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Yusupov A.R.

**Candidate of Technical Sciences, Associate Professor,
Fergana Polytechnic Institute. Uzbekistan. Fergana**

**RULES FOR CALCULATING THE ECONOMIC EFFICIENCY OF
RESTORATION, REINFORCEMENT AND MAJOR REPAIRS OF
BUILDINGS IN SEISMICALLY ACTIVE REGIONS**

Abstract: the article considers the calculation of the economic efficiency of measures for the restoration, reinforcement and overhaul of buildings in seismically active regions. The possibility (admissibility) of using heuristic approaches to solve each complex problem, such as a field survey, is determined by the ratio of costs for solving the problem using accurate and heuristic methods, the cost of error and statistical parameters of heuristics. In addition, it is important to have a "common sense filter" at the output – an assessment of the result by a person, a competent specialist with the skills and experience of empirical and theoretical research in a particular field.

Keywords: construction, building, seismic resistance, spatial rigidity, sediment, damage, reinforcement, restoration, reconstruction, design soluti

Introduction

The assessment of the technical condition of buildings begins with an initial technical inspection. The purpose of the initial technical inspection is to determine the bearing structural system of buildings, the main geometric parameters, the seismicity of the area and the area where the building is located, as well as to verify the compliance of the main parameters of the building with the requirements of earthquake-resistant construction [1].

The assessment of the technical condition of buildings includes the processes of preliminary technical inspection and full-scale inspection of equipment. In both processes, it is necessary to pay attention to the extent to

which the technical condition of the construction parts meets the requirements of the relevant standards and QMQ [2].

Materials and methods:

This includes empirical methods such as modeling, fact-finding, experiment, description and observation, as well as theoretical methods such as logical and historical methods, abstraction, deduction, induction, synthesis and analysis, as well as methods of heuristic strategies. The research materials are: scientific facts, the results of previous observations, surveys, experiments and tests; means of idealization and rationalization of the scientific approach.

The list of parts of the building to be studied as part of a survey of the technical condition of the building: floor and foundation; load-bearing structures; roof; exterior decoration of the building; interior decoration of the building; water supply networks; sewer networks; power supply network and electrical equipment; heating networks and equipment; gas supply network and equipment; surrounding space; fire safety elements.

Results and discussion:

After studying the complex engineering and geological conditions of the construction area in kind, the next step is to analyze violations of regulatory requirements for the soil of the structure and the impact of defects on other structural parts of the building (Table 1).

The possibility (acceptability) of using heuristic approaches to solve each complex problem, such as a field survey, is determined by the ratio of the cost of solving the problem using accurate and heuristic methods, the cost of error and statistical parameters of the heuristic. In addition, it is important to have a "common sense filter" at the output – an assessment of the result by a person, a competent specialist with the skills and experience of empirical and theoretical research in a particular field [3]. Table 1

Analysis of damage from engineering and geological conditions in buildings and structures

The name of the damage to the structural part of the building	Degree of damage, details	What geological, geodynamic and hydrogeological process or event and climatic conditions caused the damage?	Recommended methods, constructive, technological and organizational measures to strengthen the soil of the structure, ensure its priority and increase seismic resistance

Conclusion:

As a result of the calculation based on Table 2, given as an example, it was determined that the total damage index of the building [4] is 35.6 %:

$$P = \sum K_i * P_i / 100 = 3560 / 100 = 35,6\% \quad (1)$$

It is recommended to determine the generalized financial value of the costs of strengthening, restoration and repair of structural damage based on the indicators of general wear of the building using the following formula:

$$C_1 = C * P * N_i \quad (2)$$

where: C_1 is the value of the generalized costs of strengthening, restoring and repairing damage to building structures; C is the financial assessment of the building based on cadastral documents; P is the total damage index of the building; N is the indexation coefficient for the transition from the last determined cadastral value of the building to the price of the current year.

If necessary, it is recommended to use the following formula to find the amount of generalized costs for strengthening, restoring and repairing damage to any part or structural element in a building:

$$C_{1i} = C * K_i * P_i * N_i / 100 \quad (3)$$

where: C_{1i} is the value of the generalized costs of strengthening, restoring and repairing damage to the i -th structural part; C is the financial assessment of the building based on cadastral documents; K_i is the share of the i -th structural part of the building; P_i is the level of damage to the structure; N_i is the

indexation coefficient of the cadastral value of the building to the price of the current year [2].

Table 2

Generalized indicators of destruction of structural elements of a building

№	Structural elements and parts of the building	The share of structures in the cost of the building: K_i , %	The level of damage determined as a result of the technical assessment of the structure: P_i , %	The percentage of destruction (the product of indicators in the 3rd and 4th columns): $K_i * P_i$, %
1	2	3	4	5
1	Foundations	7	20	140
2	Building frame and load-bearing walls	36	20	720
3	Partitions	6	20	120
4	Covering and overlaps	12	20	240
5	Roofs	3	40	120
6	Floors	6	60	360
7	Doors and windows	4	60	240
8	Interior decoration Внутренняя отделка	5	60	300
9	Exterior decoration	3	60	180

1 0	Engineering equipment	12	80	960
1 1	Other elements	6	30	180
	Total:	100	-	3560

References:

1. Юсупов А.Р. Инженерные решения реконструкции здания «Мадрасаи Мир» в городе Каканд. "Экономика и социум" №11(102) 2022 www.iupr.ru
2. Tojiev R.J., Yusupov A.R., Rajabova N.R. Qurilishda metrologiya, standartlashtirish va sertifikatlashtirish. Darslik. T., "Yosh avlod", 2022, 464 b.
3. Юсупов А.Р. Эвристические стратегии интеллектуального образования. "Экономика и социум" №11(102) 2022. www.iupr.ru.
4. Юсупов А.Р. Оценка сейсмостойкости и сейсмоустойчивости железобетонных каркасных зданий и сооружений методом предельного равновесия. "Экономика и социум" №11(102) 2022. www.iupr.ru.