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Coatings for the Complex Protection of Metal Structures of Industrial Facilities

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Abstract: This article discusses the main content from the point of view of science, corrosion processes in civil engineering represent the most real threat to metal structures. Regardless of the thickness of the steel, rust quickly renders the material unusable, the technology of protection against the appearance and development of corrosion requires an increase in the corrosion resistance of structures.

Keywords: corrosion, metal structure, gas corrosion, iron and steel products, temperature, coatings

Introduction. Corrosion control is a very important task for the oil and gas industry.

In order for metal structures to serve for many years, it is necessary to protect the metal against corrosion. The destructive effect of the atmosphere and aggressive environment leads to the fact that the material gradually loses its qualities and loses its appearance. In this case, the metal needs corrosion protection.

The anti-corrosion protection goals depend on the high-quality anti-corrosion coating of the durability and reliability of various metal parts, pipes, construction structures and many other metal objects. For the anti-corrosion treatment of metal structures, machine tools, construction and agricultural techniques, special paints are used.

Metal structures corrosion-resistant coatings are very widely used. For example, corrosion protection is necessary for pipes, building metal structures, (construction and rail). In addition, bridges, hydraulic structures, roadblocks and any other metal structures that come into contact with an aggressive environment need protection.

The main factors that reduce the durability of metal structures of objects of the oil and gas industry:

- severe climatic conditions and precipitation;
- industrial pollution of the atmosphere (sulfur compounds, chlorides, etc.);
- aggressive liquid environment;
- aggressive soils.

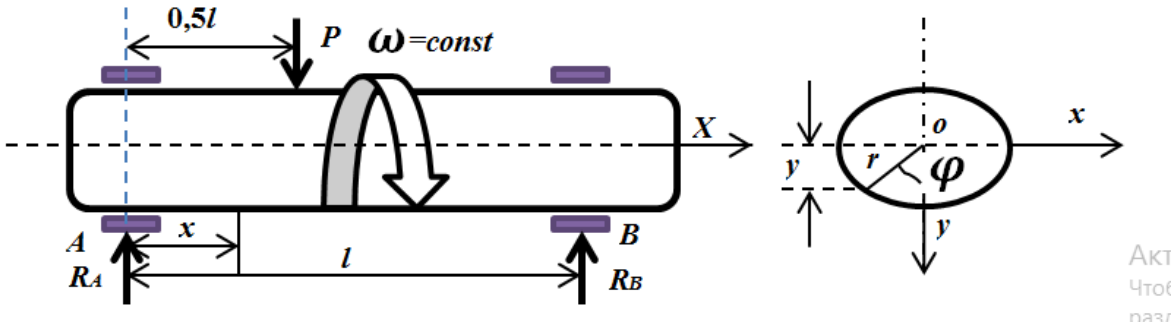
To ensure the continuous operation of oil and gas equipment, effective means of anticorrosion protection should be used.

Over time, forces can change from time to time or periodically. In the future, we will only consider the voltages that change from time to time from the maximum that is most common in the construction industry.

So, for example, with an even rotation of the balcony (fig. 1) under the influence of a constant P load that leads to bending, the normal voltage at Point C, located on the surface of the part of the balcony under consideration, is determined by the following formula

$$\sigma_c = \frac{M_x y}{I_x} = \frac{M_x r}{I_x} cos\omega t,$$

Here $M_x = R_A \cdot x = 0{,}5P_x -$ region moment in cross section x from the reaction on the left base; y is the distance from the point under study to the neutral axis (y \ $cos\omega t$) ; I_x – moment of inertia of Val cross section of cross section with respect to neutral axis; ω – the rate of rotation of the shaft; t is the current time.



Form: 1. Symmetrically loaded shaft

The constant load of P leads to bending, the upper fibers of the shaft are located in the compressed zone, and the lower fibers are located in the stretched area. (1) the formula follows that the voltage graph represents the cosinusoid shown in the time-dependent loop

Attachment of Lattice sterjins from pairs and single angles is carried out with knotted styles or corner nodes directly on the straps and is calculated by the external force acting on the attached sterjins (Figure 1.). This movement is distributed between the nodes and the angle:

$$N_k = \alpha N, N_t = (1-\alpha)N,$$

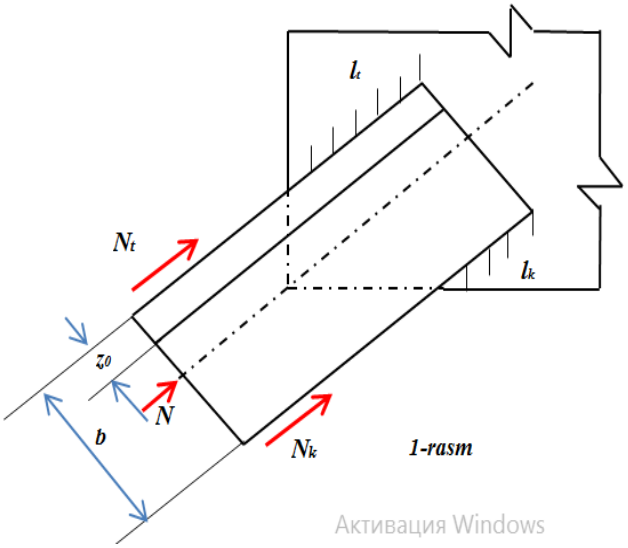
$$\alpha = \frac{z_0}{b}$$

approximately acceptable;

For angles with equal angles 0,3,

0,35-for unequal places attached with a wide angle,

0,25-the same, for places attached with a narrow shelf.



If the height of the flat part of the double taurine wall is not enough to accommodate grid attachment seams, such styles are arranged in knots as thick as the double taurine wall. To increase the strength of the knots, one of the planes is fixed on one of the corners to the wall of the double Torah, the other is not brought before it, to ensure the welding of the style. To pairs of lengths, the angles of each angle were the same, their attachment at the bottom and performed at the upper corners (Figure-2)

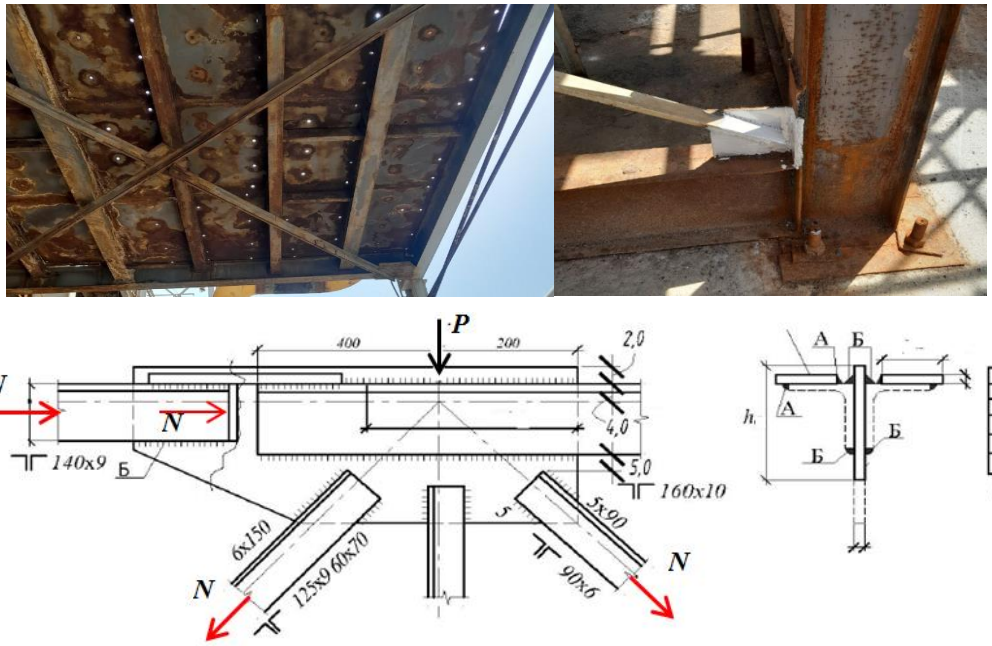


Figure-2

These norms apply to the protection of building buildings and structures (concrete, reinforced concrete, steel, aluminum, wood, stone and asbestos) from corrosion when designing under the influence of aggressive damage at temperatures from minus 40°C to plus 50°C.

Corrosion protection of building structures that emit radioactive substances from themselves is not recommended for design, including the design of special concrete structures (polymerbeton, acid, liquid-resistant concretions). When designing buildings and structures, the analysis of the state of corrosion should definitely be considered, taking into account the degree of aggressiveness in the environment of the appearance and new conditions of use of structures and protection coatings. The protection of construction structures is guided by the application of corrosion-resistant materials for this environment, as well as by the fulfillment of structural requirements (initial protection), the coating of metal, oxide, varnish and Mastic - wax coatings on the surface of the structures, lubrication, wrapping with a thin curtain, covering other, storage with materials (second protection), at the same time

A comprehensive review of existing corrosion models of steel-reinforced farm structures and a study of their efficiency in long-term exposure under different atmospheric environment conditions, with an emphasis on low and high (C2 To C4) corrosion classes. These levels can be represented by the presence of corrosive factors in the air, from the atmosphere (low level of pollutants) to the industrial atmosphere.

High levels of pollutants, Table 1

№	Corrose categories	Corrosi state	Atmosphere Of The Outer Atmosphere
1	C1	Too low	Dry or cold zone with very low pollution and gravity
2	C2	Low	Emperor zone with low pollution (SO_2 $\left(\mu g/m^3\right)$< 5), Short-drawn dry and cold zone, such as
3	C3	Middle	Intermediate zone with moderate pollution5 <SO_2 $\left(\mu g/m^3\right)$< 30) and low chloride effect, for example, low concentration of chloride ions
4	C4	High	Moderate zone with high pollution 30 <SO_2 $\left(\mu g/m^3\right)$< 90) or important effects of chlorides

5	C5	Too High	Temperate zones with high pollution levels 90 <SO_2 $\left(\mu g/m^3\right)$<250) high chloride deposition rates, such as industrial areas
6	CX	Extreme	Jju has a high level of SO_2 atmospheric environment with deposits SO_2 $\left(\mu g/m^3\right)$<250) accompanying and production factors with a deep effect of chloride concentration

To implement this goal, holistic instructions were first given on the mechanism of corrosion in steel-reinforced farm structures and its main causes. Subsequently, a quantitative comparison (table 1) of the most updated and reliable corrosion models of steel-reinforced farm structures in the atmospheric environment by various corrosion categories was reported, and for a long time the most significant differences were indicated. In addition, Applied Research has been analyzed to assess the dynamic properties of corrosive samples by using the finite element method at different corrosion rates, referring to the process unit within the petrochemical plant.

Impact on construction structures, by level, the environment is divided into nonagressive, sluggish aggressive, moderately aggressive and strongly aggressive. It decomposes into gaseous, solid and liquid according to its physical state in environments. It is advisable to carry out the surface protection of construction structures prepared at the plant in a factory setting.

Metals are rare in elemental forms, and they combine with oxygen and other common chemicals to form thermodynamically stable ores. They are usually oxides and mineral ores; therefore, they occur in this form and must be purified in energy-intensive processes (Figure 3). Chemically, corrosion is defined as a chemical or electrochemical reaction between a material (usually metal or alloy) and an aggressive medium that causes the material to decay.

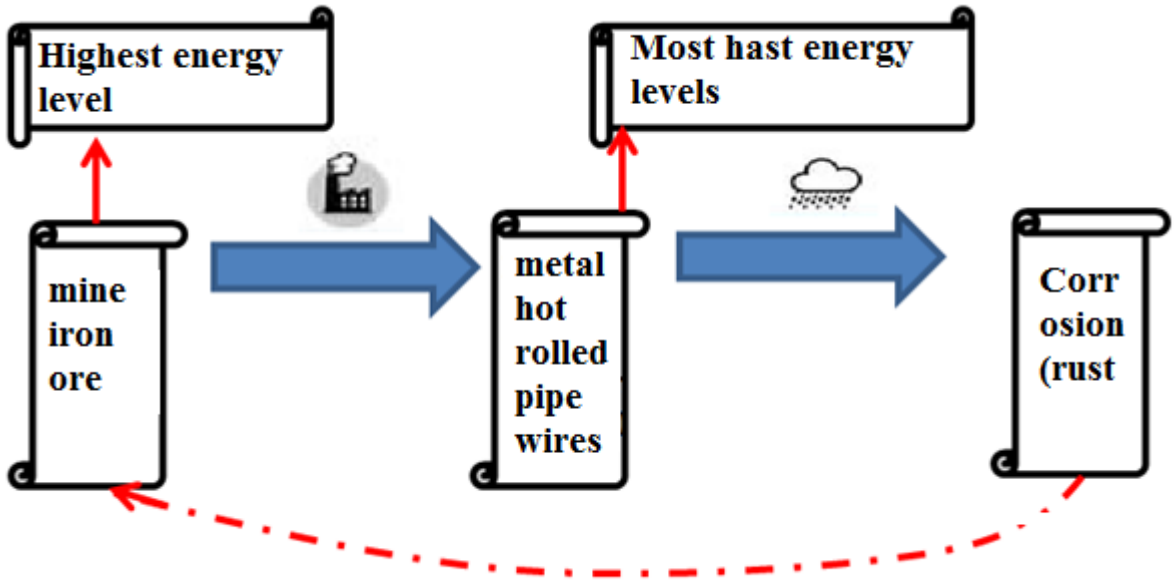


Figure 3. Corrosion cleaning of steel parts process

Corrosion can be classified using different approaches. The most common classification divides types of corrosion according to their appearance, some can be identified visually, while others are not visible (figure 5). The most common types of corrosion to steel components can be expressed as follows

Conclusions.

In connection with the production of metal structures, as a rule, in factories that are later transported to the construction site, the project should provide for the possibility of transporting them in full or in parts (load-bearing elements) using the appropriate vehicles. It should be designed with an emphasis on the most modern and effective technological methods that ensure maximum reduction of labor, taking into account the production technology and installation requirements. It should correspond to the possibilities of assembling it in the shortest possible time, taking into account assembly equipment. The durability of a construction is determined by the conditions of its physical and spiritual deterioration. Physical wear of metal structures is mainly associated with corrosion processes. Wear is associated with changes in working conditions. Loyhas, regardless of their purpose, should have harmonious forms. This requirement is especially important for public buildings and structures. All these requirements are met by layha on the basis of the principles developed by science and practice and the main directions of its development.

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