PROSTOR

21 [2013] 2 [46]

ZNANSTVENI ČASOPIS ZA ARHITEKTURU I URBANIZAM
A SCHOLARLY JOURNAL OF ARCHITECTURE AND URBAN PLANNING

SVEUČILIŠTE U ZAGREBU, ARHITEKTONSKI FAKULTET
UNIVERSITY OF ZAGREB, FACULTY OF ARCHITECTURE

ISSN 1330-0652
CODEN PORREV
UDK | UDC 71/72
21 [2013] 2 [46]
235-418
7-12 [2013]

POSEBNI OTISAK / SEPARAT | OFFPRINT

Znanstveni prilozi | Scientific Papers

Fig. 1. Marko Peljhan with collaborators: Makrolab, 1997-2007
Sl. 1. Marko Peljhan sa suradnicima: Makrolab, 1997.-2007.

Peter Šenk

University of Maribor
Faculty of Civil Engineering
Department of Architecture
Slovenia – 2000 Maribor, Smetanova 17

Sveučilište u Mariboru
Građevinski fakultet
Odsjek za Arhitekturu
Slovenija – 2000 Maribor, Smetanova 17

Subject Review
UDC 721.013:691.81(497.5:497.4)"19/00"
Technical Sciences / Architecture and Urban Planning
2.01.01. – Architectural Design
Article Received / Accepted: 19. 2. 2013. / 10. 12. 2013.

Pregledni znanstveni članak
UDK 721.013:691.81(497.5:497.4)"19/00"
Tehničke znanosti / Arhitektura i urbanizam
2.01.01. – Arhitektonsko projektiranje
Članak primljen / prihvaćen: 19. 2. 2013. / 10. 12. 2013.

The Concept of Capsule Architecture as Experiment
Origins and Manifestations with Selected Examples from Slovenia and Croatia

Koncept arhitektonske kapsule kao eksperiment
Podrijetlo i manifestacije s odabranim primjerima u Sloveniji i Hrvatskoj

CAPSULE
EXPERIMENTAL ARCHITECTURE
MEGASTRUCTURE
MINIMUM DWELLINGS
MOBILE ARCHITECTURE

KAPSULA
EKSPERIMENTALNA ARHITEKTURA
MEGASTRUKTURA
MINIMALNI STAMBENI OBJEKTI
POKRETNA ARHITEKTURA

The paper presents the concept of the capsule in architecture in relation to modernism, social and cultural change after World War II and experiments with housing typology and construction technology. Based on examples of genuine and metaphorical capsule architectures, the vividness and relevance of the concept is also shown through selected pioneering and contemporary examples from the cultural environments of Slovenia and Croatia.

Rad prikazuje koncept kapsule u arhitekturi u odnosu na Modernu te društvene i kulturne promjene nakon Drugoga svjetskog rata kao i eksperimente u okviru stambene tipologije i tehnologije građenja. Polazeci od primjera autentičnih i metaforičnih arhitektonskih kapsula, u radu se prikazuje vitalnost i relevantnost ovoga koncepta na odabranim ranim te suvremenim primjerima u kontekstu kulturnih sredina Slovenije i Hrvatske.

INTRODUCTION – THE CONCEPT DEFINITION

UVOD – DEFINICIJA KONCEPTA

The concept of the capsule, explicitly naming compact, minimal, completely furnished and equipped living units, has generally been presented in architectural history in relation to the trend of megastructures and utopian radical architectural experiments with uncritical faith in technological and scientific progress of the 1960s. Generally known derivations of the concept include capsule hotels, mainly in Japan, as well as prefabricated sanitary facilities, 'climate capsules' as structural protection from atmospheric agents[1] or capsules as bordered and/or controlled building complexes or territories[2], which are no longer directly related to the original concept.

The origins and development of the capsule concept in architecture can be traced through theoretical concepts of modernism, the post-World War II contexts and protagonists of a distinctively technological architecture, particularly in Great Britain and Japan. As early as before and during World War II, the functionalist approach, CIAM, endeavours towards prefabrication[3] in architecture with early protagonists – Le Corbusier, Gropius, Wachsmann, Prouvé and others, demands for mobility and questions of subsistence minimum, especially so after the second CIAM congress in Frankfurt in 1929[4], encouraged architects to undertake experimental practice to provide answers to questions on social and cultural change, appropriate housing typology and construction technology as well as economic efficiency, thus serving as an important basis for designing radical minimal environments such as examples of capsule units.

Setting the mental ground for their emergence, modernism, which evades a comprehensive definition, always meant either introducing something new into the existing system or completely breaking away from it and providing a basis for experiment.[5] As highlighted by Tomaž Brejc, although experiment carries a different connotation in science and engineering than in art[6] (which can also be said for architecture), it is in fact both inevitable and crucial for a critical examination of the existing and the previous, which is not necessarily absolute and appropriate. Peter Cook, the experimentalist of the Archigram Group, argues that in the 20th century "there have been several occasions when science, technology and human emancipation have coincided in a way that has caused architecture to explode."[7] Chasing *the new* in the spirit of time, the heterogeneity of modernism and open perception of modernity as contemporaneity and progressiveness represent the experimental field that also allowed for the development of the capsule concept – not always and exclusively as a complete denial of the past, but also as a complex and critical response to it.

In the context of the post-World War II modernisation process, the Team 10 group, which sprang from within CIAM, sought answers to social and technological questions in an experimental manner, exploring concepts and strategies of enabling individual and collective identity, resident participation in housing development and self-realisation of society.[8] At the beginning of the sixties of the 20th century, the highlighted relationship between the individual (living) component and the collective infrastructure, which soon became part of the open design of megastructure formations, manifested itself in the form of the relationship between individual living, i.e.

1 Orig.: VON BORRIES, 2010

2 BOOMKENS, 1998; DE CAUTER, 2004

3 While the modularity of prefabricated elements that formed larger architectural compositions in fact often built on traditional construction procedures with an industrial approach, the concept of the modular living unit as a prefabricated whole is revolutionary.

4 The congress was organised at a time when an experimental field for new typologies of housing construction for the needs of workers was established in Frankfurt under the leadership of Ernst May. The theme of the "Minimum Subsistence Dwelling" *(Die Wohnung für das Existenzminimum)* specifically focused on design concepts solving the issue of high apartment rent and low salaries, offering the smallest comfortable dwelling for the lowest price [MUMFORD, 2000: 27-44; HEYNEN, 1999: 43-70]. Eric Mumford points out that the question of minimum hous-

capsule units and the collective megastructure framework.

Even though the concept of the capsule with metaphorical dimensions was not clearly defined in Japan, it initially represented, similarly as in Great Britain, a compact, mobile, fully equipped and ergonomically designed living unit with a built-in life span, as well as a monofunctional unit (sanitary facility, kitchen unit, furniture element, etc.) with same characteristics. The definition of a spatial unit called *the capsule* is also underlined with Günther Feuerstein's description of it as "the smallest, still moveable and autonomous environment well-equipped with communications."[9]

Pioneering examples / technological derivations and experiments with housing typologies – the concept of the capsule in Great Britain and Japan

Rani primjeri / tehnološke varijacije i eksperimenti u okviru stambenih tipologija – Koncept kapsule u Velikoj Britaniji i Japanu

Based on the work of the Independent Group and Peter and Alison Smithson's New Brutalism in the second half of the 1950s, the revisionist criticism of the modern movement reveals the starting points, origins and development as well as first designs of living units called *capsules* in Great Britain, the latter devised by their successors.

Incorporating differences, blurring the boundaries between popular and high culture and exhibiting an interest for everyday life and authenticity provided the Independent Group with an open mode of action that went beyond strict modernist principles. This established the foundations for the development of many experimental practices that introduced radical reflections on the mode of dwelling, housing, as well as living in the city and comprehension of the environment in general. It was the Smithson's *House of the Future* and its logic of incorporation, which is characteristic both of the Independent Group and New Brutalism, that provided the grounds for merging contemporary technology with pop culture and paved the way for the later realisation of Reyner Banham's *architecture autre*. The truly other architecture of the Second Machine Age, un-architecture, consumer and expendable architecture, technologically conditioned and mass produced architecture was brought forth by the swinging sixties through experimenting with new materials, dwelling patterns and the accordingly adapted new typology of the capsule. In Britain, living units that were designated as capsules were designed in 1964 by members of the Archigram Group, introducing vivid pop lightness in Warren Chalk's *Capsule Home* and the compatible *Plug-in City* by Peter Cook, and Cedric Price, who employed an operational, technological and iconoclastic approach in *Potteries Thinkbelt*.

Archigram's early capsule units were inspired by the space capsule, which was founded on an entirely different concept and efficiency than the traditional building[10], the capsule experiment employing technology transfer from space engineering and car industry to respond to questions regarding construction technology and economic efficiency. Moreover, questions on social and cultural change and appropriate housing typology were dealt with through the capsule's ergonomic design, the possibility of mass production and integrated expendability, extendability and interchangeability of some elements or even the entire capsule as consumer goods[11], as well as the housing approach that included a series of highly sophisticated and designed elements integrated into a tailored box, adopting an industrial design approach and implying a deliberate or even preferred lifestyle.[12]

In the first half of the 1960s, capsule living units for individualised inhabitants by Archigram (*Capsule Home,* 1964; Fig. 3), *Gasket Homes* (1965) were generally plugged to a hardware infrastructural core or megastructure frame, similarly as in the case of the famous and paradigmatic *Plug-in City* (1964; Fig. 4). On the other hand, later designs (*Living Pod,* 1966; *Cushicle,* 1966-1967; *Suitaloon,* 1968) break free of this attachment like Price's capsules in *Potteries Thinkbelt* and become, as prophesied by Banham in "A Home is not a House"[13], *un-houses*, completely furnished and equipped, truly mobile, software and minimal environments for contemporary nomads and *ad hoc* spatial interventions, or are radicalised into monofunctional spaces or equipment connected to the infrastructure of living or activity environments (*Control and Choice,* 1966; *units for the Monte Carlo project,* 1971). In his retrospective discussion on creating new typologies of minimum dwellings, Peter Cook describes the capsule as "a convenient term

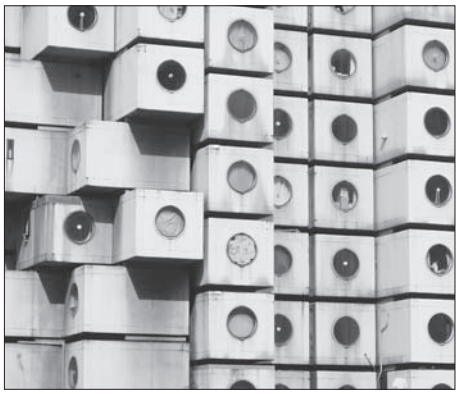
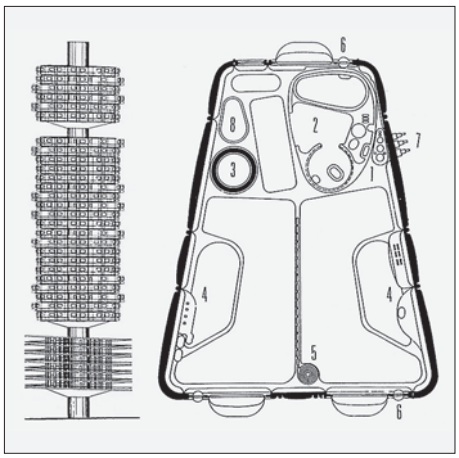


Fig. 2. Kisho Kurokawa: Nakagin Capsule Tower, Tokyo, 1972
Sl. 2. Kisho Kurokawa: Nakagin toranj kapsula, Tokyo, 1972.

Fig. 3. Warren Chalk, Archigram: Capsule Homes, 1964, view of tower and plan of capsule unit: 1 – service duct, 2 – bathroom, 3 – pneumatic lift, 4 – clip-on appliance wall, 5 – pull-out screen, 6 – wide service door, 7 – services connection, 8 – storage unit
Sl. 3. Warren Chalk, Archigram: Kuće kapsule, 1964., pogled na toranj i tlocrt kapsule: 1 – servisna vertikala, 2 – kupaonica, 3 – hidraulično dizalo, 4 – montažni zid s kuhinjskim uređajima, 5 – pregrada na izvlačenje, 6 – široka servisna vrata, 7 – servisni priključci, 8 – spremište



ing for the working class in France and England had already appeared before the congress, roughly in the period since the nineteenth century, referring to the example of Paris, which has a smaller residential area than the majority of proposals presented at the congress.

5 Brejc, 1991: 141-150; Lynton, 1994

6 Brejc, 1991: 141

7 Cook, 1970: 11

8 Risselada, van den Heuvel, 2005; Williams Goldhagen, Legault, 2000

9 Feuerstein, 1996: 61-62

10 Cook, 1999: 44

11 Cook, 1970: 63

12 Cook, 1999: 44

13 Banham, 1969

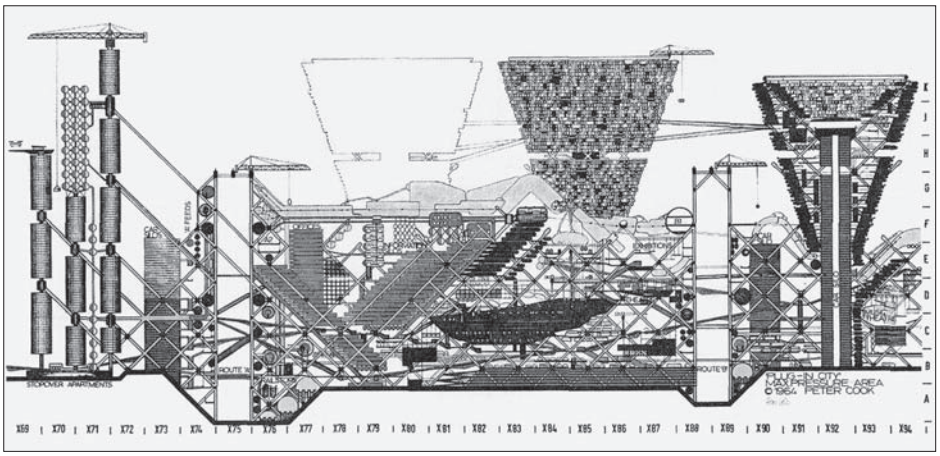
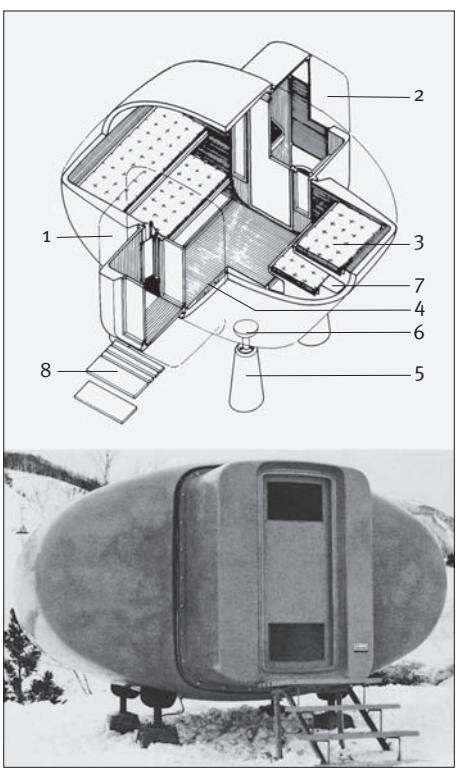


FIG. 4. PETER COOK, ARCHIGRAM: PLUG-IN CITY, 1964
SL. 4. PETER COOK, ARCHIGRAM: *PLUG-IN CITY*, 1964.

FIG. 5. GK INDUSTRIAL DESIGN ASSOCIATION: KOMATSU SKI-LODGE, 1962; 1 – PORCH UNIT, 2 – SERVICE UNIT, 3 – BUNKS, 4 – FRAMEWORK OF TIMBER, SHEATHED EXTERNALLY WITH FIBREGLASS, INTERNALLY WITH PLYWOOD, 5 – CONCRETE PAD, 6 – RUBBER CUSHIONS, 7 – SHELF, 8 – STEPS
SL. 5. GK UDRUŽENJE ZA INDUSTRIJSKI DIZAJN: SKIJAŠKA KUĆA *KOMATSU*, 1962.; 1 – ULAZ, 2 – SERVISNA PROSTORIJA, 3 – LEŽAJEVI, 4 – DRVENI OKVIR, IZVANA OJAČAN STAKLENIM VLAKNIMA, A IZNUTRA OBLOŽEN ŠPERPLOĆOM, 5 – BETONSKI OSLONAC, 6 – GUMENI PODMETAĆI ZA APSORPCIJU, 7 – POLICA, 8 – STUBE



with which to discuss the perfected industrially-designed prototype home – with the space capsules somewhere in the background, creating the necessary rhetoric but also calling to mind the concept of totally interrelated parts and appliances."[14]

Similarly as in the case of the Archigram Group and at the same time in an entirely different manner, the capsule concept in Japan relates to the nation's cultural tradition, though it is reformed under the pressure of post-war social reality; founded as a response to urgent needs in fast-growing big cities in reconstruction and to ineffective spatial planning, it also reflects faith in science, technology and modernity of the newly defining Japan society. With regard to modern technology, Japanese Metabolists[15] implemented an architecture concept that encompasses *invisible tradition* and enables ceaseless metabolist transformation of structures interrelated with the cycle of changes in human life. The duality of permanence and transitivity is manifested in durable megastructure formations of 'artificial land' – artificial islands or massive cores with cells – living capsule units with a shorter life cycle 'growing' out or being 'clipped' on them. Cellular living units were already used in projects by Kiyonori Kikutake and Kisho Kurokawa at the end of the fifties, while they came to be referred to as 'capsules' mainly in the second half of the sixties, when they became an almost established and predictable practice among designers and at competitions in Japan despite being built rarely.[16] In addition to connective units, for instance in projects like Kitukake's *Tower Shaped Community* (1958; Fig. 6) and Kurokawa's *Box Type Apartments* (1962), the Expo '70 *Takara Beautillon* and *Capsule House* (1970) and the famous *Nakagin Capsule Tower* (1972; Fig. 2 and 7), Japanese architects and designers devised many prototypes of independent, temporary and mobile living units, with GK Industrial Design Associates as one of the most active groups, and established a discourse on capsule architecture and its social implications.[17]

The manifesto "Capsule Declaration" and realisations of built capsule dwellings established Kisho Kurokawa as the leading representative and prophet of capsule architecture, which he believed to hold liberating potential for the individual and the possibility of radical transformation of society as a whole. "Capsule Declaration" tackles the concept of the capsule as an envelope for protecting the living organism, as an object of mobility and leisure society, as a mechanism of individuality and social diversity, as a creation of a different family system founded on the individual, as an object of the individual's spiritual fulfilment in a Metabolist city, as a private envelope protecting one from unwanted information, as a characteristic product of prefabrication and mass production, and as a tool against systems and uniformity.[18]

Although Kurokawa's arguments about capsule architecture are practically philosophical and/or reflect social renaissance, designs of capsule architecture by Japanese pioneers can similarly be characterised within the framework of the prophecy on 'the inevitability of experiment', which was established by Peter Cook in *Experimental Architecture* in 1970. It was devised through an overview of characteristics, works of protagonists and examples mostly from the 1960s and was based on the primacy or combination of the factors of *the logic of production, the value of the object, the value of the constituents, the opportunity of the material* and *opportunity of the technology*.[19]

MAIN TYPES OF CAPSULE UNITS

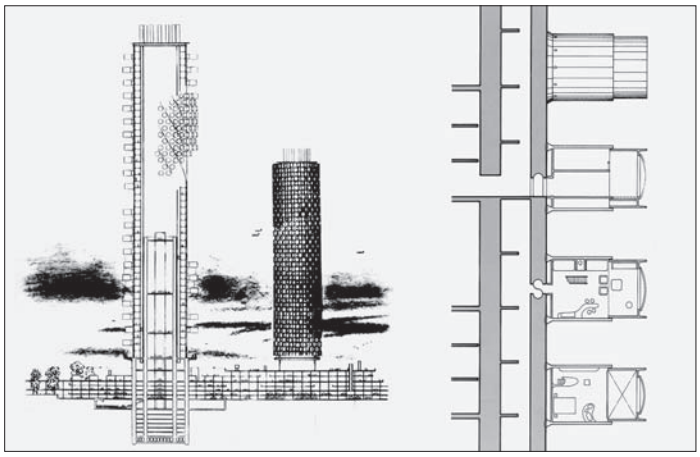
GLAVNI TIPOVI KAPSULA

Two main types of capsule units are evident: the *autonomous*, self-sufficient type of the

14 COOK, 2002: 80-82; "Buckminster Fuller was the godfather of the concept, the space capsule the outrider, and the capsules of Kisho Kurokawa (seen by members of Archigram in issues of "Architecture d'Aujourd'hui") the ones to beat."

15 As early as at the end of fifties, an architectural movement called 'Metabolism' was established during preparations for the 1960 World Design Conference in Tokyo. The movement was based on the philosophy of transformation and encompassed urbanism and industrial design besides architecture. In *Metabolism 1960 – The Proposals for New Urbanism*, the architects Kiyonori Kikutake, Fumihiko Maki, Masato Ohtaka, Noriaki (Kisho) Kurokawa, writer Noboru Kawazoe and designer Kiyoshi Awazu presented their view of human society as a part of a continuous natural entity that includes animals and plants and underlined their faith in technology as "an extension of humanity". [KAWAZOE, et al. 1960]

16 A good example are participating and winning projects at competitions organised by the *Shinkenchiku (Japan Architect)* magazine in 1966 and 1967. [NITSCHKE, 1967: 207-216; DAHINDEN, 1972: 76-81, 92-97]



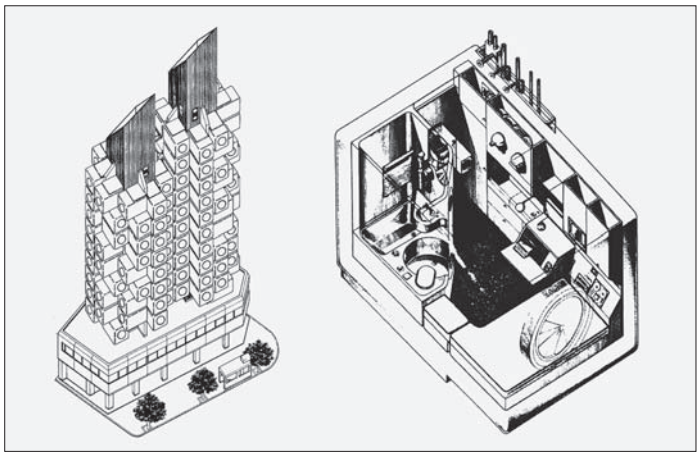


Fig. 6. Kiyonori Kikutake: Tower Shaped Community, 1958, view and section of tower and detail of clip-on unit
Sl. 6. Kiyonori Kikutake: Stambene jedinice u obliku tornja, 1958., pogled i presjek tornja i detalj montažne jedinice

Fig. 7. Kisho Kurokawa: Nakagin Capsule Tower, Tokyo, 1972, axonometric view of tower and axonometric cut-away view of capsule
Sl. 7. Kisho Kurokawa: Toranj kapsula *Nakagin*, Tokyo, 1972., aksonometrijski prikaz tornja i aksonometrijski presjek kapsule

capsule and the *connective* type, which is connected to infrastructure or megastructure framework and is dependent on it.

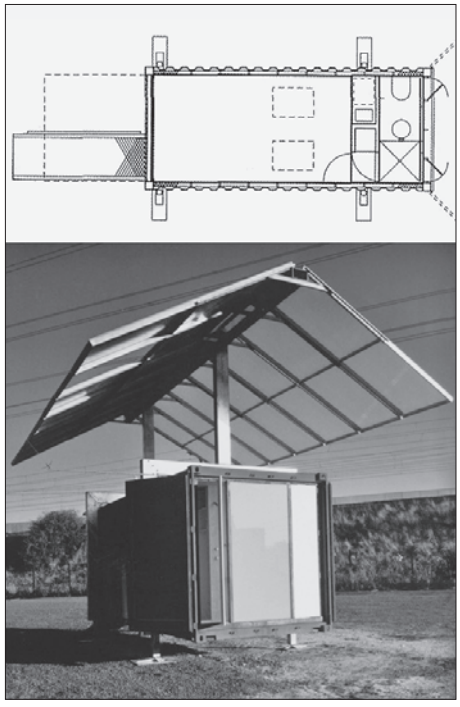
• **Autonomous capsules**: from mobile architecture of complete autarchy and nomadism to composite cellular agglomerations, biological metaphors and structuralism – Autonomous cellular capsule units are independent living units intended for one person or a smaller household; they can be completely autarchic or constructionally solid enough and of such forms that they enable horizontal and/or vertical aggregation, facilitating the creation of more complex composite structures. Independent cellular capsule units are highly mobile and represent the most appropriate implementation of the demand for complete autonomy and nomadism. These units are the most direct implementation of technology transfer from space engineering for the needs on Earth. The experimental field includes designs of living units for extreme conditions, which imply entirely new social relations and community formation, the development and use of new materials and enabling the tendency for nomadism, established in the desire to transform the society after World War II and culminating in counter-culture movements in the 1960s.

Living units for polar research set an example for many proposals for temporary dwellings in less demanding conditions, such as ski lodges, alpine huts or more extreme proposals for underwater dwellings. In addition to Archigram's *Living Pod* or even *Suitaloon* and the *Komatsu* ski lodge by GK Design in Japan (Fig. 5), Matti Suuronen's *Futuro House* from late 1960s is a paradigmatic and famous example of such a living unit.

Structurally speaking, independent units comprise primarily types of prefabricated structures of homogeneous *monocoque*[20], frame or panel designs with mass-produced, stable, light-weight and mobile components or even entire volumes, which were also enabled by the *use of new materials*, i.e. plastic, rendering the design of living environments a part of industrial design. First prototypes of an all-plastic house (1955-1956) were Ionel Schein's *monocoque* single space modules for hotel cabins and mobile library.[21] Arthur Quarmby, the British pioneer of the use of plastic in architecture, paradigmatically described cabins as "a brilliant exercise in the development of a living capsule to cater for ten hours of night and eight hours of daytime. It includes twin beds which convert for daytime use into a couch and a table, and a splendidly compact top-lit bathroom with W.C., shower and washbasin."[22] Schein's *Maison Plastique* from 1956 is a proposal of a 'growing', flexible house made of plastics in a panel design, while plastic houses designed by Cesare Pea were a direct reference to Archigram with regard to the question of expendable architecture and corresponding responses, similarly as Qarmby's 'shells' for British Railways and older Fuller's experiments, as well as traditional prefabricated houses, house trailers and caravans.[23]

With Fuller's 1940 caravan *Mechanical Wing* serving as a model, living 'capsules' *for the*

Fig. 8. Sean Godsell: Future Shack, a recycled shipping container as a mass-produced relocatable house for emergency and relief housing, 1985-1997
Sl. 8. Sean Godsell: Koliba budućnosti, reciklirani brodski kontejner kao masovno proizvedena prenosiva kuća za potrebe osiguravanja smještaja u nuždi ili za odmor, 1985.-1997.



17 In 1969, the Japanese magazine *SD (Space Design)* published a thematic issue on 'capsules' with several papers by Japanese Metabolists, including Fumihiko Maki, Noboru Kawazoe and Kisho Kurokawa, as well as a discussion and description of activities by GK Industrial Design Associates. [*** 1969: 36-45]

18 Kurokawa, 1977: 75-85

19 Cook, 1970: 30-67

20 In 1943, Marcel Breuer devised a housing prototype with *Plas-2-Point*, one of the first projects where the outer skin also had a structural function. The project was a forerunner of experiments with a single-shell, i.e. *monocoque* construction, which emerged at the end of the 1950s with the development of the plastics industry. [Bergdoll, 2008: 21]

21 Busbea, 2007: 58. Schein designed it together with the engineers Magnant and Coulon.

22 Quarmby, 1974: 48

23 *See: Archigram 3*, 1963, on 'expendability'. [Cook, 1999: 14-15]

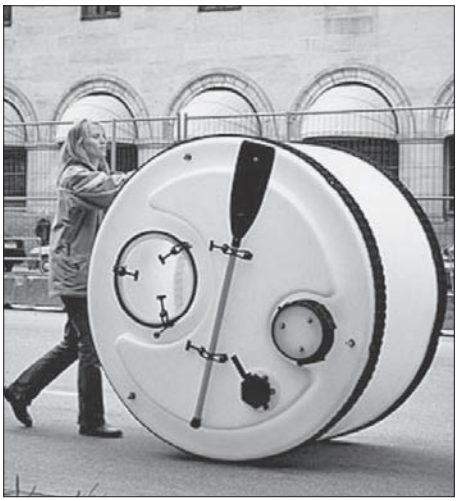


FIG. 9. N55: SNAIL SHELL, 2002, LOW COST LIVING UNIT, WHICH ENABLES LIVING IN VARIOUS NATURAL ENVIRONMENTS, ALSO FUNCTIONS AS AN ARTISTIC INTERVENTION IN PUBLIC SPACE

FIG. 9. N55: *SNAIL SHELL* (PUŽEVA KUCICA), 2002., JEFTINA STAMBENA JEDINICA KOJA OMOGUĆAVA STANOVANJE U RAZLIČITIM PRIRODNIM OKOLIŠIMA. TAKOĐER MOŽE FUNKCIONIRATI KAO UMJETNIĆKA INTERVENCIJA U JAVNOM PROSTORU.

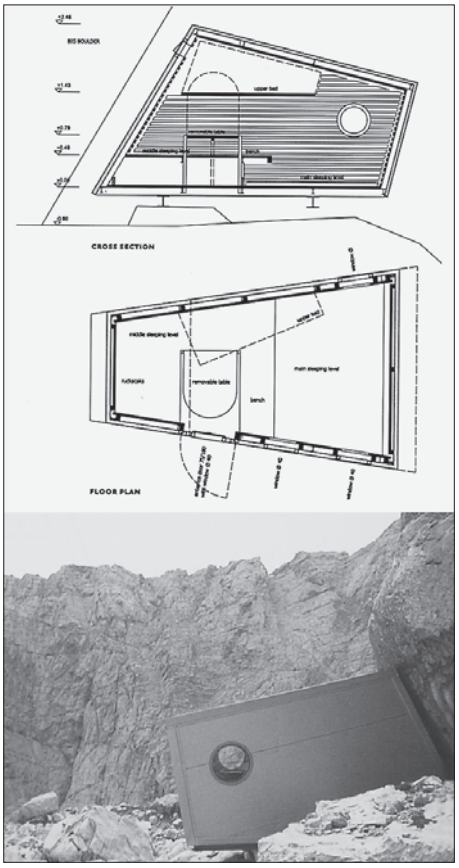


FIG. 10. MIHA KAJZELJ: BIVOUAC 2, KOTOVO SEDLO (1965 M), JULIAN ALPS, 2005

SL. 10. MIHA KAJZELJ: BIVOUAC 2, KOTOVO SEDLO (1965 M), JULIJSKE ALPE, 2005.

needs of the nomad were completely furnished and equipped mobile dwellings.[24] However, as the American caravan was never actually used as a *mobile* home, the 1960s projects of truly mobile dwellings for contemporary nomads appear to be an experiment that grasps the opportunity for true liberation.[25] Projects of potential emancipation were realised as dismountable container dwellings: from units designed by the Hornsey College of Art for the *Milan Triennial 1964* to Alberto Rosselli's *Mobile House* exhibited at *Italy: The New Domestic Landscape, 1972*, as well as many contemporary successors of living units for extreme conditions and mobile or temporary art interventions (Fig. 8 and 9).

On the other hand, composite cells are units with an interior structure that allows for cellular agglomerations. Such units are generally modular and constructionally stable structures designed as *monocoque* or a *frame and infill*. Composite cells are completely furnished and equipped for functioning as independently as possible, as also characteristic of autonomous cells. Nevertheless, assembling or 'growth'[26] of cellular agglomerations reveals the issue of a complete lack of control, which renders difficult or completely negates the basic possibility of further mobility of such cellular units due to vertical agglomeration.

Taking the definition of the capsule and its demand for mobility into account, integrated 'capsules' can only be referred to as such on a metaphorical level if disassembling the composite structure is no longer possible.

The dismountable version most commonly appears in the form of light-weight, prefabricated and container units and their temporary designs, usually reaching up to several floor heights. Wolfgang Döring's early experiments with plastic cells, which date back to the mid-sixties, or the *Portakabin* system can be compared to 'stacking', prefabricated components of contemporary and highly popular container architectures, as they build on the potential of realisable general mobility and nomadism as well as solving housing issues.[27]

Furthermore, the 'metaphorical' version employs prefabrication and is usually based on units constructed of dwelling materials that are more durable and conventional, weaving into compositions with representational features of the *open structure*, growth, incompleteness, fragmentation or even organicity. In the history of architecture, this version represented an attempt to establish a relationship between the built and social structures dealt with by *structuralism* in architecture. A typical and notorious example is Moshe Safdie's *Habitat '67* for Expo '67 in Montreal.[28]

- **Connective capsules**: megastructure and clip-on/plug-in units – The second main type of capsule units, depending both on the load-bearing and other infrastructural systems, is the *connective* type, which can be clipped on, plugged in, hanged or inserted in the infrastructure frame or core. Stemming from the relationship between the megastructure and the equipped living capsule, Archigram's *clip-on/plug-in* concept[29] denotes a pragmatic system for solving housing issues with a simultaneous creation of a new lifestyle, 'liberating' anarchism, techno-fetishism and occasionally an ironic undertone of the view into a *brave new world*. On the other hand, Japanese Metabolists express this relationship through social and political commitment inspired by a technologically conditioned 'natural growth' and 'cyclicality'. Paradigmatic and pioneering examples of such designs include Kikutake's *Tower Shaped Community* and Kurokawa's *Bamboo Type Community* from the end of the fifties or the 1964 *Capsule Homes* by Archigram's Warren Chalk, which were realised in Kurokawa's *Nakagin Capsule Tower* in 1972 and his *Capsule House K* from the same year.

On the other hand, the connective type of the capsule, which is inserted in the structural frame, is directly related to the tradition of space frames.[30] Reyner Banham notes that the first project that resembled a megastructure was the 1952 group project produced at the Architectural Association[31], while he presents François Jamagne's project for Antwerp

24 The first caravans in the United States became popular in early 1930s and by 1937 represented a permanent shelter for two hundred thousand families, mainly due to the consequences of the Great Depression. Caravans with sanitary facilities were introduced after 1950. [PRAHL, 1999: 69-73]

25 SCOTT, 2007: 215-237

26 Dahinden notes that the growth of cellular agglomerations has often been inappropriately compared with natural growth, as natural growth in the plant world leads to the ultimate state of maturity. [DAHINDEN, 1972: 21]

27 Composite cellular capsule units reveal the relevance of capsule architecture in conditions that require maximum pragmatics. While many similar examples and projects could be pointed out, particularly when it comes to container architecture, it should be noted that minimum, i.e. capsule units are used primarily as dwellings for students, functioning as a pragmatic tool for solving housing conditions, but also cater to temporary living needs of seasonal workers or in case of natural disasters. Cedric Price's 'non-architectural' architecture in *Potteries Thinkbelt* has thus become a reality in more compact systems.

28 Reyner Banham describes the development of the project and its implementation, but always refers to living cellular units comprising the megastructure as 'habitable capsules', 'house-capsules', 'concrete-box capsules' or 'stacked capsules'. This does not correspond to our definition of capsules as developed from pioneering examples,

from 1955 as one of the first examples of megastructure with a diagonally braced vertical frame and inserted highly technological 'capsules', which in this case promoted maximum flexibility of an art museum.[32]

In addition to Archigram's nomadic projects, for instance *Blow-out Village* (1966) or *Free Time Node: Trailer Cage* (1967), Metabolists' spiral and frame structures that wait to be completed randomly, such as Kurokawa's *Takara Beautillon* and structures for Kikutake's flexible *move-net* units, as well as Yona Friedman's space frames with *ad hoc* cellular dwellings from the second half of the fifties, other numerous examples of using and implementing the typology in the 1960s can be highlighted as paradigmatic examples of frames and capsule *insets*. In an early and typical example from 1964, Wolfgang Döring proposed relatively traditionally designed, modular and prefabricated 'family' duplex living cells as *insets* in a multilevel steel frame. At the beginning of the seventies Peter Cook recognised potential in Döring's housing projects and their use of plastics, as they made "the idea of the simple prefabricated capsule a near reality".[33] (Fig. 11)

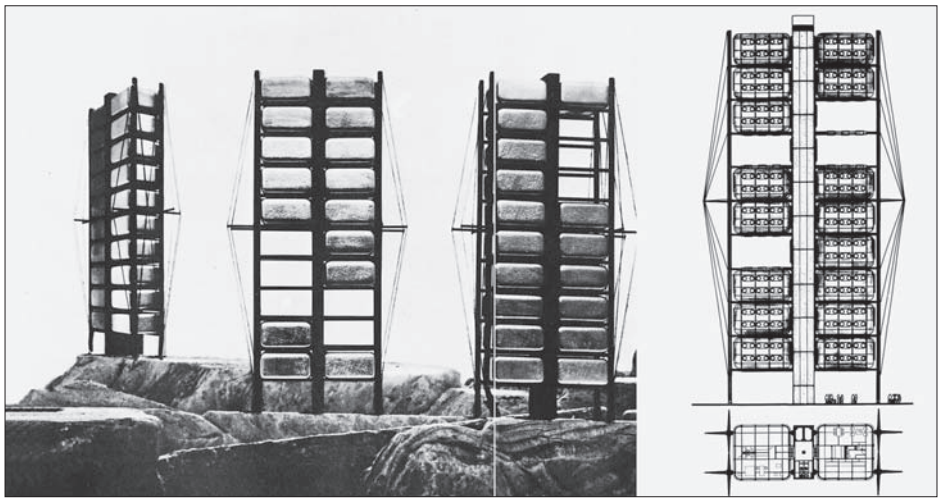


Fig. 11. Wolfgang Döring: Stapelhaus (House of stacked units), 1964, model, plan, section
Sl. 11. Wolfgang Döring: *Stapelhaus* (Kuća s naslaganim jedinicama), 1964., model, tlocrt, presjek

Contemporary examples with manifestations from cultural environments of Slovenia and Croatia

Suvremeni primjeri i njihove manifestacije u kulturnim sredinama Slovenije i Hrvatske

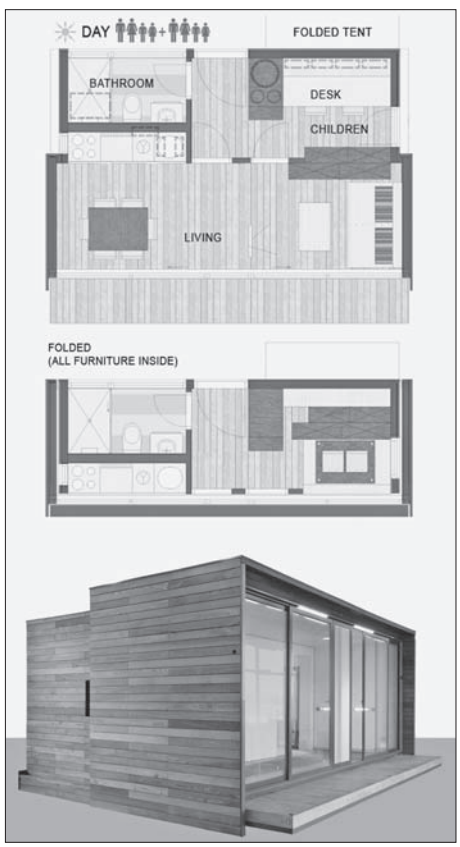
The trends of the experimental approach are illustrated in a comparative overview with selected examples from the cultural environments of Slovenia and Croatia in the pioneering times and contemporaneity.

- **The autonomous type** – With regard to material experimentations, demands for mobility and autarchy, the cultural environments of Slovenia and Croatia also offer some pioneering as well as contemporary examples.

In 1972, Kobe and Garzarolli's *Soft House*, the Slovenian 'protocapsule' proposal for material, technological and social redefinition of architecture, dwelling and home, which introduced a hard foam building with a limited, ten-year life span, attempted to respond to contemporary issues of high housing prices and demands for increased mobility that traditional construction could not tackle.[34] In terms of mobility, the Slovenian project of a travelling library from 1947 should also be mentioned. The concept transformed the railway station into an *ad hoc* experimental cultural centre *avant la lettre*, with a mobile exhibition held in a freight car, book sale and a dwelling for the librarian.[35] Following the path of independent structures like *Living Pod, Komatsu* ski lodge or *Futuro House,* similarly contemporary, formally and structurally diverse designs like Richard Horden's *Ski Haus* and, last but not least, bivouacs by Slovenian architect Miha Kajzelj should be mentioned (Fig. 10).

A unique art example from Slovenia is Marko Peljhan's *Makrolab*[36], a mobile laboratory that was installed in several sites around the world in a ten-year period before 2007. *Makrolab* is (was) an autonomous and self-sufficient communications, research and living unit, connected to the external world via electronic media and capable of sustaining work of four people in physical isolation (Fig. 1).[37] This transforms the capsule into a social experiment.[38] Instead of filtrating information and seeking individuality or intimacy, the

Fig. 12. Architectural studio G&B: FA House – an energetically autonomous folding mobile unit, 2011
Sl. 12. Arhitektonski studio G&B: SMO Kuća – energetski autonomna sklopiva pokretna jedinica, 2011.



since living units no longer satisfy the necessary criterion of mobility after they are built in. [Banham, 1976: 106-107]

29 It was described more thoroughly by Reyner Banham in his paper "A Clip-on Architecture". [Banham, 1965: 535]

30 Examples extend from Paxton's Crystal Palace in 1851 and the development of three-dimensional space frame systems to a great interest and use in the 1950s and 1960s, with main protagonists including Buckminster Fuller, Konrad Wachsmann, André Waterkeyn and others.

31 Banham, 1976: 85

32 Banham, 1976: 37-38

33 Cook, 1970: 87

34 The project was developed in prof. Ravnikar's studio at the Ljubljana School of Architecture. [Kobe, 1972: 11]

35 *** 1975. Although this could hardly be characterised as true capsule architecture, Domicijan Serajnik's project is well though-out protocapsule architecture, with at least as much credit for clairvoyance going to the client, i.e. the Ministry of Education.

36 http://makrolab.ljudmila.org/faq/ [19/1/2013]

37 As a thorough communication among a limited number of individuals in an isolated space should produce more 'evolutionary codes' of social relations than large social movements. [http://makrolab.ljudmila.org/reports/press/slo /19/1/2013]

38 http://makrolab.ljudmila.org/reports/published/peljhan/ [19/1/2013]

Fig. 13. Saša Mächtig: Kiosk K-67, 1967-1969
Sl. 13. Saša Mächtig: Kiosk K-67, 1967.-1969.

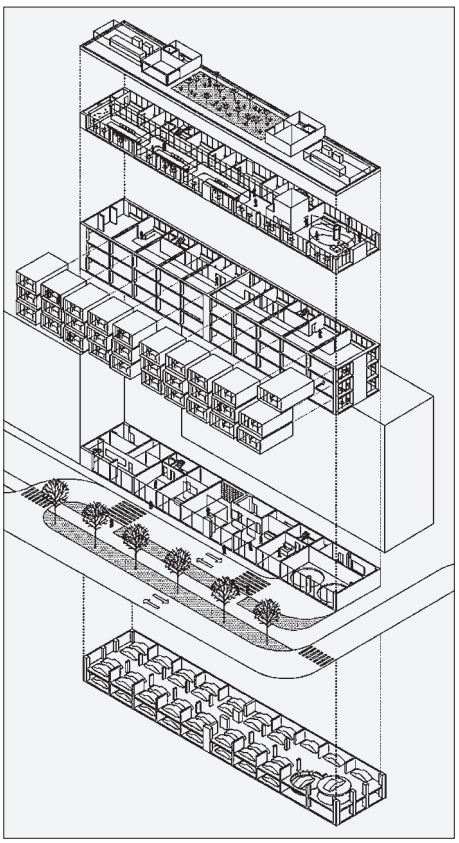


Fig. 14. Lea Pelivan, Toma Plejić (Studio UP) + Ivana Franke + Silvio Vujičić: Spectator Group's Headquarters, 2010, axonometric view with set-in 'work capsules'
Sl. 14. Lea Pelivan, Toma Plejić (Studio UP) + Ivana Franke + Silvio Vujičić: Poslovna zgrada sjedišta Spectator grupe, 2010., aksonometrijski prikaz s umetnutim 'radnim jedinicama'

residents of the *Makrolab* capsule are intensively and literally involved in activities in the global *space of flows*; this capsule unit is of a heterotopian nature, simultaneously functioning outside the system and being critically connected to it, and represents a true example of using the liberating potential of the capsule in the quest for autonomy in contemporary space.[39]

In the field of container-like prefabricated buildings, we can mention examples like the Slovenian RIMAMOBIL or the Croatian *SMO – Sklopivi Mobilni Objekt (FA House)* by G&B architectural studio, which is an energetically autonomous foldable mobile unit and does not require a building permission nor connections to the infrastructure.[40] They both follow the path of highly-tailored mobile prefabricated units, which can be used for different programmes and can be seen as experiments in the redefinition of dwelling connected to the site or prescribed relation between the unit and its programme or use (Fig. 12).

While belonging to the group of autonomous – composite units, which can form *open structures,* the *K-67* kiosk, a famous Slovenian example of a flexible system for urban furniture, which was being designed by Saša Mächtig from 1966 onwards, could hardly be classified among capsule systems, even though the independent unit could function as a capsule envelope (Fig. 13).[41] The same can be said for his later UMS system. The basic 'cross' element functioned either as a closed independent unit or allowed for connections to new units, generating a passable multicellular system. Therefore, this example can be classified as a metaphorical capsule system, similarly as the 1964 Chenéac's project[42] with comparable characteristics.

Examples of light-weight, prefabricated and container composite or stacking units are omnipresent all around the world. There are several manufacturers of container units in Slovenia and Croatia, while numerous student projects and, last but not least, Jure Kotnik's book and exhibition at the Museum of Architecture and Design in Ljubljana have recently contributed to the popularisation of container architecture in the area. The latter presents such architecture as low-priced modular construction with an emphasis on individuality and environmental friendliness – with recycled containers, fast installation, minimum noise-related stress on the environment and site intervention, i.e. as environmentally-friendly construction.[43]

- **The connective type** – A structural equivalent of Döring's or even Friedman's proposals can also be found in Croatia. Andrija Mutnjaković[44], a pioneer of experimental architecture, developed a project for an apartment building for the 1968 competition in Osijek so as to create a flexible system that would facilitate the merging of positive features of individual and collective housing construction in a 'socialist society'. The basic frame structure and areas for ensuring basic functional and hygienic needs is upgraded with personally tailored apartment units for residents, who can arrange the layout, form and appearance of the apartment unit with their own personal engagement.[45] The technologically feasible and planned rational solution is concurrent with world trends, but can be classified among structures of *metaphorical capsule systems* only conditionally due to an implied possibility of inserting prefabricated capsule units, potentially evident only in the model, and since the system was designed as 'traditional construction' (Fig. 15).

This group of projects also includes contemporary designs by Studio Up, which used the capsule concept in a metaphorical manner in projects such as Spectator's Group headquarters in Zagreb (Fig. 14), where work areas, i.e. 'capsules'[46], are set in a structural frame, as also represented on the facade, or a variation on the theme of capsule hotels with *Goli Bosi Design Hostel* in Split.

In contemporary architectural practice, the capsule concept is metaphorically used also in the form of prefabricated, monofunctional, primarily sanitary facilities built in the frame structure of many hotel, housing or office complexes.[47] A sensitive authorial and entirely individual interpretation and design of such form but in a completely different setting can, for instance, be found in *Five Houses on Silba* by the architects Igor Pedišić and Iva Letilović, who integrated crucial programmes

39 Makrolab is (was) a non-profit project financed both by state and interstate institutions as well as private and mobile capital and individuals. Moreover, the project is transterritorial.

40 http://www.gib.hr/SMO/smo.html [15/6/2013]

41 Although Marjetica Potrč notes that it was not very likely for *K-67* kiosks to function as a home, this is no longer as unrealisable. [Potrč, 2003: 148; Mächtig, 1969: 60-63]

42 Chenéac, Prototype de cellule polyvalente, 1964. [Busbea, 2007: 60]

43 http://www.aml.si/dogodki/aktualno/dogodki-strani/kontejner.html [15/10/2010]; Kotnik, 2008

44 His commitment to architectural experiments is evident in many projects [Galović, 2004: 18-19]. The commentary for the 1966 national competition for the project of the Seven Secretaries of SKOJ youth centre in Zagreb

for contemporary functioning of an existing traditional building in five external monofunctional units without any major interventions within it[48], though the project remains on the level of metaphorical capsules due to the unfulfilled condition of mobility (Fig. 16).

Conclusion

Zaključak

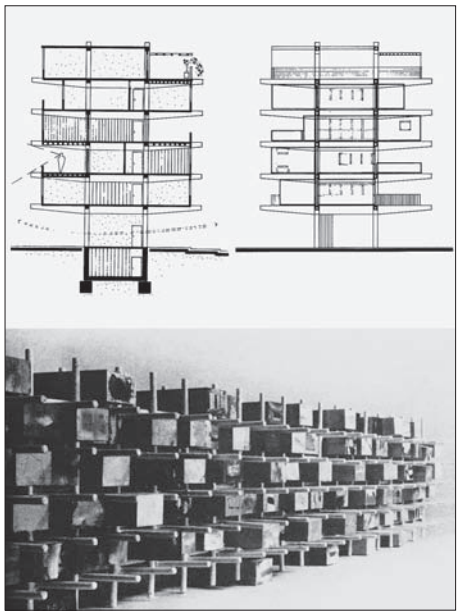
The period from the late fifties of the previous century onwards was highly favourable for experimental work by individuals who put forth proposals for future society and dwellings to provide responses to the actual situation regarding the social, economic and also spatial reality. Within this context and resulting from possibilities offered by the new technology, the concept of the capsule was formed, introducing a living unit intended primarily for the individual or couples without children and strongly challenging the traditional perception of home, its material structure and spatial relations offered by the new typology. Many designs of modernist minimal living cells for the individual could be regarded as protocapsule units, while the 1960s living capsules, when compared to the former, represent a technologically compact upgrade and fulfilment of the mobility condition.

The capsule concept is a relevant, vivid and significant part of contemporary architectural production and every-day life. Offering a clearer definition, it denotes projects that build on the tradition of original proposals as well as metaphorical manifestations inspired by them.

The purpose of this paper was not to provide a complete overview of capsule systems in the development of architecture, but primarily to highlight the origins, basic types, manifestations and use of the concept in pioneering times and contemporaneity, illustrating them with some examples of experimental practices from the cultural environments of Slovenia and Croatia. While at least an apparent commitment to experiment can be expected in contemporary practices, these pioneering examples reveal concurrent and progressive practices of architects and designers also in the cultural environments of Slovenia and Croatia as early as in the revolutionary sixties of the previous century.

After comparing pioneering and contemporary designs, it can be concluded that the utopian tone of pioneers has been superseded by productivity, application and viability here and now. Heroic manifestos and their promises of social change, which would supposedly make capsule architecture truly realisable, were replaced in contemporaneity by solving housing issues of the current reality in creative fields of architecture, industrial design and more or less subversive artistic practices. Products, i.e. capsule dwellings, are thus both urban and anti-urban proposals, stimulators and interpositions in public space, environments of retreat and contemplation in the centre of and away from city noise, as well as exponents and installations at exhibitions, or appear in all of the abovementioned environments, testing their own limits with their presence. This establishes, though not always explicitly, a transdisciplinary discourse of the experiment, which discovers and reveals the issues of the individual and community, housing typology, building and dwelling, function and representation, and by offering a common architectural denominator relativises the authority and autonomy of disciplines, uniting them in a complex and richer whole that responds to the unpredictability of contemporaneity.

[Translated by: Mojca Trampuš, MA]



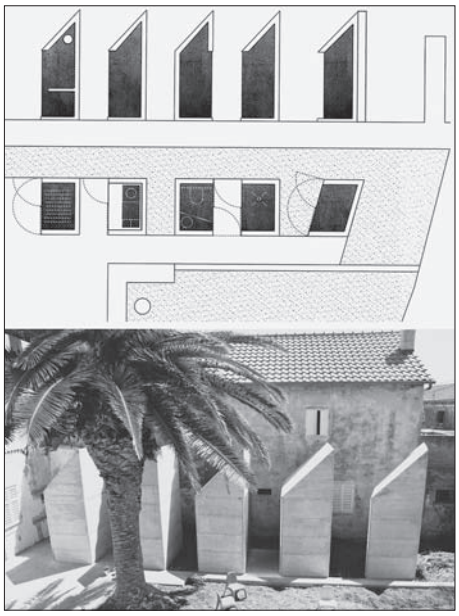


Fig. 15. Andrija Mutnjakovic with collaborators: apartment building for the competition in Osijek, 1968, model, section, elevation
Sl. 15. Andrija Mutnjakovic sa suradnicima: višestambena zgrada za natječaj u Osijeku, 1968., model, presjek, proćelje

Fig. 16. Igor Pedišić, Iva Letilović: Five 'capsules' on the Silba island, 2011
Sl. 16. Igor Pedišić, Iva Letilović: Pet 'kapsula' na otoku Silbi, 2011.

even carries the title "The Right to Experiment" [Mutnjakovic, 1988: 85-97].

45 Mutnjakovic, 1988: 68

46 These spaces are designated as 'work capsules' and integrated in the structure, lacking the condition of mobility [http://pogledaj.to/arhitektura/studio-up-poslovna-zgrada-sjedista-spectator-grupe /22/12/2012/]. Although the experimental potential of the capsule concept could be recognised in the project, these spaces can be classified as capsules on the representational or metaphorical level only.

47 There are a number of producers and examples of prefabricated bathroom pods. For example, company from Slovenia with a long tradition and more than 70.000 manufactured units is Varis Lendava d.d. [http://en.varis-lendava.si/references /15/6/2013].

48 The project is also called *Five Capsules, Silba.* [Mrduljaš, 2012: 104-109]

BIBLIOGRAPHY

LITERATURA

1. BANHAM, R. (1965), *A Clip-on Architecture,* "Architectural Design", November: 534-535, London
2. BANHAM, R. (1969), *A home is not a house*, "Architectural Design", January: 45-48, London
3. BANHAM, R. (1976), *Megastructure: Urban Futures of the Recent Past,* Thames and Hudson, London
4. BERGDOLL, B. (2008), *Home Delivery: Viscidities of Modernist Dream From Taylorized Serial Production to Digital Customization*, in: *Home Delivery* [BERGDOLL, B.; CHRISTENSEN, P.], The Museum of Modern Art, Birkhäuser: 12-26, New York/Basel/Boston/Berlin
5. VON BORRIES, F. (2010), *Klimakapseln: Überlebens-bedingungen in der Katastrophe*, Suhrkamp, Berlin
6. BOOMKENS, R. (1998), *Een drempelwereld. Moderne ervaring en stedelijke openbaarheid,* Nai Uitgevers, Rotterdam
7. BREJC, T. (1991), *Modernizem: oris kriterijev, "Sinteza",* October (87-90): 141-150, Ljubljana
8. BUSBEA, L. (2007), *Topologies: The Urban Utopia in France, 1960-1970,* MIT Press, Cambridge, Mass.
9. COOK, P. (1970), *Experimental Architecture,* Universe Books, New York
10. COOK, P. (ed.) (1999), *Archigram,* Princeton Architectural Press, New York
11. COOK, P. (2002), *Capsules, Pods and Skins,* in: *Concerning Archigram* [ed. CROMPTON, D.] Archigram Archives: 80-82, London
12. ČELIK, M. (2007), New Architecture in Slovenia, Springer Verlag: 160, Wien
13. DAHINDEN, J. (1972), *Urban Structures for the Future,* Praeger Publishers, New York
14. DE CAUTER, L. (2004), *The Capsular Civilization: On the City in the Age of Fear,* NAi Publishers, Rotterdam
15. FEUERSTEIN, G. (1996), *Der Mensch in der Kapsel*, in: *Wieviel Raum braucht der Mensch? Wohnen für das Existenzminimum* [ed. HAUSSMANN, R.; SCHULTE, K.], Aries, 61-62, München
16. GALOVIĆ, K. (2004), *Razgovor: Andrija Mutnjaković, arhitekt; Oduvijek me zanimao eksperiment,* "Vijenac", 12 (277): 18-19, Zagreb
17. HEYNEN, H. (1999), *Architecture and Modernity: A Critique,* MIT Press, Cambridge, Mass., London
18. KAWAZOE, N.; KIKUTAKE, K.; KUROKAWA, N.; OHTAKA, M.; MAKI, F. (1960), *Metabolism 1960: The Proposals for New Urbanism,* Bijutu Syuppan Sha, Tokyo
19. KIKUTAKE, K. (1978), *Koso To Keikaku,* Bijutsu Shuppan-sha: 102-105, Tokyo
20. KOBE, G. (1972), *Mehka hiša*, "Arhitektov bilten", May: 11, Ljubljana
21. KOTNIK, J. (2008), *Container Architecture: This book contains 6441 containers,* Links Books, Barcelona
22. KUROKAWA, K. (1977), *Metabolism in Architecture,* Studio Vista, London
23. LYNTON, N. (1994), *Zgodba moderne umetnosti: Pregled likovne umetnosti 20. stoletja,* Cankarjeva založba, Ljubljana
24. MÄCHTIG, S. (1969), *Kiosk sistem K-67*, "Sinteza", October (15): 60-63, Ljubljana
25. MRDULJAŠ, M. (2012), *Being Open to Reality: Five Capsules, Silba, Croatia*, "Oris", 14 (75): 104-109, Zagreb
26. MUMFORD, E. (2000), *The CIAM Discourse on Urbanism, 1928-1960,* MIT Press, Cambridge, Mass., London
27. MUTNJAKOVIĆ, A. (1988), *Tercijarni grad,* Revija, Osijek
28. NITSCHKE, G. (1967), *The Metabolists*, "Architectural Design", May: 207-216, London
29. POTRČ, M. (2003), *Next stop, Kiosk = Naslednja postaja Kiosk: Moderna galerija Ljubljana,* 29.10.-30.11., Moderna galerija, Ljubljana
30. PRAHL, S. (1999), *Gimme Shelter, Short-term Solutions for a Long-term Problem: Temporary Housing for No-Income and Low-Income People*, in: *Transportable Environments: Theory, Context, Design and Technology* [ed. KRONENBURG, R.], E&FN Spon: 69-73, London
31. QUARMBY, A. (1974), *Plastics and Architecture,* Praeger Publishers, Washington/New York
32. RISSELADA, M.; VAN DEN HEUVEL, D. (2005.), *Team 10: in search of a Utopia of the present,* NAi Publishers, Rotterdam
33. WILLIAMS GOLDHAGEN, S.; LEGAULT, R. (ed.) (2000), *Anxious Modernisms: Experimentation in Postwar Architecture Culture*, MIT Press, Cambridge, Mass.
34. *** (1965), *Industrial Design in Japan*, "Architectural Design", July: 355, London
35. *** (1969), "SD – Space Design", 3, Japan
36. *** (1975),"Arhitektov bilten", 24/25, Ljubljana

SOURCES

IZVORI

INTERNET SOURCES

INTERNETSKI IZVORI

1. http://makrolab.ljudmila.org/archives/imagearc/2000/2000rott3.jpg [15/10/2010]
2. http://makrolab.ljudmila.org/faq/ [19/1/2013]
3. http://makrolab.ljudmila.org/reports/press/slo/ [19/1/2013]
4. http://makrolab.ljudmila.org/reports/published/peljhan/ [19/1/2013]
5. http://www.aml.si/dogodki/aktualno/dogodki-strani/kontejner.html [15/10/2010]
6. http://www.n55.dk/manuals/snail_shell_system/sss.html [19/1/2013]
7. http://pogledaj.to/wp-content/uploads/2010/11/studio-up_aksonometrija.jpg [22/12/2012]
8. http://pogledaj.to/arhitektura/studio-up-poslovna-zgrada-sjedista-spectator-grupe/ [22/12/2012]
9. http://en.varis-lendava.si/references/ [15/6/2013]
10. http://www.gib.hr/SMO/smo.html [15/6/2013]

ILLUSTRATION SOURCES

IZVORI ILUSTRACIJA

FIG. 1. http://makrolab.ljudmila.org/archives/imagearc/2000/2000rott3.jpg
FIG. 2. Photo: author
FIG. 3. COOK, 1999: 45
FIG. 4. COOK, 1970: 105
FIG. 5. *** 1965: 355, 356
FIG. 6. KIKUTAKE, 1978: 102, 104
FIG. 7. BERGDOLL, CHRISTENSEN, 2008: 146
FIG. 8. KOTNIK, 2008: 198, 200
FIG. 9. http://www.n55.dk/manuals/snail_shell_system/sss.html
FIG. 10. ČELIK, 2007: 160, 161
FIG. 11. DAHINDEN, 1972: 66, 67
FIG. 12. Architectural studio G&B
FIG. 13. Photo: author
FIG. 14. http://pogledaj.to/wp-content/uploads/2010/11/studio-up_aksonometrija.jpg
FIG. 15. MUTNJAKOVIĆ, 1988: 66, 69
FIG. 16. MRDULJAŠ, 2012: 106, 107

Summary

Sažetak

Koncept arhitektonske kapsule kao eksperiment

Podrijetlo i manifestacije s odabranim primjerima u Sloveniji i Hrvatskoj

Koncept kapsule, pod čime se podrazumijeva kompaktna, minimalna, potpuno namještena i opremljena stambena jedinica, uglavnom je u povijesti arhitekture povezana s trendom megastruktura i utopijskih radikalnih arhitektonskih eksperimenata iz 60-ih godina 20. stoljeća. Općepoznate varijacije ovoga koncepta čine hotelske kapsule i prefabricirani sanitarni objekti, konstrukcije za zaštitu od atmosferskih utjecaja, te kapsule kao ograničeni i/ili kontrolirani građevni sklopovi ili područja koji nisu više direktno povezani s izvornim konceptom. Cilj je rada prikazati podrijetlo, osnovne tipove, manifestacije i upotrebu ovoga tipa stambene jedinice od prvih primjera do suvremenih rješenja, te na odabranim primjerima prikazati važnost ovoga koncepta u svome prvotnom, ali i metaforičnom obliku u kontekstu kulturnih sredina Slovenije i Hrvatske. Podrijetlo i razvoj koncepta kapsule u arhitekturi može se pratiti kroz teorijske koncepte moderne, u kontekstu arhitekture nakon Drugoga svjetskog rata i u sklopu izrazito tehnološki utemeljene arhitekture, osobito u Velikoj Britaniji i Japanu.

Temelj eksperimentalne arhitekture u Velikoj Britaniji postavili su revizionisti moderne u sklopu Nezavisne grupe u drugoj polovici 1950-ih godina. Radikalna promišljanja o načinu stanovanja, stambenim objektima, životu u gradu i razumijevanju okoliša poslije su razvili prvi protagonisti arhitekture kapsule početkom 1960-ih na temelju stapanja suvremene tehnologije i pop-kulture, konzumerizma, mobilnosti, masovne proizvodnje te eksperimentiranja s novim materijalima.

U Britaniji, članovi Archigram grupe i Cedric Price projektirali su 1964. godine stambene jedinice koje su se nazivale kapsulama. Eksperiment projektiranja stambene jedinice kao kapsule bio je potaknut konceptom svemirske kapsule kao odgovor na pitanja o tehnologiji građenja i učinkovitosti. Usto, pitanja koja su se odnosila na društvene i kulturne promjene, kao i prikladnu stambenu tipologiju, nalazila su svoj odgovor u kontekstu ergonomskog dizajna kapsule, mogućnosti masovne proizvodnje i mogućnosti korištenja elemenata koji bi bili potrošni, po potrebi nadograđivani i međusobno zamjenjivi, te koji bi se (kao i cijele kapsule) tako mogli smatrati potrošnom robom, usvajajući pritom pristup inače karakterističan za industrijski dizajn u cilju kreiranja novoga životnog stila obilježenog konceptom potencijalne mobilnosti.

Iako je koncept kapsule u Japanu povezan s *tradicijom nevidljivog (invisible tradition),* on je u osnovi ponajprije nastao kao odgovor na hitne potrebe brzorastućih gradova u kontekstu obnove i neefikasnoga prostornog planiranja, a bio je dodatno ojačan vjerom u znanost, tehnologiju i modernost u sklopu novoga japanskog društva. Neki su metabolisti uspostavili dualnost trajnosti i prijelaznosti u svojim projektima već krajem 50-ih godina 20. stoljeća. Takve tendencije vidljive su u trajnim megastrukturama s ćelijama, tj. stambenim jedinicama – kapsulama s kraćim vijekom trajanja koje su iz njih izrastale, no naziv 'kapsula' nije bio u široj upotrebi prije druge polovice 1960-ih godina. Temeljni dokument „Deklaracija o kapsuli", kao i realizacije stambenih objekata kapsula – potvrdili su Kisho Kurokawu kao vodećeg predstavnika i predvodnika arhitekture kapsule, za koju je vjerovao da predstavlja oslobađajući potencijal za pojedinca i mogućnost radikalne transformacije društva u cjelini.

Unatoč prilično dvosmislenoj definiciji, izvorni koncept kapsule – kako u Velikoj Britaniji tako i u Japanu – odnosi se prije svega na kompaktnu, mobilnu, potpuno opremljenu i ergonomski dizajniranu stambenu ili monofunkcionalnu jedinicu s ugrađenim rokom trajanja. Dva glavna tipa stambenih jedinica kapsula mogu se jasno razabrati: prvi je autonomni *(autonomous),* samodostatni tip kapsule koji se manifestira kao mobilna arhitektura te ima obilježja potpune samodostatnosti i nomadske pokretljivosti, kompozitne ćelijske aglomeracije, biološke metafore i strukturalizma. Drugi tip je spajajući *(connective)* s obilježjima spajanja i priključivanja, a može se spojiti, priključiti, objesiti ili umetnuti u infrastrukturni okvir ili jezgru o kojima ovisi. U pogledu njihove konstrukcije, oba tipa jedinica sadrže primarno masovno proizvedene, prefabricirane homogene ili kompozitne tzv. *monocoque* konstrukcije, okvirni ili panel dizajn s konstruktivnim ojačanjem na osnovi tipa aglomeracije ili veze.

Autonomne stambene jedinice kapsule predstavljaju projekte potencijalnog oslobađanja glede mobilnosti u formi stambenih objekata koji se mogu rastaviti ili čine kompaktne kontejnerske objekte. To su stambene jedinice za ekstremne uvjete i pokretne ili privremene intervencije. Ipak, sastavljanje ili 'rast' ćelijskih aglomeracija pokazuje se složenim zadatkom, ili pak u potpunosti negira njihov potencijal mobilnosti. Integrirane stacionarne kapsule stoga se mogu smatrati kapsulama samo na metaforičkoj razini.

Slično tome, spajajući tip kapsule i njegov odnos između megastrukture i opremljene stambene jedinice kapsule označava pragmatički sustav namijenjen rješavanju stambenih pitanja s paralelnim stvaranjem novoga životnog stila. Nepredvidivost konačnog izgleda može se dovesti u vezu s 'oslobađajućim' anarhizmom, tehno-fetišizmom, društvenim i političkim angažmanom, tehnološki uvjetovanim 'prirodnim rastom' te potencijalom za stapanje pozitivnih obilježja individualne i kolektivne stambene izgradnje.

Kao rezultat eksperimentiranja u cilju pronalaženja rješenja za aktualne probleme društvene, ekonomske i prostorne stvarnosti, koncept kapsule snažan je izazov tradicionalnoj percepciji kuće, njezinoj materijalnoj strukturi i prostornim odnosima u arhitekturi. Utopijsku dimenziju prvih rješenja zamijenila je u moderno doba produktivnost, primjena i sposobnost rješavanja stambenih pitanja, kao i privlačan prostorni dizajn u kreativnim područjima arhitekture, industrijskog dizajna i umjetničkih djelatnosti.

U konačnici, interdisciplinarni diskurs eksperimenta označava koncept kapsule kao relevantan koncept suvremenoga doba. On razotkriva pitanja koja se dotiču individualnog i zajedničkog, stambene tipologije, građenja i stambenih objekata, funkcije i reprezentacije. Na temelju zajedničkoga arhitektonskog nazivnika on relativizira autoritet i autonomnost disciplina, ujedinjujući ih u složenu i bogatiju cjelinu koja nudi odgovor na nepredvidivost suvremenoga doba.

Peter Šenk

Biography

Biografija

Peter Šenk, PhD, is a lecturer at the Faculty of Civil Engineering, University of Maribor, and a practicing architect. He studied architecture at the Faculty of Architecture, Ljubljana, and Berlage Institute, Rotterdam, and obtained his PhD in Philosophy and Theory of Visual Culture from the Faculty of Humanities, University of Primorska. He is a co-founder of Studio Stratum, an architecture and urbanism practice, and Institute for Spatial Policies [IPoP].

Dr.sc. **Peter Šenk**, predavač na Građevinskom fakultetu Sveučilišta u Mariboru. Studirao je arhitekturu na Arhitektonskom fakultetu Sveučilišta u Ljubljani i na Berlage Institutu u Rotterdamu, Nizozemska. Doktorsku disertaciju iz filozofije i teorije vizualne kulture obranio je na Fakultetu za humanističke studije u Kopru. Suosnivač je arhitektonskog i urbanističkog biroa Studio Stratum kao i Zavoda za prostornu politiku.