



Deficiencies and Damages in Used Brick Buildings

Sattarov Ikramboy Saparboyevich

Candidate of technical sciences, associate professor

Sattarov Temur Ikramboyevich

Independent researcher

Safarov Fazliddin Sattor o'g'li

Master student of Samarkand state institute of architecture and construction

Abstract: *This article examines the causes of defects and damages in brick buildings which used at present time and their impact on the safety of building structures.*

Keywords: *soil, groundwater, deformation, building foundation, damage, cracks.*

Date of Submission: 15-4-2022

Date of Acceptance: 18-5-2022

Introduction: In recent years, a significant increase in groundwater levels in the regions of the country requires protection of buildings from groundwater and the strengthening of important engineering measures in the design of local drainage networks in buildings. Flooding of base occurs as a result of waterproofing failure. This leads to corrosion of the building foundation structure and a decrease in the load-bearing capacity of the foundation [1, 2].

Factors that can cause damage to building structures include:

- inconstancy of groundwater level;
- degree of aggressiveness of groundwater;
- increasing the load on the building foundation or change on its loading period;
- poor performance of underground works during construction process;
- using poor quality materials in construction;
- violation of exploitation rules in the building etc.

Under the influence of the factors listed above and a number of similar factors, uneven deformation occurs in buildings, which cause cracks in the building and various cases of damage. This process can lead to the destruction of the building over time.

Method and style. The appearance of cracks in the walls indicates a violation of the distribution of internal forces. Cracks are an external sign of various exertion and deformations in the wall structure. When such cracks are detected, it is important to first identify the source that caused them.

The causes of wall damage and deformation include [2, 4]:

- ✓ uneven subsidence of a part of the building, creates a state of additional tension in the wall, which leads to the appearance of cracks (see picture 1);
- ✓ inconformity of load carrying capacity between construction materials and load's impact;
- ✓ absence of temperature seams along the length of the building;
- ✓ putting additional gaps in the walls for various purposes, without following technical requirements;
- ✓ deformation of the base (subsidence of foundation which not installed at a sufficient depth due to soil deformation);
- ✓ construction of new large structures adjacent to or adjacent to an existing building;
- ✓ biological effects and aggressive environment;
- ✓ natural disasters (fires, earthquakes, floods, etc.)

During a visual inspection of buildings, a general direct inspection of structures is carried out and their external signs are revealed for all defects and damage. During the inspection, not only the physical condition of building structures is determined, but also their obsolescence, the need to demolish the building, the possibility to build an upper structure on the building, whether it is appropriate or not, to leave individual structural elements of the building unchanged.

As can be seen from the pictures, as a result of uneven deformation of the base of the building, cracks up to 3 m long and up to 20 mm thick appeared in the outer walls of the building (see pic. 1 and 2). Another reason for this is that there is no anti-seismic belt in the building.

So, a visual inspection is carried out to give an opinion on the technical condition of the building in terms of the appearance of building structures and determine the need for inspection using equipment. Visual inspection is carried out by using measuring instruments (binoculars, camera, tape measure, caliper, etc.) to measure the building and its structural elements. During the visual inspection, visible defects and cases of damage are identified and control measurements are carried out.



Picture 1. Cracks formed in the outer wall as a result of uneven deformation of the building.

Depending on the appearance and nature of the cracks in the wall, it is possible to determine the cause of their origin. For example, as a result of severe frosts, the base freezes through and most of the cracks at the bottom of the wall are smaller compare to at the top. Cracks expanding downwards arise as a result of subsidence of the basis [2]. If the cracks widen from the bottom to the top and this is not the result of freezing of the basis, then the cause of the deformation can be explained by the different deformation properties of the base ground under the building in different places.



Picture 2. Measurement of the width of the cracks formed in the outer wall as a result of uneven deformation of the building.

Results and observations. When characteristic cracks, inflection part of the building, cracking of walls and other types of damage and deformation appear, indicating an unsatisfactory state of the basis, it is necessary to immediately carry out engineering and geological research. As a result of this research, not only the reconstruction and repair of building structures, but also the strengthening of base and building foundations will have to be carried out.



Figure 3. The outer and inner walls are cracks formed at the junction node.

As a result of uneven deformation of the base, cracks were formed at the junction of the outer and inner walls (see picture 3). Errors and defects during the construction process also influence to the appearance of these cracks. For instance, bricklaying, at the junction nod was done incorrectly, and in the process of bricklaying wire nets were not installed.

Conclusions and suggestions.

We can list many reasons of occurring damages in the buildings we use. However, one of the most common of these reasons, and one that needs more attention, is that the building's exploitation process is poorly organized. Most of the damages that occur in buildings during exploitation are not the result of external influences but of human factors, and this has a negative impact on the safety of the building.

In many buildings, violations of the operating rules lead to damage to the facade of the building, in other words due to malfunctioning gutters and internal sewer pipes, water accumulates under the foundation of the building, resulting in uneven deformation and cracks in the internal and external walls of the building.

In order for the building to safely pass its normal service life, we will prevent aforementioned defects and damage if we carry out all the checks based on city building regulation [8].

The list of used literature

1. Низомов Ш.Р., Хотамов А.Т. Бино ва иншоотларни техник баҳолаш. Дарслик. 1-қисм. – Тошкент, 2013, 155 бет.
2. Саттаров И.С. Бинолар ташхиси ва экспертизаси. Дарслик. – Самарқанд: СамДЧТИ нашрети, 2022. -276 бет.
3. Бойко М.Д. Диагностика повреждений и методы восстановления эксплуатационных качеств зданий. -Л.: Стройиздат, 1975. – 334с.
4. Sattarov I.S., Sattarov T.I., Safarov F. Increasing lifetime by repairing defects and damage in brick buildings. Innovative Technologica: Methodical Research Journal, ISSN: 2776-0987 Volume 2, Issue 11, 2021, 72–78 pages.
5. Sattarov I.S., Sattarov T.I. Labor protection and safety in construction research. European Journal of Life Safety and Stability ISSN 2660-9630. Volume 2, 2021, 9-12 pages.
6. СП 13-102-2003. Правила обследования несущих строительных конструкций зданий и сооружений / Госстрой России, 2004. -27с.
7. ҚМҚ 2.01.03-2019. Строительство в сейсмических районах / Минстрой РУз. –Ташкент, 2019. – 111с.
8. ШНК 1.04.03-05. Положение об организации и проведении реконструкции, ремонта и технического обслуживания жилых домов, объектов коммунального и социально-культурного назначения / Госкомархитекстрой. Ташкент, 2007. – 40 с.
9. <https://youtu.be/ymRItrilcU4>