

СЕКЦІЯ 6
**СУЧАСНІ ЕФЕКТИВНІ ТЕХНОЛОГІЇ У БУДІВНИЦТВІ,
АРХІТЕКТУРІ ТА ДИЗАЙНІ. ГЕОДЕЗІЯ ТА ЗЕМЛЕУСТРІЙ**

УДК 620.197

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**INNOVATIVE ECOPROTECTION OF METALS AGAINST CORROSION IN METAL-
INTENSIVE STRUCTURES WITH THE HELP OF THE CONTRRUST RUST
MODIFIER**

Currently, corrosion losses in industrialized countries reach 3-5% of national income. This is especially true of metallurgical and chemical enterprises, oil and gas pipelines, watercraft and others, where elements and structures operate in highly aggressive environments of 4-5 degrees. The total damage from corrosion is billions of dollars due to emergencies, environmental disasters and so on. According to statistics, the lack of corrosion protection is the cause of almost 25 percent of accidents

As a result of corrosion, metals are converted into various compounds - oxides, hydroxides or salts, in the form of which they are in nature. It is difficult to take into account indirect losses from downtime and reduced productivity of equipment that has undergone corrosion, from disruption of the normal course of technological processes, from accidents caused by reduced strength of metal structures. Up to 10 percent of the produced metal is lost due to corrosion.

There are also indirect losses that are difficult to predict or predict. These are losses from downtime and reduced productivity of equipment that has undergone corrosion, from the disruption of normal technological processes, from accidents caused by reduced strength of metal structures, environmental pollution, insurance benefits and, most importantly, from fatalities.

The main idea and purpose of development-preservation of metal in metal-containing structures and products, environmentally friendly means, extending terms of safe operation of objects and protecting environment and people from harmful waste at cleaning of surfaces and from harmful substances at preparation of metal surfaces for painting by transformation. rust in the metal-polymer environmentally friendly film-coating in microcracks and pores inaccessible to sandblasting, protecting the metal from corrosion under a protective layer of coating or paint, without harming humans and the environment.

The main research methods are laboratory and field tests, as well as experimental implementations. Contrrust rust converter has passed successful tests, received positive feedback from consumers, has awards:

- tests were carried out in the EEZ Paton laboratory. polish; the inner part of the stainless steel cylinder is brought to a metallic luster; under air pressure of 200 kgf/cm² peeling of protective films is not revealed; with the help of "Contrrust" it is possible to determine the presence of spot corrosion by rinsing the tank;

- the welding process on the metal treated with "Contrrust" is somewhat more stable over time, the formation of the seam is facilitated by increasing the fluidity of the welding bath; when welding

electrodes for manual welding does not adversely affect the welding process and the chemical composition of the weld metal "

- protocol №08-8 / 06-16, №08-9 / 06-16, №08-13 / 07-16, calculation of the durability of protective coatings 18/869 "after the action of neutral salt spray and increasing humidity ($98 \pm 2^\circ\text{C}$) and temperatures of $+ 38 \pm 2^\circ\text{C}$ and $19 \pm 2^\circ\text{C}$ in accordance with ISO 9227-2012 with a total duration of 984 hours - meets the requirements of the test program."

NASU IFH them. LV Pisarzhevsky "application of" Contrrust "does not impair the physical and mechanical ability of the tested materials, and their anti-corrosion properties are improved, the service life of protected objects increases by 2-3 times."

NASU FMI them. GV Karpenko "Contrrust" can be used in the preparation of steel surfaces in repair work in civil engineering, transport, shipbuilding, pipeline transport and coating systems, the extension of the service life of metals in conjunction with coatings for durability can be predicted in within 5 to 15 years "

KiAZ "AVIANT" "positive results in all coating systems".

MONU "KNUBA" "as a result of tests it was found that the treatment of reinforcing bars with anti-corrosion agent" Contrrust "does not impair the adhesion of reinforcement to concrete, this tool can be used for treatment of corroded reinforcing bars class A240C... A500C and 60 heavy heavy constructive methods of concreting (from monolithic to shotcreting). Metal structures covered with a protective chelate-polymer film do not adversely affect the concrete.

Perfect protection against corrosion is provided by 80% special surface preparation, and only 20% by the quality of the coating systems used, paints and methods of their application and therefore "Contrrust" is a "hi-tech" breakthrough technology in the mechanism of rust removal from metal surfaces, on wet surfaces without loss of metal at all.

When isolating the metal surface from aggressive environments, an important role is played by chelating metal-polymer film-soil, which is formed when applied to the rust "Contrrust" and is the first layer in the coating system, which extends the life of the metal structure, which is very important to eliminate emissions. into the atmosphere of heavy metals and ensuring the durability of coating systems and achieving a high economic effect.

Aggressiveness of the production environment in the manufacture and use of "Contrrust" - no. The metal-polymer chelate film formed on the surface of the reduced metal acts as one (- two layers of soil) (ISO 4618: 2014) and replaces the stage of mechanical cleaning of the corroded surface to the degree of Sa 2.5 according to ISO 8501-1.

The converting power of Contrrust at an average rust thickness of $300\ \mu\text{m}$ reaches 100% purity. Metal-polymer film does not peel off under the influence of underground stray currents and aggressive environment

Data on the problems of anti-corrosion by chemical methods, in Ukraine, the Russian Federation, European countries and the United States shows the advantages of "Contrrust" even over the advertised Super Rust Killer "Loctite 7505", which turns rust into a solid base on the metal surface and acts essentially similar to "Contrrust", forming the first layer as a layer of primer, however, at elevated drying temperature, the protective film begins to blister and, moreover, "Loctite 7505" should not be applied to wet surfaces, metal surfaces under the sun, etc. ., the economic effect of its application is 7.8 times lower than "Contrrust".

Achieved results. Conclusions

1. Application of "Contrrust" provides high-quality preparation of a surface for finishing works. It is used to treat metal surfaces before applying a protective layer or paint.

2. All laboratory and field tests have shown high efficiency of this CONTRRUST modifier

3. Processing of reinforcement of reinforced concrete products by the CONTRRUST modifier does not worsen coupling of reinforcement with concrete

4. CONTRRUST modifier is not toxic, not harmful to humans and the environment natural material, which is less time consuming, expensive and safe to work compared to known methods, and the economic effect of experimental implementations is already over 65 million UAH.

References

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УДК 331.45

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ENSURING THE SAFETY OF WORKERS ON CONSTRUCTION SITES

Ensuring labour safety on construction sites is and will be a topical topic. Any construction can pose a threat to the health or even life of workers or just passers-by. To prevent accidents, it is necessary to strictly comply with the requirements of labour protection and safety rules. At construction sites, labour protection is regulated by the «Minimum requirements for labour protection on temporary and mobile construction sites» (hereinafter referred to as «Minimum Requirements»), approved by the Order of the Ministry of Social Policy of Ukraine dated 23.06.2017 No. 1050 [1].

The issue of minimum requirements for the organization of labour protection and workplaces on temporary or mobile construction sites in the implementation of construction works in accordance with the list of types of construction works, which are subject to the Minimum requirements for labour protection on temporary or mobile construction sites approved by the Ministry of Social Policy of Ukraine, is investigated.

The analysis showed that in order to fulfill the Minimum Requirements it is necessary:

1. Customers and managers of construction are obliged not later than 30 calendar days before the start of construction work to send to the territorial body of the State Service of Ukraine for Labour preliminary information on the implementation of construction work in the appropriate form in one of the following cases: if the duration of construction work is provided for more than 30 working days with simultaneous employment in construction work of more than 20 employees and individuals; if the planned volume of construction work exceeds 500 man-days.

2. Appointment by the customer or head of construction of one or more coordinators on labour protection at the stage of development of project documentation for construction and coordinators on labour protection at the construction stage.

3. Occupational health and safety coordinators have the necessary training to perform their functions [2]: higher education in the relevant direction of training; at least 5 years of professional experience in the field of architecture, construction or management of construction sites; confirmed by an independent body qualification by profession of occupational safety engineer (construction).