

METHODS AND TOOLS FOR DETECTING DEFORMATIONS IN BUILDING
WALL STRUCTURES

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*exploitation, building,
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*This article covers the use of local methods
in the examination of cracks and crevices in
the wall structures of their buildings, as well
as the identification of deviations from the
vertical axial line in the wall using
geotechnical methods.*

Introduction

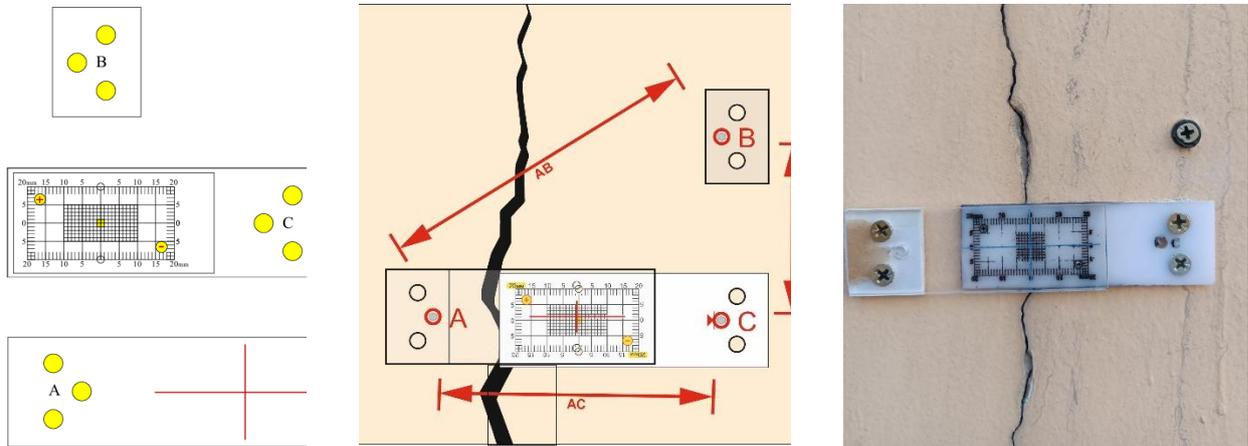
Today, the increase in the number of inhabitants from year to year is causing their demand for multi-apartment houses to increase, as a result of which the living space in high-population areas can be exemplified not only by the side, but also by multi-apartment housing, which is being built on the principle of vertical cultivation.

In operational buildings, a constant process of physical decay and Wear continues, the reason for which is considered that a type or combination of external influences on the load-bearing structures of the building constantly exert its negative influence.

For example, in some cases we can cite the fact that in areas adjacent to the building when precipitation falls, the external water escape system does not fully fulfill its function. or example, in some cases we can cite the fact that in areas adjacent to the building when precipitation falls, the external water escape system does not fully fulfill its function. As a result of this, dunes (flat and uneven) are observed in the ground of the area in which the building is located, which creates cases of deformation [1].

Methodology Uneven sinking of the ground results in cracks as well as cracks in the building's structures, consider a simple form of verification of information about these

cracks that appear, in which the first indicator numbers to the existing area of the crack in the wall solidify the existing part into the wall on one side of the crack, and the second to the These two parts should not touch each other and the target should be lowered into the center of the measuring part (figure-1).



1-figure. Local determination of crack changes in building wall structures.

The width of the crack in the wall and the distances of AB, BC and AC between these parts installed should be recorded along with the day of the initial measurement through the stencil.

As a result of repeated periodic observations, we will be able to obtain preliminary information about the state (change) of cracks in the wall.

If this pointer changes continuously, we will be able to call industry professionals to the building for a technical inspection to know exactly the technical condition of the building, as well as obtain accurate technical conclusions about the building.

Experts in the field (Sokolov V. I. and Chernov V. A.) jointly proposed a laboratory tool called a shelmer, which measures cracks in building structures with an accuracy of 0.01-0.03 mm (figure-2) [4].

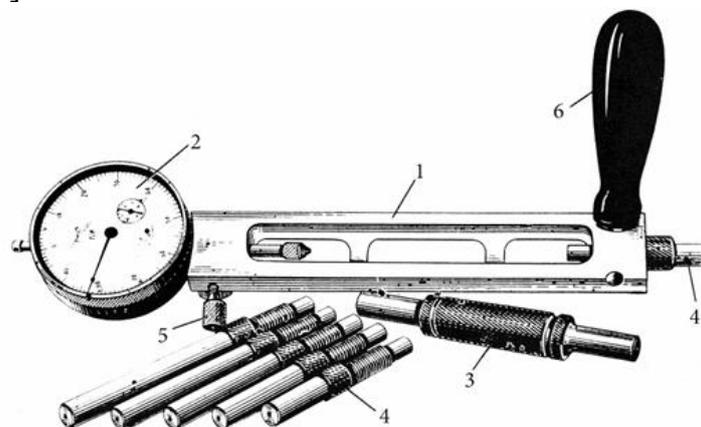


Figure-2. Shelemer, a tool for measuring cracks in structures.

1-hollow body, 2-indicator, 3-control support, 4-replaceable connecting support,
5-clamping screws, 6-handle.

With this technical tool, we can obtain more accurate information about cracks in the building and their changes than with local methods.

We can carry out the above work in order to inspect and analyze the condition of buildings and structures in operation (to obtain information about the deviation of building walls from the horizontal axis as a result of deformation), while our knowledge and skills in conducting inspection work and processing data also have an impact.

In addition, geodetic measurements are required to determine the subsidence and subsidence of buildings and structures, which is now considered the task of specialists in the field. This process means that geodetic measurements should be carried out even on buildings after construction work has been completed, i.e., approximately 5 years for clay-based soils, 2 years for sand-based soils, but in all cases, it is recommended to check until the change stabilizes. [2].

Discussion Measurement of horizontal or vertical displacements and deflections of building and structure structures over time is carried out by placing markers at foundation points located away from existing deformation zones in the building foundation.

requiring the placement of special rappers as a fixed point if it is not possible to use urban geodesic grid points. Thanks to this, we can obtain accurate periodic information about the vertical and horizontal positions of the building through initial and re-periodic geodesic measurement works [3].

The deviation of the external walls of a building from the vertical axis is found by the following formula [2].

$$\operatorname{tg} \alpha = \frac{\Delta l}{h}; \quad \text{unit of measurement, } ^\circ \quad (1)$$

here: h- building height,

Δl - wall deviation distance; $\Delta l = l_1 - l_2$ mm.

We can determine the relative settlement of the construction points using marks installed on the foundation, based on expression (2) (3-figure, b).

$$\Delta S_{\text{relative}} = \frac{S_1 - S_2}{L} \quad (2)$$

here: S_1 -height mark of the first point, m.

S_2 -altitude of the second point, m.

L- distance between the first and second points, m.

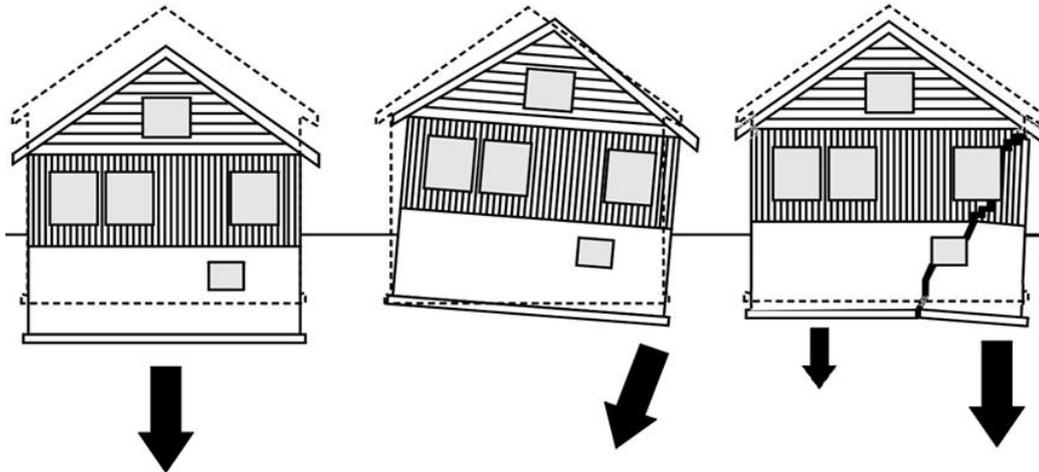


Figure 3. Settlement and deflection of building structures.

Finding the settlement rate of each (n) point of a building or structure foundation over time (t) based on data obtained from that point is presented in the literature [2] and [5] as follows.

$$\Delta W_n = \frac{S_{n2} - S_{n1}}{t}; \text{ mm/month} \quad (3)$$

here: (t) – time; month,

S_{n1} – (n) the result of the elevation mark obtained from the initial observation of the point; mm,

S_{n2} – the height mark result obtained from the observation of point (n) after time (t), mm.

Conclusion As a result of uneven settlement of the foundation, the building's tilt and rotation, the building's deviation from its horizontal and vertical position increases, and cracks and then fractures appear in the load-bearing structures.

The technical condition of the building is reduced by one or more levels in the technical requirements category. Such damage in the form of cracks and fissures increases the impact of the climate on the structure, the result of which is a permanent decrease in the technical and operational indicators of the building.

Therefore, in the process of instrumental inspection of multi-apartment houses, the continuous application and monitoring of geotechnical methods is considered expedient.

With this, it is possible to anticipate the degree of deformation and damage that will occur in buildings, prevent them in time, apply the necessary technical measures and ensure the extension of the operational life of the building.

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