

5. Detailed design

Use and recognition of the new transport system are significantly conditioned by detailed design of particular vehicles and supporting structures, i.e. their attractiveness and thus are important factors for decisions concerning use of public transport. Modern technological solutions of tram carriages with low thresholds enable easy access, which is an important factor for functionally disabled people, cyclists etc. Tram stops, besides being protected from atmospheric elements have to provide substantial information about tram schedules, possible further connections or arrivals of other trams, while their design (image) has to follow an uniform, comprehensive system. Only in this way will the »new greens« become a recognisable and popular feature of Ljubljana.

Opportunity for adding to the city's image

The project for the new tram in Ljubljana is offering the city enormous possibilities for rehabilitation and redesign of the city's image, which has for decades lived the fate of a modern Snow White. The new tram in Ljubljana is the improbable prince, who could awake the slumbering princess – why not? Practice in cities comparable to Ljubljana has shown the approach to be a sensible one. Building an effective and able transport system coupled with improvements to the city's image can improve the competitiveness of particular cities versus comparable ones in the urban network. One could mention Grenoble in France, a renowned example of building an urban railway with simultaneous rehabilitation of the city, provision of pedestrian and green surfaces and renewal of the built stock. By introducing the urban railway the city was given a new, fresh image and replenished economic impetus. The system didn't prove itself only by efficient handling of transport, but was also the mode of urban revision in the noblest sense of the expression.

6. Conclusion (to be seen)

The project for the new tram in Ljubljana is still in the phase where numerous possibilities and routes are still being debated. These are more or less friendly to its users, more or less feasible in the present economic reality and present urban structure or even, more or less probable. The presented possible scenarios have to become the basis for a real plan in the near future with defined benchmarks, financing and physical limits. Public response showed that the tram would attract sympathy if the planning was well thought out, although the passage to implementation will probably be much more demanding. As individuals we can attempt the passage already by changing our travelling habits – what if we went about our daily business without a car?

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Illustrations:

Figure 1: Schematic presentation of the tram-rail construction phases (source: Municipality of Ljubljana)

Figure 2: The possible position of the ground level route – Dunajska Street (source: TTK, Karlsruhe).

Figure 3: The possible ground level route through the city centre (source: TTK, Karlsruhe).

Figure 4: Animation of the ground level route on Ljubljana's streets (source: RenderSpace – Pristop Interactive).

Figure 5: Possible subterranean routes through the city centre.

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Transformations in organised multi-apartment housing – concepts, technology, financing

1. Introduction

The statement »the home is a machine for living« was heard as early as 1853, when the architect Adolph Lance said: »The home is an instrument, a machine, that serves mankind, not only as a shelter that adapts as much as possible to ones needs, but also has to support ones activities and multiply the products of labour. Industrial buildings, offices and factories of all kinds are from this aspect almost perfect and worth copying as models.«¹ On the other hand we are aware that the present times are times of massive changes in the field of urban development, which is similarly as other scientific or practical disciplines under increasing pressure of information technology. Traditional urban patterns, which were based on hierarchical order, cannot be controlled anymore, but we nevertheless consistently repeat concepts and ideas from the industrial revolution.

Today more and more people are choosing to live in multi-apartment housing with low density, which can provide the quality of life and advantages of detached housing² and simultaneously ensure benefits of collective construction (security, managed parking lots and open spaces, common infrastructure etc.). Therefore research of multi-apartment collective housing as constant, physical structures³ is important in the wider sense and not only from the viewpoint of physical manifestation in space.

In urbanism and also in architecture experts always ask themselves whether they have been innovative and above all efficient in improving the culture of living in their practical or executed concepts. Here we encounter the quest for motives and criteria for objective evaluation of novelties. All high quality development, idea, motive or concept of housing construction inherently includes six components: **social** (purpose, for whom and why), **economic** (economical construction, economical use of a site, legitimacy of the purpose of construction), **technological** (purpose and availability of technology in a given environment, the home as a serial product of the construction industry), **ecological** (pollution and degradation of the living environment)⁴, **physical** (legitimacy of intervention) and **artistic** (conceptuality of the act, architectural theory; modular coordination in housing development, typification and standardisation, and even flexibility etc.). These components are measures that serve as entry points for evaluation of proposed models, ideas and completed examples presented in this article, whereby we limited our discourse to Europe where the culture of living is still fairly traditionalistic and less inclined to new-age nomadic lifestyles.

2. Conceptual transformations in Europe

Population growth, migration, new infrastructure systems, technological advances, unhindered flow of innovation ... these are simple facts that triggered the schism in social and economic structures in the 19th century (industrial revolution). Physical space was also under the influence of such flows. The phenomenon of poor neighbourhoods growing on city fringes was typical for cities in the 19th century: poor construction on the periphery devoid of essential hygienic spaces driven by the principles »roof over ones head« and maximum usage of space. The conditions in cities, especially social housing, deteriorated. A consequence of such developments were the establishment of numerous associations promoting minimal social essentials (introduction of the stated norms and standards), which should »regulate and control« building in the peoples quarters⁵. The first such association was the *Royal Commission for Health and Housing* Established in Great Britain.

E. Howard with his concept »Garden City of Tomorrow«, which was based on planned migration of urban population to smaller satellite cities set in natural surroundings carried out an important role in the past. Limitations of this concept stem from the figurative scheme of concentric rings of particular categories of functions, whereby a hierarchical social division of work and space takes place, which should prevent unplanned structural growth. The model (diagram) manifests a desire for connecting pleasant and comfortable aspects of the city and countryside: joining the city with the countryside into a »pleasant social environment« (social and spatial issue that provides entry points for artistic concepts). Important aspects of this model are: planned settlement policy, which should condition the suitable size of the place, pleasant and natural environment, which should combine with the pleasant sociability of the urban population and strictly determined building order in the shape of concentric circles. No innovative solutions were provided on the technological level of the model and even from the economic point of view, the model was rather extravagant, space as a whole should be used rather lavishly. Howard's garden cities were built as self-sufficient satellite settlements on the outskirts of London. *Letchworth* (B. Parker and R. Unwin, 1902) and *Welwyn* (L. de Saissons, 1920) are the best-known completed examples of the garden city model.

Garnier's industrial city *Le Cité Industrielle* is based on a grid system. The city's composition was determined by three key elements that are functionally separated according to their programmes: housing, industry and sanatoriums. The main road was the backbone of the system. With such a real solution as the model, several examples of later industrial cities were built, the most radical models being Soviet ones from the 1920s in which they translated the radial-centric urban form into a linear form and spread it as a pattern across the whole Soviet Union. Electric power lines were the basis of the grid structure. The model was much more aligned to new technology and utilising its power than to population structure and flows – the Soviet de-urbanistic city by M. Okhitovitcha in M. Ginzburga. **N. A. Miljutin** also found his ideas for the linear city *Socgorod* (1930) in the model. His city was divided into six parallel functional strips, running across the countryside and spreading endlessly to infinity (equality for all, as opposed to centrality). Organisation of production systems was the form's rationale, which runs in a line from »the resource to the product«.

C. Perry⁶ developed a similar idea for a neighbourhood in the 1920s, which should be seen as the basic urban unit. His idea was subject to numerous changes and adaptations (e.g. Swedish satellite cities).

During the period between the world wars housing construction in Europe took the form of workers colonies (*Hufeisensiedlung Berlin-Neukölln* »horseshoe«, Taut and Wagner, 1925–1930; *Torten-Dessau*, Gropius, 1926–1928). Ideas about self-sufficient housing estates still weren't very influential during that period.

In the work of **Le Corbusier**, great emphasis was given to living culture and it's spatial expression in both master plans and particular architectural projects. On one side were spatial elements (space, air, sun, greenery) and functional human demands (living, work, physical and spiritual recreation, traffic) on the other. Building was given a vertical dimension with openness on the ground level. This was Le Corbusier's understanding of garden city. Residential areas should be concentrated, thus leaving as much green open spaces in the city as possible.

Immeubles-villas were the new formula for city apartments. Le Corbusier placed streets vertically and grouped apartments in large complexes. Every apartment was a small house with a garden, placed at a certain height above the street. The road itself was also modified. It ran away from the houses and trees over flooded the city. The density of urban quarters was similar to the present ones, but the houses grew much higher, with views opening endlessly ...

The *Unité d'Habitation* (1947–1952) in Marseilles represents the quintessence of Le Corbusier's long-term engagement with collective housing. 337 housing units were grouped together into cells of a 165 m long and 56 m high reinforced concrete frame and connected with »internal roads«. The layout of particular flats was narrow and long – the normal flat was 25 m deep, which is according to present standards quite unacceptable. Residents were given subsidiary functions (shopping streets, social activities, restaurants, hotels). The language of the buildings architecture was expressed by rough surfaces, strong primary colours, the play of light and shadows on purposely articulated surfaces with plastic elements. The whole repertoire of Le Corbusier's previous concepts, i.e. duplex (two-floor flat), house on pillars embellished with sculptural elements, social activities, were included in the roof gardens on the building. The quality of the prototype was never met in future projects (Nante-Rezé, Berlin, Meaux, Briey-en-Forêt, Fermey-Vert).

Despite his work applying to USA, **F. L. Wright** developed a significant theoretical model (*Broadacre City*, 1934), which was rather unsuitable for European space because of its expansive use of land, but was nevertheless important for its respect for humanity and human needs. Any individual needs one acre of land for normal life, which is the root of the name »broad – acre«. He pointed out changes in the structure of living, which became devoid of site hierarchy. Individuality and redesign of cities were emphasised in which traditional forms and places would be lost: »the future city will be everywhere and nowhere ...«. ⁷

A. Aalto through several small projects made a major contribution to living culture in social housing, but an important fact is that they were enabled and stimulated by the Finnish society and nature, which is conditioned by the expanses and vastness of the country and enormous quantity of tim-

Large projects

ber. Aalto's projects (*Sunila pulp mill*, 1936–1939) are characterised by open spaces, nature, organic forms and discontinuity – elements that can be found in traditional Finnish structures, which also affected Aalto's organic urbanism.

After World War 2 novel design for new settlement concepts put Sweden in the forefront (1965–75, under the influence of the national housing programme, striving to build 1.000.000 new homes in ten years), which decentralised urban space by adding distant satellite cities. Organic cores were designed in new, vacant areas in which central spaces were dedicated to quiet public functions. Whole neighbourhoods were designed aligned to urbanistic movements of the time – functionalism with emphasis on transport, the latter also forming the framework of a neighbourhood's area. These were solutions with a large level of freedom in layout, also because of the open character of nature in the country where they were built. The first examples relied partly on Perry's principles, while the later ones already found a human scale in low open layouts and harmony with their natural surroundings.

Parallel to completed practical neighbourhood concepts, which were also a manifestation of space and society on one hand and architectural discourse by individuals on the other (*Les Courtilères*, Aillaud, 1955–1960), a growing number of alternative visions of cities appeared. Amongst the later are ideas presented by the group Archizoom with their project »No-Stop City Residential Parking« (1970), where they designed an endless repetitive landscape, which wasn't »utopia ... but an unlimited quantity of fragments, as many as there were people« – not one culture, but one for each individual. These models were seen as manifests and protests against the route societal development was taking: unmanageable technological achievements and innovation, developments in nuclear physics and chemistry and the threat of nuclear war. Simultaneously they protested against classical urbanism and manipulation with humans as the factor emphasising beauty of the created.

Amongst the ever-expanding mass of concepts, ideas, theories and completed projects, G. Candilis demands special attention. With Josic and Woods they tried to devise a differentiated urban space with a system of spatially self-referential »nuclear« units. Urban functions were distributed throughout the settlement and integrated amongst other organic forms. Individual buildings were freely placed into an orthogonal traffic grid aligned to self-reference and limitless fractal growth, already appearing at the time in Mandelbrot's research of irregular patterns in nature (*Toulouse le Mirail*, Candilis, Josic and Woods, 1962).

During the seventies events, triggered by the earlier mentioned projects, only intensified. Modern cities should be results of artificially designed structures. There the human only »filled« the buildings. This attitude experienced severe critique. Experts dealing with urbanism were more occupied with possibilities for ensuring harmonised development with respect to existing structures, rather than researching new settlement models.

Representatives of the post-modern movement A. Rossi, R. Krier⁸, C. Rowe and F. Koetter retreated from all findings of earlier modernists by stating that they had destroyed everything artistic in cities. They didn't establish new models, but argued for the city as a structured entity with all its historical past. During the eighties an important role

was played by the IBA programme (Internationale Bauausstellung) in Berlin, which was completed in 1987 – a vision of a correctly rehabilitated city. It was an unique opportunity for architecture to free itself from the shackles of urbanism, but later however proved to be a laboratory of ideas, which was incapable of reconstructing a city as a complex organism. It had an ideal space where one could afford not to deal with issues raised by physical, functional and symbolic factors of normal cities. Emphasis was given to the expression of particular architecture, designed by numerous famous architects (from R. Krier, A. Rossi to A. Siza).

The idea that the city is not simply a site, but a way and condition of life influenced by consumption and production by its inhabitants, was gaining in support. The city ceased to be a compact, centric, nodal structure. Living in the city wasn't defined as living on an urban street, but implied a manner of conduct, expression, speech, attire ... and possibility to access information. The human individual became the centre of events. Nevertheless, this human still wanted to live in one's »own shell«, in a pleasant environment, with greenery, known neighbours etc.

*Ecolonia*⁹ (ecology + colony, 1991–1993) was a pioneer example on the global scale, at a time when principles of sustainability were still not generally known. Based on Kroll's urban design layout 101 homes built as one-, two- or three-floor semi-detached houses or terraces with 280 housing units were built in Alphen aan de Rijn in the Netherlands. The project gave the Dutch building industry and the global scene direct insight into methods of introducing ecological principles to building. This ecological settlement included all modern elements of ecological construction: use of ecological building technologies (massive brick walls, wooden frame constructions), optimal heat and sound insulation, which were later seen as a sound financial investment with quick returns, modern technologies for using solar energy (photovoltaic and photothermic modules), passive use of natural conditions (building orientation, protection from the wind), roofing with vegetation etc. – all with the sole aim of decreasing energy consumption and providing a healthy and comfortable living environment – ideas, which mingled with ecological construction methods and living. In the centre of all considerations was the human, the user. Not as an individual, but as a commune that jointly generated these changes (in fractal theory the so called attractor). The basic idea behind the Ecolonia as a settlement with a strong ecological component was soon copied around the World (*Ecovillage*, USA, 1991; *Kolding*, Denmark, 1993–1996; *McKenzie Towne*, Canada, 1997; *Slagelse*, Denmark, 1993; *Viikki*, Finland; *Windsong*, Canada 1997).

3. Conceptual changes in Slovenia?

Slovenia never created such innovative ideas that could have significant effects on societal development or planning (such as Howard's Garden city). Ideas and changes always travelled with a slight delay in the opposite direction – from abroad.

The industrial revolution however did in fact trigger an avalanche of dramatic and dynamic changes, which followed industrialisation: the introduction of new communications (Southern railroad) and the shift from crafts to manufacturing and industrial production. A consequence was migra-

tion of population to the cities and de-agrarisation of the countryside. Fastest growth was seen in Ljubljana¹⁰, Maribor and Celje, mainly because of the railroad. The period of engineering-technical regulation with smaller urbanistic successes lasted right up to World War 1.

C. Sitte's master plan for Ljubljana (1895) followed all his theoretical principles and ideas, whose rationale was in formal-aesthetic elements. Sitte saw confirmation for his ideas in medieval cities, although he stressed that ancient patterns couldn't be translated to modern cities. His plan for the earthquake-smitten Ljubljana was a combination of »irregular« orthogonal grids. Thus a hierarchy of streets was designed whose longer axis ran towards the main monumental landmark in the city – all vistas opened towards the castle hill, the only real landmark in the city and condition for further design. The city wasn't given edges, these Sitte left open, in fact he didn't really bother.

M. Fabiani's master plans for Ljubljana (Rehabilitation of the North part of the city, 1895; plans for Southern Bežigrad, 1897) were a combination of aesthetical principles of design and sociological aspects of urban management, with emphasis on engineering-technical solutions. Fabiani argued for the rehabilitation of the old city with improved hygienic living conditions. He granted communication an important role, as well as redistribution of urban functions and connecting people to nature. His technical-engineering approach to planning existing structures (a game of regulation lines) stressed the traffic solutions. The urban structure was extended with an orthogonal technicist matrix of streets, which was roughly joined to the semi-circular motif of the Ljubljanica River on both riverbanks.

Much more than with his plans for Ljubljana, Fabiani made a significant contribution with regulation plans for smaller settlements. In these plans he advocated uniform development of settlements, seen as open organisms prone to constant changes, something indefinite. He didn't stop with design proposals for smaller settlements, but predicted a hierarchy of development conditioned by physical position (development of the urbanisation axis in Posočje and Vipavska dolina, with extensions for industry, following the idea of linear city).

With his master plan for Ljubljana (1929) **J. Plečnik** showed how spontaneous developments along the main access roads should be filled in with »wedges«, formed between them. He derived the geometry for the new structures from the existing structure and transformed it into organically growing forms that pass from one to another at precisely specified points. These points were designed in classicist, monumental manner in a specific way with specific physical layout. These were focal urban points for the organically spreading tissue that needed guiding landmarks. He nevertheless tried to limit the outward growth by filling in internal spaces, thus also defying the later star-shaped form of the city.

I. Vurnik was the first architect in Slovenia to tackle the problem of mass housing construction. His typological research on standardised housing units in fact mark the beginning of the process that later brought about new relations between architecture and urbanism, which left its legacy on more than fifty years of urban development.

His most important contribution, in which he managed to realise the concept of an ideal housing estate, was the

Workers housing colony in Maribor, completed in 1927. In this project Vurnik relatively successfully managed to solve most of the set essential problems, mainly »how to enable with given resources to provide a completely equipped home in the building sense, for such a price, that any diligent labourer can afford to pay the monthly dues and interest«¹¹.

Vurnik's urban layout was a simple, enclosed housing estate, separated from the surrounding area with trees, but integrated as well with a more or less orthogonal street grid. The novelty was the single-family terraced block, a building type never seen before in Slovenia. The traditional perimeter block was opened on two sides, so that the terraces were built in the North-South direction, with a smaller part running East-West. The plots were long and narrow, the main façades of the single-floor terraces formed the street, while in the back they opened out towards the gardens, running all the way to a parallel street closed for vehicular traffic. This was an important novelty in building urban space and was later used elsewhere in the same or modified form. Reference for such building can be found in contemporary examples around Frankfurt (e.g. the *Westhausen* estate). The architecture, typified by economic rationale, rational layout and carefully planned open space, can compete with any other similar example from corresponding European avant-garde.

In the post-war period **M. Mušič** played a significant role with his writing about »Renewal of the rural settlement« (1947) or what a co-operative village should be like. The core of the matter was applying urbanistic theory to co-operative systems of rural economy. He thought that the time was ripe for humane synthesis of the traditional home and village layout with technically and socially advanced collectivisation and social transformation of villages. These solutions were technical and communal, demanding time and comprehensive building of whole complexes. Expansions were provided on a simple orthogonal grid, which included elements of the rural environment. The old village was cleared, opened and ceased to be a compact structure. Such an entity would ensure »healthy, sunny and open« life (Le Corbusier).

Within the framework of countryside rehabilitation, **E. Ravnikar** was the first who argued for rationality and humane spatial decentralisation enabled by the development of modern railway transport and small settlements in the human scale, the latter being built by individual self-initiative. In models of unlimited growth (urban research on the transformation of villages, 1945–1946), which offered simple grid systems, there was however a hidden issue, the problem of endless growth occurring alongside roads tied to the primary road system in nodes from where they spread out. The model resembles Hibernheimer's visions of decentralised cities, but is much more realistic in placement and also includes existing structures.

Nova Gorica, besides Velenje, was the only Slovenian city built on modernist principles. The Slovenian region around Gorizia lost its central city (to Italy) after the Second World War and needed a new centre. Thus the regional aspect was the decisive factor in determining the site for a new town, but also the local aspect, i.e. possibilities for linear development between Solkan, Šempeter and the hinterland. **E. Ravnikar** presented the master plan in 1948, which was later during construction significantly altered. He proposed a city-park with collective housing, humanised with

squares, sculptures, landscaping. The city didn't penetrate into nature, but functioned with it in unison in a subordinate relationship. The structure was open and limitless, creating designed, strictly determined positions for buildings, whose number and disposition were necessary for creating a clearly defined form, vision and spatial symbol. Nova Gorica's orthogonal traffic grid was directed with a declination from the North-South axis, giving the city possibilities for linear growth. Only one diagonal road was added to the orthogonal grid, symbolically tying the city to the street network of Gorizia. The city was symmetrically divided into two halves by a monumental avenue with a central representative park. Its axis was aligned to the hill Sveta Gora with a monastery, closing the prospect. The city had a linear layout with the main avenue functioning as the backbone of the orthogonal structure formed by freely positioned buildings amidst greenery. In this one finds the duality, swinging from technically correct traffic solutions and romantic greenery of open spaces.

The first attempts at post-war organised multi-apartment housing¹² visually resembled workers colonies, but included ideas of the modernist movement. During this period several independent housing estates were built, which included principles of unifying and socialist societal orientation, but weren't positioned according to broader concepts or settlement systems. One such estate was the Litoštroj complex by architect **E. Mihevc** (1947–1963, in cooperation with M. Gregorič). The complex was placed near Ljubljana »in the fields« and planned as an industrial complex in nature. Use of prefabricated concrete elements, different constructions and façades showed it as innovative in the architectural sense. The area was divided into three parts: housing, industry and culture-education. The housing area was built with freestanding three-floor blocks (longitudinal layout with two stairwells), parallel to the streets.

Numerous examples of designing housing construction came next, built upon experiences from abroad. The organisation concept »neighbourhood«¹³ gained support. The idea behind the concept clearly shows a shift from old schematic to organic composition, which used various housing types to design free-flowing forms in nature and street organisation resembling tree-structures¹⁴. The communication network, the main composition tool, was organised as an emphasised system, tied to the main communication routes at a point and simultaneously forming the edge of the neighbourhood.

From the seventies housing neighbourhoods prevailed as the method of urbanistic, communal and technical organisation of settlement, however only in cities. It showed a slightly delayed acceptance of Perry's principles, complemented with Scandinavian and British experiences. Towards the end of the seventies debates ensued concerning the legitimacy of dormitory estates.

Ljubljana experienced a boom of housing construction after the master plan of urban development was adopted in 1966, which enforced development in a star-shaped form along the main access routes towards the city centre¹⁵. Housing construction was oriented towards two categories: neighbourhoods with blocks and concentrations of inhabitants and housing areas in the suburbs with detached low buildings, corresponding more to the countryside structure rather than urban character of the city. The neighbourhood **Fužine**¹⁶ corresponds to the first type (urbanism: Novak et al., architecture: Brezar et al., 1980–1990), built somewhat

later according to Perry's concepts. Even before construction began there were however doubts, whether differentiating building heights wouldn't become a significant element in social stratification¹⁷. The neighbourhood contained all elements of infrastructure, communication and programmes for self-sufficiency of the area. The **Murgle** neighbourhood with its semi-detached and terraced housing belongs to the second group (Ivanšek, 1965–1968)¹⁸. It manifests desires for individuality, seen as single-family homes, which was on the level of spatial utility closely tied to social changes of the neighbourhood's purpose. The neighbourhood was designed as a garden settlement with a road system limited as much as possible (similar to Radburn). The whole area was organised as a housing block with a perimeter road running along three sides. Both neighbourhoods can be compared to similar ones built in Sweden in the sixties.

From the later period one estate – **Župančičeva jama** (urbanism: Pahor, architecture: Brezar, 1985–1992), can be singled out in Ljubljana, both because of its size and comprehensive design, with its layout of small town blocks, graded significance of open spaces and defined edge within the urban tissue. At the time the city already got its present form and housing buildings were being built independently on vacant land, thus becoming predominantly supplementary »fillings« of voids, rather than separate organised urban structures. One of the latter was the perimeter building Tabor, striving for innovative artistic principles and achieved by different rapport from several architects (Podlogar, Koželj, Sadar, Pahor, 1989–1992 and the neighbouring block by Kobe, Todorčič, 1994).

4. Building technology in Slovenia

After the Second World War the process of deagrarianisation, started before the war, continued and blossomed. The state promoted multi-apartment organised building. Numerous achievements can be identified from this period, which despite attempting to advances in execution still remained on the classical level of masonry (just as was the case before the war). Nevertheless new systems were introduced, such as transversal load-bearing walls (*Litoštrojski bloki*, Mihevc in Gregorič, 1948), longitudinal load-bearing walls (*Savska kolonija*, Kobe, 1946), prefabricated concrete elements and façade sandwiches with slag-concrete insulation. Towards the late fifties attempts were made for vertical building, but only one building was in fact built with a reinforced concrete frame (*Kozolec*, Mihevc, 1956).

Use of reinforced concrete gained support in the sixties, when it became possible to produce high quality concrete and at first wooden, then metal intentionally produced casting panels (wall panels and tables) allowing for larger spans and better execution (neighbourhood *S-6* in *Šiška*, Arnavotović, Peršin; *Ferantov vrt*, Ravnikar). The technology of building with reinforced concrete allowed deeper layouts (up to 6 m, which is even today the upper limit of sensibility and rationality in housing construction), but layouts of apartments couldn't be changed.

Two benchmarks that significantly influenced building technology have to be mentioned. The first one was the earthquake in Skopje (1963), which marked the end of masonry, i.e. using bricks for multi-apartment construction. The second was the energy crisis at the beginning of the seven-

ties, when marked the end of single layer façades and the introduction of new technological solutions for multi-layer heat-insulated façades and outer façade membrane. Industrialisation of building construction brought about changes in particular elements, such as doors, windows, staircases, roofing, fittings and new complex technological systems for building load-bearing elements (e.g. Velox lost panels, Isospan etc.), large spatial castings and heavy and light prefabricated assembly with panels and bathroom cells. Such building could withstand earthquake standards and also facilitate quick execution, but also disallowed flexible layouts.

During the eighties the demise of functionalism became noticeable, the end of technological mythology and extensive construction of mega-neighbourhoods for the unknown, statistically average resident. Different systems emerged enabling greater flexibility and joint decision-making with users concerning layouts (e.g. the Ingrad system, where part of the wall bearing structure was replaced by slabs and columns, allowing dividing walls to be move in either direction or the Pop system with transverse walls and façades created single cells for each apartment, later subdivided by walls, but disallowed extensions outwards). Spatial (tunnel) casts facilitated simultaneous casting of walls and floors, also ensuring better execution of built-in systems, such as heating, scaffolds etc. Following the spirit of prefabricated building, even concrete façade elements were given legitimacy in urban and suburban environments.

During the last decade, organised housing construction has diminished. Building technology hasn't changed significantly, yet the quality of materials and building equipment has. Different producers offer systems for casting, making building easier and cheaper, they don't however influence important changes to technology. Masonry for smaller buildings is again gaining in sympathy (even in combination with reinforced concrete), bricks being an ecological and healthy material.

5. Social-political environment and economy

One of the key factors of organised building is the economic scheme of ensuring adequate financial resources, also conditioned by pertaining legislature. In Slovenia it is changing alongside social and political changes. Since the beginning of the 20th century we can discern seven distinct periods, which conditioned different types of financing¹⁹:

(Until the Second World War)

Before the Second World War housing provision, in the present sense of the expression, could be seen only in cities. There, besides owner-occupied houses, there was a certain stock of profit based rented apartments owned by smaller or larger private investors. There was also a sizeable stock of social non-profit apartments owned by municipalities or legal persons (especially near operational industrial areas) and a special type of rented apartments in »housing colonies« for employees of large companies.

(1945–1956)

During the war a large part of the housing stock was demolished or damaged so the first post-war years (1945–1947) were spent on repairs. Because of post-war industrialisation the pressure of migrants on cities increased thus causing a

housing shortage. National committees established offices that were put in charge of all the housing stock in particular municipalities. Because of rationalised use of housing space owners of larger apartments saw their property confiscated or with state pressure these committees could move the former owners elsewhere or move one or more families into their apartment (nationalisation of homes happened later!). Homes were the most important element of social policy – every person was ensured minimal housing. Between 1947 and 1956 changes occurred on two levels. The first enthroned the housing right and corresponding further rights concerning unlimited use of an apartment and prohibited cramming or moving residents. The second was financing of housing through the national budget, which also caused certain consequences. Resources from the budget were spent on collective housing and first neighbourhoods, while detached or individual building occurred in the countryside, financed by their owners since loans weren't available. Illegal building also gradually gained citizenship. Most of the publicly owned apartments were intended for politicians and professionals. The social function of the apartment diminished and instead, housing policy became part of the employment policy.

1956–1965

In 1956 municipal funds for housing construction were established and financed from compulsory contributions from salaries of all employees. Thus a relatively broad economic basis for complex building was formed. Physical persons – individual builders – could obtain loans from municipal funds to build family homes or apartments in cooperatives. These funds were the basis for the development of housing construction and connected industries. In 1958 the Law on nationalisation of rented buildings and building land was enacted, bringing many novelties to housing policies:

- The law enforced class relationships towards rented buildings and building land. Property was taken from owners of large flats at a time when rents began to correspond to the market value of a particular apartment. The idea was to prevent the tendency of rents enabling simple reproduction;
- It was estimated that the poorly developed building industry couldn't manage to provide enough to cater to the gathered funds for housing construction, therefore individual actions were stimulated, but there was not enough available and suitable land. The principle of obtaining land by expropriation was too slow, so **nationalisation** was brought in. Agricultural land near the big cities was nationalised first, triggering their rapid growth. The former owners of nationalised land (farmers) thus became a social problem. This was coupled with final and definite expropriation of owners of buildings completed before the war. The number of new, detached homes also grew immensely.

1965–1972

1965 was the year of economic reform. With the resolution about future development of the housing provision system the whole mechanism of housing was translated to the economic sector. Building for the market began. Society accepted the fact that the building industry should solve all complex problems of home and housing. Housing policy was relieved of its social component. In the housing construction model certain deformations occurred:

- the structure of prices was not public, producers behaved as monopolies – prices grew;
- norms concerning size and structure of apartments didn't exist (the price of a square meter was the same for a single-, two- or three- or multi-room apartment).

Because housing policy lost its social component, a large mass of employed people couldn't obtain an apartment. Thus **solidarity apartments** were built, which were partly financed by the buyers and builders, and not by the society as such. During this time, multi-apartment housing increased and the number of apartments or homes in detached buildings relatively decreased.

1972–1990

In this period, companies and other, so called, users of social resources, financed housing. These were obtained by various means:

- from income for solidarity (irretrievable) association – to build solidarity apartments;
- from net profit for mutual (retrievable) association – to solve housing problems of employees, professionals, building and renovating private apartments, resident halls etc.;
- from net profit and excluded from the final annual account – for solving housing problems of employees, ensuring loans for employees, dedicated bonds in banks etc.

Until 1987 the quantity of homes built was relatively large, in the early eighties more than 10.000 apartments were completed annually. In the second half of the eighties the share of housing construction in the public sector started decreasing in comparison with the private sector. After 1987 inflation caused complete devaluation of all collected resources, banks started granting loans with clauses on monthly revalorisation, but also economic strength started to diminish. In 1989 real interest rates were introduced. When socialist self-management was abolished, the system of financing funds for housing construction followed.

1991–1999

The Housing law (1991) brought two important changes in housing:

- the sale of social (public) apartments abolished social ownership of apartments (88 % of apartments in Slovenia are privately owned);
- the Housing fund of the Republic of Slovenia was established (1991), through which the National housing programme should be financed, and to stimulate housing construction, renewal and maintenance of homes; it is a public legal person with rights, obligations and responsibilities, as stipulated by law.

The housing law is built on the principle that care for assuring oneself a home is the affair of the individual, while the state takes care of those that are unable to take care of themselves by applying social correctives. Instead of the principle »ensuring provision of a home«, enacted in the past, the new one is »enabling obtainment of a home«. Thus housing has become less bureaucratic and administrative allocation of homes has been replaced by procedures on the organised housing market and support for individual initiatives.

The most important provider of reasonable housing loans with acceptable interest rate is the Housing fund. The main source of its capital was the 20 % share of sold, privatised apartments. In 1995 certain resources were granted from the national budget. According to the Housing law municipalities and non-profit housing organisations also established housing funds. However, resources for crediting social and non-profit apartments grew scarce. In 1995 the Housing fund issued the first series of bonds for physical persons, intended for purchasing apartments with contractually tied construction firms. The law also categorised types of apartments: owner-occupied, non-profit, official and profit.

1999–

The National housing savings scheme, adopted by Government in 1999, increases the scope of reasonable housing loans, since it stimulates long-term saving. It is implemented through the Housing fund and banks chosen through public competition. Such saving is attractive because it grants a certain premium added to the amount saved after each year. It also provides reasonable loans. Long-term saving should ensure an adequate amount of resources for long-term housing loans. The first will be available in 2004, when demand for apartments will probably increase. Activities for their provision will have to start soon, above all provision of building land and infrastructure. In 1998 the Housing fund issued the second series of bonds for legal persons, the third in 2001 and the fourth in 2002 which are intended for increasing the capital of the Fund and facilitating execution of tasks stipulated by law.

In Slovenia we should build or renovate at least 10.000 apartments annually. According to the National housing programme this would mean 2.500 non-profit rental, 2.000 social rental, 5.000 owner occupied and 500 profit rental apartments.

6. Contemporary housing

What is happening on the European level?

»Apparently« new concepts are emerging, still relying on former ideas, but integrating new programmes for vacant degraded areas (*Borneo Sporenburg*, Amsterdam, Geuzen and West 8, 1993–1996). Vacant lots in cities are still being filled in in the classical »perimeter block« manner (*Gazeau*, Paris, 1996). Great emphasis is given to architectural expression. The concepts include mixing and mobility in all directions (*Amsterdam*, MVRDV, 1994–1997). Last but not least, new forms of housing types are emerging with new types or meanings of living (*Bordeaux*, Marzelle et al., homes for emigrants, 1991–1994).

Can we compare foreign examples with new housing areas in Ljubljana, such as *Koseški bajer*, *Bežigrajski dvor*, *Grba* and *Nove Poljane*? What do they mean on the urbanistic level and how will such long-term development affect high quality organised multi-apartment building? We can only say that »new« concepts don't in fact contain »anything new«, they do however stress the importance of individuals and pleasant living²⁰, which is conditioned by high quality, aesthetical architecture, which is »pleasant to behold«.

Are we still lagging behind?

There were several examples of organised multi-apartment building in Ljubljana during the last few years (we cannot speak about them as »estates«, because of their rather small scale) – *Koseški bajer-Mostec* (mixture of various structures of small-scale social housing, building in nature, varied combination of architectural expression of particular buildings), *Bežigrajski dvori* (urban, open composition of housing blocks with unified content, undefined open spaces, which should resemble a park), *Nove Poljane* (uniform architecture and urban layout, strict spatial composition, unemphasised social structuring, which is nevertheless present). All of them seek small urban scale with all characteristics of modern European scale.

We are seriously lagging behind where technology is concerned. In ecologically more conscious countries (Germany, Austria, Switzerland, France, Scandinavian countries etc.)

new technologies are being pushed forward²¹. There modern architectural practice (*Rödental-Spittelstein*, Germany²², *Ballerup*, Denmark²³, *Luzern*, Switzerland²⁴, *Vorarlberg*, Austria²⁵ etc.) is responsive to environment protection doctrines. These actions manifest themselves by building constructions and elements, which can be dismantled and are replacing the prevailing use of reinforced concrete. Their rationale lies in principles of ecological assessment and principles of recycling and regeneration. Architecture conceived in this manner that uses light prefabricated elements and exuberant use of glass is actually very contemporary and fashionable. Particular materials used for construction and load-bearing elements are later, after they have served their purpose, dismantled, sorted and reused, others are recycled and only in the final phase discarded. These constructions are ecological with definite prospects, much more than for example reinforced concrete ones. After being used, the latter usually end up in refuse dumps. The ecological component, which was in recent practice not considered with adequate respect, is becoming increasingly important. Therefore tackling this issue is inevitable.

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Notes

- 1 Zlodre, Janko (1984): On the »function« of the imperfect machine, AB No. 68/69, pp. 54.
- 2 An interesting diversion: »The concepts of our new apartments mainly differ in the arrangements of the household part: we have residential kitchens with badly arranged kitchen equipment, living rooms with kitchen niches and inherited parts of kitchen furniture, which were suitable for households with maids that found employment elsewhere after 1945. The first post-war apartment blocks in Ljubljana were built without kitchens, the idea being to relieve housewives from cooking and to feed the population in collective refectories. The refectory was built, but families don't use them; they prefer to place a stove in their rooms.« Fürst, Danilo (1951): A contribution to the question on development of residential standard in Slovenia; Arhitekt No.1, pp.7.
- 3 »However, this is were dialectics between »inside and outside« begin, between the home where we live and open space ... this is the dialectics between human desire to be protected, which one achieves in ones »home«, and striving for the frontier, towards space and expanses, away from the clutches of one place. We could also say: this is the dialectic tension between man, searching for shelter, rest and quiet, and the human hunter, that has still, right up to the present day preserved this atavistic sediment from times immemorial. Bollnow correctly states that for the human the home is still a nest, where one experiences primeval happiness of living, in this aspect still feeling related to animals. Existentialists are therefore wrong, when they state after Heidegger, that »primeval human experience« lies in the threat as a consequence of being »thrown into the world«. No! The primeval experience is »protection« in »maternity« of home or nest. As Goethe put it, »a man without a home« (or better still: one that doesn't live in a home) is a »non-man« (*Unmensch*). As soon as we relieve one of protection, in fact the secrecy of the home or apartment, we take ones peace and human decay is inevitable, says Bollnow.« Trstenjak, Anton (1984): Ecological psychology; issues and perspectives; ČGP Delo, Ljubljana, pp. 191.
- 4 Building ecology: Today we are quite aware of the harmful effects that certain materials and building technologies have, therefore amongst the most conscientious there are already new ideas pointing out approaches to building. In the future three criteria will have to be given full respect:
 - ecological concepts – building layout that respects the given natural environment, active use of solar energy, use of radiosthetic data;
 - ecological construction – construction rationale and use of building technology that have least negative effects on humans and the environment (building elements and constructions that can be dismantled, traditional building technology);
 - ecological choice of materials – local materials, low-energy materials, regenerative materials, recyclable materials.
- 5 Under the auspices of Prince Albert, Edwin Chadwick and Lord Shaftesbury, the architect Henry Roberts designed a series of Model Houses for the Great Exhibition of 1851. According to separation and denomination of spaces and selective connections between them, a foundation would be enacted according to which moral and social improvements of a population would be enacted ... he used perforated bricks as the construction material, which would as a good insulator also insulate particular homes from each other. The home offered a family »quiet, peace and comfort« and simultaneously excluded life on the street, public buildings, places of entertainment and nocturnal meetings. It was a home, which should paralyse, isolate and cleanse the family, right up to the annulment of noise and unrest, passion and violence. Such a home is only a necessary addition to hard work ...« Zlodre, Janko (1984): On the »function« of the imperfect machine, AB No. 68/69, pp. 54, 55.
- 6 Similar to the theoretical findings of Ebenezer Howard and George Pullman predicted for peripheral areas, Clarence Perry (1872–1944) did the same for inner city neighbourhoods (»garden suburb« of Forest Hills Gardens, New York). His scheme for a »uniform neighbourhood« – self-sufficient residential area, fed from the main communication route, with shops and all essential daily offer and a primary school as the central point.
- 7 Wright, F.L. (1958): *The Living City*, Bramhall House, New York.
- 8 Research of urban structures that emerged from the idea about renewed integration of order and form before the industrial revolution into the contemporary city. Krier's reconstructions are based on Sitte's theories.
- 9 <http://www.google.com/search?hl=en&q=ecolonia&btnG=Google+Search>
- 10 The new era of development in Ljubljana started after the earthquake in 1895. After WW2 the city didn't expand according to a uniform urban development concept, but occurred by partial urbanistic solutions. The most significant obstacle in the city's development was the railroad. In the South development was stopped by the marsh, causing development to move northwards, to the railway and beyond.
- 11 Ivan Vurnik – Slovenian architect, J. Koželj, ed., AB, special issue, No. 119/124, 1994, pp. 89.
- 12 Housing estate in Šiška (1947–51 – J. Usenik, F. Tomažič, D. Bohinc), housing estate Čečovje today part of Ravne na Koroškem (1949 – M. Bohinec), Kidričevo near Ptuj – previously known as Strnišče (1948–50 – D. Fürst).
- 13 An example of such organisation is E. Ravnikar's idea from 1958 for an ideal housing estate for 5.000 inhabitants.
- 14 (Aleksander, C.: limitations of the tree system that enables only singularly, hierarchically distributed communication).
- 15 »Amongst the other urban planning solutions, completed before the general master plan was adopted, the most important ones are the construction of the new city centre on Titova Street, reserving the complex in Rožna dolina for student dor-

mitories and the South part between the Gradaščica River and Tržaška and Aškerčeva Street for research institutes. The city centre began to create a new central place with the construction of the Revolution Square, within the complex in front of the Slovenian Assembly ... Significant dynamism was brought here and elsewhere into the city's skyline and the new tall buildings gave it a new image ... The evident lack of a uniform and promising urban development concept became clear ... in 1961 the District agency for urbanism in Ljubljana was established. « Ljubljana 1945–70; The Ljubljana city archive, books in the Historical archives of Ljubljana, Ljubljana 1970.

- ¹⁶ The following estates in Ljubljana: Housing estate ŠS-6 Ljubljana Šiška (urb.: LUZ, Vovk, Šarec, arch.: Arnautovič, Peršin, Prinčič, Sulič, Stegu, 1964–69), housing estate BS-7-Ruski car (urb.: V. Mušič, Bežan, Starc; arch.: Bežan, Štrukelj, Lavrič, 1966–70 and later), Koseze (urb. and arch. Pust, 1968–74), Štepanjsko naselje (urb.: Mrva; arch.: Brezar, 1972–78), BS-3 (urb.: Jernejc, arch.: Arnautovič, 1969–75), Ferantov vrt (Ravnikar, 1964–69) Nove Jarše (urb.: Štor, arch.: Reya et al., 1987–81),...
- ¹⁷ Kos, Drago (1984): Unused potentials of the Fužine estate; RSS, Ljubljana, pp. 13.
- ¹⁸ Examples of collective low density housing in Ljubljana: Sneberje (Pust, 1970–73), Črnuče (Pust in Pavšek, 1978), Rudnik RS1, RS2 (urbanism.: Rems, architecture.: Lapajne et al., 1978).
- ¹⁹ Pust, Viktor, et al. – eds. (1984) Actual issues of housing construction in Slovenia, AB No. 68/69.
- ²⁰ The quality of living and the living environment are being increasingly stressed, however when we as the users walk along Večna pot towards Šiška past the new housing estate we wonder, where are all the measures and principles?
- ²¹ Horden, R. in Vogler, A., (1998), Bauen mit Systemen, Detail 5, Institut für internationale Architektur, München, pp.761–766.
- ²² Wohnbebauung in Rödental-Spittelstein, (1997) Detail 1, Institut für internationale Architektur, München, pp.41–45.
- ²³ Wohnanlage in Ballerup, Dänemark, (1998), Detail 3, Institut für internationale Architektur, München, pp. 348–351.
- ²⁴ Wessely, H., Einfaches Bauen in der Schweiz, (2001), Detail 3, Institut für internationale Architektur, München, pp. 394–395.
- ²⁵ Vorgefertigte Wohnhäuser in Vorarlberg, (2001) Detail 4, Institut für internationale Architektur, München, pp. 628–629.

Illustrations

Figure 1: *Is this the answer to modern, comfortable living? The wish of all inhabitants of our planet is to live in one's own home, on one's plot with an access path and of course swimming pool. Hereby as users we ask ourselves: will we need a special code to find our own home in such an environment ... how important will the aesthetical image of the building be in the future ... isn't a more comfortable and real option for the overstressed individual of the present a multi-apartment building, which inherently contains all humane principles of the contemporary society?*
(Source of photos: Salazar, J., Gausa, M. (1999): *Single-family Housing; the Private Domain; Birkhauser publishers, Actar, Barcelona*).

Figure 2: *From the first models by Howard, the idea of the Garden city even today endures, repeats itself, changes and adapts ... Howard's first sketches present the main idea – joining the city with the countryside into a »pleasant social environment«*

(Source: <http://www.library.cornell.edu/Reps/DOCS/howard.htm> and <http://www.leitchworthgardencity.net/>)

Figure 3: *Housing estates planted in »the middle of open green spaces« as industrial estates in greenery, i.e. dislocated areas in pleasant green environments, offering labourers pleasant living. A – the site of the built housing estate Strnišče (Kidričevo), arch. Fürst, B – model of Strnišče (Kidričevo), arch. Ravnikar, C, D – Housing estate Šiška, Ljubljana today*
(Source: A, B – Arhitekt No.1, 1951; C, D – photo: author, M. Z. S.)

Figure 4: *New multi-apartment estate in Ljubljana – Mostec or Koseški bajer. The estate tries to unify the ideas of the garden city – pleasant living in nature, and the neighbourhood – added offer within the estate, self-sufficiency of the multi-apartment unit. An estate that integrates socially diversified housing units within the framework of un-innovative technology.*

Figure 5: *A building built according to ecological principles and constructed from environmentally- and human-friendly materials and elements that can be easily replaced, dismantled after use, sorted and reused or recycled.*
(Source: Horden, R., Vogler, A.: *Bauen mit Systemen, Detail 5, 1998, pp.761–766*).

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Tihomir JUKIĆ
Srečko PEGAN

Traditional values, quantitative growth and qualitative development Key Study for Master plan of Osijek

1. Introduction

This scientific research of the town of Osijek in Croatia presents the implementation of principles of urban rehabilitation. The concept of urban rehabilitation of Osijek has radically changed because of new geopolitical and economic circumstances and negative demographic processes. The new concept is based on redevelopment of built structure, as well as principles and goals of ecological planning and environmental protection. Osijek is particularly valuable in terms of its architectural heritage and park design. It is necessary to prevent such reconstruction of certain town areas that could allow inappropriate relations, which could obstruct high quality city design, both in terms of traffic regu-