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THE LIFE CYCLE REDUCTION FACTORS OF BUILDINGS AND CONSTRUCTION IN THE CONDITIONS OF INNOVATIVE ECONOMY DEVELOPMENT

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The paper analyzes the concepts of the life cycle of non-movable assets, the economic and physical life terms. The analysis of the life cycle stages of buildings and structures was carried out, the characteristic features of each of them at the present stage of development were noted. The factors affecting the shortening of the building life cycle and structures at each stage were identified.

Nowadays, the Republic of Belarus is facing the task – the final transition of the economy to an innovative path of development. The solutions are one of the main ways to achieve the dynamic development of the country in the long term.

The analysis of current trends in the development of the leading Western countries economies shows that an innovative economy is an economy of society, which is based on knowledge, innovations, a perception of new ideas, systems, technologies, and on readiness for their practical implementation in various spheres of human activity. It highlights the special role of scientific knowledge and innovation.

The transition to an innovative way of development and a formation of a new technological order requires an accelerated updating of fixed assets and production capacities in almost all sectors of the national economy.

The life cycle of production technologies and the buildings and structure created for their use are sharply reduced, in the context of the world economy globalization, the intensification of competition in the commodity and product markets, and the transition of the economy to an innovative development path.

The non-movable asset life cycle as a physical object is a sequence of processes for the existence of a non-movable asset from the idea to the liquidation (disposal) [1]. It includes the term of economic and physical life.

Term economic life determines the period of time during the object is used as a profit source. It ends when the improvements made cease to contribute to the value of the object and operating costs exceed the potential income from the asset use.

The term of physical life is the period of the non-movable asset existence in a functionally fit state before its demolition. It is determined by regulatory documents.

Stages of the non-movable asset life cycle are shown in Fig. 1.

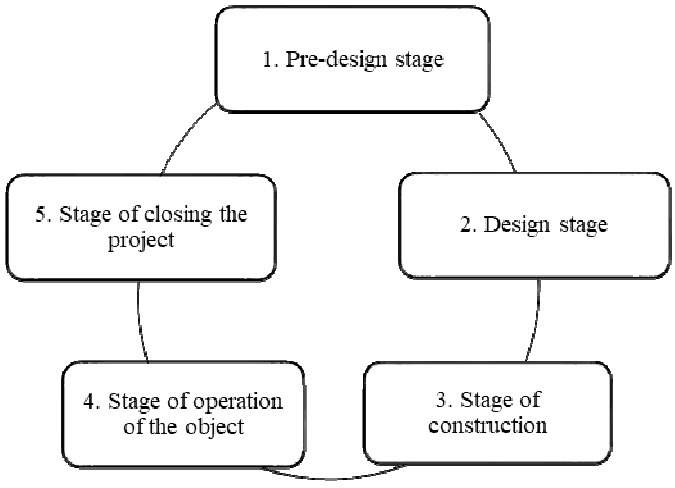

Figure 1. – Stages of the non-movable asset life cycle

Pre-design stage includes the analysis of the non-movable asset market, the formation of a project strategy, an investment analysis, execution of initial permits, attraction of investment funds [2]. In the innovation economy this stage plays an important role.

The design stage includes a development of a financing scheme, a choice of a project management team, an architectural engineering group [2]. The introduction of BIM-processes in the design leads to a reduction in the timing of project preparation and its integration with financial and analytical indicators.

Obviously, the profit is not formed at the early stages. These projects are important aspects for active project work. At the moment, there is a reduction in the duration of the first two stages, as well as minimization of operating costs for all stages of the life cycle of an object.

Under the existing design system, not enough attention is paid to the concept of costing over the entire life cycle. In Europe, the emphasis is placed on "a cost of the whole life cycle" [3]. Even before making a decision on the project implementation, it is necessary to consider several options for its implementation and distinctly understand the goals pursued by the investor.

The rationally constructed cost calculation system taking into account the entire life cycle will make it possible to distinctly represent the need to choose one or another constructive solution of the building. The developer seeks only to minimize the initial investment, not comparing with the cost of operating real estate.

Making decisions based only on the initial benefits is not appropriate. Of course, the task of calculating the cost of operation is complex. But the implementation of this strategy will allow to achieve significant savings in the further operation, spending a little more at the initial stages.

Construction stage consists in the selection of a contractor, coordination of construction work, and quality control of construction [2].

Currently, they are striving to shorten the construction period so that the results of the project will be of benefit in the chosen direction of investment activity as early as possible. A clear and well-developed project management system in the construction industry makes it possible to achieve a total savings of up to 10% in construction, reducing the project implementation time.

Operation stage involves the operation of facilities, their maintenance and a repair. Operating expenses at the operational stage make up 75% of total expenses throughout the entire life cycle of buildings and structures (Fig. 2) [4].

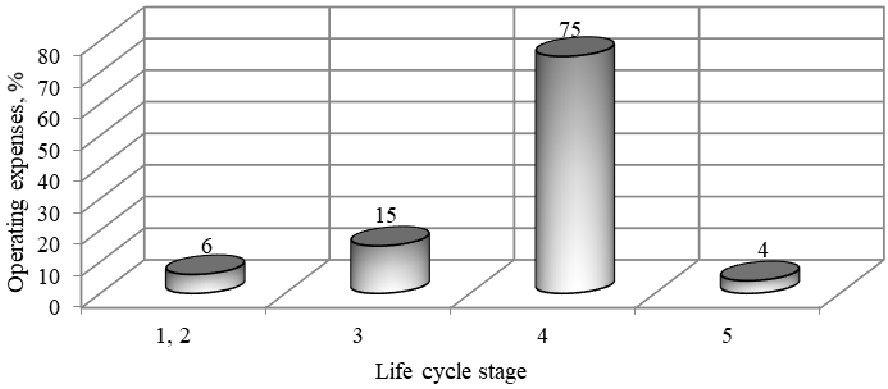

Figure 2. – Distribution of operating costs by life cycle stages

Obviously, managing costs and operating time can bring significant value and time savings. This diagram proves the importance of planning the entire life cycle cost in the first stages.

Project closing stage is the complete liquidation of its original and acquired functions, as a result of which is either demolition or a qualitatively new development.

As a result of the study, factors that affect the shortening of the life cycle of buildings and structures at each stage were identified. This is facilitated by:

- improvement of the innovation management system in the building complex;
- the speed innovation increase;
- the emergence of new methods of planning and design;
- introduction of information technology in the design process, the development of BIM-design;
- expansion of online commerce;
- production of modern building materials and improvement of existing ones;
- improvement of constructive solutions for buildings and structures;
- an increase in the rate of obsolescence of materials and equipment;

- the quality research improvement;
- accelerated modernization of fixed assets of the construction complex;
- increasing the skill level of engineering and technical workers and construction workers;
- legal and financial support for the development of innovative activities in construction.

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