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MOBILE HOUSING FOR RECREATIONAL USE IN POST-INDUSTRIAL PRYDNIPROVIA



Introduction. In the post-industrial period of the society development, under the conditions of economic globalization and a high social mobility, the use of mobile housing is a relevant and promising direction.

Problem Statement. In the socio-economic conditions of modern Ukraine, the practical and advantageous mobile residential technologies have great prospects for the development, especially through organizing recreational and tourist activities.

Purpose. To study the opportunities for using recreational and tourist mobile housing in the existing natural-land-scape fund of the post-industrial Prydniprovia.

Materials and Methods. An integrated methodological approach, general scientific and applied methods, including, bibliographic and comparative historical methods (archived local historical heritage, modern scholarly research publications and regulatory documentation), field surveys and photographing, experimental modeling.

Results. In the natural-landscape zone of post-industrial Prydniprovia region, there are many lands disturbed by maninduced load. However, in the case of its termination or significant reduction, the ecological state of the environment can be optimized. Design solutions for the organization of temporary mobile housing for recreation in the structure of potential natural-landscape fund of the region have been offered.

Conclusions. The use of recreational and tourist mobile housing in safe green landscapes seems to be an expedient and promising functional typological direction, because the organization of recreational housing in the mobile form is based on an environment friendly approach that aims at maximally reducing the man-induced load and preserving the natural environment.

Keywords: recreational and tourist mobile housing, complex natural-landscape zone of post-industrial Prydniprovia, mobile organization of recreational and tourist activities.

Mobile residential technologies have been widely used in various regions of the modern world. The structural and technological features of mobile housing enable to actively use it, first of all, for the organization of temporary accommodation in the industrial development areas and housing in the recreation and tourism industry, as well as in the field of capital construction.

In the socio-economic conditions of presentday Ukraine, the problem of using the mobile housing facilities for recreational and touristic purposes is very important, especially, for the organization of leisure for both children and adults, in summertime.

The importance of this research is related to the problem of developing the mobile form of recreational and touristic accommodation in the conditions of the post-industrial Prydniprovia, namely, in the landscapes of the integrated green zone of Dnipro-Kamianske (former Dnipropetrovsk-Dniprodzerzhinsk) industrial and urban agglomeration.

The analysis of recent publications has showed that a lot of special studies in various countries of the world deal with theory and methodology of mobile architectural forms. Some aspects of modern mobile housing have been studied in PhD researches by I.K. Khvylia (the development of mobile recreational housing and the definition of types of architectural and design systems for different landscapes of Ukraine) [1], O.V. Panfilov (the formation of mobile housing for temporary stay, in particular, in the conditions of the shift method in the severe climatic conditions of the north, conceptual proposals for the creation of mobile settlements of the future) [2], I.S. Ekonomov (the principles of the formation of low-rise residential objects on water) [3], S.B. Pomorov (the mobile housing is considered as compensationtype housing for urban residents) [4], N.L. Tymantseva (the simulation of the living environment in extreme living conditions) [5], and by Yu.I. Blinov (the awning structures and facilities) [6].

This research deals with the possibilities of using recreational and tourist mobile housing in the conditions of the existing natural landscape of the post-industrial Prydniprovia.

The ancient history of the Prydniprovia, as well as of the whole steppe zone of Ukraine is inextricably associated with nomadic herding tribes who used mobile housing, primarily, based on wheeled vehicles (the oldest archaeological find in Eastern Europe related to wheeled transport is the cart from the Watch Tomb burial mound (the 3rd millennium BC) in the Dnipro Oblast) [7].

A significant contribution to the development of mobile wheeled housing was made in the Scythian period. In the ancient era, in the steppes of the Northern Black Sea maritime region, two basic types of nomadic mobile housing, the Scythian and the Sarmatian, were popular. It should be noted that the Scythian kibitkas were greatly diversified in terms of the housing body configuration based on conical and pyramidal yurts, with rectangular and square plan views [8].

In the Middle Ages, in the Wild Steppe, where the waves of various nomadic ethnic groups were replacing each other repeatedly, the mobile housing, especially, wheeled non-assembled one, was widely used (the archaeological finds related to wheeled vehicles mostly have the Polovtsian and the Tatar-Mongolian origin; the maximum number has been found in the Dnipro Oblast) [9, 10].

After the expulsion of the Tatar-Mongolian invaders, the nomadic mobile housing has not been practically used in the territory of Ukraine (later, the steppe zone was explored and settled by sedentary population having a multinational ethnic composition). Since that time, the mobile housing was used mainly in the military life in the form of various booths and tents.

New configuration types of mobile housing in the territory of modern Ukraine appeared in Soviet times and, as usual in the USSR, were associated with capital construction, in contrast to the foreign practice of active development of mobile housing in many typological areas, in particular, the recreational and tourist mobile housing based on motor vehicles (campers and trailers of various designs).

In today's Ukraine, the mobile housing has a limited functional and typological scope of application. Normally, only mobile/inventory housing is regulated. It is used mainly in construction or adapted to suburban housing [11]. The recreational and tourist mobile housing that is very popular abroad, in Ukraine is under formation, despite a huge recreational and tourism potential.

However, unfortunately, a significant part of Ukrainian landscape, historical, and cultural assets are located on ecologically polluted territories.

The recreational and tourist potential of natural landscapes in industrial regions, in particular, in the conditions of natural environment damaged as a result of a significant industrial and human-induced impact, can be exemplified by Dnipro-Kamianske industrial and urban agglomeration.



Fig. 1. Wood and lakes in the place of former sand quarry near Samarsky island (the Dnipro City)

The industrial base of the Dnipro-Kamianske industrial and urban agglomeration was founded at the end of the 19th century. Over time, it had made the region one of the most influential centers of the Russian Empire and the USSR in terms of economy and politics.

In the second half of the 19th century, the Prydniprovie lands were mentioned as "Russian California" or "Ukrainian Ruhr", where "there are huge natural resources that need to be developed" [12]. However, the population's high standard of living cost an unjustified price, the damage of the landscape ecosystem in urbanized areas of the Middle Dnieper and, which has resulted in serious environmental problems.

According to historical data, in several decades after the foundation of Katerynoslav (former Dnipropetrovsk, now Dnipro), the thick woods that had been growing along the right bank of the Dnieper River near the Cossack settlement Polovitsa (the first attempts to found the city on the marshy and reedy banks of the Samara River, had failed) was intensively cut down to free the space for the city [13, 14].

Among favorite recreation places of Katerynoslav population there were forests, the Monastery's Wood and Negrescula, located 3–4 miles southwest to the city [13]. Also, people practiced retreats to numerous islands on the Dnieper River, for which ferry boat lines were set up. The

most attractive place for leisure and recreation was the riverside near the unique Dnipro rapids that were flooded in 1932 during the construction of DniproHES in Zaporizhia.

The city of Kamianske (Dneprodzerzhinsk) owes its rapid development to the Dnipro metallurgical works (formerly the Warsaw Steel Mill that resumed its operation in 1886, when the Warsaw corporation together with all its workers and employees was finally moved to the banks of Dnieper, near the village of Kamianske that likely had been established by Zaporizhian Cossacks), the leader of metallurgy industry of the whole tsarist Russia [12].

The present-day environmental problems of the Pridniprovia traced their roots back to the 1880s and 1890s, the period of rapid construction and commissioning of the first metallurgical corporations of the Dnipro-Kamianske agglomeration. At this time, the enterprises started to breach the sanitary-and-hygienic standards, which has led to severe harmful effects (absence or insufficient parameters of sanitary protection zones, discharge of untreated wastes into the atmosphere and water bodies, accumulation and storage of harmful waste in settling ponds and dumps in conditions, which do not meet safety requirements, etc.).

Nowadays, a significant part of the residential development of the Dnipro-Kamianske agglomeration is located in the vicinity of large metallurgical, chemical, and power engineering corporations producing very harmful pollutions. There are over 170 plants in the city of Dnipro, and 58 ones in the Kamenske region [15, 16].

The most unfavorable ecological situation has been reported in some agglomeration territories on the right bank of the Dnieper River (according to the data of the environmental passport of the city of Dnipro, about 40 enterprises are discharging waste water directly into the Dnieper and other rivers, in the gully network). The green landscapes of the main recreational fund and reserves are located on the left bank, where anthropogenic impact is much less pronounced [17].

In the conditions of severe pollution of the populated areas of the agglomeration, the sanitary role of green plantations, mainly the species that have been growing in this area since ancient times, is of paramount importance. Modern data of biochemical studies have proved the antimicrobial and purifying properties of green land-scapes: 1 m³ forest contains 200—300 times less bacteria than 1 m³ industrial area; 1 hectare green plantations can absorb 5—10 tons of carbon dioxide during the vegetation period; 20—60% of fluorine compounds; 14—65 tons of dust and can produce 10—20 tons of oxygen into the atmosphere [16].

The integrated green zone of the Dnipro-Kamianske agglomeration is spatially differentiated into green landscapes of different typologies (typical for large urban formations). The structural elements of the green zone are distinguished by the degree of recreational, economic, and sanitary use. In the green complex there are objects of the natural reserve fund and rare tree plantations.

The forests of the valley area on the left bank, which act as protective green belt around the Dnipro and Kamianske (floodplain forests, oak woods, pine forests, and ravines) have the largest recreational potential. On the right bank, in the conditions of developed gully system, only some small ravine-type forests have survived [17].

The damaged lands can be recovered both by self-regeneration and by artificial landscape reclamation, provided the anthropogenic load is stopped or significantly reduced.

Examples of the self-recovered natural landscapes within the Dnipro-Kamianske agglomeration are:

→ green plantations that were growing in the past 20—30 years in the places of former sand quarries in the Dnieper River near the Samara Island (instead of sand dunes, now there are thick plantations of willows, poplars, acacias, and sea buckthorns habituated by the traditional fauna, with the places where sand was excavated forming lakes that represent a single water system of the Samara River) (Fig. 1);



Fig. 2. Lake in the place of former granite quarry (the Lenin Park in the Dnipro City)



Fig. 3. The protection zone around Sukhachivske-1 tailing dump

★ the filling of dead quarries with groundwater and the formation of picturesque lakes (for example, such popular recreation places as the Blakytne Lake in the village of Yelyzavetivka, near Kamianske, and the lake in the Lenin park, in the residential area Chervonyi Kamin, in the city of Dnipro, which has been included in the natural reserve fund) (Fig. 2) [18].

Unfortunately, on the territory of Dnipro-Kamianske agglomeration, there are natural landscapes damaged as a result of anthropogenic impact, which bear a serious environmental hazard, because these open pits are sources of environmental pollution.

The most dangerous are tailings and sludge dumps (in Dnipro Oblast, there are about 120 in-



Fig. 4. Prototype of mobile residential facilities for children summer camp



Fig. 5. Prototype of group mobile residential facilities for children summer camp

dustrial waste dumps, 12 of which contain radioactive waste; 37 million tons of radioactive waste have been accumulated in 9 radioactive hazardous dumps located between Dnipro and Kamianske, near the villages Sukhachivka and Taromske) (Fig. 3) [19, 20].

Despite very attractive view of the sanitary protection zones of some tailings (30 years after their shutdown, the flora and fauna have recovered and are characterized by a considerable diversity, as compared to neighboring agricultural landscapes), the recent soil studies have shown a high concentration of radionuclides and heavy metals, which far exceeds the background indicators) [20].

As for the tailing ponds, currently, there are projects aiming at bringing some of them to a safe condition, but their reclamation involves road transportation of radioactive soils, during which, unfortunately, it is impossible to avoid the release of radioactive particles into the air) [20].

In the modern conditions of the post-industrial Prydniprovia, the development of cultural and recreational capacity of landscapes in the system of the regional natural complex safe for human health and the organization of tourist infrastructure and recreational facilities (except for the protected areas) are of paramount importance. In this case, it is expedient to use mobile housing technologies. The introduction of mobile residential facilities in the natural environment is based on an environment friendly approach aiming at maximally reducing the anthropogenic load.

The spatial arrangement of mobile housing for recreation and tourism can be represented by the following models:

- 1. The *compact complex*: in the form of a large mobile complex (over 20—30 mobile residential objects), among which there are several basic types:
- → tourist parks of mobile modules (campsites), which can be formed by mobile residential objects based on wheeled vehicles and framed tents;
- → tourist parks that can be formed by mobile blocks not equipped with a wheelbase;
- → combined models (based on various combinations of car, tent housing, and wheel-free structures).
- 2. The *compact group* type: in the form of a small camp consisting of 8—10 mobile residential objects.
- 3. The *linear* type: in the form of a small group of mobile residential objects located in a row.
- 4. The *scattered* type: in the form of scattered residential mobile objects located within a certain area.
- 5. The individual type: in the form of an individual mobile housing object (Fig. 4).

The organization of children's recreation during the summer holidays (the traditional system

of pioneer camps in modern conditions has been transformed into children's sanatoriums and camps for recreation, sports, tourism, etc., which are based, as a rule, on stationary residential buildings or houses, except for campsites of tourist type) is of particular importance. As the children's camps operate seasonally (except for sanatoriums), the use of mobile housing (Fig. 5) can be a good option.

One of the promising directions of developing the recreational and tourist mobile housing is the creation of a system of agrarian recreational camps and agro parks for tourists whose purpose is to familiarize themselves with the process of cultivating and producing agricultural products, to be involved in it, and to get exotic (for urban people) impressions.

Also, in the present-day Prydniprovia, in the conditions of the developed hydrological network of the Dnieper River basin, floating recreation and tourist mobile housing can be actively used, for example, raft-based facilities.

However, today, the recreational and tourist development of the Prydniprovia natural landscapes is associated with many problems, the most important of which are as follows: underdeveloped information and public awareness activities, poor transport and pedestrian accessibility, difficulties related to the organization of the environmental protection regime with balanced anthropogenic load of visitors, poor culture of some people often caused by the lack of facilities (footpaths, places for rest and eating, etc.).

As a result, the existing tourist and recreation potential has been underdeveloped, which prevents the Prydniprovia residents from effective use of green landscape capacity for the rehabilitation and recovery of emotional state. Consequently, the tourist business that provides a significant part of budget revenues in most countries of the world has not been generating profit to the full extent.

Hence, in the conditions of the modern natural landscape system of post-industrial Prydniprovia, the use of mobile housing for recreation and tourism has good prospects, as the mobile form of organization of temporary accommodation in the recreation places belongs to potentially environment friendly solutions, is comfortable and cost-effective for people.

REFERENCES

- 1. Hvyilya, I. K. (1994). Osobennosti formirovaniya mobilnogo rekreatsionnogo zhilischa (MRZh) dlya usloviy Ukrainyi: avtoref. dis. ... kand. arh. Moskva. 20 s. [in Russian].
- 2. Panfilov, A. V. (2013). Osobennosti formirovaniya mobilnogo zhilischa dlya vremennogo prebyivaniya (konets XX nachalo XXI v.): avtoref. dis. ... kand. arh. Moskva. 22 s. [in Russian].
- 3. Ekonomov, I. S. (2004). *Printsipyi formirovaniya maloetazhnyih zhilyih ob'ektov na vode*: avtoref. dis. ... kand. arh. Moskva. 36 s. [in Russian].
 - 4. Pomorov, S. B. (2005). Vtoroe zhilische gorozhan kompensatsionnogo tipa: avtoref. dis. ... d. arh. Moskva. 25 s. [in Russian].
- 5. Timantseva, N. L. (2010). *Printsipyi modelirovaniya zhiloy sredyi v ekstremalnyih usloviyah obitaniya*: avtoref. dis. ... kand. arh. Moskva. 21 s. [in Russian].
- 6. Blinov, Yu. I. (1991). *Tentovyie zdaniya i sooruzheniya (aspektyi myagkih pokryitiy i perspektiv razvitiya)*: avtoref. dis. ... d. tehn. nauk. Moskva. 48 s. [in Russian].
 - 7. Terenozhkin, A. I. (1951). Kurgan Storozhova Mogila. Arheologiya, 239–241 [in Russian].
 - 8. Bessonova, S. S. (1982). O skifskih povozkah. Drevnosti stepnoy Skifii. S. 102—117. [in Russian].
 - 9. Pletneva, S. A. (1982). Kochevniki srednevekovya. Moskva. 186 s. [in Russian].
- 10. Evarnitskiy, D. I. (1904). Doklad professora Evarnitskogo o proizvedennyih im raskopkah kurganov i istoricheskih izsledovaniyah. Ekaterinoslav. 25 s. [in Russian].
- 11. DSTU B V.2.2–22:2008 Natsionalniy standart Ukrayinyi «Budinki mobilni (Inventarni). Zagalni tehnichni umovi». Kyiv, 2009. 14 s. [in Ukrainian].
 - 12. Slonevskiy, A. (2009). Ignatiy Yasyukovich. Imya v istorii. Dnepropetrovsk. 219 [in Russian].
- 13. Akinfiev, Iv. Yak. (1889). Rastitelnost Ekaterinoslava v kontse pervogo stoletiya ego suschestvovaniya. Ch. 1. Ekaterinoslav. 238 s. [in Russian].

- 14. Kernichnaya, E. A., Starostin, V. S. (2002). Retrospektivnyiy analiz landshaftno-planirovochnyih osobennostey osvoeniya territorii Dnepropetrovska. *Visnik Dnipropetrovskogo universitetu. Geologiya. Geografiya.* Vip. 4. Dnipropetrovsk, 2002. 145 150. [in Russian].
- 15. Pasichniy, G. V., Serdyuk, S. M. (2002). Geoekologichni monitoringovi doslidzhennya vmistu vazhkih metaliv u gruntah tehnogenno zminenih landshaftiv na prikladI m. Dniprodzerzhinska) Visnik Dnipropetrovskogo universitetu. Geologiya. Geografiya. Vip. 4. Dnipropetrovsk. S. 161—166. [in Russian].
- 16. Ekologiya megapolisa. *Ekologicheskie aspektyi promyishlennogo razvitiya Dnepropetrovska*. (2002). Pod obschey redaktsiev Kulichenko I. I. 368 s. [in Russian].
- 17. Pavlov, V. O., Peremetchik, M. M., Kolotenko, V. P., Shevchenko, B. E. (2000). *Ekologichniy pasport mista Dnipropetrovska*. Dnipropetrovska. 112 s. [in Ukrainian].
- 18. Manyuk Vadim, Manyuk Volodimir. (2011). *Pam'yatki prirodi Dnipropetrovskoyi oblasti*. Dnipropetrovsk. 60 s. [in Ukrainian].
- 19. Panchenko, A. F., Nechiporenko, L. G., Zhaldak, D. N. (2011). Privedenie territorii hvostohranilischa «Suhachevskoe-1» v ekologicheski bezopasnoe sostoyanie. Tehniko-ekonomicheskoe obosnovanie. Tom 2. *Otsenka vozdeystviya na okruzhavuschuvu sredu*. Dneprodzerzhinsk. 241 s. [in Russian].
- 20. Shmatkov, G. G., Serebryanaya, M. Z., Anischenko, O. L. (2002). Otsenka rasprostraneniya tyazhelyih metallov ot hvostohranilischa othodov pererabotki uranovih rud. *Visnik Dnipropetrovskogo universitetu. Geologiya. Geografiya*. Vip. 4. Dnipropetrovsk. 64–70. [in Russian].
 - 21. Miroshnichenko, A. A. (1998). Agrarno-rekreatsionnyie zonyi v Ukraine. Dnepropetrovsk. 178 s. [in Russian].

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МОБІЛЬНЕ ЖИТЛО ДЛЯ РЕКРЕАЦІЙНОГО ВИКОРИСТАННЯ В УМОВАХ ПОСТІНДУСТРІАЛЬНОГО ПРИДНІПРОВ'Я

Вступ. В постіндустріальний період розвитку суспільства, в умовах економічної глобалізації та високої соціальної мобільності, використання мобільного житла є актуальним та перспективним.

Проблематика. У соціально-економічних умовах сучасної України практичні переваги мобільних житлових технологій мають великі перспективи розвитку, особливо при організації рекреаційно-туристичної діяльності.

Мета. Дослідження можливостей використання рекреаційно-туристичного мобільного житла в умовах існуючого природно-ландшафтного фонду постіндустріального Придніпров'я.

Матеріали й методи. Використано комплексний методологічний підхід, що базується на застосуванні загальнонаукових та прикладних методів, насамперед, методи бібліографічний і порівняльно-історичний (архівна краєзнавча спадщина, сучасні наукові праці та нормативно-правова документація), а також, метод натурних обстежень та фотофіксації, експериментальне моделювання.

Результати. У складі комплексної природно-ландшафтної зони постіндустріального Придніпров'я існує значна кількість техногенно порушених територій. Але в разі припинення або суттєвого зниження антропогенного навантаження екологічний стан довкілля може бути оптимізовано, завдяки самовідтворенню природних ландшафтів або за допомогою штучних заходів з рекультивації. Запропоновано проектні рішення щодо організації тимчасового мобільного житла для відпочинку у структурі потенційного природно-ландшафтного фонду регіону.

Висновки. Застосування рекреаційно-туристичного мобільного житла у безпечних зелених ландшафтах вбачається доцільним та перспективним функціонально-типологічним напрямком, оскільки організація рекреаційного житла у мобільній формі базується на екологічному підході, спрямованому на максимальне зниження антропогенного впливу та збереження природного довкілля.

Ключові слова: рекреаційно-туристичне мобільне житло, комплексна природно-ландшафтна зона постіндустріального Придніпров'я, мобільна форма організації рекреаційно-туристичної діяльності.

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МОБИЛЬНОЕ ЖИЛЬЕ ДЛЯ РЕКРЕАЦИОННОГО ИСПОЛЬЗОВАНИЯ В УСЛОВИЯХ ПОСТИНДУСТРИАЛЬНОГО ПРИДНЕПРОВЬЯ

Введение. В постиндустриальный период развития общества, в условиях экономической глобализации и высокой социальной мобильности, использование мобильного жилья является актуальным и перспективным.

Проблематика. В социально-экономических условиях современной Украины практические преимущества мобильных жилых технологий имеют большие перспективы развития, особенно при организации рекреационно-туристической деятельности.

Цель. Исследование возможностей использования рекреационно-туристического мобильного жилья в условиях существующего природно-ландшафтного фонда постиндустриального Приднепровья.

Материалы и методы. Использован комплексный методологический подход, основанный на применении общенаучных и прикладных методов, прежде всего, методы библиографический и сравнительно-исторический (архивное краеведческое наследие, современные научные работы и нормативно-правовая документация), а также метод натурных обследований и фотофиксации, экспериментальное моделирование.

Результаты. В составе комплексной природно-ландшафтной зоны постиндустриального Приднепровья существует много техногенно нарушенных территорий. Но в случае прекращения или значительного снижения антропогенной нагрузки экологическое состояние окружающей среды может быть оптимизировано, благодаря самовозрождению природных ландшафтов или с помощью проведения искусственных мероприятий по рекультивации. Предложены проектные решения по организации временного мобильного жилья для отдыха в структуре потенциального природно-ландшафтного фонда региона.

Выводы. Применение рекреационно-туристического мобильного жилья в безопасных зеленых ландшафтах представляется целесообразным и перспективным функционально-типологическим направлением, поскольку организация рекреационного жилья в мобильной форме базируется на экологическом подходе, направленном на максимальное снижение антропогенного воздействия и сохранение природной среды.

Ключевые слова: рекреационно-туристическое мобильное жилье, комплексная природно-ландшафтная зона постиндустриального Приднепровья, мобильная форма организации рекреационно-туристической деятельности.