



Technical Diagnostics of Building Structures

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Abstract: Technical diagnostics is one of the elements of the general theory of building reliability. Assessment of the state of structures at various stages of the operation of buildings establishes the signs and causes of damage, allows you to identify defects in collapsing structures, determine the degree and boundaries of damage in order to repair them in a timely and high-quality manner. Defects and damage can be classified according to the causes of occurrence, conditions of occurrence, external signs, the degree of influence on performance. Diagnostics is one of the elements of the general theory of the reliability and durability of buildings, its specific tasks are related to the early detection of defects and structural failures.

Key words: diagnostics, damage, defects, deterioration of buildings, operation, external influences, corrosion, assessment, state of structures, causes, diagnostic devices.

Diagnostics of buildings and structures should provide information on the technical condition of structures, elements, assemblies and joints. Technical diagnostics is one of the elements of the general theory of building reliability. The tasks of technical diagnostics are related to the early detection of defects and design malfunctions.

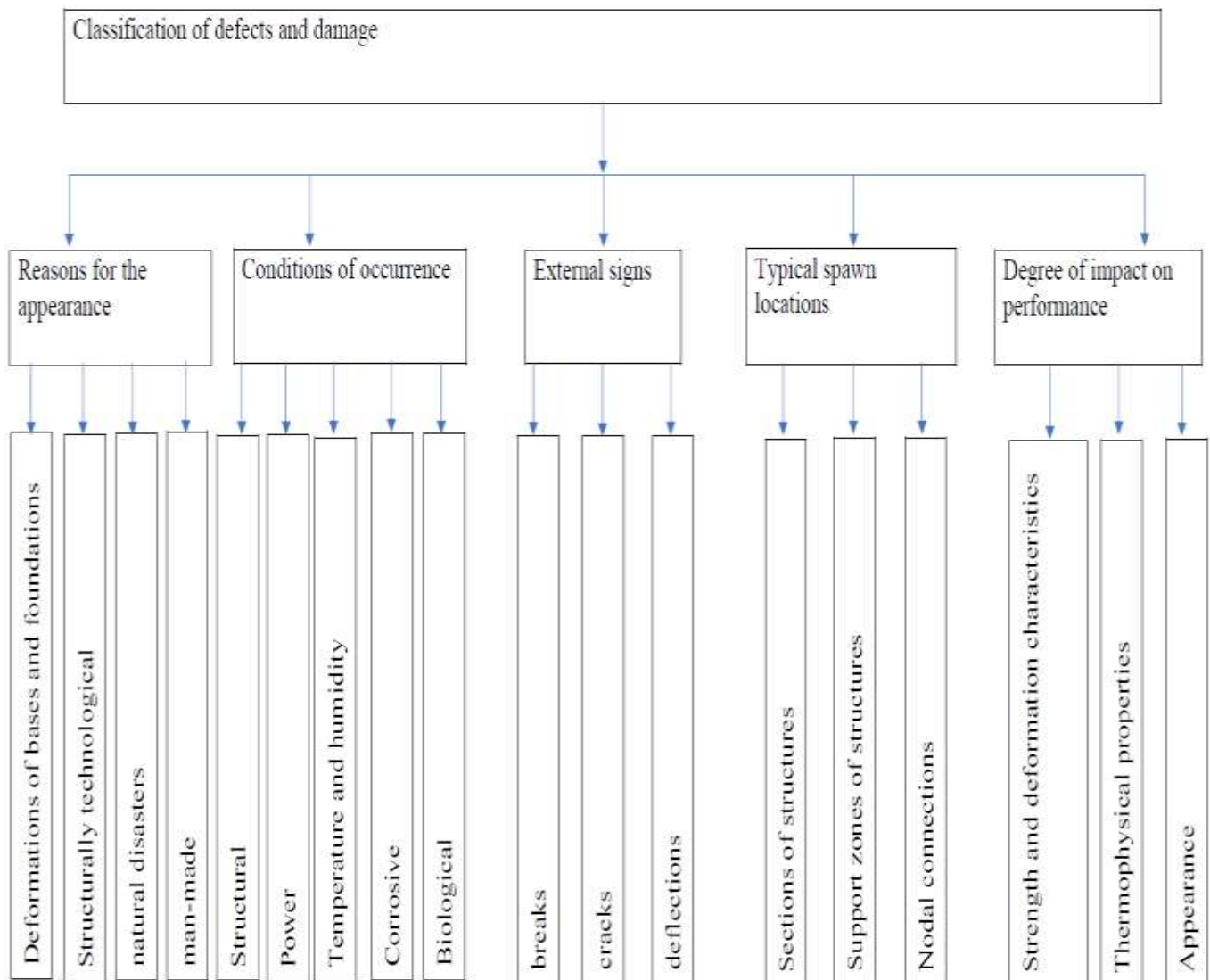
Assessment of the state of structures at various stages of the operation of buildings establishes the signs and causes of damage, allows you to identify defective, collapsing structures, determine the degree and boundaries of damage in order to repair them in a timely and high-quality manner. In this regard, it is necessary to monitor the condition of buildings and engineering equipment from its acceptance into operation and to the detection of defects before being placed for major repairs or before reconstruction or modernization.

The control system provides for the creation of methods for evaluating instruments and tools that allow determining the parameters of the technical condition and their compliance with regulatory characteristics. The data obtained as a result of assessing the condition of the structure of buildings in operation can serve as the basis for improving the quality of construction, improving construction methods, their proper operation and repair.

Often defects can cause damage. Damages are subdivided into minor (remain functional) and major (failure of structures). Defects and damage can be classified according to the causes of occurrence, conditions of occurrence, external signs, characteristic places of manifestation, the degree of influence on operational characteristics. (fig.1)

Violations of the normal state of the building can be imagined, on the one hand, as violations that do not affect the main structural scheme of buildings (increase in humidity, violation of the properties of materials, damage to finishes, etc.) etc.). The operational wear of buildings is mainly the result of a long-term force impact and the influence of the external environment. When designing, in addition to working conditions, coefficients take into account such random factors as

the deviation of structures made in kind from the designed one; non-coincidence of the actual work of structures with that indicated in the calculation and an accidental change in the nature of the work of structures.



If the values of all these coefficients were absolutely reliable, then the durability of the building provided for by the project would be more fully ensured. Refinement of the value of each coefficient can be achieved on the basis of accumulated experimental and static data.

In construction practice, full-scale tests of models of structural elements or entire structures are widely used in real working conditions. At present, the need to accumulate operational data and information about the frequency of external impacts on the building as a whole and its elements is obvious.

The main parameters to be controlled to maintain the normal condition of buildings are:

- structural strength;
- spatial rigidity of buildings;
- general and local deformations;
- thermotechnical qualities of enclosing structures;
- corrosion of metal bonds in also load-bearing metal structures.
- air and moisture permeability of the joints between the elements of the enclosing structures of large-panel large-block buildings;

The technical condition is determined:

- load-bearing structures;
- roofing, cornices, balconies, and downpipes;
- finishing of facades of buildings;
- foundations and waterproofing of walls, and other structures;
- state of expansion joints.

The most complete assessment of the survey of buildings in operation is provided by comprehensive field studies, which can be divided into two types:

- full-scale tests of the stress-strain state of the structural system of the building in various conditions and full-scale studies of its state;
- study of the operation of individual load-bearing and enclosing structures of buildings.

Rational and efficient operation of the building stock in modern conditions is possible only with correctly diagnosed damage to buildings.

Diagnosis comes from the Greek word for recognition. Diagnostics as a science is based on the study of wear and corrosion of building structures and includes three main sections: (Fig. 2)

- method of visual determination of wear by external signs;
- methodology for instrumental assessment of the state of structures and buildings using instruments;
- a technique for engineering analysis of diagnostic data in order to draw up a conclusion on the technical condition of the building

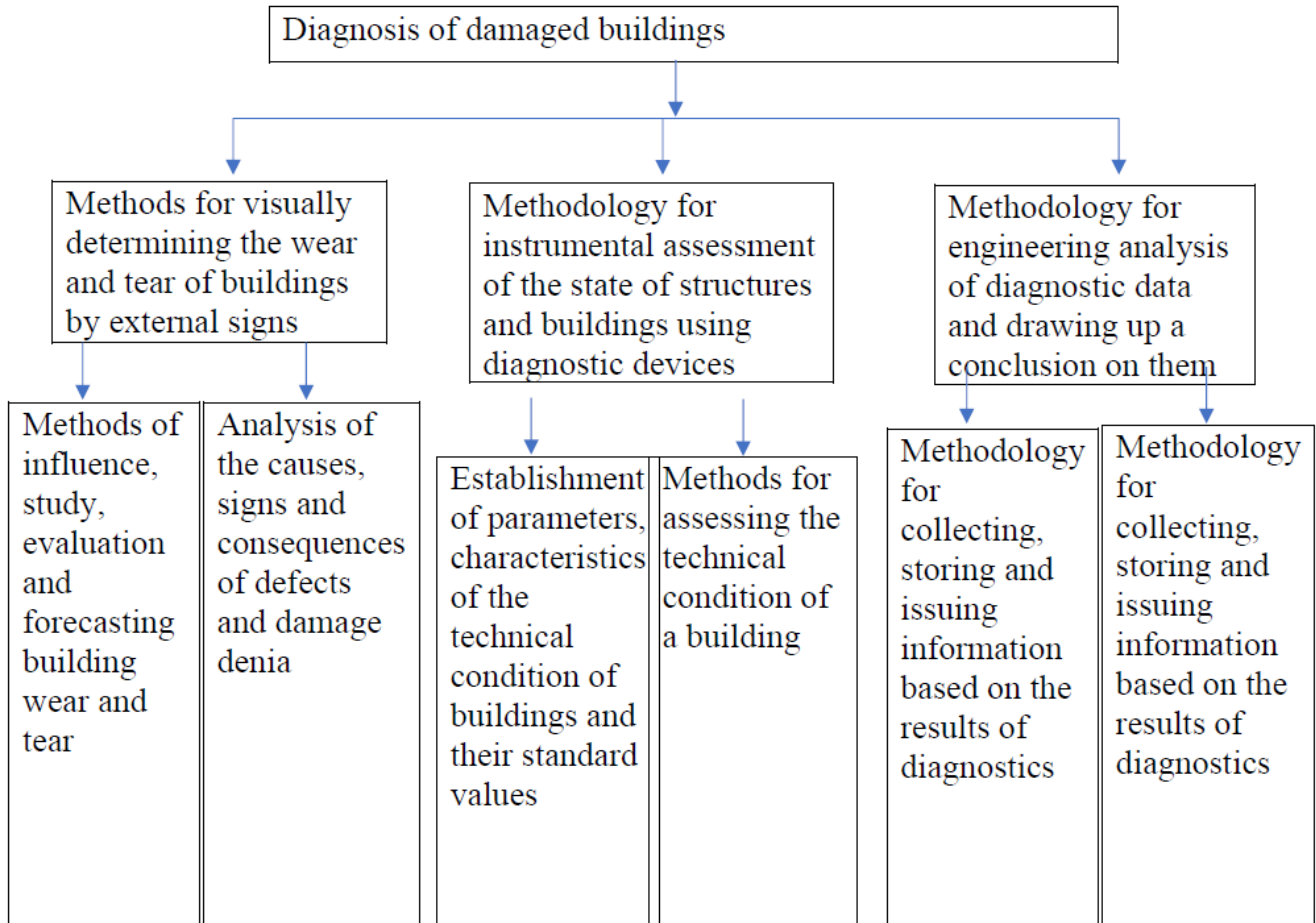


Fig.2. Diagnosis of damaged buildings

Over a long period of operation, building structures are exposed to destructive factors. In the conditions of large cities such as Tashkent, it is fashionable to attribute to the most characteristic destructive factors: the effect on building structures of harmful automobile gases (CO_2 , NO , NO_2 , SO_2 , etc.) due to heavy traffic on highways located next to buildings; vibration action; seismic activities; sharp temperature fluctuations in winter and summer; impact on structures of moisture in most cases with aggressive components dissolved in it, which are emitted by factories and vehicles into the ground, airspace of the city; destructive effect on structures of stray currents, the spread of which is facilitated by the same salt solutions; unforeseen deformations of the soil, etc.

As a result of the deterioration of the environmental situation in the most difficult conditions were the structures of buildings located near highways with heavy traffic. On the facades of buildings located at a distance of up to 50 meters from major highways, increased pollution of the surface layer with car exhaust gases is also added. In addition, with poor quality gasoline, the amount of pollutants emitted into the surrounding cut increases. In connection with the development of motor transport, the relevance of highways as sources of pollution of the urban atmosphere and adjacent territories with buildings and structures located on them is growing. The most dangerous emissions from vehicles that contribute to the destruction of building structures and their materials are carbon monoxide, nitrogen oxide and dioxide, sulfur dioxide, and soot.

Diagnostics of buildings and structures should provide information on the technical condition of structures, elements of buildings. Diagnostics is one of the elements of the general theory of the reliability and durability of buildings, its specific tasks are related to the early detection of defects and structural failures.

From a static analysis of the causes of damage to buildings, it follows that the greatest number of damage and defects occurs due to poor-quality manufacturing of structures and installation.

Causes of damage to structures of buildings and structures
(According to averaged data).

No.	Causes of damage	AT %
one	Design code flaws	four
2	Design errors	25.6
3	Poor quality materials	6
four	Defects in manufacturing and installation	48.4
5	Improper maintenance, prevention and repair	15.6
6	Other reasons	0.4

Diagnostics in practical terms is a set of documents, methods, parameters that allow a specialist to objectively assess the state of structures and buildings, compare the measured parameters with their normative values.

In the presence of well-developed methods that form the basis of diagnostics and diagnostic tools, qualified specialists in the operational service are required to put them into practice.

Properly diagnosed damage to buildings and structures will ensure the rational conduct of operation, and thus will contribute to the widespread introduction of the system of planned preventive repairs in the practice of building operation.

Literature:

1. Grozdev V.T. Defects in building structures and their consequences - St. Petersburg: Publishing House - 2001
2. Kalinin V.M., Sokova S.D. Assessment of the technical condition of buildings. Textbook M 2006
3. SHNK 2.08.01-2019 Residential buildings Tashkent - 2020.
4. SHNK 2.08.02-09 Public buildings Tashkent - 2021
5. Kasymova S.T. Technical operation of buildings and structures. Tutorial. Tashkent 2014