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УКРАЇНСЬКИЙ ДЕРЖАВНИЙ УНІВЕРСИТЕТ
ЗАЛІЗНИЧНОГО ТРАНСПОРТУ

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«ПРОБЛЕМИ НАДІЙНОСТІ ТА ДОВГОВІЧНОСТІ ІНЖЕНЕРНИХ СПОРУД І БУДІВЕЛЬ НА ЗАЛІЗНИЧНОМУ ТРАНСПОРТІ»

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«RELIABILITY AND DURABILITY OF RAILWAY TRANSPORT ENGINEERING STRUCTURES AND BUILDINGS»

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10-а Міжнародна науково-технічна конференція «Проблеми надійності та довговічності інженерних споруд і будівель на залізничному транспорті», Харків, 20-22 листопада 2024 р.: Тези доповідей. - Харків: УкрДУЗТ, 2024. - 225 с.

Збірник містить тези доповідей науковців вищих навчальних закладів України та інших країн, підприємств транспортної та будівельної галузі за трьома напрямками: залізниці, автомобільні дороги, промисловий транспорт і геодезичне забезпечення; будівельні конструкції, будівлі та споруди; будівельні матеріали, захист і ремонт конструкцій та споруд.

10th International Scientific and Technical Conference "Reliability and durability of railway transport engineering structures and buildings" Kharkiv, November 20-22, 2024: Abstracts. - Kharkiv: UkrSURT, 2024. - 225 p.

The proceedings include abstracts of presentations by researchers from higher education institutions in Ukraine and other countries, as well as representatives of enterprises in the transport and construction industries. The topics are organized into three main areas: railways, highways, industrial transport, and geodetic support; building structures, buildings, and facilities; and construction materials, including the protection and repair of structures and facilities.

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BASIC APPROACHES TO FORECASTING ENERGY NEEDS OF OPERATED BUILDINGS TAKING INTO ACCOUNT THE FACTOR OF ACHIEVING THE EXPEDIENT LEVEL OF ENERGY EFFICIENCY

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According to European experience with thermal modernization, which is carried out in accordance with current energy efficiency standards, the final energy consumption for heating, ventilation, and hot water supply can be reduced to approximately 25-50%, the index of demand for useful energy for heating and ventilation can be about 70-80 kWh/m^2 per year. Comprehensive thermal modernization can bring the greatest benefit, but its implementation requires high investment costs [1].

In accordance with Directive 2010/31/EU [3] in Annex III, "Comparative methodological framework for the determination of cost-optimal levels of energy performance requirements for buildings and building elements", the estimated economic life cycle is defined by each Member State. It refers to the remaining estimated economic life cycle of a building in the case of setting energy performance requirements for the building as a whole or to the estimated economic life cycle of a building element in the case of setting energy performance requirements for building elements.

According to the analysis of the technical and actual condition of the buildings put into operation, indicators of the expedient economic level of buildings were determined (Fig. 1). Therefore, when modernizing existing buildings, it is necessary to take into account investment costs for eliminating damage to the main load-bearing and enclosing structures and damage to engineering systems (heating, ventilation, air conditioning), to determine the economic feasibility of implementing energy efficiency measures, and also to identify cases when measures to increase energy efficiency are economically inexpedient for carrying out modernization work.

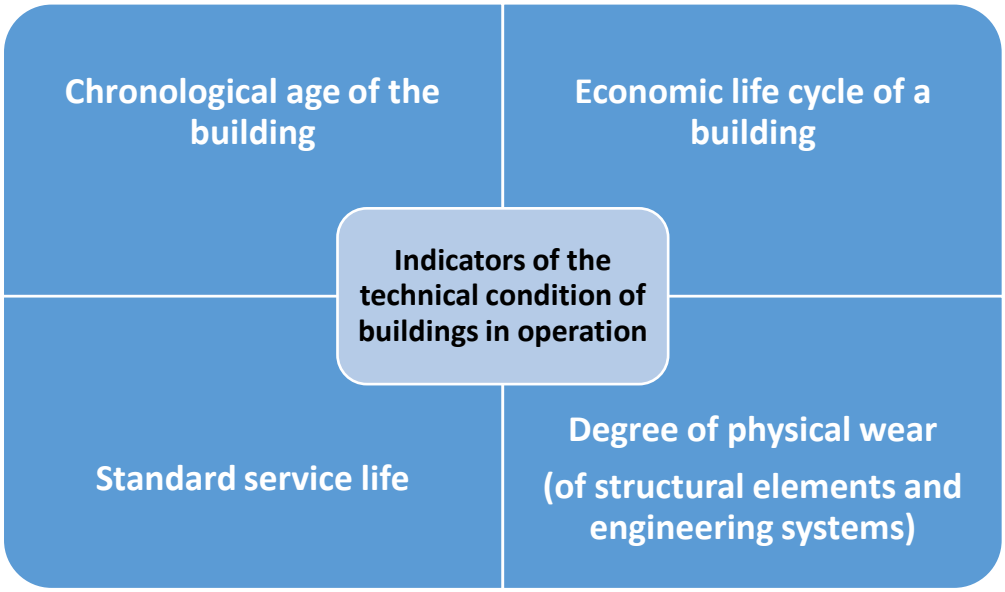

Fig. 1. Indicators of the technical condition of buildings in operation

In accordance with Part Four of Article 6 of the Law of Ukraine "On Energy Efficiency of Buildings" [3], the minimum requirements for the energy efficiency of buildings are calculated according to the Methodology "Determination of the Economically Expedient Level of Energy Efficiency of Buildings" [4], provided for in Part One of Article 5 of this Law, taking into account the requirements for the thermal characteristics of enclosing structures and the requirements for the energy efficiency of engineering systems (including equipment) of buildings in accordance with the economically expedient level and are differentiated depending on the functional purpose of buildings, the height of buildings, and the type of construction work (new construction, reconstruction, major repairs).

To ensure the normative indicator of energy efficiency of a building in accordance with the type of construction work, it is necessary to predict the economic feasibility of implementing modernization measures, taking into account the life cycle of the building. The energy needs of buildings are determined by the regulatory and legal documents of Ukraine, which clearly prescribe the boundary conditions for energy consumption depending on the type of construction work (new construction, reconstruction, major repairs).

[1] Dorota Anna Krawczyk. Buildings 2020. Constructions, materials and installations Copyright by Bialystok University of Technology, Bialystok 2019. ISBN 978-83-65596-70-3, p. 227.
[2] Directive 2010/31/EU
[3] Law of Ukraine «On Energy Efficiency of Buildings» (With changes introduced according to Law № 199-IX dated 17.10.2019, HVR, 2019, № 51, p.377).
[4] Methodology «Determination of the Economically Expedient Level of Energy Efficiency of Buildings». Approved by Order № 170 dated 11.07.2018. Registered in the Ministry of Justice of Ukraine 16 July 2018, № 823/32275.