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Monitoring of Apartment Buildings

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Summary

The subject of this paper is the preparation of the computer system for monitoring the of state of apartment building resources for cognitive purposes, for facilitating the technical exploitation of existing objects and for verifying accepted technical solutions affected by real conditions of use. The database was created on the basis of questioning performed by persons skilled in building know-how with the aid of a specially prepared questionnaire. Test analysis of the system was conducted for data obtained for 135 objects. It showed correct operation of the system.The computer system was based on the relation database according to the BDF standard. The software was prepared using the clipper language and the whole installation was set up on IBM PC type computer and DOS.

Structural concept

As a result of analysing the goals and tasks of the monitoring, the desired scope of monitoring was specified. The acquired data was divided into nine problem groups as follows:

1. Preliminary data: date of the investigation, name of person performing the investigation, access to object during the investigation, technical documentation.
2. General data: address of the object, owner of the object, year of construction of the object, essential modernisation, size of the object.
3. Use of the object: dwellings, other premises.
4. Construction data: type, damages, technical state.
5. Data about filling elements: non-bearing walls, openings, technical state.
6. Data about installations: range, technical state.
7. Data about protections: heat insulation, dampness insulation.
8. Data about environment: neighbouring objects, aggressive components of the environment.
9. Additional data in descriptive form.

Information about protection from heat and dampness refer to the insulating properties of construction partitions, but not in relation to energy consumed in the object.

The structure of the database is consistent on the basis of merit and formally with the dBase standard and user software was written using the clipper environment. In the questionnaire three type of answers occur:
- descriptive (e.g. address),
- questionnaire type (e.g. technical method of construction work: traditional, industrial, mixed),
- evaluated by linguistic variables (e.g. small cracks, substantial cracks and serious cracks)

This way of formulating answers causes that essential information on the technical state of the object is extracted - but it is still determined by a specifically qualified inquirer.

Methods of acquiring data

There are two main sources of acquiring data:
- questioning and
- the existing technical documentation

In general 135 questionnaires were filled out and stored in the computer using the appropriate program. The collected data concerned objects located in Warsaw and in its vicinity. The data contained information about differentiated buildings: old and new, small and big, being in different technical condition, and having different useful values.

For operation of programs general rules accepted for IBM PC type computers were followed. As a result of realisation of the system the tool for systematic data acquisition and analysis of existing apartment building resources were set up. In addition, principles of acquisition, classification, storing, processing and analysis were established. On the basis of the elaborated system the possibility of setting up unified procedures of data acquisition and creating the basis for establishing quality classification of buildings was formed.

Examples of the results of analysis are given in the Figures.

The percentages of the various types of floor slabs in the monitored sample (they are: p-type monolithic panels, monolithic slabs reinforced concrete slabs floor slabs made of small-scale elements, ribbed and wooden panels) are shown on Fig. 1.
Fig. 2 gives the percentages of cracks and other damages.
Performance, overload, ground settlement, thermal interaction, dampness, natural expansion joint and others.