

# Living anew - About possibilities of contemporary adaptations of flats carried out in industrialised technologies in Poland

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## Abstract

Around the half of Polish population currently live in the buildings constructed in the second half of the twentieth century in industrialized technologies. Economic conditions indicate that this state will not change substantially over the next decade. This situation forces people who deal with shaping housing space to take action that will raise the value of existing, technically and morally degrading, housing substance. As a result of conducted research, the author of this study pointed out that the so-called revitalization of the housing environment is carried out at the level of residents, administrators of buildings and housing estates. Their effects are often not correlated or even contradictory. He also emphasized the importance of comprehensive measures and the need for systemic solutions that integrate legislation, administration and contracting. As an important element of these actions he pointed out the need to develop a catalogue illustrating the possibility of reconstruction of housing. The article will present the results of research aimed at developing a strategy of remodelling flats, considered today unattractive, located in buildings constructed in OW-T technology. The analyses were carried out on a group of flats (about 85 m<sup>2</sup>) completed at the turn of 70s and 80s. During the construction period they were intended to be settled by families of minimum 6 people and were the largest. Their structure consists of a number of relatively small rooms (including very small bathrooms and kitchens). The author made a critical analysis of this housing offer. He defined contemporary needs of investors who are involved in buying flats of such size - they are families with one or two children. Measurable results of the work carried out are the schemes of housing conversion plans. The article presents four specific design solutions that show the direction of possible actions. According to the author, popularizing the possibility of reconstructing such flats should be one of the elements of the strategy of renovation and improvement of the quality of the Polish housing environment implemented in the second half of the 20th century.

## 1. Introduction

During the V Plenum KC PZPR (executive body of the Polish United Workers' Party, which ruled in Poland between 1948 and 1989), which was held in Warsaw on May 10-th and 11-th, 1972, the First Secretary of the Polish United Workers' Party Edward Gierek said: - The big issue is to create a second Poland during the lifetime of one generation - Poland which will be more affluent, corresponding to the aspirations of the citizens of modern industrial country. The challenge in the area of economic development was to build new job posts, including the production of modern prefabricated building materials and assembled buildings (at that time the concept of building - which was identified with



traditional construction, was replaced by the concept of assembling prefabricated technology). In the social dimension, it involved the migration of rural people into cities and the constant raising of standards of living - including flats' standards. The above-mentioned challenge and the political and economic decisions resulted in constructing of approximately four million new flats over the next twenty years. All of them were implemented in prefabricated technologies. Currently, it is estimated that about 12 million Poles live there today (about one third of the population). Buildings which life span (at the design stage) was estimated at 50-75 years, are now being redecorated and will be used, due to durability, for next decades. They form a distinctive housing environment which today in the social assessment, is considered to be morally degraded. The issue of the quality of this environment, mainly the quality and standards of buildings, has been repeatedly raised by architects. Its criticism was taken in the early 1980s. Jakub Wujek summed up such a way of housing development with the words: "Production, production again! In itself, it began to be treated as the ultimate value. It is not the final product, the result or the outcome of the process, and the process itself gains the status of a work of art" [1]. At the same time Henryk Wilk added: "The design offices in the current organizational structure do not represent the interests of Polish architecture, none of them have the word "architecture" even in the name. It dominates the treatment of creative and intellectual work only in production and financial terms "[2]. Helena Syrkus, in her statement given to Tadeusz Barucki in 1981, summarized these processes stating, "The last 25 years of the settlement network reflects in us and not only the dictatorship of the "pre-fab" and the mounting of heavy cranes. Destruction of the natural environment is progressing at an alarming rate, and the subject of planning of human and human society is confused and helpless "[3]. At the beginning of this century, acting in retrospect, Andrzej Basista criticised these implementations in "Concrete inheritance. Architecture in Poland at the time of communism "[4]. At present, apart from criticism, and in the face of the need to solve the problem of dealing with the existing building structure, work has been undertaken on remodelling and "modernization" understood as adaptation to the expectations of the contemporary inhabitant. Such works, modelled on European experiences in 2001, were undertaken by Jan M. Chmielewski and Małgorzata Mirecka in "Modernization of housing estates" [5]. In 2007 in the "Creation and modernization of living space. Theory and practice on the example of selected Wrocław projects from 1970 to 1990 "[6] Barbara E. Gronostajska presented them broadly. Over the past two decades, a number of scientific studies have been conducted in this area. There are also a number of publications raising this issue. Authors presented in them both the patterns and concepts of revitalization of Polish construction. Their activities were largely concerned with urban planning [7]. Often they referred also to the problem of aesthetics taken in the context of problems of thermos modernization of buildings [8]. Different issues related to the quality of the housing environment were discussed by Maciej Kłopotowski in the article "OW-T. The concrete potential" [9] in 2009 and the text "The Present and Future of Residential Architecture" [10], published in 2014, highlighted the randomness, appearance and inadequacy of modernization work in degraded buildings and housing estates. He emphasized the importance of systemic and comprehensive actions, and pointed to the need to develop and disseminate good practices. Among them, he paid particular attention to the problems of flats, which are being repaired and rebuilt individually by their owners, and these processes are beyond any control. These actions are often intuitive and often results in unsatisfactory results. Because in general evaluation the quality of housing is the basis for assessing the quality of the entire housing environment, the author proposes to develop a catalogue illustrating the possibilities and range of such changes.

## **2. Area, goal, conduct of the study and methods used**

The study area covered the flats located in Białystok, in buildings assembled in OW-T technology (one of the most popular prefabrication systems in Poland) at the turn of the 1970s and 1980s. The work was carried out in detail on a collection of flats of approximately 85 m<sup>2</sup>. These are the largest of the housing developments in this period, while at the same time due to their surface, they are among the most desirable in the real estate market.

The purpose of the study was to develop diagrams of model projections of solutions of selected flats. This work is intended as a basis for further work that will lead to the creation of a complete catalogue of good patterns.

In pursuit of the goal:

- the OW-T system was analyzed in the context of possible construction and structural changes - this task was based on studies by E. Pliszka, "Housing and General Housing Systems", 1974 [11] and T. Biliński and W. Graczyk "Residential and general housing systems" of 1982 [12]. Construction issues were also analyzed in the aspect of executive practice, which was presented in detail by Anna Ostańska, Teresa Taczanowska [13] in the "Accuracy of implementation and the need for modernization of large panels buildings".
- critical analyses of existing dwellings were made, their functional and technical faults were indicated,
- an analysis of the renovation works carried out by the owners of the apartments was carried out - this was based on interviews with property managers and real estate agents,
- a model utility program of a modern apartment for a family of four was developed - based on the results of research by Maciej Kłopotowski from the year 2015 published in: "How to evaluate contemporary apartment. An attempt to define the criteria for evaluating the utilitarian quality of modern Polish dwellings" [14] and the work of the team led by Walery Jezierski from 2016: "Multicriteria comparative analysis - utility tool for assessment of housing quality" [15],
- master plan schemas were developed.

### 3. Results of the research

#### 3.1. Characteristics of the OW-T system

OW-T (Economical Pre-fab Typical) - is one of several prefabrication systems commonly used in the Polish housing industry of the seventies and eighties. It is the most spectacular and widespread Polish response to the aesthetic and technical views of the late 1960s - a simple and common method of addressing the problem of housing hunger, while at the same time paving the way towards modernity in the aesthetics of residential architecture (figure 1a) [16].

The system was developed in the Bureau of General Projects and Urban Construction Studies in Warsaw. Its architectural authors were: Halina Rościszowska and Aleksander Kirow, the construction system was developed by the team: Jerzy Cyganecki, Janusz Regulski, Władysław Bacciarelli, while the production technology was prepared by: Włodzimierz Kołodko and Leszek Jarecki. The OW-T/67 system was expansion of OW-1700 and OW-1700K programs (known in the 1960s), which were positively evaluated and qualified for nationwide endorsement by the Interdepartmental Prototype Construction Council of Ministers. The new system, as claimed by its authors, was based on analyses of traditional and industrial construction from the country and from abroad. Its purpose was to build flats compliant with the applicable surface norms - NTP-59 (norms determining the area of dwellings divided by the number of inhabitants.)

The new system gained huge approval thanks to:

- achieving the maximum production capacity of the system components (inter alia through the construction of polygon plants, which significantly limited the transport of finished goods),
- limiting to the minimum necessary number of produced type of elements,
- the use of a minimum number of prefabricated units per flat, thus limiting the number of knots and connections (limiting the number of assembly work),
- design of functional and structural solutions in such a way as to make the most use of the lifting capacity of the assembly cranes (this element had a significant influence on the design of urban housing schemes).

The system was based on a 270x480 cm structural module connected with the size of the floor slab. The surface of the panel corresponded to the difference in the size of the individual dwellings (3 rooms

- 3 slabs, 4 rooms - 4 slabs, etc.). Elements of the slab as well as internal reinforced concrete walls (made of boundary reinforced sand-gravel concrete B 200) were prefabricates with the thickness of 14 cm (Figure 1b, c). Prefabricated internal walls were implemented in two basic types: longitudinal lengths of 540 cm and transverse lengths of 480 cm, with appropriately spaced door openings. The outer gable walls were designed as layered: reinforced concrete structural layer of 14 cm, 5 cm insulation (styrofoam), rinsed-stoned textured layer 5 cm. The outer longitudinal walls are designed in the form of a "beam-walls" of 540 cm in length. They consisted of a lintel beam (Figure 1d), which was based on internal transverse walls and a "window sill part" (Figure 1e) (reinforced concrete element 6cm, thermal insulation (styrofoam) 5cm, textured stone layer 5cm). Repeatability and limited number of facade elements led to the characteristic stripe facade - recognizable sign of the system. Alternate stripes of reinforced concrete slabs finished with rinsed stone contrasted with the linear arrangement of windows separated by coloured „inserts between windows", Figure 1a. In this system, 5-storey buildings (Figure 3a, b) and 12 storeys (Figure 3c, d) were installed - equipped with passenger lifts.

The technical documentation of the system was approved in 1967. The first polygonal prefabrication factory OW-T/67 was commissioned in 1968 in Białystok. The first implementation took place in 1969, in the area of the Piasta Housing Estate.



Figure 1.

- a) One of the first implementations of the system OW-T – Białystok Piasta housing estate (postcard from 1970s of twentieth century)
- b) Construction of unfinished block of flats
- c) Building interior-construction
- d) Detail of the connection of the transverse wall, slab, window sill
- e) Detail of external wall

### 3.2. Possibility of rebuilding OW-T

Construction of buildings realized in OW-T system makes it impossible to reconstruct their structural system. This is due to the triangular support of the slabs. All actions related to the reconstruction of housing systems are possible within the construction modules 270x480 cm and 540x480 cm (Figure 3e-h). In these fields you can demolish all partition walls (made of gypsum boards of 8 cm thickness or gypsum panels on frames) and rearranging these spaces. It is also possible to widen existing door openings and make new ones with a width of up to 1 m. Fixed building elements in the analysed buildings are prefabricated ventilation and installation systems (including water and sewage), which stiffen the functional layout of apartments. These factors determine the possibility of remodelling bathrooms and kitchens. One of the shortcomings of the system has also been that, due to the adopted aesthetics, the banding layout of windows - considerably scaled in size to the needs, filling almost the entire length of the building. Thus, the exterior walls of the premises become useless in terms of furniture, which becomes a real drawback for very small rooms or requiring specific furnishings such as kitchens. The obvious disadvantage of the system is also a very low window sill cover of 80 cm. Their low level is especially disadvantageous in the case of kitchens where the worktops are set at 85 and 90 cm at present.

### 3.3. Characteristics of selected spatial elements of flats

In buildings constructed in the OW-T system are located flats designed on the basis of the Technical Standard of Design (NTP-59 and NTP-75). It defined the size ranges of flats intended for a certain number of people and the minimum and recommended floor space. M-6 (currently the most popular, on the secondary market, among four-people families) was chosen for the needs of the conducted research. During the settlement period it was designed for families of 6-7 people. Their upper surface is 85 m<sup>2</sup>. These apartments consist of a living room of over 25 m<sup>2</sup>, three or four bedrooms of 6 to 13 m<sup>2</sup>, a kitchen of 8 m<sup>2</sup> and a separate WC (0.88 m<sup>2</sup>) and a bathroom (2, 31 m<sup>2</sup>). The sanitary facilities in these areas were in the form of an integrated unit (II. 6.), figure 2, which currently does not meet the surface needs of users. The toilet was not equipped with a washbasin and there was too little space in the bathroom for the free setting of the washing machine. Significant differences in the size of rooms (rooms) cause them to be considered too small or too large for psychological reasons (Figure 3i-l).

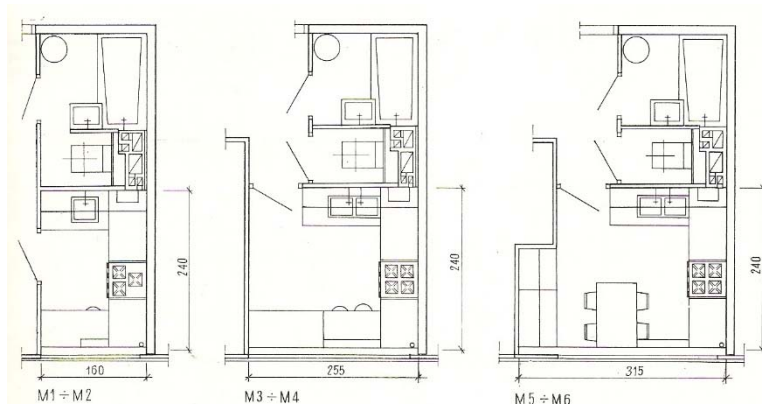


Figure 2. A projection of a sanitary unit of flats (of different size) in buildings constructed in the OW-T system (E. Pliszka (ed.), Residential and general housing systems, Arkady, Warsaw 1974).

### 3.4. The range of renovation works realized by the dwellings owners

The renovation work currently being carried out by the owners of the apartments is aimed at improving their comfort and increasing the aesthetics of the interior. Each time they are related to the fact that the number of people living in a renovated apartment will be less than the number of people at the time of settlement. In practice this means that some rooms (especially very small ones) do not find the destination in the new apartment. The scope of construction work is limited to:

- exchange of entrance doors - which improves apartment acoustics,
- changing the windows and reducing them - which improves the thermic and roominess (these often conflict with thermo-modernization works - windows are reduced in already insulated buildings which negatively affect the aesthetics of the modernized facade)
- bathroom remodelling - by connecting it to the toilet - which results in a slightly larger sanitary space (see 3.3.), cut out of metal frames and enlarged doorways - especially leading to the living room,
- reconstruction of the part of the apartment adjacent to the kitchen - demolition of partition walls to enlarge the room, connecting adjacent rooms - demolishing partition walls to enlarge the rooms.

Homeowners also exchange internal electrical installations and radiators by themselves.

The scope of these works is based on the knowledge of the construction of the owners of the apartments and based on the experiences observed in the neighbours and proposed by the contractors. Architects' advice on this subject is sporadic. Financial expenditures incurred on their execution are often considerable. The key element in their conduct (demolition works) is the interference in the finishing of the floors and ceilings. Investors have no knowledge that the extension of the scope of this work would not significantly improve the cost of renovation and could definitely improve the usable quality of the apartment.



### 3.5. Postulated usable program

At present, the research on the usable quality of dwellings allows us to develop an ideal usable program meeting the needs of the contemporary Polish family. Their results clearly indicate the need to divide the space into separate living areas: the living area (hall, living room, kitchen, toilet) - intended for all inhabitants, the parent zone and the children's zone, in addition to separating the rooms for the storage and economic purposes. At the same time, analyses of contemporary developments indicate that such divisions are possible in the case of large flats of over 100 m<sup>2</sup>.

Taking into account construction constraints of the analysed dwellings and the expectations defined above, the following desirable features and parameters of the premises should be defined, which should be characterized after reconstruction:

- in situations where it is possible for structural and construction reasons to introduce zoning as a design priority,
- the entrance zone in the form of a hallway with a separate area for outer clothes,
- locate the entrance to the separated toilet or open-access bathroom within the hallway,
- living room with an area of more than 25 m<sup>2</sup>, divided into a living area with TV and dining area,
- kitchen, as far as possible combined with a living room, equipped with island furniture and places for daily meals,
- master bedroom (parent), complemented by closet (and/or wardrobe set) and possibly a separate bathroom (main bathroom),
- two children's rooms (not smaller than 8 m<sup>2</sup>), complemented by wardrobes and possibly a separate bathroom,
- a room or utility room acting as an additional closet, laundry room, utility room.

### 3.6. Postulated direction of action - design work

For the design work, specific housing M-6 (85m<sup>2</sup>) was chosen. It was constructed at the turn of the 70s and 80s of the 20th century in different housing estates in Białystok. Two apartments located in five-storey buildings were selected: Example A - Piasta housing estate (Figure 3a, e) and Example B - Dziesięciny housing estate (Figure 3b, f) and two located in twelve-floor -buildings: Example C - The Piaski Estate (Figure 3c, g.) and Example D - The Dziesięciny Estate (Figure 3f, h).

It was assumed that the planned construction work would consist in the complete reconstruction of internal systems of housing. Therefore, when entering into the design of the new arrangement of their interiors it was based on the construction, spacing of the door and window openings and the maintenance of ventilation and sanitary vents (Figure 3e-h). It was possible to completely rebuild the electrical system and transfer radiators. Based on the core of the construction system, new room divisions were developed. They were then compared with existing systems. In the course of conducted design work, with economic considerations, the number of construction changes introduced was gradually reduced - in particular the demolition and construction of new walls. In the final versions, the planned wall shifts of up to several centimeters were abandoned - considered as not economically feasible. The moving of door openings in partition walls has not been dispensed with - particularly in cases where these changes have significantly influenced room (furniture) settings.

### 3.7. Obtained results

As a result of the project work, four studies illustrating the postulated change direction were drawn up.

#### Example A:

The original flat (Figure 3i) consisted of a living room, large kitchen, three bedrooms, bathroom, separated toilet and internal communication space. For its shortcomings it was considered: very small bathroom and lack of utility room. In the target apartment (Figure 3m), too big and difficult to furnish kitchen was reduced, and a pantry was separated from its space. The entrance to the living room has

been extended. The location of the bathroom was completely changed, it was also significantly increased and in its original place laundry or utility room were proposed.

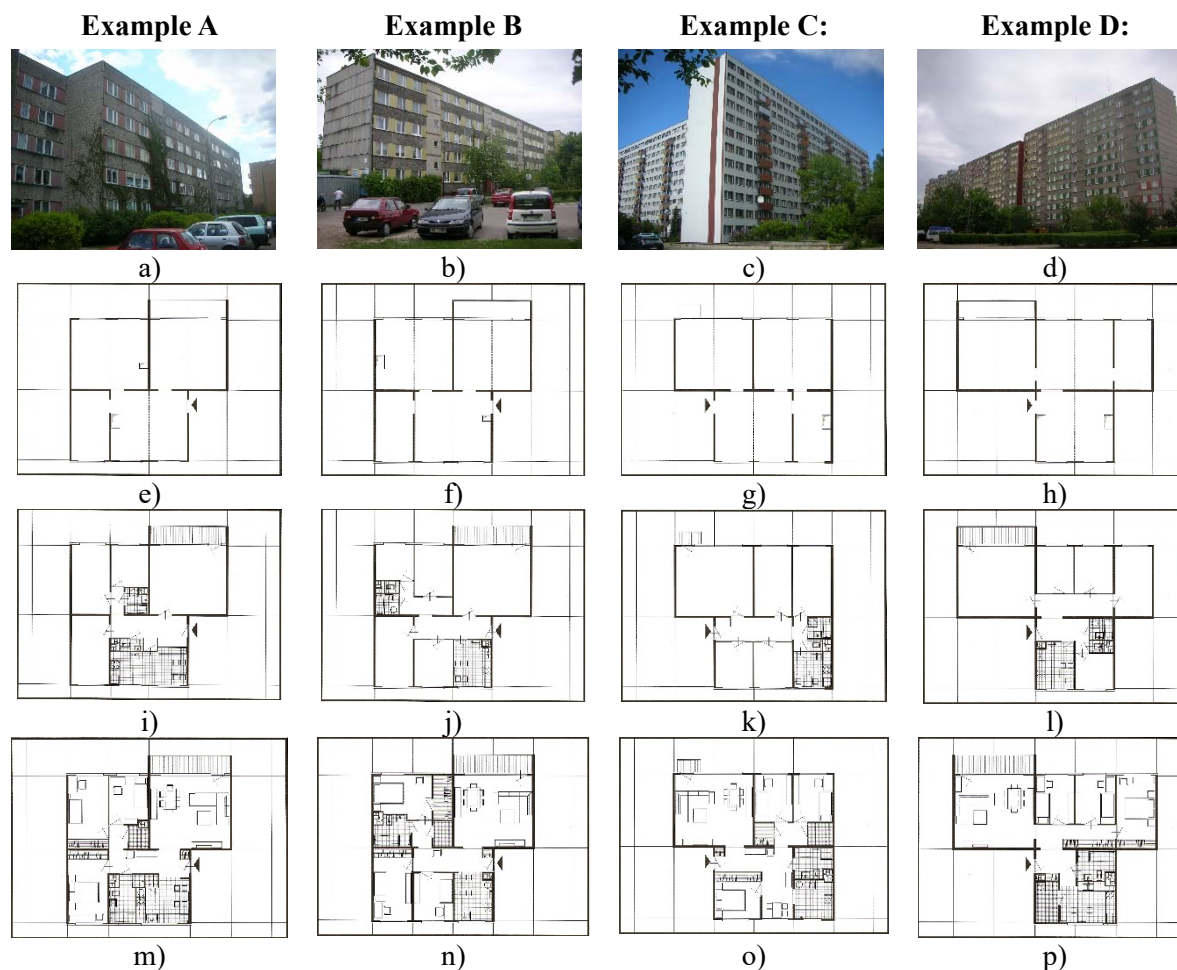


Figure 3 a) Multifamily building at Piasta Street, Piasta Housing Estate in Bialystok, the beginning of the 1980s of the twentieth century.

b) Multifamily building at Dziesięciny Street 45, Dziesięciny estate in Bialystok, the beginning of the 80s of the 20th century.

c) Multifamily building at Waszyngtona Street 22, Piaski Housing Estate in Bialystok, realization of the late 1970s.

d) Multifamily building at Berlinga Street 14, Dziesięciny Estate in Bialystok, the beginning of the 1980s.

e-h) Schematic diagrams of individual housing constructions. The drawings indicate structural modules (floor slabs) and location of ventilation and plumbing divisions.

i-l) Planes of M6 flats (according to the NPT in 1975). Apartments: 4 and 5 rooms, designed for six people families, with separate kitchen, bathroom and separate toilet.

m-p) Diagrams of projections of flats after reconstruction. Four room apartment for families of four people.

### Example B:

The original flat (Figure 3f) consisted of a living room, four bedrooms, a separate kitchen and a sanitary facility (Figure 3j) and internal communication space. For its shortcomings it was considered

too small bathroom and toilet and the room of 6.1 m<sup>2</sup>, also lack of utility room. In the target apartment (Figure 3n), one (the smallest) room was skipped. The bathroom was significantly enlarged and a closet and a separate utility room were introduced. The kitchen was open to the hallway and the entrance to the living room was widened so that the rooms were visually connected. In the smallest of the rooms left, the entrance door was changed.

#### **Example C:**

The original flat (Figure 3g) consisted of a living room, four bedrooms, a separate kitchen and a sanitary facility (Figure 3k) and an internal communication space. For its shortcomings it was considered too small bathroom and toilet and a 6.1 m<sup>2</sup> kitchen located at the end of the spatial layout of the apartment, which caused it complete isolation in relation to the living room, in addition lack of utility room. In the target apartment (Figure 3o), one of the rooms was replaced with a dining room adjacent to the enlarged kitchen. For this purpose, it was proposed to make holes in the structural wall separating the kitchen from the adjacent room. Also, for the needs of the parents' bedroom, the space of the room located adjacent to the entrance to the apartment, and the location of the entrance door to the room was also changed. The bathroom was enlarged and the part of the apartment was upgraded with children's rooms. By reducing their surface, the closet and the utility room were separated.

#### **Example D:**

The original flat (Figure 3h) consisted of a living room, four bedrooms, a separate kitchen and a sanitary facility (Figure 3l) and an internal communication space. For its shortcomings it was considered too small bathroom and toilet and the room of 6.1 m<sup>2</sup>, also lack of utility room. In the target apartment (Figure 3p), we resigned from the smallest room. The bathroom was significantly enlarged and a large utility room was designed.

In each redesigned flats were obtained:

- a planned program of living room and kitchen, in each of these rooms provided space for eating,
- master bedroom (parent) and two children's room,
- large bathroom equipped with bathtub, shower cubicle, washbasin and toilet
- utility room that can serve as a separate laundry.

In none of the analyzed examples could be implemented:

- division into separate usage zones, which is caused by too small area of flats,
- the combination of living room and kitchen, due to their separation of communication space and too little ventilation and sewerage ducts,
- island furniture in the kitchen, which is caused by too small space (flats),
- extra bathroom and separate toilet, which is caused by too small area of the apartment and lack of installation possibilities.

## **4. Summary**

To summarize the conducted research, it should be stated that they confirm the possibility of reconstruction and adaptation to modern utility standards, flats built in industrialized technology. The economic analysis, proposed changes, indicate that their cost does not exceed the finishing work in new buildings. Hence, the actions taken by the author seem to be fully justified, and the postulates of developing a catalogue of possible apartment remodelling are all right. The quality results of the proposed changes improve the quality of the dwellings in a meaningful way (incomparably higher than the arbitrary actions of their owners) and can be considered as a collection of good designs that are constantly expanding.

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