

THE MAINTENANCE OF RESIDENTIAL BUILDINGS - A FAD OR A NECESSITY!

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Abstract: *Given that the total cost of a residential building - the amount of the expenses for: concept design, building, maintenance and operation for post-use - maintenance and operation expenses have the highest weight proportional to lifespan, it is imperative to give appropriate weight to developing strategies for maintenance of residential buildings within the requirements of quality management and to highlight these expenses by homeowners associations. The analysis we further present allows to warn the stakeholders to give due weight to the maintenance - maintenance and operation - for residential construction*

Key words: *maintenance, buildings, cost*

1. The Maintenance as Preventive Action

The maintenance consists of all technical and organizational actions that are associated, performed in order to maintain or restore the original features of a building or building element [1], being able to perform the specified function under the influence of various factors. The English Stas BS 47787/1979 defines the maintenance as the combination of all technical and administrative actions in order to maintain or restore a product in the state that can meet its required function. It is possible to identify two types, namely:

a) preventive maintenance - maintenance performed at predetermined time intervals or corresponding to predetermined criteria, in order to reduce the likelihood of damage to, or degradation of performance of one or

more elements of construction. The preventive maintenance process must be planned from the outset, based on previous experiences [2]. One can differentiate several types of preventive maintenance, which are based on various strategies and data held as follows:

- the monitoring based on status / condition - under this strategy, the preventive maintenance is performed by using instruments or computerized monitoring systems.
- predetermined maintenance – the maintenance activities are based on experience, it can be changed although the need is not assessed continuously. It can be detailed as follows: cleaning, maintenance; interventions more often than once every two years to heating, cooling, air conditioning, water supply,

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sewerage; interventions rarer than once every two years on building elements.

- corrective maintenance – the maintenance performed after the occurrence of degradation, in order to restore the original characteristics of the element or elements of construction. The process for corrective maintenance must be designed during its deployment. In the next stage there are made different types of records that must be filled with terms and codes (eg. Disposals / malfunctions, maintenance activities etc.). Following this, the staff should be trained before starting maintenance. The planning of maintenance includes three actions namely :

- the maintenance policy – which must provide solutions to any problem that occurs during the lifetime of one or more elements of construction;
- the maintenance documentation – which contains maintenance instructions that must be developed and delivered before the commissioning of the building;
- the fault registration – it refers to filling in the forms prepared for this purpose.

2. The Maintenance and Repairs in Residential Buildings

The maintenance interventions include small-scale buildings that run periodically in order to prevent premature deterioration and maintain various elements in running. [Norm P95/77].

The works of repair of residential buildings is carried out regularly or as needed in order to create the possibility

of continuous operation of the found fixed [3].

These generally consist in: troubleshooting; partial replacement of building used elements; restoration of protection works etc. The maintenance and repairs are made under the current rules. The GE 032-97 Norm on "Performance of maintenance and repairs to buildings and special constructions" states the "life" for different categories of works that make up buildings. Next, Table 1 presents a selection of maximal data for different elements of residential construction.

3. Identifying the Operating Expenses and Maintenance of Residential Construction

To identify the expenses related to the operation and maintenance of residential construction, the source is the monthly list displayed by the owners' association. In this regard as following consultation and analysis of lists displayed by an association of residents of Iasi, one can identify the maintenance costs for a certain period, from which the results for three years can be cropped. It should be noted that for the two buildings that were subject to analysis of the expenses of maintenance it was not performed, although absolutely necessary, any overhaul. The maintenance expenses presented in Tables 3.1 and 3.2 refers only to maintenance and repair.

Table 3.1 presents the operating and maintenance costs for a period of three years for an apartment building with structural frame of the panel with the following configuration: Block A, 51 persons 1004.70 sqm living space; Block B, 42 people 994.72 sqm living space; Block C, 48 persons 1004.70 sqm living space.

The duration of existence for different categories of works

Table 1

No	The elements	Duration of existence (years)
1	2	3
1	Finishing elements in exterior walls	
	Plastering trowel	20
	Painting with whitewash	3
2.	Finishing elements in interior walls and ceilings	
	Plastering trowel	40
	Paintings	5
	Paint	10
3.	Floors	
	Mosaic	55
	Parquet	35
4	Covers	
	Insulation waterproof terraces	15
	Thermal insulation terraces	10
5	Wood carpentry and metal	
	Exterior door profiles	50

The cost of repairs in the current block panel

Table 2.

No.	Month Year	Block	Repairs (ROL)	Cost in Euro (RON)	Total (Euro)
1	2	3	4	5	6
1.	January year I	A	5,700,000		
		B	5,100,000		
		C	6,200,000		
Total January			17,000,000	35,860	474.1
3.	March year I	A	2,466,295		
		B	2,206,685		
		C	2,356,240		
Total March			7,029,200	36,168	194.3
4.	April year I	A	1,710,000		
		B	1,530,000		
		C	1,835,000		
Total April			5,075,000	36,952	137.3
5.	May year I	A	532,000		
		B	476,000		
		C	560,000		
Total May			1,568,000	38,084	41.2
Total year I			30,672,200		846.9
17	May year II	A	1,157,247		
		B	1,157,247		
		C	1,157,247		
Total May year II			3,471,741	40,796	85.1
18	June year II	A	1,906,476		
		B	1,271,088		

		C	1,789,052		
Total June year II			4,966,616	40,615	122,3
23	November year II	A	2,186,030		
		C	2,640,800		
Total November year II			4,826,830	38,494	125,4
24	December year II	A	1,965,000		
		B	2,135,447		
		C	1,900,500		
Total December year II			6,000,947	39,663	151,3
Total year II			19,266,134		484,1
27	March year III	A	3,560,000		
		B	3,650,000		
		C	3,550,800		
Total March year III			10,760,800	36,825	292,2
29	May year III	A	7,712,578		
		B	1,140,048		
		C	4,524,300		
Total May year III			13,376,926	36,217	369,4
33	September year III	A	1,968,000		
		B	1,968,000		
		C	1,968,000		
Total Septembrie Anul III			5,904,000	35,586	165,9
36	December year III	A	18,780,000		
		B	18,265,300		
		C	19,356,650		
Total December year III			56,401,950	36,771	1533,9
Total year III			86,443,676		2361,4

The text with the explanation of the table Table 3 presents the operating and maintenance costs for a period of three years for an apartment building with masonry structure strength with the following configuration: Block A, 41 people 965.84 sqm living space; Block B, 37 people, Living space 965.84 sqm; C Block, 48 people 965.84 sqm living space. We present below the Figures 1, 2, 3, the variation of maintenance costs for both residential construction - the structure of the panel and the structure of masonry (Z) - for the periods specified in Tables 1 and 2 in the three years that were identified in the expense repair lists of the association of owners:

3. Conclusions

Identifying the expenses of maintenance for the two structures of large panels or in masonry at limited intervals of three years under consideration, both could select from lists of owners association, we can draw the following conclusions: at owners' associations there are not mentioned all categories of the expenses for operation and maintenance, making it difficult, if not impossible, to devise strategies for maintaining buildings within quality requirements, according to Law 10 of 1995 with completions. Law 10 of 1995 with completions.

The cost of current repairs to the masonry block

Table 3.

No.	Month Year	Block	Repairs (ROL)	Cost (RON)	Euro	Total (Euro)
1	2	3	4	5		6
1.	January year I	A	6,000,000			
		B	5,500,000			
		C	6,205,500			
Total January year I			17,705,500	35,860		493,7
3.	March year I	A	6,000,000			
		C	5,000,800			
Total March year I			11,000,800	36,168		304,2
4.	April year I	A	1,800,000			
		B	2,400,000			
		C	1,350,000			
Total April year I			5,550,000	36,952		150,2
5.	May year I	A	560,000			
		B				
Total May year I			560,000	38,084		14,7
Total year I			34,816,300			962,8
14.	February year II	A				
		B	3,450,500			
		C				
Total February year II			3,450,500	40,014		86,2
17.	May year II	A	925,515			
		B				
Total May year II			925,515	40,796		22,7
18.	June year II	A	7,304,560			
		B				
		C				
Total June year II			7.304.560	40.615		179,8
20.	August year II	A				
		B				
		C	2,561,350			
Total August year II			2,561,350	40,977		62,5
Total year II			14,241,925			351,2
29.	May year III	A	911,760			
		B				
		C	536,250			
Total May year III			1,448,010	36,217		40
30.	June year III	A	3,120,000			
		B				
		C	3,120,000			
Total June year III			6,240,000	36,050		173,1
32.	August year III	A				
		B	4,000,000			
Total August year III			4,000,000	35,111		113,9
Total year III			11,688,010			327

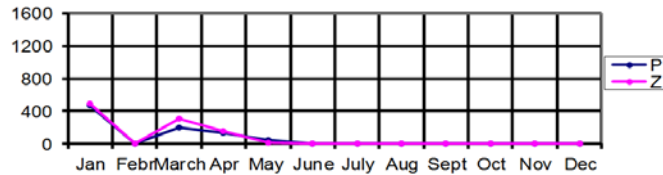


Fig. 1. Maintenance costs year I - *PM* – structure of panel, *Z* – masonry

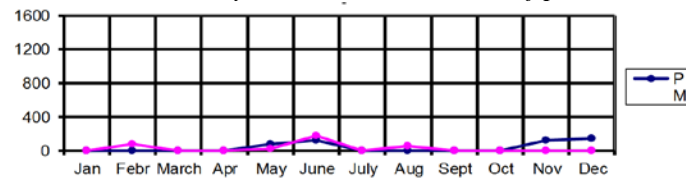


Fig. 2. Maintenance costs year II - *PM* – structure of panel, *Z* – masonry

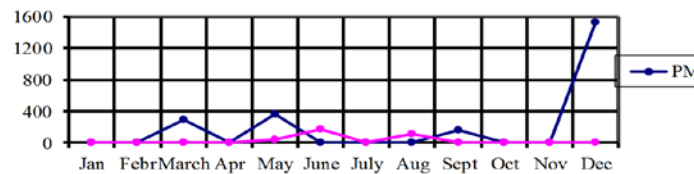


Fig. 3. Maintenance costs year III - *PM* – structure of panel, *Z* - masonry

Besides the built environment for residential construction, mostly at the limit of their normative operation, requires more than a rethinking of how to identify and manage maintenance costs;

- in the category of maintenance costs should be included those required by the thermal rehabilitation in order to reduce energy consumption, as goal imposed of both the European and national legislation;

- A major portion of the expenses of operating and maintenance facilities must be booked for functional residential building, especially when the duration of their service is far less than the life of the building. In the case of functional systems should be considered the physical wear which is much faster than for other components of residential building as a whole.

Given that the total cost of a residential building - the amount of the expenses for:

concept design, building, maintenance and operation for post-use - maintenance and operation expenses have the highest weight proportional to lifespan, it is imperative to give appropriate weight to developing strategies for maintenance of residential buildings within the requirements of quality management and to highlight these expenses by homeowners associations.

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