

DOI 10.26886/2414-634X.3(30)2019.3

UDC 728

INTEGRATION OF HOUSING UNITS IN PUBLIC AND PRODUCTION FACILITIES

V. Babyak, S. Lukyanchenko

"Lviv Polytechnic" National University, Institute of Architecture, Lviv, Ukraine

The article shows the existing methods of comparison and interconnection of residential construction, public buildings and industrial facilities. Examples are provided to illustrate the understanding of the material presented as well as the layout. In connection with the compaction of urban development, this topic deserves detailed research.

Key words: housing, residential objects integration in the already formed environment, public works, industrial production

Informative abstract. The driving processes, that are taking place now in the society, affect not only the economy, cultural life, political or international relations, science, religion, but architecture too. Architecture was not only a factor of comfortable life or indicative scale, indicating the capabilities of the state, the country, federations or confederations, but also an instrument for developing living conditions of societies and improving the functionality of the city. In order to further develop the city, it is necessary to develop a housing function and methods of its combination with other functions, such as public and industrial ones. This article describes the methods of combining housing and public functions.

Goal. To highlight the existing blockade approaches and the combination of residential, industrial and public housing development.

Presenting the main material.

1. Public function in a residential building. *1.1. Integration of a public function with the ground floors of a residential building.* The most popular type of a combination of residential and public functions is when a public function is situated on the ground floor, but the rest of the building belongs to residential one.

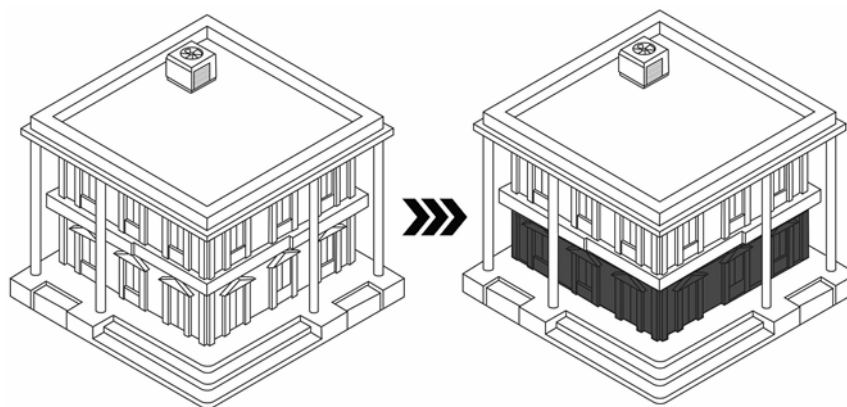


Fig.1.1 The scheme of a public function on the ground floor.

Depending on the type of a street, it is also necessary to choose which public function there is on the ground floor. Example:

A fully residential floor is arranged on a quiet residential street. In this case, it is important to make the entrance to the building from the street for social control;

On streets with medium activity. Service and catering facilities may appear on the ground floor. The main entrance to the building is from the street;

On the busy shopping malls. The public ground floors are set up. In order to avoid a conflict between inhabitants of the building and passersby, the entrance to the building from the yard is allowed.

1.2. Integration of public functions in the atrium of residential development. The next principle of the combination of a public function with a residential one is formation of a public center within the housing function.

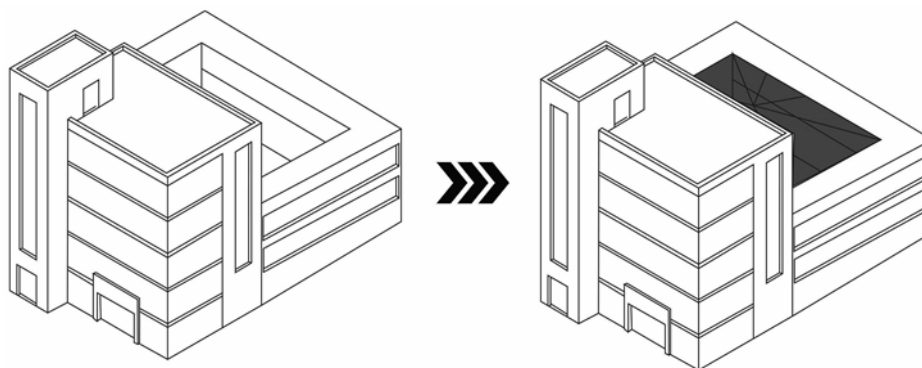


Fig.1.2 The scheme of location of a public function within a residential complex.

An example of this approach is the residential building Ingolstadt – Hollerstauden, designed by Behnisch Architekten, Stuttgart. This precedent image can be used for densely populated cities. The building introduces a dialogue between the different concepts of lifestyle, as well as different environmental approaches. The interior space turns into the core, becoming the center of the facility and interacting with other functions of the building.

The extensive public open spaces of Hollerstauden inside the atrium help residents come cross each other. The silence among people develops psychological illnesses and sleep disorders that affects the ability to work. Therefore, they need space for moral relaxation and communication with other residents, which does not bother picking up a public place.

In addition, the shape of the building is similar to the shape of a quadrilateral, which is inherent in the traditional China courtyard. That is why, it inspires to combine the strengths of the Chinese local traditional culture with modern design. The atrium serves as a garden in winter, which is a buffer for solar thermal increments.



Fig.1.2..2 Exterior Facade Residential building Ingolstadt - Hollerstauden [2.]

On the example of the Residential building Ingolstadt - Hollerstauden [2.] it is possible to select atriums typing for using and integration of housing facilities. The most important functional and compositional element of the internal environment architecture is the common usable open space. According to the degree of connection with the external environment, it is interpreted as closed or open. Public space allows to a greater or lesser extent to create a specific emotional environment, contributes to the intensification of social and trade activities, the emergence of visitors' contacts, providing recreational and entertainment facilities.

1.3. *The combination of residential buildings with public space through hybrid bridges.* This model is recommended for densely populated cities. The population works most of its time and does not always have time for socialization or, in other words, "integration into public life," so a good option for solving this problem is to design a place for meetings or a recreation area inside a residential building, i.e, a public function. The given example is a solution to the problem of combining public and residential functions.

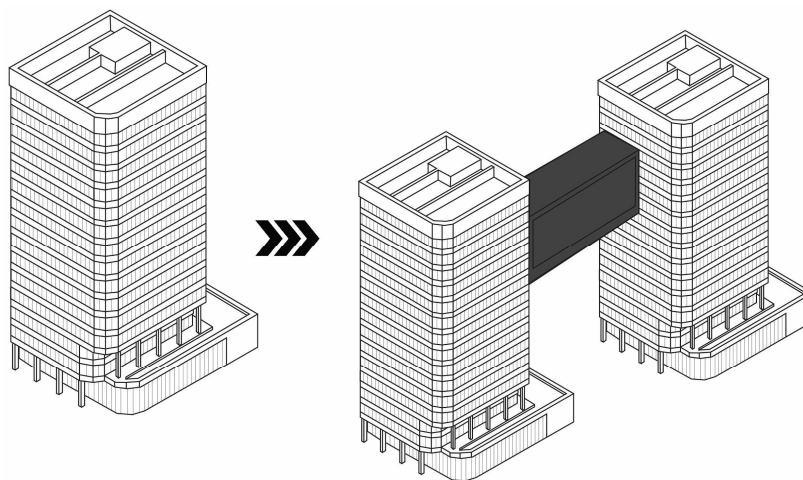


Fig.1.3 The scheme concerning the use of public bridges between residential buildings.

Like the traditional courtyard, the public space has to provide the territory with various kinds of activities that can enrich the lives of people. According to preliminary studies, people prefer to stay in a place where they could free up their stress after work. Based on the survey, the three most suitable places for urban residents are the gym, library and cafe.

Similar to the reconstruction of the semi-public space, the change for the public space depends on the plan of each apartment. The goal is to install float blocks as in Fig. 3.1.1 to get the best possible combination of public and residential functions for people. Through these public bridges, people can also return home and at the same time go to the gym, to the library or to the coffee shop to meet friends and loved ones.

In reality, there are already buildings that use this method. For example, the Linked Hybrid building, located in Beijing (China) and created by architect Stephen Holl. Linked Hybrid is a complex of eight interconnected towers. These towers include residential apartments, a hotel, a cinema, a kindergarten, a school, an underground parking lot, shopping areas and public green space [3].

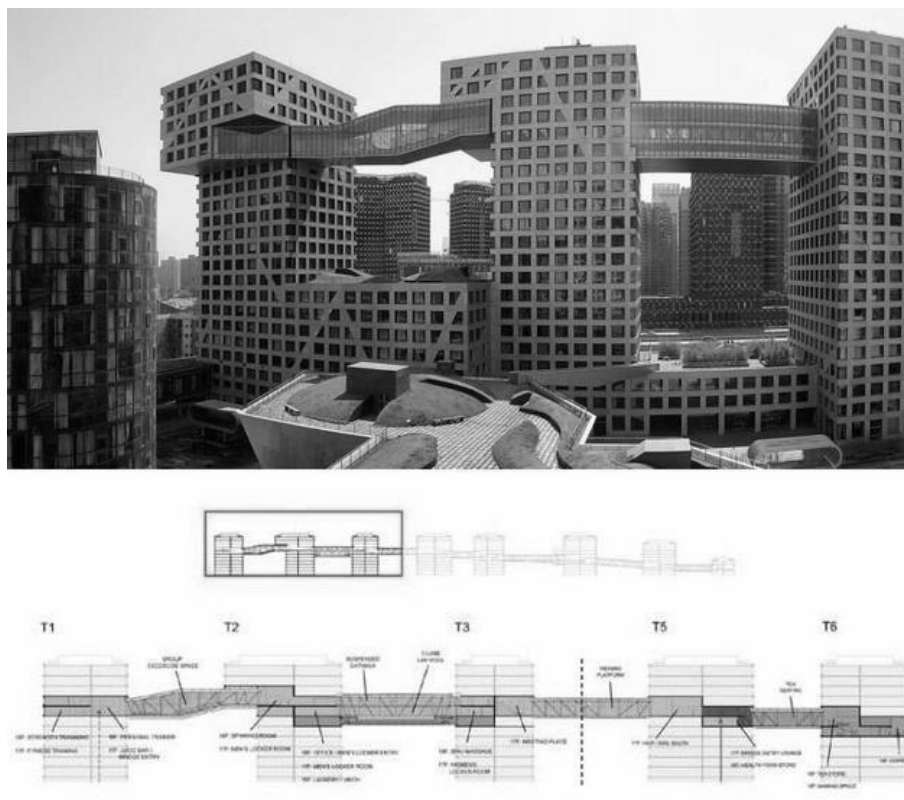


Fig.1.3.2. Realized design, view of Linked Hybrid [3]

2. Equal combination of public and residential functions

2.1 *A combination of residential and office functions.* The development of the economic sphere in the modern world determines the new development directions of both residential and office space. That is why, it is necessary to pay attention to the fact how modern architects locate and integrate residential spaces into public buildings.

Currently, the traditional scheme of organization of the working process is transformed in the direction of integration of physical and cyberspace, that sets a qualitatively different approach to models of interaction between office and living environments.

Orientation to ideas, as the main product, and the development of communication technologies, finally develop direct territorial connection of an employee and his/her working place, greatly expanding the possibilities of combining business and residential spaces. Hierarchical rigidly

deterministic models give way to models that are organized on the principle of horizontal connections, for example, "networked" or "mosaic".

With the development of large cities there is also the evolution of the typology of office and residential complexes. Nowadays, the priority is the development of alternative small business structures that can be used with housing function and multifunctional spaces, where the unified developed infrastructure works for different categories of users. Thus, Shinonome Canal Court is an example of a successful integration of residential space into public facilities.

The basic idea of this type of combination of residential and public function is based on a type of housing that is flexible enough to accommodate small offices and home offices (SOHO). Thus, it includes economic activity (which is often absent in many residential complexes) in order to improve the social relations of its residents, as well as adapting to the current lifestyle. The complex should be flexible enough to accommodate family rooms, dwelling for single or elderly people [4].

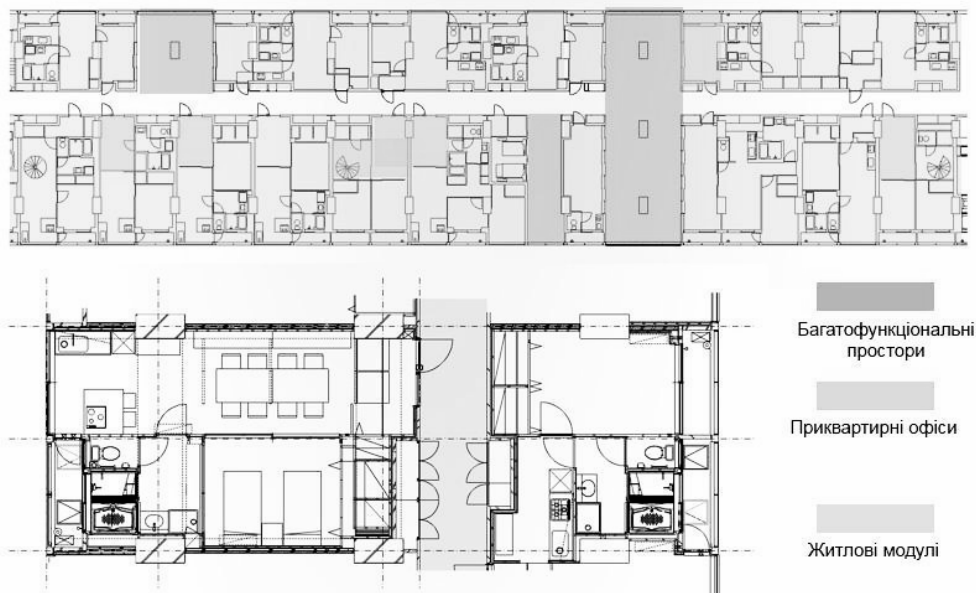


Figure 2.2 The blocks, designed by Ricken Yamamoto, are organized along the central passageway, but with the use of glass doors in each of the blocks, more light is allowed [4].

3. Integration of housing in public buildings. The work of a group of architects from the Institute of Architecture in South Carolina, USA (Caroline Dahl, Robert Cha, Hossein Lotfi Shemirani) [5] is an example of this method. The idea of the project is to combine different classes of housing with public spaces. Planning of the building lies in the fact that apartments of high comfort, with its network of vertical communications are on the territory of the outer perimeter of a high-rise building. There is also a corridor between apartments and living quarters of lower quality that separates these two types of housing. In this way, people of different classes do not come across each other.

This system is an example of how a link between a core of low-rent units with expensive real estate usually occurs. However, it is possible to take and make public function out of the outer sheath, but the interior does not have insolation and illumination. Thus, the public and housing function of luxury class and apartments will bring income, that reduces the cost of a core housing.

This principle of designing a building can serve as a "win-win" option only for temporary residence if to use a core for residential functions. There are many disadvantages that can not serve for permanent residence in a closed space without lighting and contact with the outside environment. A core can be used for service personnel that will work in the public outer layer of this planning scheme, so it is good to use the outer circle of the designed area for public or residential functions, but if the outer layer is used for these two functions, then a good solution would be to give a core for premises for service personnel or temporary residence, that is, dormitories for students or migrants.

However, today, according to the current state building codes and design rules, and housing construction, the implementation of such ideas

and projects, unfortunately, is impossible. That is why, it is desirable to revise and adjust the norms according to the nowadays requirements.

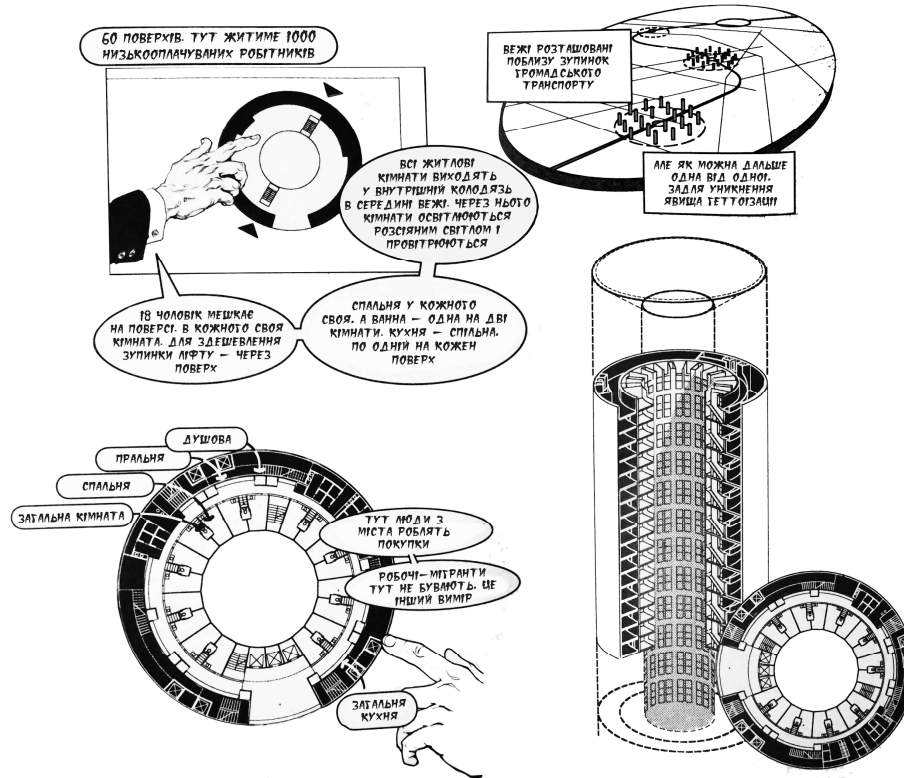


Fig. 3.2. A suggestion by a group of architects from the Institute of Architecture in South Carolina, USA (Caroline Dahl, Robert Cha, Hossein Lotfi Shemirani) [5]

4. Residential function in the structure of industrial buildings and structures. This approach involves the location of housing combined with production facilities.

Expecting the implementation of auxiliary functions that provide a person with actual residence on the territory of a production unit, without leaving the territory of the enterprise. This integration method is rather controversial, since housing can sometimes be located in the immediate proximity to a source of noise, vibration, atmospheric or chemical pollution. It should be understood that this housing is a supportive version

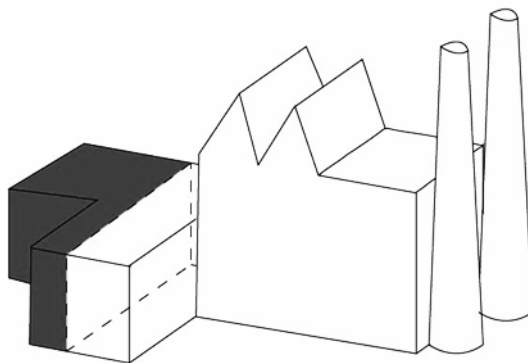


Fig.1.3 The scheme of combination of industrial buildings with a housing function.

and an alternative to living on the street, or in non-adapted housing conditions. Housing of this category may have its own degree of comfort, and the EÜPA Factory located in China is a good example of it. A country that is famous for mass production is interested in the efficient use of its workers, and one of the possible options to do this is full concentration of workforce on the territory of the enterprise. The factory itself is not limited only to the workshops producing any type of equipment from players to portable grills, but extends its territory to a mini city. The territory of the factory also includes a residential quarter, which is connected to the Leisure Centre, where people can rest from work and integrate into social life. There is also a swimming pool and a football field, where workers can relieve stress after working on a continuous conveyor.

On this layout plan, we can see a cleverly designed, not built-up area. It is located near residential quarters and factory workshops, that may indicate that the factory will expand and is interested in developing the housing function.

Conclusions. The combination of housing with other functional areas of the city becomes a necessity in connection with urban compaction, new social tendencies in the field of employment and increase in productivity indices. A need arises to study existing experience and develop new recommendations for housing, public works and production facilities.

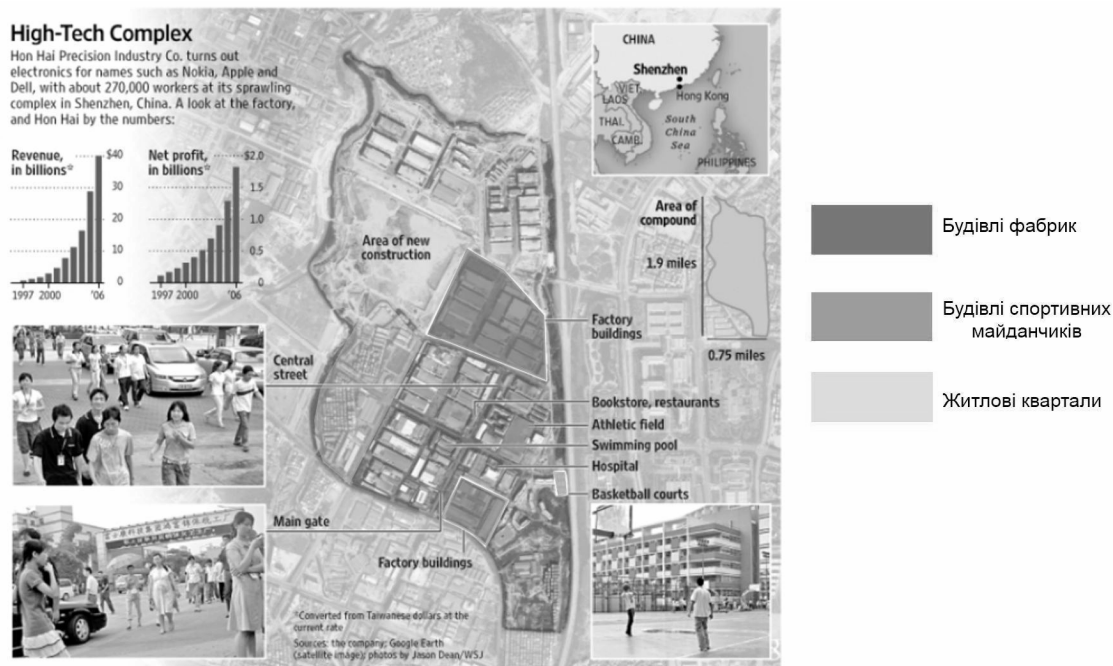


Fig.4.2 The scheme of planning of an industrial area with an integrated housing function [6]

References:

1. Кудрявцева М. Как крупные города противостоят перенаселению, Маргарита Кудрявцева, DP.: http://news.nb.dp.ru/a/2016/08/18/Ponaehali_kak_krupnie_go. (2016)
2. *RESIDENTIAL BUILDING INGOLSTADT-HOLLERSTAUDEN* (2018), Behnisch Architekten.: <https://behnisch.com/work/projects/0449>.
3. Linked Hybrid | Steven Holl Architects, ARCH20.: <https://www.arch2o.com/linked-hybrid-steven-holl-architects/>, (2017)
4. French H. (2006). *New Urban Housing* / Hilary French., New Haven, Yale University, 197
5. Caroline Dahl, Robert Cha, Hossein Lotfi Shemirani (2009), *Southern California institute of architecture, KDG*, Журнал по мировой архитектуре ПИ22. ОАО «Типография Новости», 52-60
6. *Factory City: EUPA. Documentary China labors and the largest factory in the world*, EUPA: <https://official-sites-catalog.ru/eupa-official-site/>, (2018)