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1.8 Technical inspections of buildings and structures that ensure the life of people

For human life, it is extremely important to constantly and uninterruptedly provide various kinds of communications, namely water, electricity, gas, heating, sewerage, etc. In settlements, engineering complexes have been created from buildings and structures for various purposes. For the constant and uninterrupted operation of engineering systems, these buildings and structures must be in a satisfactory condition. Accordingly, periodic technical inspections of such buildings and structures are important.

Any structure is subjected to permanent and temporary loads, which gradually reduce its quality characteristics. Therefore, the main purpose of the survey is to assess the safety of buildings and structures for people.

Conducting scheduled and unscheduled inspections of the building is required by law. The first time the study must be carried out 2 years after the commissioning of the building. Subsequently, the building is examined at inte.rvals of every 5-10 years. An unscheduled inspection of the object is carried out after man-made and natural accidents, after the detection of damage to the structures.

Inspection of buildings and structures is carried out in order to obtain objective data on the actual state of building structures, taking into account changes over time. During operation, under the influence of aggressive factors of the external environment, the features of technological processes, the properties of materials and structures change, the risk of violating their quality and causing damage to the environment increases. Untimely identified and eliminated defects in building elements often develop into serious violations. Their consequences, in addition to social and environmental damage, can lead to significant material costs associated with the restoration of the operational properties of structures. Therefore, it is important to correctly and timely assess the condition of structures and equipment of buildings, make a forecast about the possibility of developing defects and develop measures to stabilize or eliminate them. To ensure safe operating conditions for buildings and

structures, maintaining the technical condition of buildings and structures at the proper level, including by extending the standard operating life, restoration and reconstruction, is of paramount importance. The general purpose of surveying the technical condition of building structures is to identify the degree of physical wear and tear, the reasons for their condition, the actual performance of structures and the development of measures to ensure their performance.

Inspection of the technical condition of buildings and structures consists of the following stages:

- analysis and study of design estimates and technical documentation for the facility;

- preparation of the survey program, equipment and technical means necessary for the survey;

- visual inspection of buildings and structures, and their individual elements;

- instrumental inspection of buildings and structures, and their individual elements;

- identification, photographic fixation and analysis of defects and violations identified during the examination;

- office work;

- verification calculations;

- development of estimate documentation for the elimination of defects and damage, overhaul, reconstruction, etc.;

- development of a graphic part based on the results of the survey;

- development of recommendations for further safe - operation of the structure;

- development of a project for reinforcement, overhaul, reconstruction, etc.

- drawing up a technical Conclusion.

The result of the technical survey is a technical report. The first and main part of the results is the conclusion. It should contain the main parameters identified during the study and the category of technical condition.

The category can be one of four:

- normative technical condition;

- satisfactory technical condition;
- technical condition unsuitable for normal operation;
- emergency technical condition.

The first two categories allow you to operate the building without restrictions and additional work. The assignment of the third obliges the owner to take measures to eliminate the identified problems. In the fourth category, the operation of the building is prohibited. Also, if significant defects are identified that can lead to the collapse of the building, the appraiser is obliged to immediately report such a fact to the owner and to the executive authorities and construction supervision.

An example of a survey of an existing boiler house building is described in the article.

Typical boiler room. The purpose of the boiler house is to generate thermal energy. (Figures 1-6). The existing building in axes 2-8, A-B is a one-story brick frame production unit with a mezzanine (in axes 2-3, A-B) with dimensions in plan in axes 1-8, A-E 18.640 x34.570 m, roof beams 5.740 m high, 5.640 m, mezzanine at elevation +3.530; in axes 1-8, A-B - a one-storey part, in axes 1-3/1, G-E - a two-storey administrative part (overlapping at elevation +3.530).

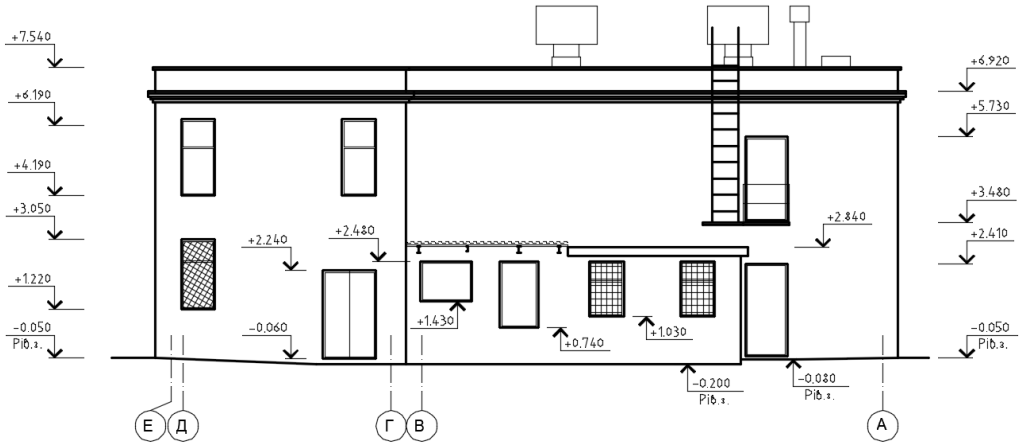

Figure 1. The facade of the building in axes E-A

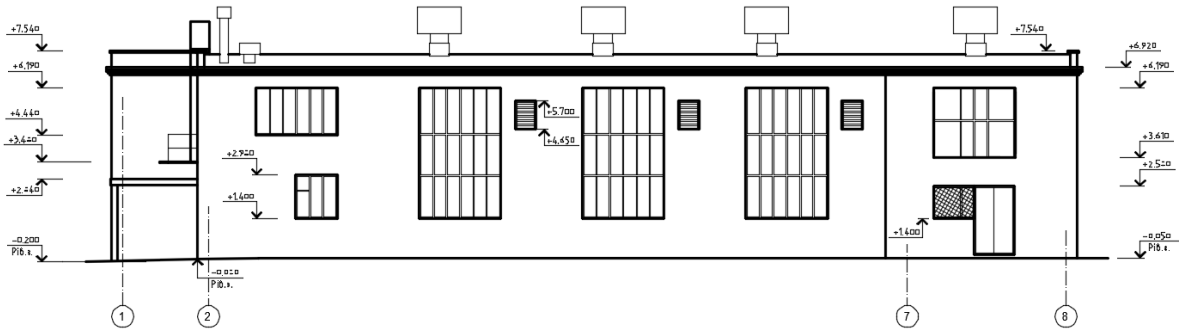

Figure 2. The facade of the building in axes 1-8

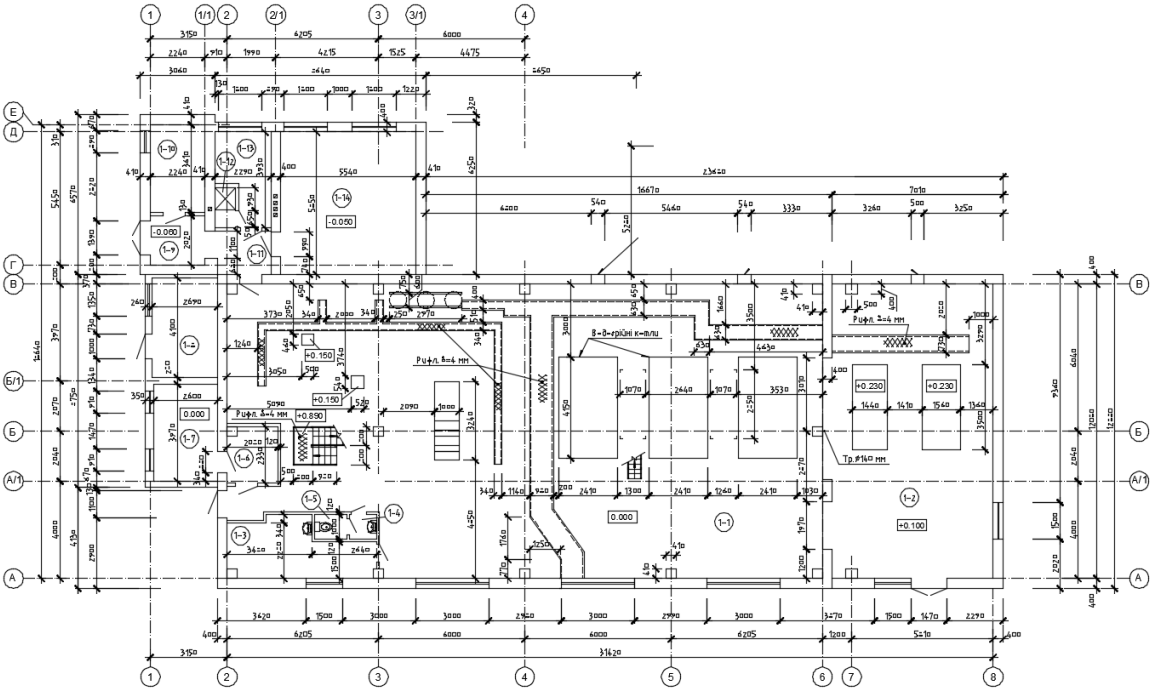

Figure 3. First floor plan

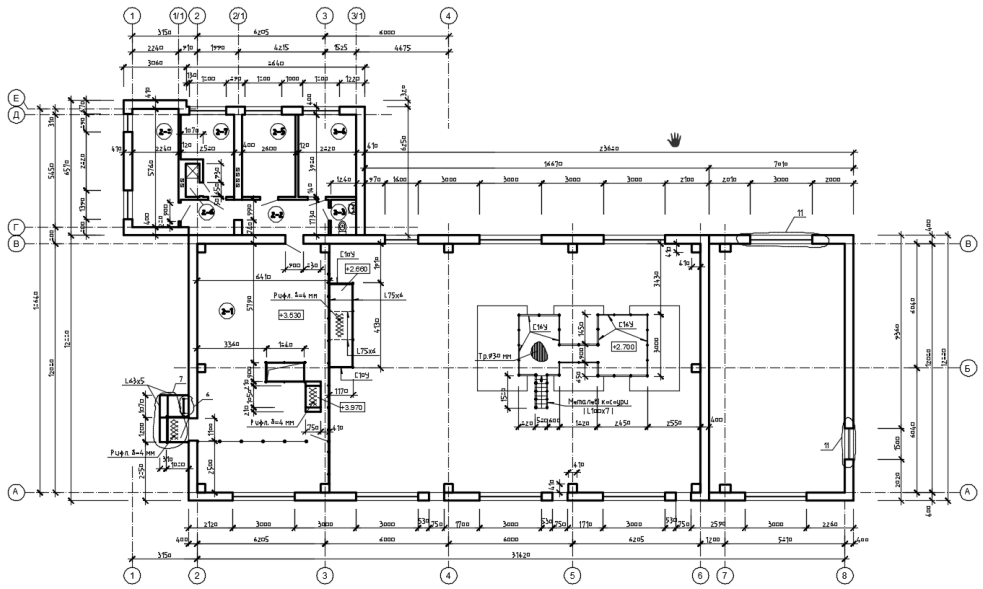

Figure 4. Second floor plan

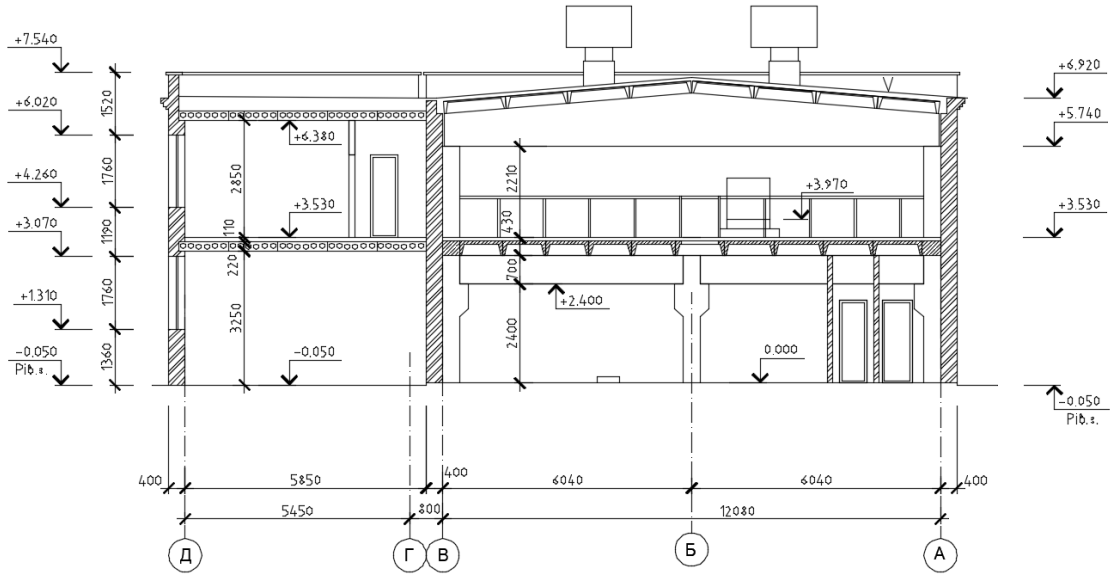

Figure 5. Cross section of a building

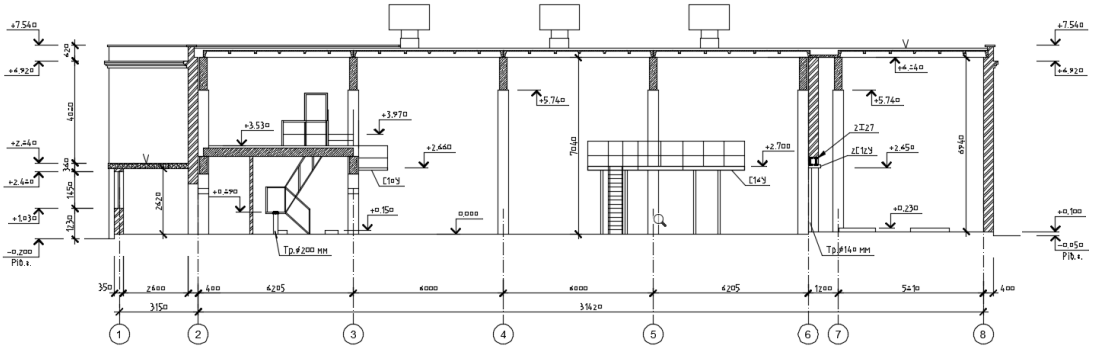

Figure 6. Longitudinal section through the house

The rigidity of the building in both directions is ensured by reinforced concrete columns fixed in the foundations, transverse reinforced concrete roof beams, load-bearing transverse and longitudinal brick walls and a horizontal disk of roof slabs.

As a result of the inspection of the building, the following was found:

one-story part (in axes 1-8, A-B) with a mezzanine (in axes 2-3, A-B):

- foundations - prefabricated reinforced concrete;
- foundations for equipment - monolithic concrete;
- frames for equipment - metal (channels No. 16U, bent channels No. 10);
- columns - prefabricated reinforced concrete;
- technological channels in the floor - monolithic concrete, framed with a steel square 50x5; channel overlap - corrugated steel δ=4 mm,

- roof slabs - prefabricated reinforced concrete ribbed slabs 1.5 m, 3.0 m wide, prefabricated reinforced concrete round-hollow slabs, prefabricated reinforced concrete flat slabs;

- roof beams - prefabricated reinforced concrete gable cross section L=12.0 m, prefabricated reinforced concrete gable lattice L=12.0 m; metal (channel No. 12U, I-beams No. 16);

- mezzanine floor slabs - prefabricated reinforced concrete ribbed slabs 1.20 m wide, 1.0 m wide;

- mezzanine floor beams - prefabricated reinforced concrete 0.30x0.70 (h) m;

- internal stairs - metal (corners 50x5, 60x5, 100x7, channels No. 10U, pipe. Ø200 mm, corrugated steel δ=4 mm);

- fire escape - metal;

- outdoor area - metal (corners 63x5, corrugated steel δ=4 mm);

- walls - brick with a thickness of 250 mm, 380 mm;

- partitions - brick;

- floor - ceramic tiles, concrete tiles, corrugated metal sheets;

- parapet slabs - prefabricated reinforced concrete;

- lintels - prefabricated reinforced concrete; metal;

- windows - wooden, metal bars, metal shutters;

- louvre grille - metal;

- door - wooden; metal;

- deflectors - metal;

- roof (in axes 2-8, A-B):

- two layers of roofing material on bituminous mastic;

- leveling layer (cement screed);

- insulation (expanded clay);

- vapor barrier (1 layer of roofing material);

- roof (in axes 1-2, A / 1-B / 1):

- one layer of roofing material;

- roof (in axes 1-2, B / 1-C):

- asbestos-cement wavy leaves;

- boardwalk;

- interior finish - lime whitewash; panel - oil painting, ceramic tiles;

- finishing of the ceiling - lime whitewash;

- external finishing - is absent;

- window sills - absent;

- parapet aprons - galvanized steel;

- drainage system - absent;

- blind area - concrete; partially absent;

two-story part (in axes 1-3/1, G-E):

- foundations - not surveyed;

- coating slabs - prefabricated reinforced concrete round-hollow slabs;

- floor slabs - prefabricated reinforced concrete round-hollow slabs;

- walls - brick 380 mm thick;

- partitions - brick;

- lintels - prefabricated reinforced concrete;

- floor - ceramic tiles;

- windows - wooden, metal bars;

- door - wooden; metal;

- roofing: two layers of roofing material on bituminous mastic; leveling layer (cement screed); insulation (expanded clay); vapor barrier (1 layer of roofing material);

- interior finish - lime whitewash; panel - oil painting, ceramic tiles;

- finishing of the ceiling - lime whitewash;

- external finishing - is absent;

- window sills - absent;

- parapet aprons - galvanized steel;

- drainage system - absent;

- ventilation caps - brick;

- blind area - absent;

Certain defects in the building:

– corrosion of metal elements of technological channels in the floor;

- corrosion of metal deflectors on the roof;

- corrosion of metal shutters, window bars;

- corrosion of metal shutters;

- corrosion of metal roof beams;

- corrosion of the outer metal platform;

- corrosion of metal parapet aprons, in some places the absence of parapet aprons;

- paint peeling, corrosion of the metal door and metal door frame;

- vertical crack in the wall along the expansion joint;

- wall lock, wall damage by fungus;

- locking of the coating slabs, damage to the protective layer of concrete with exposure of the reinforcement, corrosion of the reinforcement;

- horizontal cracks in the longitudinal ribs of floor slabs;

- detachment of the protective layer of concrete along the corner of the column;

- in some places, the absence of parapet slabs;

- there is no painting of window frames, cracking of wood, increased water absorption of window frames;

- there are no external window sills;

- there is no exterior wall decoration, wall locking in the cornice part, brickwork seams are not filled,

- there is no external decoration of the walls, the lock of the walls in the basement part with a fungus attack, the seams of the brickwork are not filled, the weathering of the brick;

- leaking roof. Damage to the integrity of the roofing felt carpet, loose connection of the roofing felt carpet to the parapet walls;

- locking of the coating slabs in the places where the deflectors pass, damage to the ceiling finish;

- lack of earnings of seams between plates of a covering;

- damage to the blind area, in some places there is no blind area;
- damage to the flooring, potholes, cracking, falling off of ceramic tiles;
- detachment of oil paint of wall panels;
- cracking of concrete foundations for equipment;
- leakage of the roof, damage to the integrity of the ruberoid carpet;
- roof leakage, damage to asbestos-cement corrugated sheets;
- there is no drainage system.

Conclusion. As a result of the survey, it was found that the main building structures are in a satisfactory condition. For further safe operation of the building, it is necessary to eliminate all structural defects found during the survey. The technical report contains recommendations for troubleshooting.