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METHODS OF NON-DESTRUCTIVE TESTING

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Assessment of hazardous production facilities occupies a special place in the system of industrial safety. Today, expertise is a key element of this assessment. Industrial safety review is conducted to assess the state of the object, confirmation of compliance with the requirements established by the legislation in the sphere of industrial safety, determine the level of risk of accidents and threats to life and health of people. Today no examination passes without NDT methods. Non-destructive testing is an assessment of reliability, working capacity and parameters of the object or some of its elements, not requiring the removal of the object from the work or dismantling. It is an essential element of the system of industrial safety expertise, providing technical safety at hazardous production facilities. The main purpose of nondestructive testing is reliable detection of defects by analyzing the interaction of the test object with fields of different nature (magnetic, electric, acoustic, etc.) and substances. Depending on the purpose and subject of research, choose the appropriate NDT method. To do this, the expert needs to know about the advantages and disadvantages of each and determine the best option that fits his goal. Because each method has its own good and profitable, but each has weaknesses, for example, using liquid penetrant inspection reveal surface defects. The advantages of this method over others are: good detectability of cracks, high sensitivity and resolution, but using this method can only be detected leading to surface defects and it is impossible to accurately determine their depth. This article discusses 3 types of non-destructive control and devices with which help it is possible to detect the defects provided the comparison chart static detection of defects using ultrasonic and radiation method, and identified the most promising and cost-effective method.

Non-destructive testing (NDT) is an essential element of the industrial safety expertise system ensuring technical safety at hazardous production facilities. object. The main methods of non-destructive testing are considered: acoustic emission (AE); radiation (RC); ultrasound (UC); magnetic particle (MC); capillary (CC), eddy current (ECC); visual and measuring (VC).

Let's consider some of them. Visual and measuring control is the simplest, as well as an informative control method. is he considered to be the only non-destructive testing method for which it is not required any equipment.

The capillary method is used to determine surface defects. Its advantages are good crack detection, high sensitivity and resolution, also the clarity of the control results, etc. However, using this method it is impossible to accurately

determine the depth of defects, also a big minus is that it can detect only defects that come to the surface.

Magnetic particle control is used to detect defects that are on the surface or lie to a depth of 10 mm. It is suitable for evaluating structures and parts made of ferromagnetic steels of ordinary quality or of high-quality carbon and low alloy steels.

Using eddy current control, surface defects and defects lying to a depth of 1–4 mm can also be detected. This method examines basic metals, welded joints constructions.

The radiation control method is used to identify internal and inaccessible to visual inspection surface defects. Its goal is to identify in welded joints internal and surface defects.

According to the report of the Institute Dr. Ferster the most common physical method of non-destructive testing is ultrasonic testing. The following can be distinguished as advantages of this method over others: it is very sensitive, has good performance, safe and cheap. Negative side of this method is that it is difficult to decipher the result, it is impossible to apply to all metals. The most important advantage of ultrasonic testing is its ability to detect more dangerous plane defects. Experimentally proved that the performance level of this is 3-10 times higher than the radiographic method. Also when comparing the cost of these two methods control it turned out that the cost of ultrasonic testing is 4-8 times lower.

A very important part in non-destructive testing methods is occupied by magnetic methods designed to detect magnetic flux scattering, which is created due to various defects in magnetized products from ferromagnetic materials. By the ability to detect magnetic flux scattering magnetic non-destructive methods control can be divided into magnetic particle, magnetographic, fluxgate.

Among all control methods, it is necessary to distinguish the method of acoustic emission (AE) as one of the most promising methods. This method differs from the others in the ability to evaluate a number of processing quality parameters in the process grinding.

The action of the magnetic powder method is possible if the suspension consists of a ferromagnetic powder and kerosene (instead of kerosene you can use oil or soap solution) applied to the surface of the magnetized part. Instead of a suspension, you can use an aerosol, what is the dry method. It is used on pre-inspection phase to identify gross defects, as it is less sensitive. Powder particles due to the action of the retractor forces of the scattering magnetic fields will move on the surface of the parts and accumulate near defects. The forms of these same clusters are similar to the outlines of detected defects.

Having examined three types of non-destructive testing, we can conclude that the most promising and cost-effective is the ultrasonic method of non-destructive testing. Like in other methods, it has its minuses and pluses, but the best and more popular option it is he who remains.