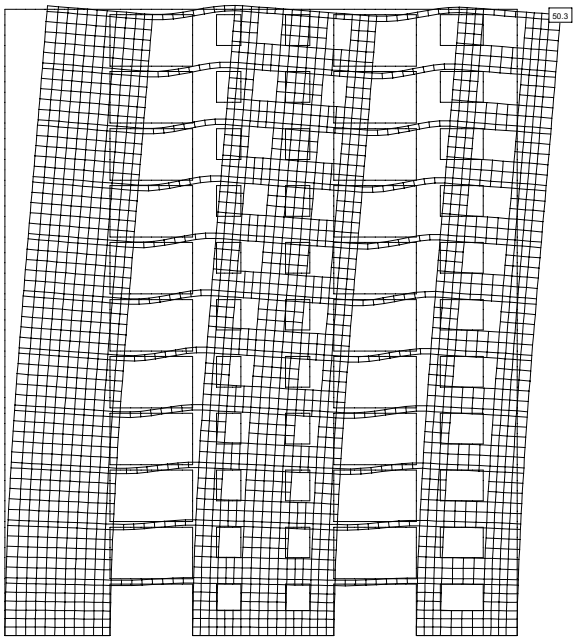
manj kot polovične vrednosti. V vsakem primeru bodo stene v spodnjih etažah betonirane z visokimi "markami" betona.



Slika 4: Vertikalna armatura stene v cm^2/m v spodnjem levem (desnem) delu vzdolžne stene (Program: CUBUS – statik).
Figure 4: Vertical steel reinforcement of the wall.

Končni izgled saniranih stolpnic

Obstoječe roške stolpnice predstavljajo za svoj čas – kvalitetno arhitekturo, ki pa pri vseh odličnih potezah obeh arhitektov ne more skriti, da ima svojstven "socialistični" "pridih". Pri sanaciji bodo stolpnice dobile "novo obleko", kjer bodo fasade sodobno oblikovane v kombinaciji relativno velikih steklenih površin in različnih stenskih oblog, kar bo še bolj prišlo do izraza pri različnih kombinacijah balkonov, lodž, zimskih vrtov ali novih lahkih metalnih sten novih prostorov. Pri tem moramo ponovno poudariti, da se bodo sedanje neto stanovanjske površine povečale za skoraj 100%. V povprečju dobi vsako stanovanje ≈ 62.50 m² novih kvalitetnih površin, ki bodo pri nekaterih stanovanjih lahko bolj ali pa manj "bogato" obdelane. Tam, kjer bodo stanovalci hoteli cenejšo izvedbo, bomo seveda vseeno postavili določene zahteve, ki bodo v soglasju te nove arhitekture. Če nekdo ne bo želel npr. zimskega vrta, bomo na robu konzolne plošče predvideli npr. brisolej, ki se bo morda pojavil pri istem stanovalcu tudi na drugem delu "balkona". Seveda pa bo to treba "estetsko" uskladiti z drugimi stanovanji.



Slika 5: Deformacija vzdolžne stene pri potresni obtežbi (Program: CUBUS – statik).
Figure 5: Seismic deformation of the wall.

Slika 6: Pogled na stolpnico pred sanacijskim posegom.
Figure 6: Tower building before proposed reconstruction.

Slika 7: Pogled na stolpnico po sanacijskem posegu.
Figure 7: Tower building after proposed reconstruction.

Slika 8: Panoramski pogled na stolpnice po sanacijskem posegu.
Figure 8: Scenery view of the tower building after proposed reconstruction.

Slika 9: Fasadni izrez sanirane stolpnice.
Figure 9: Façade as it is proposed in the reconstruction documentation.

Stroški

Upoštevali smo naslednja dela:

- izkopi
- varovanje gradbene jame
- jetgroting piloti – računajmao ca 10.0 m globine
- temeljna stena 101 cm debela, ki sega od dna obstoječih temeljev do vrha spodnje kleti
- zunanje – prečne stene d=50 cm
- zunanje – vzdolžne stene d=40 cm
- 3 metre široka konzolna plošča krog in krog v vsaki etaži d=25 cm – s 1% padca proti robu (torej na robu debela 22 cm.
- Sidra (glej besedilo)
- Lenton spojke za stikovanje armature v vsaki drugi etaži po grobi oceni znaša ~100000.- € za vsako stolpnico
- Izolacija 15 cm – zgoraj stiropor, v kleteh stirodur
- Enostranski opaži za stene
- Opaži za plošče
- Obdelava zunanjih AB sten in barvanje
- Tlaki konzolnih plošč delno keramične ploščice, delno podi (morda v razmerju 60%:40%)
- Obrobe balkonskih plošč – ali pločevina, ki se montira od zgoraj (da ne bo potrebno lokalnega odranja) ali keramika, ki pa zahteva lokalno odranje.
- Ograje balkonov, brisoleji ali montažne stene z zunanjo – morda kovinsko oblogo
- Projekti : analize, dovoljenja, arhitektura, statika & armaturni načrti

Po grobi oceni se bo cena celotne sanacije in finalizacije novih prostorov gibala od 400.00 – 500.00 €/m².

Sklep

Kolikokrat smo v zadnjih desetletjih že želeli "streti ta trd oreh" - Roške stolpnice. Vedno so bili prioritetni drugi problemi in pred vsem veliki projekti. Sedaj, ko velikih projektov v Sloveniji ni več in nihče ne ve, kdaj bodo vzklili novi, smo končno našli čas, za brez dvoma zelo akuten problem, kako zavarovati veliko število družin, ki živijo v visoko problematičnih roških stolpnicah in premorejo skupaj okrog 260 stanovanjskih enot. Preveliko število, da bi to smeli "spregledati". Nihče ne more predvideti, kdaj se bo ljubljanska zemlja spet stresla. Stresla pa se bo in samo upamo lahko, da ne premočno in tudi ne kmalu. Zadnji večji potres je Ljubljana doživela leta 1895. Takega potresa "Roške stolpnice" ne bi preživele. Za to predlagamo sanacijo teh objektov v taki obliki, da bi bili stroški prenove sprejemljivi in da bi v isti sapi dodali še novo vrednost, ki bi jo predstavljala pridobitev novih prostorov ki bi bili skoraj "zastonj". Ali pa obratno, pridobili in plačali bi nove bivalne prostore, protipotresna sanacija pa bi bila "zastonj". Kakor koli to obrnemo, se sliši morda malo "čarovniško", čeprav pri tem trdno ostajamo na zelo realnih "tleh". V vsakem primeru pa za proti-potresno ojačitev stolpnic potrebujemo močan plašč, ki bo zaščitil objekt proti horizontalnim silam, ki pa mora dobiti tudi horizontalne ojačitve v vsaki etaži (samo sidranje v zelo tanke in minimalno armirane stropne obstoječe plošče pri nateznih silah ne zadostuje). Take obročaste ojačitve morajo biti dovolj toge, da stabilizirajo stene zelo dematerializiranega armirano-betonskega ovoja proti izklonu. Te ojačitvene obroče smo smiselno izkoristili in dodatno razširili in tako dobili nove "stanovanjske površine". Vse konstrukcijske poteze, ki smo jih storili, so v približno 95% vrednosti potrebne za proti-potresno zaščito obstoječih objektov. Le slabih 5% od celotne vrednosti konstrukcijskih elementov, predstavlja diferenca "balkonskih" površin, ki jih enostavno "prilepimo" na konstrukcijsko potrebne horizontalne ojačitvene obroče. To pa pomeni, da bodo nove bivalne površine zelo poceni. V vsakem primeru

pa je k temu potrebno prišteti vso finalizacijo novih površin in ne nazadnje tudi dodatno toplotno-izolacijsko plast stiropora (stirodurja), Pri tem moramo spomniti na to, da bi v primeru klasičnega načina izoliranja stavbe potrebovali drage odre, ki v našem primeru odpadejo. Odpade tudi zaščita izolacije (mrežica in tanka zaščitna plast, ki jo nanašamo na izolacijski ovoj). Ker bomo gradili postopoma – najprej steno v eni etaži in potem konzolno ploščo in tako korak za korakom do vrha stavbe, ne bodo potrebni nikakršni odri. Le pri končni obdelavi robov konzolnih plošč bomo morali zopet postopoma fiksirati v vsaki etaži "podaljšanje" konzole z lahko "prenosno" konstrukcijo, ki bo omogočila izdelavo zaključkov balkonskih plošč. Pa celo to bi lahko opustili, če se bomo odločili za kvaliteten pločevinasti zaključek in za lahke montažne zunanje stene, skupaj s potrebno zasteklitvijo.

Ves projekt za sanacijo "Roških stolpnic" je izdelan na nivoju "Idejnega projekta". Če se bodo stanovalci morda le odločili, da ta poseg realizirajo, bo potrebno še veliko dela, da se izdelajo vsi potrebni načrti in statične analize. Velikih sprememb ne bo. Pri globini novih konzolnih plošč bo potrebno izdelati še nekaj "osvetlitvenih" analiz, ki bodo morda zahtevale nekaj ožje konzole, vendar le teh ne nameravamo ožiti na manj kot 2.50 m. Bo pa potrebno izdelati še bolj natančne cenovne kalkulacije in seveda bo potrebno vključiti sodelovanje z geomehaniki, ki bodo natančno izračunali, kako globoki bodo piloti in koliko bodo stali. Izdelali smo približne cenovne kalkulacije, vendar so le-te samo orientacijske.

Ostane nam samo še strah pred umetnostnimi zgodovinarji in "varovalci naše kulturne dediščine", ki jo mnogokrat prav zaradi njih "varujemo" toliko časa, da nazadnje objekt propade, umetnostni zgodovinarji pa si "umijejo roke". Če bi morda umetnostni zgodovinarji zahtevali, da zunanjost roških stolpnic ostane takšna, kakršna je danes, bi bilo korektno sanacijo skoraj nemogoče izvesti. Pa tudi potrebna konstrukcija odrov bi bila zelo draga. Dobili bi sicer določeno potresno varnost, vendar nikakršnih novih stanovanjskih površin. In taka sanacija bi po hitri oceni stala ~ 80% sanacije po našem predlogu. Med stanovalci bi težko našli kandidate, ki bi bili pripravljeni to plačati. Za tak neverjeten hazard pa bi brez "odgovornosti" odgovarjali "varovalci kulturne dediščine. Takih primerov imamo že kar nekaj v Sloveniji. Ne tako problematičnih v smislu varovanj človeških življenj, vsekakor pa zelo problematičnih v finančnih izgubah, ki jih povzročajo napačne ortodoksne odločitve naših umetnostnih zgodovinarjev.

V vsakem primeru pa bo moralo mesto Ljubljana krepko priskočiti na pomoč s izdatnimi sredstvi, kajti imetniki stanovanj tega bremena sami ne bodo zmogli. Morda bi Mestna občina Ljubljana posredovala pri banki za ugodna posojila ali poskusila pridobiti evropska denarna sredstva za rešitev problema, ki po svoji zahtevnosti ni več samo ljubljanski problem, marveč že problem cele države Slovenije.

Zahvale

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prof. dr. Blaž Vogelnik
VO & VO d.o.o. Radovljica

Larisa Brojan

AR

POROČILO O OPRAVLJENIH RAZISKAVAH NA UNIVERSITY OF MASSACHUSETTS, AMHERST (ZDA)

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Raziskave so bile financirane s sredstvi Javnega sklada Republike Slovenije za razvoj kadrov in štipendije. Sredstva / štipendija je bila pridobljena po razpisnih pogojih "Štipendiranja oz. sofinanciranja raziskovalnega sodelovanja doktorskih študentov v tujini v letu 2012" po pogodbi s številko 11012-47/2012.

Ključne besede
bala slame, zrakotesnost, tlačna trdnost, anketa, dokumentacija

Key words
straw bale, air tightness, load capacity, survey, documentation

Uvod

Gradnja z balami slame se uvršča v eno izmed mlajših tehnik gradnje. Začetki segajo na začetek 19. stoletja, ko je bil namen gradnje začasnega značaja, izkazalo pa se je, da je gradnja ob primerni izvedbi lahko tudi trajnega, značilnosti take gradnje pa so popolnoma primerljive s konvencionalnimi tehnikami in materiali gradnje, ki jih v določenih segmentih celo presegajo. Recimo z okoljskega in zdravstvenega.

Bala slame je naravnega izvora, nima škodljivega vpliva na okolje, še več, zaradi visoke vsebnosti CO_2 je vpliv na okolje celo negativen. Zanimanje za gradnjo z balami slame je navzoče tudi v Sloveniji. V zadnjih treh letih je bilo zgrajenih vsaj šest objektov, kjer je kot polnilo uporabljena bala slame.

Zasnova izvedenih eksperimentov je temeljila na številni literaturi, ki obravnava gradnjo z balami slame [Morrison 2012, Ashour 2011, Racusin 2011, Atkinson 2008, King 2003, Lacinski 2000, Cosmulescu 1997,] ter upoštevanju obstoječih pravil gradnje z balami slame [http://www.dcat.net/].

Namen, cilji

Z zastavljenimi raziskovalnimi vprašanji bo ugotovljeno ali je princip uporabljenih tehnik gradnje z balami slame v tujini (Anglija, Nemčija, ZDA, itd.) primeren tudi za slovenski prostor. Z analizo in dokumentacijo obstoječih objektov iz bal slame na območju Nove Anglije je namen predstaviti splošne značilnosti takšnih objektov z vidika: velikosti, etažnosti, konstrukcije, izbire materiala za omet, namenske rabe objekta, višine investicije ter dokumentiranje subjektivnih izkustev uporabnikov takih objektov.

Ali je obstoječa praksa, ki je glede na podnebne pogoje, ki so podobni tudi pogojem v Sloveniji – relativna velika temperaturna nihanja na dnevni, letni ravni, primerna tudi za izvedbo v Sloveniji.

V primeru gradnje trajnostnih objektov je eden izmed kriterijev zrakotesnost objekta. S predvidenimi testi ugotoviti ali je trenutna praksa zadovoljiva in ali zagotavlja ustrezno zrakotesnost. V primeru pomanjkljivosti predstaviti morebitne rešitve.

Povzetek poteka raziskav

V sklopu podiplomskega študija je bil del raziskav opravljen v tujini in sicer na **University of Massachusetts, Amherst** v ZDA. Raziskave v tujini so potekale devet mesecev v obdobju od septembra 2102 do junija 2013. Delo je bilo opravljeno pod mentorstvom **Assoc. Prof. Dr. Peggi L. Clouston**.

Raziskovanje je bilo razdeljeno na dva dela in sicer, na terenski in laboratorijsko-eksperimentalni del.

Tema raziskovanja v obeh delih je bila neposredno vezana na temo doktorske naloge tj. gradnja z balami slame.

V sklopu terenskega dela je bilo obiskanih in dokumentiranih sedem objektov grajenih z balami slame. Lastnikom oziroma uporabnikom objekta je bilo zastavljenih 44 vprašanj, katera so vezana neposredno na lastnosti objekta ter njegovo rabo. Enak vprašalnik je bil v obliki spletne ankete posredovan na naslove lastnikov objektov grajenih iz bal slame po celem svetu. Do junija 2013 je v anketi sodelovalo 171 lastnikov oziroma uporabnikov objektov iz bal slame.

Slika 1: Hiše iz bal slame v mestu Trumansburg, New York (ZDA).
Figure 1: Straw bale house in Trumansburg, New York (USA).

Vsi obiskani objekti so locirani na območju Nove Anglije in sicer v zveznih državah Massachusetts, New York in Vermont. Podnebne značilnosti lokacij, kjer stojijo obiskani objekti,

so podobne podnebnim značilnostim v slovenskem prostoru. Analizirani primeri bodo služili kot referenčni primeri za gradnjo z balami slame, ki je ustrezna in primerna tudi za slovenski prostor.
Ugotovitve bodo združene z rezultati omenjene ankete, kateri rezultati bodo predstavljeni v znanstvenem prispevku.
Drugi del raziskave je temeljil na eksperimentalnem delu, kjer sta bila opravljena dva tipa eksperimentov tj. merjenje zrakotesnosti ter merjenje tlačne trdnosti posameznih bal in posedanje sten iz bal slame. Pri izvedbi obeh tipov eksperimentov so bili uporabljeni isti merjenci, stene.
V namen eksperimenta je bilo v prvi fazi pripravljenih 40 merjencev. Štirideset merjencev je bilo deljenih na štiri podskupine, ki so bile formirane glede na vrsto ometa (brez ometa, apnen omet, apneno-cementen omet in ilovnat omet). Vsaka skupina je vsebovala deset merjencev od katerih je bilo pet orientiranih klasično, naleganje na večjo ploskev, pet pa orientiranih na rob, se pravi, naleganje na manjšo ploskev bale.

Slika 2: Pred pripravo merjencev.
Figure 2: Before straw bale treatment.

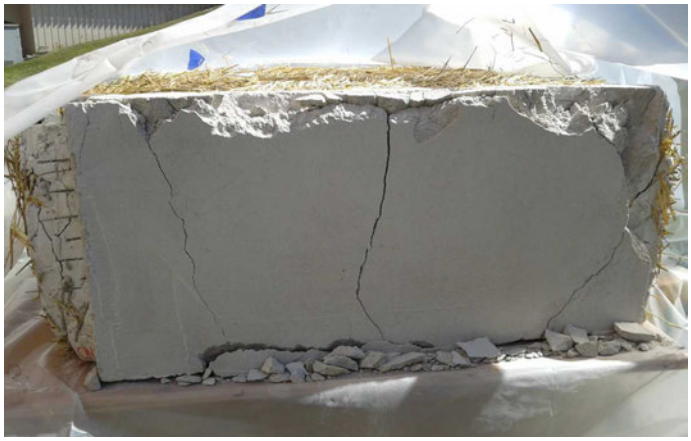
Pri pripravi merjencev in izvedbi meritev je bil upoštevan protokol ASTM standarda. Izbrana vrsta ometov je temeljila na ugotovitvah predhodnih raziskav ter priporočil različne literature s predstavljenimi smernicami in napotki za gradnjo z balami slame. Ker je osrednja raziskava osredotočena na gradnjo v slovenskem prostoru so bili izbrani tisti materiali, ki so primerni in priporočeni za uporabo v določenem okolju in omogočajo optimalno delovanje obravnavanega materiala kot kompozita. Pri uporabi bal slame je ključen ustrezen prehod vlage skozi steno. V primeru prevelike izpostavljenosti slame vlagi je velika verjetnost gnitja slame. Le to uspešno prepreči z ustrezno izbiro in aplikacijo ometa.
Pred nanosom ometa, so bile izmerjeni naslednji parametri; velikost, masa, vlažnost ter na rezultate meritev izračunana gostova posamezne bale. Neustrezne bale, bodisi zaradi neprimerne oblike, zvezanost, bodisi zaradi neustreznih dimenzij – prenizka gostota, previsoka vsebnost vlage, so bile izločene.
Omet na trideset merjencev je bil apliciran ročno v dveh slojih. Pri pripravi ometov in samem nanašanju ometa na bale so bile upoštevane smernice pozitivne prakse. Bale so bile zaradi boljše oprijemljivosti ometa predhodno navlažene. Vse vrste ometa so bile aplicirane v dveh slojih v debelini prbl. 15 mm. Po nanosu prvega sloja je bila površina ometa po nekaj urah zglajena z gladilko z utori, s čimer je zagotovi boljšo oprijemljivost drugega sloja. Nanos drugega sloja je bil dva tedna po nanosu prvega. Drug nanos je bil natančnejši, površina je bila kar se da lepo zglajena in poravna.

Slika 3: Priprava merjencev – nanos ometa na bale slame.
Figure 3: Specimen preparation – straw bale plastering.

Čas sušenja vseh merjencev pred izvedbo testa nosilnosti je bil 45 dni. Pred izvedbo testa nosilnosti je bil na vseh štiridesetih merjencih izveden test zrakotesnosti. Za izvedbo testa zrakotesnosti sta bila uporabljena dva sistema. Pri merjenju zrakotesnosti neometanih bal slame je bil uporabljen naslednji postopek. Posamezna bala slame je bila vložena v plastično škatlo, ki je ustrezala volumnu posamezne bale. Nezapolnjeni žepi v škatli so bili zapolnjeni z dodanimi kosi slame, s čimer se je zapolnil celoten volumen škatle, kar je za ustrezne meritve ključnega pomena – da ni zračnih žepov, ter je vpihan zrak prisiljen izstopiti skozi slamo ter ne skozi zračne žepe. Na škatlo je bila nameščena zračna cev po kateri je bil pod različnim tlakom vpihan zrak in ki je na določeni površini izstopal na nasprotni strani škatle/zračne cevi.
Na vseh neometanih balah sta bili opravljeni dve meritvi in sicer v dveh različnih orientacijah; klasično in na rob, saj je ena od postavljen tez, da orientacija bale vpliva na zrakotesnost.
Meritve zrakotesnosti ometanih bal so bile izvedene po naslednjem postopku; Na površino ometa je bila tesno prislonjena škatla z znanim volumnom. Na škatlo je bil nameščena zračna cev ter kontrolirana odprtina s površino 2sq incha (prbl. 13 cm2), s katero je bila omogočena razlika tlaka in posledično merjenje potrebnih parametrov, t.j. pretok zraka ter tlak. Meritve so bile opravljene na obeh straneh bal, skupno je bilo opravljenih 60 meritev.
Testi tlačne nosilnosti so bili izvedeni po protokolu na merilnem stroju 150kN Material Testing System (MTS). Merjenci so bili testirani s stiskanjem, do porušitve pa je prišlo v časovnem

intervalu med 5 in 20 minut. Hitrost testa je bila pri neometanih balah mnogo višja 17.8 mm / min, kot pri ometanih balah 2.5 mm / min. Obremenitev in premik sta bila zabeležena z računalniškim zajemanjem podatkov med samim potekom testa.

Slika 4: Test tlačne trdnosti.
Figure 4: During compression test procedure.



Slika 5: Merjenec po testu tlačne trdnosti.
Figure 5: Specimen after compression test procedure.

Druga faza eksperimentov je bila izvedena na štirih, v namen eksperimentov postavljenih stenah. Stene so bile postavljene s posnemanjem dejanske prakse. Dve steni sta bili postavljeni s klasično postavljenimi balami in sicer sedem bal postavljenih ena na drugo, dve steni pa sta bili zgrajeni z na rob postavljenimi balami, na vsaki steni jih je bilo pet. Bale so bile fiksirane z bambusovimi palicami, kot narekuje Austin City Code [http://www.dcat.net/].

Ko so bile stene zgrajene so bile obremenjene/obtežene z vrečami peska v količini, ki je dovoljena skladno z "Austin City Code - Volume II, Chapter 36 – straw bale construction" in sicer 19.15 kN/m2. V primeru sten s klasično postavljenimi balami je bila dodana obtežba v višini 1000 kg na steni s klasično vgrajenimi balami ter 850kg na steni z balami vgrajenimi na rob. Prvi dan po dodani obtežbi je bilo posedanje spremljano na 2 uri, v prvem tednu vsak dan, potem pa v obdobju osmih tednov enkrat na teden.

Slika 6: Postavitev eksperimentalnih sten.
Figure 6: Straw bale wall set-up.

Teden dni po dodani obtežbi sta bili dve steni, ena od vsake orientacije, ometani na obeh straneh z apnenim ometom. Preostali dve steni pa sta bili ometani po štirih tednih. Razlog za nanašanje ometa v različnih časovnih obdobjih je ugotavljanje vpliva posedanja konstrukcije na sušenje ter razpoke na površini ometa. Protokol nanašanja ometa je bil enak kot v primeru posameznih bal slame. Torej, aplicirana sta bila dva sloja, v razmiku deset dni.

Po osmih tednih je bila na vseh štirih stenah izvedena meritev zrakotesnosti v dveh korakih. V prvem koraku je bila meritev izvedena brez tesnitve oboda ter s tesnitvijo oboda posamezne stene v drugem koraku. Rezultati potrjujejo hipotezo, da je trenutna praksa pomanjkljiva, saj v primeru izpostavljene lesne konstrukcije v večini primerov ni predvidenega detajla, ki zagotavlja tesen stik med slamo, lesenim elementom in ometom. Z ustrezno izvedbo in premišljenim detajlom je učinek na zrakotesnost znaten, kar bo pokazano z meritvam zrakotesnosti na dejanskem objektu iz bal slame.

Rezultati meritev nakazujejo občutno razliko pred in po tesnjenju. Na osnovi teh meritev so predvidene variantne rešitve,

ki bi jih bilo možno aplicirati v praksi in bi pozitivno vplivale na boljšo zrakotesnost obenem pa tudi na manjše toplotne izgube stavbe, kar pa je pri načrtovanju in gradnji objektov po principu trajnostne gradnje nujno.

Slika 7: Obteževanje sten z vrečami peska.
Figure 7: Loading sand bags.

Slika 8: Test zrakotesnosti na eni od sten.
Figure 8: During the straw bale wall air tightness test.

Vpliv raziskav na nadaljnje delo.

Z možnostjo opravljanja raziskav v tujini in izvedbo ankete ter analizo več objektov ter izvedbo predstavljenih eksperimentov bo kakovost doktorske disertacije, ki bo končni izdelek raziskav, imela dodano vrednost. Rezultati posameznih sklopov, tj. merjenje tlačne trdnosti bal slame ter zrakotesnost bal slame ter zrakotesnost sten predstavljeni v dveh ločenih znanstvenih prispevkih objavljeni v mednarodnih revijah.

Z realiziranimi eksperimenti, ki so preverili korektnost obstoječe prakse z vidika konstrukcijskih lastnosti ter z vidika zrakotesnosti, predstavljajo tudi izhodišča smernic za gradnjo z balami slame v Sloveniji.

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Poročila o kongresih / *Conference reports*

Andreja Benko
Women of TUM 2012 – Connect for success
München / Tutzing 10. 10. 2012 - 15. 10. 2012

V mesecu oktobru 2012, je Tehniška univerza v Münchnu že drugo leto zapored organizirala seminar z osnovnim naslovom Connect for Success, namenjen promociji žensk v znanosti, ki so študirale na TUM in po študiju z njo tudi aktivno sodelujejo. Seminar traja pet dni pod pokroviteljstvom Deutsche akademische austausch dienst (DAAD).
Skupina udeleženk je bila izbrana na podlagi priporočil, poročil o delu, promocije in aktivnosti, sestavljajo pa jo različni strokovni profili s področja medicine, ekonomije, matematike, strojništva, managmenta, agronomije, kemije, gradbeništva, arhitekture in nekaterih drugih ved, pri čemer je poudarek tudi na mednarodni udeležbi.
23 izbranih žensk tako prihaja iz Nemčije, Egipta, Grčije, Bolgarije, Romunije, Indije, Čila, ZDA, Rusije, Ukrajine, Švice, Hrvaške, Kazahstana, Turčije, Kuvajta, Kitajske in Slovenije.
Letošnja osrednja tema je bila Kompetenca žensk v mednarodnem okolju (Competency as Women in an International Environment). Temu naslovu so bile namenjene in prilagojene različne delavnice za nastope žensk v javnosti, predstavitve dela, organiziranja, motiviranja in sodelovanja. Poglavitna tema je tako bila Pripravljena za publiko /Fit for Public/, s podtemama:

- Novi razvoji, nove možnosti /Neue Entwicklungen, neue Chancen/.
- Glas kot izrazno sredstvo /Medientraining – Stimme als ausdruckmittel/.
- V sklopu petdnevnega programa smo se udeležile tudi dvodnevnega seminarja v Tutzingu, pod delovnim naslovom Koncepti trajnosti /Konzepte für Nachhaltigkeit/, kjer je bilo organizirano delo po skupinah, z različnimi temami:
- Prihodnost trajnosti v arhitekturi in urbanem planiranju na različnih kontinentih /Die Zukunft der Nachhaltigkeit der Architektur und städtischen Planung in verschiedenen Kontinenten/
- Prostor gibanja Narava – Učenje na poti. Prispevek športne pedagogike k ozaveščanju o trajnosti / Bewegungsraum Natur – Lernen unterwegs. Der Beitrag der Sportpädagogik zu einer Bildung zur Nachhaltigkeit/.
- Trajnostni življenjski slog: Kljub težavnosti, živeti etično korektno /Nachhaltige Lebensführung: Von der Schwierigkeit, ethisch korrekt zu leben/.
- Rast in/ali trajnost – katera pot je primerna za prihodnost? /Wachstum und/oder Nachhaltigkeit – welcher Weg ist zukunftsfähig?/.
- Zelene informacijske tehnologije za trajnostni razvoj / Green IT towards Sustainability/.

Moja izbrana delavnica je bila prihodnost trajnosti v arhitekturi in urbanem planiranju na različnih kontinentih. Skupina je štela 12 udeleženk. Vsaka skupina je zadnji dan predstavila svoje delo tudi ostalim skupinam. Posebej zanimivo je bilo to, da je bila vsaka delavnica organizirana po principu brainstorminga, spoznavanja različnega principa dela v različnih državah po svetu in širjenju znanja. Prav tako je vsaka udeleženka imela kratko izbrano 10 minutno predavanje o svojem delu, da je s tem seznanila prisotno publiko, obenem pa pri tem skušala upoštevati vse, kar smo se učile skozi seminar, s poudarkom na izbranih temah delavnic. S tako predstavitvijo smo se tudi medsebojno spoznale, seznanile z delom udeleženk ter se tako lahko medsebojno povezale. Na podlagi predstavitve je vsaka udeleženka prejela tudi certifikat o udeležbi in doprinosu pri reševanju strokovne problematike.
Skozi vseh pet dni je bilo delo zastavljeno zelo resno, predvsem pa s poudarkom na mreženju in promociji Tehniške univerze v Münchnu in našemu doprinosu k izboljšavi aktivne mreže in povezavi med nami (teambuildingu).

Andreja Benko
ArchTheo 12 – Theory of architecture conference
House & Home from a theoretical perspective
Istanbul 31. 10. 2012 - 3. 11. 2012

Konec oktobra in začetek novembra v letu2012, je v Istanbulu/Turčija, potekala mednarodna konferenca Archtheo 2012, namenjena arhitekturni teoriji in razvoju arhitekture. Konferenco je gostila Mimar Sinan fine arts University, potekala pa je v organizaciji DAKAM (Eastern Mediterranean Academic Research Center) in MSFAU (Mimar Sinan Fine arts University). Konferenca je bila namenjena teoriji, razvoju in pregledu bivanjske arhitekture, saj je bilo vodilo leta 2012 House&Home from a theoretical perspective.
Konferenca je bila sestavljena iz treh različnih sklopov. Znanstveni prispevki so si po tem vrstnem redu sledili po dnevih:

- 31.10.2012 Theoretical Perspectives/teoretični vidiki
- 1.11.2012 Historical Perspectives/zgodovinski vidiki
- 2.11.2012 Social Perspectives/socialni vidiki
- 3.11.2012 Mixed contributions/mešani prispevki - teme, ki se dotikajo več področij oz. so predstavljajo primere iz prakse.

Na konferenci je sodelovalo mnogo strokovnjakov in tudi profesorjev s področja arhitekture na različnih fakultetah za arhitekturo. Tako so bile zastopane države: Egipt, Turčija, Južnoafriška republika, Kanada, Nemčija, Brazilija, Italija, Avstralija, ZDA, Slovenija, Bosna in Hercegovina…

Konferenca je potekala vsak dan od 10 ure pa vse do 6 ure popoldan v glavnem avditoriju Mimar Sinan Univerze. Skozi dneve so bili predstavljeni različni pogledi na arhitekturo, domovanja, razvoj teorije in filozofije bivanja, kot tudi praktičnih primerov s področja trajnostne gradnje in principov trajnostne gradnje. Prav tako so organizatorji dali možnost virtualnih predstavitev avtorjev oz. možnost udeležbe na delavnici s študenti. Prvi rezultati te delavnice so bili predstavljeni zadnji dan konference. Zasnovana je bila tako, da so v vsakem sklopu štirje sodelujoči v približno 15 minutah predstavili svoj prispevek ostalim sodelujočim. Po predstavitvi zadnjega je bil čas za vprašanja, replike in komentarje s publike. Tak princip se je izkazal za zelo dobrega, saj je avtorjem dopuščal čas za predstavitev brez prekinitev, po koncu sklopa pa je bil skupen čas, ki je bil namenjen odgovorom. Prvi dan konference, dne 31.10.2012 sem predstavljala članek, z naslovom: Adjustment of individual spaces to a user of 21st century, ki je v celoti objavljen zborniku konference. Konferenca se je zaključila v soboto 3.11.2012 zvečer s skupno večerjo vseh udeležencev konference.

The contemporary time, living culture, lifestyle and residence are nowadays in many ways different from the residence of our ancestors. Various factors changed our living environment from the living environment of our ancestors, because they require more new features. These elements have updated also rooms in the house or apartment, to which is given more and more attention during the planning stage. Contemporary trends are often reflected in the design of individual single-family houses, where architects are in contact with the user or users of the facility. This contact is very important to architects and designers, because they get a personal impression of the user of the facility, receive information about their habits, preferences, etc. Such a contact is not possible when planning and designing for the market, therefore is the architect the one who decides on the overall architectural design of the facility, where customers desires can be admitted and possible only with very small influence on the final image of his future home.
This is the point that architects and designers, want to avoid, because we want to give the final user good residential environment which will be completely satisfied and useful to him or them.
Currently most common requirements in the architecture praxis in Slovenia are noticed in bedroom, bathroom or living area design. These are:

- Living part of the house (kitchen, living room, dining room) is often combined into one space – visually divided by furniture.
- In case of sleeping area – bedroom it is opposite. The sleeping area is getting smaller but has additional spaces attached to it – like bathroom and wardrobe.
- The bathroom is separated into three rooms – one bathroom for parents mostly attached to bedroom, bathroom for children attached to children's room and one small bathroom for guests.

The fact is, that while planning the houses for the market, these separate spaces, which are mostly required by a known user of the facility, are often not included in the project, even though these elements are often expressed and desired to design it. The problem is that these elements would also increase the value of the investment. Such invests that would include these user desires in the hoses constructed for the market is in Slovenia very rare, because the target customers who would buy such a detached building are not very common.
In the past not much of attention was given to discussed rooms, since there was no need for it and above all, people were not that demanding as they more frequently used space outside the home.
We can conclude that the principles of dwelling are constantly changing and it can be compared to living organism. This is the result of experience, technological upgrades and amenities at the expense of knowledge and development. From basic shelters in caves, accommodation in tents, farm houses and alike, is like people, changing also the housing and homes, which have adapted to the then situation and needs of the inhabitants. People in past time were mostly farmers, livestock owner or entrepreneur. Costumed to these professions was also his residence. In contemporary times people follow or set trends in user space, which they find especially on the Internet. Development areas in the facility, especially areas of equipment, are still developing and we cannot determine when or if once it will reach its ideal form. Indeed, the ideality of an individual home defines a user who uses the space, so it must be arranged in the way that is user-friendly and meaningful.

BENKO, Andreja. History of individual spaces and modernity: adjustment of individual spaces to a user of 21st century. V: DUYAN, Efe (ur.), ÖZTÜRKCAN, Ceren (ur.). ARCHTHEO '12 : conference proceedings, 31 Oct-3 Nov 2012, Mimar Sinan Fine Arts University, [Istanbul]. 1, House & home from a theoretical perspective. Istanbul: DAKAM Publishing, cop. 2012, str. 8-16, ilustr. [COBISS.SI-ID 2772612]

Larisa Brojan
House design in the 21th century: ecological design: case study of a straw bale house in Slovenia
ArchTheo 12 – Theory of architecture conference
House & Home from a theoretical perspective
Istanbul 31. 10. 2012 - 3. 11. 2012

Prispevek je bil predstavljen na 12i mednarodni konferenci ARCHTHEO 12, ki je potekala v Istanbulu od 31.10.-3. 11. 2012. Koordinator konference Efe Duyan, glavni svetovalec pa Asst. Prof. Dr. Elvan Gökçe Erkmen. Prispevek je bil recenziran ter pregledan s strani znanstvenega odbora konference s člani:
Vsi prispevki so objavljeni v zborniku z naslovom House and Home – from a theoretical perspective, in sicer v dveh delih, kamor je vključena tudi spodaj predstavljena študija.

Znanstveni odbor konference je bil sestavljen iz 7 profesorjev iz različnih fakultet:

- Prof. dr. Edward Casey
- Prof. dr. Aylâ Fatma Antel
- Prof. Bart Lootsma
- Assoc. prof. dr. Aydan Balamir
- Assoc. prof. dr. Bülent Tanju
- Assoc. prof. dr. Murat Cemal Yalçintan
- Asst. prof. dr. Elvan Gökçe Erkmen
- Aykut Köksal
- Erdal Özyurt

Use of conventional building materials and techniques still dominates despite of global effort for more environmental friendly design. A number of projects aim at overcoming the aesthetic or structural boundaries, in each case aspect of energy consumption is neglected.
To achieve a result of ecological design the primary task of a design is a selection of a main building material with low impact on the environment and people. The use of renewable resources like organic material such as straw is significant contribution to reducing greenhouse gas emissions. From ecological point of view there are many important values calculated within environmental impact and defined such as primary energy content, global warming potential and acidification potential.
Building use and its maintenance is the longest part of the whole building life cycle. The life cycle can be divided into three phases, pre-construction, use and after use. Contemporary practice dictates guidelines for low energy consumption especially in the phase of use, although basic building material has the major influence on total energy balance. In the case of straw bale building there are many positive characteristics compared to conventional construction, such as availability of resources, sufficient isolation properties, negative embodied energy, local availability, etc.
The use of local materials was typical choice in the past, whereas nowadays residential buildings are built up with conventional materials such as brick and concrete. Designers nowadays do not give much of attention when it comes to choosing basic building material. Usually the material is chosen according to the investor's financial capacity. Investors rarely demand unconventional materials, such as straw. This type of material often raises concerns about the performance, and there are also few investors who categorically reject it. The advantage of this material is held in the accumulation of CO2 in the straw, therefore the final energy balance is characteristically lower.
Straw has a long history in architecture. For the longest period of time it was used as a layer of thatch or a binder in a clay building techniques. At the beginning of the 20th century, simultaneously with invention of steam machine for making straw bales, straw bale building technique was developed and mostly used in combination with timber and clay. Basic properties of straw are the isolation properties which are quite suitable, but the greatest advantage of straw is its organic structure which is completely recyclable and it is locally available practically worldwide.
Straw bale building is suitable not only for rural area. Many already built buildings prove that the straw and specific building techniques can be applied in urban area as well. The design of the presented single-family house is orientated environmental friendly. Currently built project in Radomlje (Slovenia) is based on the idea of low carbon footprint. Consequently the choice of natural materials was obvious. Structure of the house is timber frame filled with straw bales and rendered on both sides of the wall with clay. Exterior wall is additionally protected with a layer of lime wash. Another step in environmental design is orientation of the house with minimum glassed area on the north side and largest glassed area towards the south which present low heat loses.

BROJAN, Larisa. House design in the 21th century: ecological design: case study of a straw bale house in Slovenia. V: DUYAN, Efe (ur.), ÖZTÜRKCAN, Ceren (ur.). ARCHTHEO '12 : conference proceedings, 31 Oct-3 Nov 2012, Mimar Sinan Fine Arts University, [Istanbul]. 1, House & home from a theoretical perspective. Istanbul: DAKAM Publishing, cop. 2012, str. 38-46, ilustr. [COBISS.SI-ID 2870916]

Borut Juvanec
Architectural theory : order in reality
Symmetry: Art and Science
International Society for the Indisciplinary Study of Symmmetry ISIS
Folk Architecture – Vernacular Architecture
8. – 10. junij 2012, Budapest - Veszprém - Szentendre, Madžarska

Mednarodna znanstvena konferenca Symmetry of Forms and Structures se je odvijala na temo prostorskih struktur in harmonije. Symmetry konferenca združuje znanstvenike z različnih področij, kjer se pojavlja simetrija ali asimetrija. Na teh srečanjih se srečujemo matemetiki, industrijski oblikovalci, arhitekti, fiziki, gradbeniki, urbanisti, arheologi, ki se praktično ukvarjamo na realnih primerih in razvijamo teoretične modele in metode dela. Namen konference je v povezovanju idej, vedenja in utrjevanju misli o ravnovesju.

Order is very interesting thing, even in architecture. Mostly in architecture, maybe.
From classical times to the present, harmony has meant a healthy mind in a healthy body: in philosophy as well as in architecture. The beauty itself cannot be defined. It is a matter of fashion and applicability, that vary over time.
Knowledge, schooling, heritage are elements that are not so different in their results. Schooling gives shape to scientific knowledge, heritage knows only order. Order does not mean recipes, for instant use, but can be applied to architecture with individual inspiration, without constraint or command.
'Order and reality' is an eternal question but the wise man used myth for the realization of wisdom. Wisdom in architecture, especially in vernacular architecture, means understanding materials, techniques and design. The elements of the house, and the house itself, mean the essential parts of materialism as well as in symbolism.
Simple man, as a builder, could not know everything or master all the skills. An architect has to coordinate wisdom, skills and the ability of workers and of users.
Harmonization is the most important part of an architect's work, and the most visible.
Simplification of the work and avoiding mistakes are the elements of designing space, the result is aesthetics.
Geometry and mathematics are very important elements of sense in architecture. Simplification is of primary importance, because only simple things can be visible, understood, in the end real.
The use of simple mathematics and geometry is essential for architect's work, from prehistory till today.
One of the first architectures, sacral complex Hagar Him in Malta, shows the simple mind and anthropomorphic understanding of the prime man: use of his own elements. In groundplan, the morulla and symmetry are in use, as well as the corbelling.
The next elements are square, cube, triangle, and the use of square root of two in plain, square root of three in space, and finally the golden section, the closest proportion system to the man himself.

The square
A square is one sixth of a cube, of its outer faces. It has four sides and all right angles. It is defined by its diagonal, the square root of two.
The cube
After a sphere, a cube is the simplest body. Its use can be described in terms of the whole cube, its half, its third, and several cubes in composition.
The triangle
A triangle can be of different types but the most usable is equilateral, with all three sides the same. Its height is equal to the square root of three divided by two. Stone objects in dry stone from the ancient monuments as well as from shepherds huts have construction in corbelling: the construction of stone shelters is always the same, composed with help of the square root of three divided by two, but the elevations are quite different - from Iceland to Yemen and from Lanzarote to Palestine.
Golden section
The golden section is the most usable system of proportion system, in which the shorter part has the same ratio to the longer one as the longer part to the whole, where this is the sum of the shorter and longer parts together.
Proportion systems in use: square roots
Square root of two: Slovene kozolec/hayrack is composed in a square, with help of its diagonal - in plain, in its main elevation. Square root of three is equal to the height of an equilateral triangle. It is in use for composing the corbelled dome.
Three thirds of a cube:
Where the cube is cut into three parts, three segments with dimensions 3 : 3 : 1 appear. The beehive hut in Slovenia is embraced in a cube.
Two thirds of a cube:
The ground plan of a house has a ratio of dimensions 2 : 3, including side elevations, while the main facades are embraced in a square 3 : 3. The granary near Vrhnika is composed in this order.
Three cubes:
A Slovene kozolec/hayrack in the space is a composition of three cubes, in which only one length is determined, the others are the result of diagonals: the diagonal of a square is the square root of two, and the diagonal of a rectangle with sides one and $\sqrt{2}$ is the square root of three.
A kozolec (hayrack) in Slovenia is the only ethnic architecture I know (May 2010:66).
Conclusions
Order in architecture is used for simplifying work, for avoiding mistakes - in technical mean of the construction. The use of such order results in beauty.
With the help of order, even unschooled, but not unskilled, man can achieve the effect: good, usable, achievable and harmonious objects, which are successful and beautiful and in which the users enjoy living. Quality of life means culture itself: the culture of mankind and of architecture, in time and in space.
And nobody is perfect. Except vernacular architecture.

JUVANEC, Borut. Architectural theory : order in reality. V: NAGY, Dénes (ur.). Folk architecture - vernacular architecture: traditions and rural development, Budapest - Veszprém - Szentendre, Hungary, June 8-10, 2012, (Symmetry, 1-2). Melbourne-Kew: International Society for the Interdisciplinary Study of Symmetry, 2012, str. 68-73, ilustr. [COBISS.SI-ID 2723716]

Borut Juvanec
Clay in Architecture: Slovenia and beyond
UL Faculty of Architecture, Slovenia
RESTAPIA 2012 International congress on rammed earth
Universitat Politècnica de Valéncia
Valencia, 21. – 23. 6. 2012

Earthen architecture is more or less architecture in clay, but the boundaries between earth, clay, gypsum, lime and stone are not very clear. Earth, soil and turf can be used in construction

in a number of selected environments with constant moisture and with limited construction possibilities. Clay and concepts of construction with all the associated problems are a matter of bearing strength, resistance to external circumstances and execution.
A healthy relation between man and the clay construction is essential for the natural material. Modern clay can be used as a veneer, as insulation and as hard surfaces: insulation tiles in space capsules, in brakes, as hard, sharp knives. Use of clay in architecture: current maintenance means to live with the material; it is not a sterile relation. Clay cannot only be used in construction, it depends on the circumstances - protection and feelings, as a real human material.

JUVANEC, Borut. Clay in architecture : Slovenia and beyond. V: MILETO, Camilla (ur.), VEGAS, Fernando (ur.), CRISTINI, Valentina (ur.). International Conference on Rammed Earth Conservation, Valencia, 21-23 June 2012. Rammed earth conservation : proceedings of the First International Conference on Rammed Earth Conservation, Restapia 2012, Valencia, Spain, 21-23 June 2012. Boca Raton [etc.]: CRC Press, Taylor & Francis Group, cop. 2012, str. 145-150, ilustr. [COBISS.SI-ID 2717060]

Lara Slivnik
TROČLENSKI LOČNI KONSTRUKCIJSKI SISTEM
34. zborovanje gradbenih konstruktorjev Slovenije,
Slovensko društvo gradbenih konstruktorjev
Bled, 11.-12. oktober 2012,
http://www.sdgk.si/index.php?id=100

Organizatorji dvodnevnega zborovanja, ki združuje slovenske gradbene konstruktorje, vsako leto povabijo tudi goste iz tujine. Letos sta se vabilu odzvala dva uvodna predavatelja: prof. dr. György L. Balazs in prof. dr. Goran Markovski. Sledilo je 28 prispevkov, ki so bili razdeljeni na pet tematskih skupin: Mostovi, Konstrukcije, Gradbena fizika, Eksperimentalna in numerična analiza konstrukcij ter Gradbeni materiali. V sklopu zborovanja je tudi skupščina društva in družabni večer. V sekciji Konstrukcije sem predstavila prispevek Tročlenski ločni konstrukcijski sistem.

V prispevku je obravnavan eden izmed najenostavnejših konstrukcijski sistemov: tročlenski ločni konstrukcijski sistem. Teoretično so predstavljene osnovne konstrukcijske značilnosti, tem sledi zgodovinski razvoj tročlenskih konstrukcij in zgodovinsko pomembni primeri tročlenskih konstrukcij. Dva mostova v Ljubljani sta primera najzgodnejših tročlenskih ločnih konstrukcij v svetu: Hradeckega most (najstarejši še ohranjeni litoželezni tročlenski most, ki je bil pred kratkim obnovljen ter prestavljen na že tretjo lokacijo) in Zmajski most (najstarejši še ohranjeni most, zgrajen iz železobetona po tehnologiji sistema Melan). Pri obeh mostovih je tretji členek izjemno pomemben in bistven element konstrukcije. Opisani so tudi sočasni primeri tročlenskih konstrukcij iz Evrope. V zaključku so predstavljene prednosti in slabosti takšne konstrukcije.

SLIVNIK, Lara. Tročlenski ločni konstrukcijski sistem = Three-hinged arch structure. V: LOPATIČ, Jože (ur.), MARKELJ, Viktor (ur.), SAJE, Franc (ur.). Zbornik 34. zborovanja gradbenih konstruktorjev Slovenije, Bled, Hotel Golf, 11.-12. oktober 2012. Ljubljana: Slovensko društvo gradbenih konstruktorjev, 2012, str. 131-138, ilustr. [COBISS.SI-ID 2763396]

Lara Slivnik
A PREFABRICATED CAST IRON THREE-HINGED ARCH BRIDGE IN LJUBLJANA
The Fourth International Congress on Construction History,
ENSA Paris - Malaquais, ENSA Paris - La Villette, ENSA Versailles, Conservatoire national des arts et métiers (CNAM)
Pariz, 3.-7. julij 2012,
http://www.icch-paris2012.fr/

Organizacijo tokratne trienalne mednarodne konference, ki združuje znanstvenike s področja raziskovanja zgodovine konstrukcij, so prevzele tri pariške arhitekturne šole: Paris - Malaquais, Paris - La Villette in Versailles, skupaj z Conservatoire national des arts et métiers. V petih dneh so pripravili pet uvodnih predavanj s preko 220 prispevki v več vzporednih sekcijah, vodene izlete po znamenitostih, ki niso odprte za javnost, in bogat večerni družabni program. V sekciji Metal Structures sem predstavila prispevek A Prefabricated Cast Iron Three-hinged Arch Bridge in Ljubljana.

The paper is an overview of the Hradecky Bridge (1867) across the River Ljubljanica in Ljubljana, the first three-hinged arch bridge built in Habsburg Monarchy and the oldest three-hinged cast-iron bridge in Europe (excluding the British Isles) still in use. The supporting structure is a prefabricated three-hinged arch with the total span of 30 meters. It is made of cast-iron pipes which are joined together with screws to make one

cantilever truss. Three cantilevers from one side of the bank are connected together with I beams and linked up with another three cantilevers from the opposite bank. Both groups of cantilevers are joined together at the crown of the arch with hinges. The prefabricated structure of the bridge permitted it to be moved three times to three different locations, each time bearing the same name, i.e., the Hradecky Bridge.

SLIVNIK, Lara. A prefabricated cast iron three-hinged arch bridge in Ljubljana. V: CARVAIS, Robert (ur.), GUILLERME, André (ur.), NÈGRE, Valérie (ur.), SAKAROVITCH, Joël (ur.). The Fourth International Congress on Construction History, Paris, 3-7 July 2012. Nuts & bolts of construction history : culture, technology and society. Paris: Picard, 2012, str. 235-242, ilustr. [COBISS.SI-ID 2741380]

Domen Zupančič
Earthen architecture an evergreen type of building method
UL Faculty of Architecture, Slovenia
RESTAPIA 2012 International congress on rammed earth
Universitat Politècnica de Valéncia
Valencia, 21. – 23. 6. 2012
http://www.restapia2012.es/

About Restapia
RESTAPIA 2012 is an international congress on rammed earth, its conservation and, in general terms, on earthen constructive techniques and its conservation. This meeting aims to incentive sharing the restoration experiences of both monumental and non monumental architectural heritage made in the Iberian Peninsula and the rest of the world in order to learn from all these interventions and derive conclusions and perspectives for the future. Thus, it aims to represent an important milestone at international level in the reflection about the conservation and restoration of rammed earth architecture and earthen architecture in general.

Camilla Mileto (coordinator) - Universitat Politècnica de València, España
Fernando Vegas López-M. (secretario) - Universitat Politècnica de València, España
Maddalena Achenza - Universitá di Cagliari, Italia
Eloy Algorri García - Architect. León, España
Antonio Almagro Gorbea - Escuela Estudios Árabes, CSIC, España
Fco. Javier Castilla Pascual - Universidad de Castilla La Mancha, España
Mariana Correia - Escola Superior Gallaecia, Vila Nova Cerveira, Portugal
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María Fernandes - Universidad de Coímbra, Portugal
Juana Font Arellano - Historiadora del Arte, Fundación Font de Bedoya, España
Javier Gallego Roca - Universidad de Granada, España
Luis Fernando Guerrero Baca - Universidad Metropolitana Autónoma, México
Amparo Graciani García - Universidad de Sevilla, España
Hubert Guillaud - CRATerre. Escuela Arquitectura Grenoble, Francia
John Hurd - Presidente ICOMOS – ISCEAH, Reino Unido
Borut Juvanec - University of Lubiana, Eslovenia
Francisco Javier López Martínez - Universidad Católica de Murcia, España
José Manuel López Osorio - Universidad de Málaga, España
José Antonio Martínez López - Museo Naval Nacional, España
Frank Matero - University of Pennsylvania, Estados Unidos
Saverio Mecca - Universitá di Firenze, Italia
Jacob Merten - Escola Superior Gallaecia, Vila Nova
Alfonso Muñoz Cosme - IPCE, Ministerio de Cultura, España
Juan Francisco Noguera Giménez - Universitat Politècnica de València, España
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Julio Vargas-Neumann - Pontificia Universidad Católica de Perú
Fernando Vela Cossío - Universidad Politécnica de Madrid
John Warren - University of York, Reino Unido
Arturo Zaragozá Catalán - Generalitat Valenciana, España

Modern earthen architecture could also benefit from the use of earth by earthen architecture of the past. In Slovenia, there are very few examples of new earthen architecture. Most investors reject earth and its composing materials as useful and modern building material. The origin of this problem lies in the notion that earthen architecture is associated with poverty, farming and dirt. We usually use a theory of the vernacular architecture of a selected region (i.e. Prekmurje, Slovenia) to empower local people. In Slovenia, mud architecture or earthen architecture has a negative image. Clay is the most commonly used material for rendering walls; the use of rammed earth is stigmatised or very poorly understood in practice. The paper explains where the obstacles lie and how to overcome them.
The aim of our research is to raise awareness of the quality of life using earth as a building material. The best way to do this is by providing useful practical examples and guidelines for local communities, architects, potential investors and last, but not least, institutions such as schools and the chamber of economy.
As a university research and educational organization, we collect information, combine it with practice and disseminate the results. Our work is not over at this point; the next step is to prepare readable and understandable documents (LCA, carbon footprint CO^2, work flow) and involve interested professionals, investors and others. This is the way to develop and direct knowledge transfer.

ZUPANČIČ, Domen. Earthen architecture, an evergreen type of building method. V: MILETO, Camilla (ur.), VEGAS, Fernando (ur.), CRISTINI, Valentina (ur.). International Conference on Rammed Earth Conservation, Valencia, 21-23 June 2012. Rammed earth conservation : proceedings of the First International Conference on Rammed Earth Conservation, Restapia 2012, Valencia, Spain, 21-23 June 2012. Boca Raton [etc.]: CRC Press, Taylor & Francis Group, cop. 2012, str. 599-604, ilustr. [COBISS.SI-ID 2717572]

Navodila avtorjem

Avtor z oddajo članka zagotavlja izvirnost in avtorstvo. Z oddajo zagotavlja, da ne tekst ne grafični del nista bila objavljena ali poslana v objavo drugi reviji (razen poročil). V
sak avtor odgovarja za svoj prispevek v celoti. Avtorji naj upoštevajo zakon o avtorskih pravicah (Uradni list RS, št. 21/95, 9/01). Ta načelno dovoljuje objavo že objavljenega tujega grafičnega gradiva kolikor gre za ponazoritev, vendar mora biti vir vedno popolno naveden.
A**vtorji prispevka predložijo pisno potrdilo, da se avtor grafičnega gradiva strinja z objavo v spletni in tiskani reviji AR arhitektura, raziskave.**

Elementi prispevka
- Podatki o avtorju Ime in priimek
- Akademski naslov
- Naslov organizacije
- E- poštni naslov

Naslov članka
- Največ do 75 znakov s presledki. [naslov / title]

Izvleček članka v slovenskem in angleškem jeziku
- Največ do 1600 znakov s presledki. [izvleček / abstract]
- Izvleček naj zajema temeljne vsebinske opise iz besedila. Izvleček naj bo razumljiv, tako da bo jasno in jedrnato predstavil glavno temo in ugotovitve vašega besedila. Besedilo izvlečka je v slovenskem in angleškem jezik.

Povzetek članka v angleškem jeziku [summary]
- Povzetek naj bo dolg največ do 4000 znaki s presledki. V povzetku lahko širše opišete in predstavite vsebino vašega prispevka. Besedilo povzetka je v angleškem jeziku. Besedilo naj bo tudi lektorirano.

Ključne besede [ključne besede / key words]
- do 6 besed
- Zapisane ključne besede opredelijo tematiko prispevka. Izogibajte se veznikom (in, ali).

Dežele omenjene v besedilu
- Seznam dežel oziroma držav omenjenih v besedilu prispevka. Seznam je koristen zaradi indeksiranja prispevka.

Seznam grajenih struktur ali arhitekturnih objektov
- Avtor pripravi seznam grajenih struktur ali arhitekturnih objektov na katere se prispevek nanaša. Seznam je koristen zaradi indeksiranja prispevka.

Besedilo članka
- Priporočena velikost pisave je 10pt, vrsta pisave je Times New Roman. Uporablja se normalna pisava brez uporabe velikih tiskanih črk, naslovi se pišejo z veliko začetnico in nato nadaljujejo z malimi črkami. Številčenje poglavij in podpoglavij ni zaželeno. **Besedilo članka zajema do 40000 znakov s presledki.**
- Vire navajajte sproti v besedilu teksta z uporabo oglatih oklepajev [in] in jih ob koncu članka vključite v seznam virov in literature. Struktura navedbe citiranja vira [Priimek, letnica: številka strani navedbe] ali navedba vira ob povzemanju vsebine vira [Priimek, Letnica].
- Primer navedbe vira v besedilu: Švicarski paviljon je bil zamišljen kot “švicarska glasbena skrinjica” [Uhlig, Zumtor, 2000].

V reviji AR arhitektura raziskave **se opombe pod tekstom ne izvajajo.** Avtorji jih lahko vključijo neposredno v osnovno besedilo. Za nazornejše prikaze razmišljanj, utemeljitev misli in metod je priporočljiva tudi uporaba izvirnih grafičnih elementov kot so skice, risbe, načrti, fotografije, grafikoni in tabele.
Vsi grafični elementi naj bodo priloženi posebej. Grafično gradivo naj bo shranjeno v posameznih datotekah z imeni, ki so enaka kot so uporabljena k pripisom k slikovnemu gradivu. Vsako grafično gradivo naj ima besedilu prispevka pripadajoči opis.

Primer: Datoteka Slika_01.tif je slika 1 v besedilu članka.
Slikovno gradivo naj bo pripravljeno z resolucijo 300 dpi za fotografije in 600 dpi za skenirane črno bele načrte ali sheme. Priporočljiv format za slikovno (bitno) gradivo je TIFF ali JPG. Priporočljiva okvirna velikost gradiva je 10x15 cm. Grafičnih elementov ne vključujte v besedila članka. V članku lahko predvidite mesto grafike tako, da naredite trojni presledek v tekstu in vnesete ime grafičnega elementa in pripadajoči opis v slovenskem in angleškem jeziku.

Primer navedbe grafičnega gradiva v tekstu:
Slika 2: Objekt z vzdolžnim in s prečnim slemenom, Tlorisni gabariti so enaki, 6 x 8 m, naklon strehe je 30°, debilna zidu 40 cm.
Figure 2: Structures with longitudinal and transverse ridge. Floor plan dimensions are the same, 6 x 8 m, 30° roof pitch, wall thickness 40cm.

Viri in literatura
Vsako navajanje v prispevku mora biti navedeno v seznamu virov in literature, **omejeno do 4000 znakov s presledki oz. do 15 naslovov.**
Neobjavljene vire ali ustne vire podrobneje opišite v besedilu prispevka.
Navajanje člankov in drugih virov, ki so v postopku tiska je možno za jasno navedbo vira in pisnim dokazilom, da je navedeni prispevek v tisku.

Knjiga
Priimek, Prva črka imena. (letnica): Naslov knjige. Založba, Mesto.
primer: Nishi, K., Hozumi, K. (1985): What Is Japanese Architecture? Kodansha International, Tokio.

Članek
Priimek, Prva črka imena. (letnica): Naslov članka. V:Publikacija, Letnik, Številka: stran članka od do.
primer: Lah, L. (2002): Muzeji na prostem - večplastnost pomenov za ohranjanje arhitekturne dediščine. V: AR, 2002/1, str.: 64–65.

Spletni naslov
Naslov strani
navedba celotnega naslova, < mesec, letnica >.
primer: Fakulteta za arhitekturo UL
http://www.fa.uni-lj.si/default.asp, <november, 2009>.

Zakoni in pravilniki
Publikacija objave in številka publikacije,(letnica): Naslov zakona. Člen št.
primer: Uradni list RS 96 (2002): Zakon o uresničevanju javnega interesa za kulturo. Čl. 2.

Standardi
Področje urejanja, navedba standarda.
primer: Laboratorijske preiskave, Mednarodni standard SIST EN ISO/IEC 17025:2005.

Seznam digitalnega in natisnjenega prispevka za oddajo v uredništvo

1. Navedba avtorjev.
2. Naslov prispevka (SLO in ANG).
3. Izvleček SLO in ANG).
4. Ključne besede (SLO in ANG).
5. Seznami dežel / objektov.
6. Povzetek (ANG).
7. Besedilo članka z opisi grafičnega gradiva.
8. Viri in literatura.
9. Grafično gradivo (do 8 elementov slikovnega gradiva + 5 rezervnih elementov, če ima predlog končnega preloma večje praznznine).
10. Besedila v domačem in tujem jeziku morajo biti jezikovno ustrezna in lektorirana z navedbo lektorja oz prevajalca.
11. Če je članek v okviru doktorskega študija na UL FA, mora avtor na to opozoriti, da bo ob prispevku objavljen del recenzije.

Oddaja prispevka (oba koraka sta obvezna)

1. Tiskani izvod s slikovnim gradivom (2x)
   + CD ROM z datotekami.

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   AR arhitektura, raziskave
   Uredništvo
   Zoisova 12
   1000 Ljubljana
   Slovenija

2. Elektronska verzija: **domen.zupancic@fa.uni-lj.si**

Uredništvo, november 2013

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Book
Surname, First letter of the name., (year): Title of the book. Publishing House, City.
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Journal paper
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example: Lah, L. (2002): Muzeji na prostem - večplastnost pomenov za ohranjanje arhitekturne dediščine. V: AR, Let. IV, št. 1, str.: 64–65.

WWW site
Name of the website
full address, < month, year>.
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http://www.fa.uni-lj.si/default.asp, <November, 2012>.

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Publication and its number, (year): Title of the law. Article no.
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example: Laboratorijske preiskave, Mednarodni standard SIST EN ISO/IEC 17025:2005.

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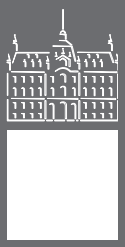
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