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MOISTENING OF BUILDING STRUCTURES AND METHODS OF THEIR PROTECTION

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Abstract:

Increased moisture content negatively affects the performance of supporting and enclosing structures. There are the following types of humidification:in the manufacture of structures (building moisture); atmospheric precipitation; condensate of water vapor, etc.During the reconstruction of buildings, drainage, restoration or installation of new waterproofing of walls are considered radical methods of protecting walls from moistening with groundwater

Keywords: Moisturizing structures, precipitation, electroosmosis, restoration of waterproofing, injection.

INTRODUCTION.

Practice shows that increased moisture content negatively affects the performance of supporting and enclosing structures.With an increase in humidity, the thermal conductivity of the material increases, its thermal properties deteriorate.In addition, with a change in humidity, the volume of the material changes, and with repeated moistening, its structure looses and its durability decreases.Waterlogging also adversely affects the state of the air environment in the premises, worsening it from a hygienic point of view.

An increased moisture content is characteristic of many structures in contact with water during manufacture and operation, while the following types of humidification are distinguished:

-in the manufacture of structures (construction moisture);
- atmospheric precipitation;
-condensate of water vapor;
- leaks from the water supply and sewerage network;
-capillary and electroosmotic suction of ground water.

The content of building moisture in structures is due to the specifics of their manufacture and in the initial period does not exceed the following values:for concrete and reinforced concrete structures - 6-9%, for stone and reinforced masonry structures - 8-12%.Subsequently, under unfavorable operating conditions, the moisture content of the structure material can increase significantly.

MATERIAL AND RESEARCH METHODS.

Humidification by atmospheric precipitation occurs in case of damage to the roof, unsatisfactory condition of the drainage equipment of the building (drainpipes, gutters, weirs), short eaves and is predominantly seasonal in nature to protect the walls from moisture moisture by atmospheric precipitation, constructive measures are taken to lengthen short eaves; repair and restoration of gutters pipes and weirs.In addition, the surface of the walls is plastered or revetted with waterproof materials. The humidification of the enclosing structures with condensate of water vapor of air occurs at the dew point temperature, when the air humidity at the surface of the structures or in the pores of its material turns out to be higher than the maximum vapor pressure at a given temperature and the excess moisture passes into the liquid phase.The mechanism of condensation formation inside the enclosing structure is rather complicated and depends on many parameters: the difference in air vapor pressure at the opposite surfaces of the structures, the relative humidity and temperature of the air inside and outside the room, as well as the density of the material.

The significant value of the nominal pressure allows the air flow to penetrate quite freely through the thickness of the outer wall.It is noticed that the lower the thermal insulation of the outer wall and the higher the relative humidity of the air in the room behind this wall, the higher the danger of its over moistening by water vapor from the room.If the outer surface of the wall is covered with a dense vapor-impermeable material, then water vapor penetrating through the wall has the ability to condense inside the wall, waterlogging it and increasing its thermal conductivity.

Condensation humidification is prevented by rational wall design based on meeting the requirements of the standards and calculating the temperature and humidity conditions.So, for example, in buildings operated in a moderately humid and dry climate, the resistance of the outer walls decreases from the inner surface to the outer, while the vapor barrier is located on the inner surface of the wall.This is especially important when protecting the outer walls of wet and wet rooms (baths, saunas, laundries, etc.) from waterlogging.When choosing an external wall decoration, it should be remembered that both its vapor permeability and excessive porosity are dangerous. If in the first case, the wall may become waterlogged with condensate, then in the second, it is atmospheric moisture.

RESEARCH RESULTS.

Humidification by leaks from the water supply and sewerage network is usually found in buildings with worn-out sanitary equipment if the timeframes for preventive maintenance are violated.Leaks lead to waterlogging and rapid destruction of the wall masonry, especially if the walls are made of silicate bricks. Moisture spots by leaks are easily detected when examining the walls for characteristic spots.Humidification by leaks is eliminated by repairing sanitary equipment, followed by drying the structures with warm air.

Humidification by capillary and electroosmotic suction of ground moisture is typical for walls that do not have horizontal waterproofing or when the waterproofing is located below the blind area.The mechanism of capillary humidification is based on the action of attractive forces between the molecules of a solid and a liquid (wetting phenomenon).In the absence of hydrophobic (water-repellent) substances in the wall material, water wets the walls of the capillaries and rises along them.

When inspecting buildings, the rise of ground moisture in the walls was observed to a height of up to 5 m, which significantly exceeds the height of the capillary suction.The decisive role in this is played by the action of electroosmotic forces.

Electroosmosis is understood as the directed movement of a liquid from the anode to the cathode through capillaries or porous diaphragms when an electric field is applied.

It should be noted that weak electric fields are always present in walls experiencing temperature drops along the length or on opposite surfaces (thermoelectric effect).In this case, positive charges (anodes) are grouped mainly at the base of the wall in the zone of contact with the ground, and negative (cathodes) - at the top.

Considering walls made of porous material (expanded clay concrete) as a kind of diaphragm, it should be assumed that the groundwater, due to electroosmotic forces, rises up the wall towards the cathode.Since the potential of the wall's electric field changes under the influence of external factors (temperature difference, intense solar insolation, air humidity), then the value of electroosmotic humidification is variable.

The outlined theoretical prerequisites provide a basis for the use of electroosmosis to regulate humidity and drain walls.

Electro-osmotic wall drying is done in three ways:

- short (by means of steel strips) closure of the opposite poles of the electric field of the wall, including the foundation (passive drainage). For this, steel strips on the outer surface of the wall must be placed in increments of 0.3-0.5 m. The length of the strips is taken according to the height of the wall moisture.

-imposed current with a voltage of 40-60 V and a current of 3-5A. In this case, an electric current is supplied from a direct current generator. The positive pole of the generator is connected to the steel strip located in the upper part of the wall and the negative pole to the strip fixed to the foundation. The duration of the superimposed current drying usually does not exceed two to three weeks.

- galvanic elements (copper-zinc, coal-zinc, etc.). The active element (protector) is installed in the ground at the level of the foundation sole, and the passive element - on the inner surface of the drained wall. The distance between the electrodes of galvanic pairs is determined by calculation based on data on the galvanic activity of the elements, the porosity of the wall, the radius of the capillaries, the coefficient of the electric motor and the specific conductivity of the water. Electro-osmotic drying of walls with galvanic cells has not yet found wide application and is in the stage of further development and improvement.

When reconstructing buildings designed for long-term operation (50 or more years), drainage, as well as restoration or installation of new waterproofing of walls, are considered radical methods of protecting walls from moistening with groundwater.

One of the most effective ways to drain groundwater from the walls of basements and buried structures is drainage.When designing drainage, it is necessary to take into account that dewatering, especially in clay and silty sandy soils, entails compaction and settlement of the drained soil layer, which can lead to significant deformation of the foundations.Additional settlement of buildings in the drained area is determined from the calculation, which can lead to significant deformation of the foundations.The additional settlement of buildings in the drained area is determined on the basis that each meter of lowering of the groundwater level corresponds to an increase in the load

on the ground of 9.8 kn / m.To protect underground structures from groundwater, in combination with drainage, it is effective to install anti-seepage curtains filled with clay packing or bitumen injection.

The most difficult and time-consuming processes or renovation works include the restoration or installation of new waterproofing of the walls of the building.The values of waterproofing can hardly be overestimated, since it is the only reliable way to protect walls from the effects and penetration of capillary ground moisture of unconfined and pressurized groundwater.At the same time, horizontal waterproofing prevents capillary and electroosmotic absorption of moisture up the wall, and vertical waterproofing prevents surface moisture and moisture penetration into basements.

Carrying out repair and restoration work on the waterproofing of the building is preceded by a thorough examination of its underground part, especially the walls of the basement, made of concrete blocks, rubble or brickwork and having a large number of seams.The survey is carried out with a temporary lowering of the groundwater level by pumping out of pits or well points. To prevent soil leaching from the bottom of the foundations, pits and well points are placed outside the basement.The identified areas of damage to the waterproofing are removed manually using metal brushes and scrapers or using mechanical methods.

In case of minor damage, the waterproofing is repaired using, if possible, the same waterproofing materials.If the damage exceeds 40%, then it is advisable to replace the waterproofing with a more effective one.When choosing the type of waterproofing, the hydrogeological conditions of the building, the category of dryness of the premises and the crack resistance of the enclosing structure are taken into account.

Repair and restoration of horizontal waterproofing walls can be done in two ways:

-injection of hydrophobic substances into the masonry walls, preventing the capillary suction of moisture;

- laying of a new waterproofing layer.

When reconstructing buildings, it is also recommended to use the latest waterproofing systems such as "Kalmatron", "Penetron".

Kalmatron is a system of protective waterproofing compounds of penetrating action, which is a reliable system for protecting concrete, reinforced concrete and other capillary-porous building materials from the effects of water and aggressive media.

Materials of the Kalmatron family are produced in the form of dry mixtures and consist of Portland cement, dry refined and fractionated quartz sand, as well as a complex of chemically active mineral additives.

Features of the Kalmatron material contributes to:

- penetration of the components of the compositions deep into concrete with a continuous front with filling of capillaries and microcracks with hardly soluble crystals;

- increasing the durability of the waterproofing of the structure for almost the entire period of its operation;

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-resistant to critical temperatures, as well as their drops. Frost resistance reaches up to F300;

- for the Kalmatron compositions, it is not required that the concrete be dry, which is very important in the conditions of the construction site;

-treated concrete has the ability to self-heal, i.e. cracks that have appeared in the structure with an opening of up to 0.2 mm are able to "tighten" if the only condition is met - the presence of moisture in this area;

-Calmatron does not cause corrosion of reinforcement and does not impair the passivating effect of concrete in relation to steel reinforcement.

Penetron-dry mix consists of special cement, quartz sand of a certain granulometry, as well as patented active chemical additives.Penetron is intended for waterproofing surfaces of prefabricated and monolithic concrete and reinforced concrete structures, including those plastered with cement-sand mortar."Penetron" is used for waterproofing cracks, seams, joints, mates, abutments, communications inputs.The use of "Penetron" material prevents water penetration through the concrete body, even in the presence of high hydrostatic pressure.The use of the material allows you to protect concrete from the effects of aggressive media: acids, waste and groundwater, sea water. Concrete treated with Penetron becomes resistant to the effects of carbonates, chlorides, sulfates, nitrates, etc. The use of "Penetron" allows you to increase the indicators of water resistance, strength, frost resistance of concrete, which are preserved even in the presence of high radiation exposure. The material is used for waterproofing surfaces with pores, cracks with an opening width of up to 0.4 mm or more.

OUTPUT:

Building structures and products must be protected from moisture penetration in order to protect the structure of their material from destruction.Moistened parts and structures negatively affect human health and worsen the thermal protection of buildings.To protect building structures from moisture, it is necessary to provide for measures to protect them.

REFERENCES

1. ГОСТ 12730.5-84 "Concrete. Methods for Determining Water Impermeability ".
2. GOST 22690-88 "Concrete. Determination of strength by mechanical methods of non-destructive testing ".
3. Technical recommendations for waterproofing and repairing reinforced concrete structures. St. Petersburg-2012
4. Technological regulations for the use of waterproofing materials of penetrating action of the Penetron system, Moscow, 2014.
5. Kasymova S.T. "Technical maintenance of buildings". Study guide 2014-TASHKENT.