

THE TYPOLOGICAL ANALYSIS OF THE DEVELOPMENT OF MOBILE HOUSING IN POST-INDUSTRIAL EUROPE

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ANNOTATION

The article is devoted to the problem of using mobile housing in the territory of postindustrial Europe. In the work the analysis of typological organization of mobile habitation is made on the basis of studying modern European experience. As a result of the study, the main typological varieties that have spread among the population of different socio-demographic composition have been identified. The article deals with issues related to the constructive and functional possibilities of individual space-planning types of modern mobile housing, in particular, typological trends based on the volume-planning principles of block-container production, in particular, using Cargotecture technologies and capsule-type dwellings. The work compares the development of the mobile residential industry in various European regions of the postindustrial period and notes the progressive nature of the introduction of new constructive and technological areas in the countries of Western Europe. In the presented article are analyzed the possibilities of residential mobile products in the market of building technologies in the conditions of modern Ukraine. As a result of the study of mobile housing produced by Ukrainian construction companies, distinctive features have been revealed, evidencing the nature of the social and economic order for mobile residential products.

Keywords: mobile housing, Cargotecture technologies, capsule-type dwellings, aquatic housing, auto-housing.

The material representation. At the present stage of development in the European continent, mobile housing is used very widely and has a wide typological range, especially in Western Europe (historically, the western part of the European region does not belong to the evolution zones of traditional mobile housing, in contrast to the steppe areas from the Danube to the Volga, which were from the deep antiquity and, until the end of the XVIII century, under the control of nomads) [6].

In the conditions of postindustrial Europe, the formation of the social and typological demand for mobile housing is, in many respects, based on global criteria, determined primarily by public migration processes, but in some regions the structure of mobile residential technologies has features.

So, in particular, the general tendency in the development of modern mobile residential technologies has been the active use of mobile residential modules full factory readiness.

In the West-European region, a wide range of typological trends have been developed, based on the volume-planning principles of block-container production:

1. Mobile housing using the technologies "Cargotecture" - a new architectural style based on the use of former transport-freight containers, primarily marine (the origins of container architecture are connected with the North American continent, the designer and painter from New Jersey Adam Kalkin one of the first began to popularize the idea of creating mobile homes with the help of Cargotecture technologies) [1].

The largest distribution in Europe of mobile housing Cargotecture style has received in countries with large port cities, especially in the Netherlands, Germany, Denmark, Norway.

In Western Europe, mobile housing from former cargo containers is widely used to organize the residence of various contingents: students, recreators, tourists, emigrants, refugees, etc. (Fig. 1).



Fig. 1. Recreational mobile home from a sea container

Examples of the organization of student accommodation were numerous mobile hostels from the reconstructed sea containers. Among the largest campuses is the Keetwonen student residence complex in Amsterdam, built in 2005 out of 1,000 container modules. The volume-planning solution of the Keetwonen campus includes 5-storey residential buildings (of 1 and 2-room apartments), separated by small courtyards (some of which serve as bicycle parking lots) and a developed social service infrastructure.

In Copenhagen, Cargotecture technologies were used to create student housing on the water. For example, the residential volume of the converted shipping containers for 12 people is installed on a floating platform located in the Öresund strait (in addition to the private space in the hostel, there are common areas: a roof terrace, a barbecue area, a courtyard, a bathing platform, a wharf for sea transport).

Also, Cargotecture technologies are used to create inexpensive varieties of hotel accommodation (for example, a mobile mini-hotel from transport containers "Snoozebox" in the UK, used for mass entertainment events).

At present, container technologies are widely used in solving migration problems [2]. Container camps for immigrants and refugees are increasingly appearing on the outskirts of many Western European cities, as a new reality and a form of mass housing designed for a longer period of residence than in tent settlements [4].

Cargotecture technologies started as creative experiments 20 years ago, are now recognized as a promising and rational direction for a number of reasons:

- the resource of recycled material available for construction is not actually limited (mainly 20 to 40 feet wide and 2.4 m wide transport and cargo containers are used);
- significant advantages (economic, temporary, energy saving), related to the specifics of the accelerated technological process of converting former containers into building modules;
- a significant reduction in the negative impact on the environment;
- high strength characteristics of transport and container modules.

However, along with the merits, in the residential buildings created by the Cargotecture industrial technologies, less positive features are revealed. In particular, these are problems related to the ergonomics of living quarters:

- small size of the internal space;
- low sound insulation of structural materials of container modules (the metal base of the container unit has high sound permeability, for example, during the rain, the rustle of the outer shell is particularly felt);
- high thermal conductivity (in hot climatic and weather conditions, there are real problems associated with overheating of premises, it is problematic to use during the frosty period).

The consequence of the low quality of the residential environment from freight containers is the low cost of living in them (as a rule, the payment for container housing is many times lower than in houses built from traditional materials).

In the countries of the European part of the post-Soviet space, the former container for cargo transportation is still used primarily as trading and storage facilities.

2. Mobile dwellings-capsules - constructions with extremely compacted functional-planning parameters (since the end of the 20th century, capsular housing construction has become one of the ways to solve the acute housing problem in megacities and industrial and urban agglomerations of East Asia).

In recent years, experiments with capsule housing have become more and more "prevalent" in Europe - in Germany, the Netherlands, etc., especially for the organization of residence while studying.

For example, architects from Rotterdam developed capsule inhabited modules "Spacebox" with a living area of 18 and 22 square meters, currently used as student hostels (for example, in Delft).

In Germany, on the territory of a stationary campus in Munich, are installed mobile capsule-containers "O2-Village" with an area of 7 sq.m. (Fig. 2).

Also, cheap sleeping boxes are gaining popularity with low-income tourists who are content with a small-sized overnight stay. At the same time, mobile lodging boxes equipped with only one or double bed can be installed inside the dwelling (for example, the Dutch sleeping boxes "Cityhub").



Fig. 2. O2-Village Container Capsules

Experiment to install a mobile ultra-compact sleeping device is being prepared for implementation in Russia. "Sleep box" area of 3.75 square meters, designed by the Moscow architectural studio Arch Group, is designed for sleeping and relaxing in crowded public places - in offices, shopping centers, schools, waiting rooms for transport terminals or just in the middle of the pedestrian part of the street. The rental of a sleeping room can last from 15 minutes to several hours (in the "Sleep box", it is proposed to place a bed with a system of automatic change of linen from cellulose tissue, as well as soundproofing, ventilation, sockets for laptops and mobile phones, TV and wi-fi).

In recent decades, despite the complexity associated with the extreme compactness of capsule houses, various design and space-planning solutions for recreational housing have been created.

For wealthy travelers - lovers of extravagant rest, nomadic mini-houses with autonomous life-support systems and an increased level of comfort are offered (for example: "Loft Cube" - "flying house", moved by helicopter, which allows to "park" on the roofs, architect B Eisslinger, Germany, floating spherical capsule, architect Marsin Panpach, Great Britain, etc.).

3. Motorhomes (caravans: self-propelled camper and towed caravans-trailers), basically, representing a small-sized apartment-studio, installed on the automobile chassis (Figure 3).



Fig. 3. Motor home trailer

For the majority of constructive typological varieties of mobile tourist accommodation located on vehicles, a high level of operational quality and artistic and aesthetic characteristics of external and internal design are characteristic, allowing them to be classified as dwellings of the highest categories (elite, luxury, business class, etc.).

The main types of constructive arrangement of dwelling bodies are: vans, having an integral container construction; folding wagons from folding rigid panels; combined, equipped with an additional folding awning (on the basis of

these types, numerous variants of modifications of residential vans have been developed, mainly using the hinged transformation mechanics).

Along with the recreational and tourist use of an motor housing designed for collective or family travel, special compartments for the rest of drivers are arranged in the cabins of trucks for long voyages. The most widespread among European and world manufacturers of lorries has received a constructive solution of the cabin with an "integral" sleeping compartment (the zone for resting the driver is arranged in the form of a cab extension, not speaking for the dimensions in width).

The practical experience of using mobile transformers without an automobile wheel base is not yet large enough, despite the many design and experimental models offered both for batch production and exclusive art capsules, mainly related to recreational use.

A separate functional and typological series represents mobile housing on *the water*. On the European continent, the widespread introduction of mobile floating technologies began after the Great Patriotic War of 1941-1945 and was associated with the solution of the acute housing problem in the recovery period (in many coastal countries, under the social cheap housing converted numerous decommissioned ships and barges).

At present, the formation of aquatorium housing is primarily related to the search for alternative places to live in conditions of overcrowded land (in the presence of natural and hydrological prerequisites); also, floating residential objects are arranged in the organization of tourist, recreational and entertainment activities. In Europe, the highest level of use of mobile floating housing (in the form of individual housing, hostels, student hostels, etc., is characteristic of the Netherlands).

The architectural and planning organization of modern mobile housing on the water presupposes constructive and technological solutions using floating foundations and light frame structures for the construction of a residential part (based on the traditional principles of the construction of a floating dwelling on rafts and boats).

The hidrodome, depending on the principle of the floating foundation, has a different degree of mobility and is divided into two main types:

- with fixed mobility (at home on the floating skeleton of the ship, at home on pontoons, including using a combination of pile and pontoon bases, etc.);
- highly mobile floating residential systems (based on the principles of creating houses-ships with the operation, as a rule, in an autonomous mode) [7].

In modern conditions, various types of frame and awning structures are traditionally popular, used as camp tourism, army housing, for accommodation of

migrants and refugees, for evacuations in emergency situations (for individual or collective accommodation, as portable sleeping accommodation, and transportable with the help of vehicles) [3].

Individually portable tent shelters (tents of individual or small capacity, sleeping bags, hammocks) are most actively used in tourism, connected with the complexity and inaccessibility of routes laid in natural landscape conditions (walking and skiing, mountaineering and rock climbing, rafting, speleotourism etc.).

In the countries of the Eastern European region, especially in the republics of former Soviet Union, mobile housing is less widely used than in Western Europe.

For example, in the modern Ukrainian market of building technologies, domestic mobile products are represented, for the most part, by construction and summer cottages of modular container type (including wheeled).

Recreational housing modular-container type for use as mobile cottages and tourist caravans in modern Ukraine has not yet received active development.

For the majority of Ukrainian construction firms, there is a lack of a narrowly specialized mobile residential specialization - as a rule, mobile housing production occupies only a certain share in the total output of a wide profile (there are more than 20 large mobile home producers in the country).

Many domestic construction companies, along with the erection of mobile residential facilities, are engaged in the manufacture of prefabricated buildings of container type using modular technology: trade and warehousing, household and industrial purposes (kiosks, guard posts, garages, hairdressers, household items, and so on) [5].

Manufacturers of residential mobile products offer a variety of project-price variability, in particular, the construction of dacha-recreational mobile housing under the order and on individual projects, while using designs and components of materials of Ukrainian and foreign production.

As an example of Ukrainian construction firms specializing in the production of recreational products of high artistic and aesthetic quality, one can note the activities of companies for the production of wooden cottages "Izbud" (Kyiv) and "Maria" (Zhytomyr region).

Along with Ukrainian companies that directly produce mobile residential products, a system of leasing, selling and re-equipment of all types of mobile structures of container type from metal structures and sea freight containers (with the full complete disinfection of external and internal surfaces) is being established in Ukraine; also the intermediary activity on sale of mobile cottages of foreign manufacture on system «dropshipping» also gets popularity.

Conclusions. Socio-economic conditions of post-industrial Europe suggest active use of mobile housing for various socio-demographic categories of the population. Structural and functional capabilities of new space-planning types of mobile residential products make it possible to use their typological assortment when creating temporary and alternative housing.

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