ACTUAL CONDITION AND PROBLEMS OF VISUAL METHODS FOR THE EVALUATION AND CONTROL OF PARAMETERS IN THE AUTOMOTIVE INDUSTRY

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Abstract: Actual application of visual method for assessing the state of the automotive industry is increasing due to the large customer requirements. There is also a set of standards that describe a number of requirements that need to be met. The visual control and evaluation method belongs to the organoleptic measurement method. This is an alternative and perspective of traditional measurement methods.

Keywords: visual method, organoleptic methods, industry

1. Introduction

The visual methods for determining parameters in the industry belong to the organoleptic method for assessing and determining the quality of components constituting the finished product [1,5,6,7].

In the past, it has been the only method of assessing product parameters in each of the then existing industries. The progress and development of the automotive industry raises the criteria for quality assurance as well as its management.

In industry apply a large number of methods of measurement, characterized by a number of specific features depending on the object of measurement and the conditions for its application [2,3].

One of the alternative, replacing the traditional and at the same time not very well-known method of measurement, is organoleptic. It is known that it is predominant and, in some cases, the only one in areas such as the food industry, sports competitions, [8].

It should not be overlooked that this method has its worthy place, and in certain fields of engineering and machine-building - in the finishing processes - measuring the deviation from rectilinearity and flatness, the heat treatment processes, etc. [6] .

The application of means for contactless measurement of high temperatures is linked to a number of limitations, both in terms of feasibility and measurement accuracy [4].

2. State of the problems of visual evaluation.

Problems in applying organoleptic methods:

- application of organoleptic methods in limited areas;
- mainly in the food industry;
- in a number of potential areas of application
- episodic and highly limited application of organoleptic methods at a local level;
- lack or little awareness of the specifics of these methods;
- there are no defined areas and limits in which organoleptic methods may be used.
- do not comply with the conditions for the correct application of organoleptic methods;
- there are no well-founded methodologies for application of organoleptic methods and measurement uncertainty measurement;
- in many cases there is no documentation of the results of the use of organoleptic methods;
- there are no methods of training of specialists on organoleptic methods, etc.

All this increases the influence of subjective factors in this assessment and leads to a decrease in its quality [5].

The organoleptic measurement method is applied in Al. Filter ". The method is also applicable in serial and mass production in the automotive industry.

The various types of controls and stages in building the quality system and ensuring the appearance of materials and raw materials incorporated into the finished product are subject to a future study and application of the method.

3. Perspectives for applying the method.

The method considered in this report applies to a number of economic sectors, such as the food, light and heavy industries, the arms industry, the automotive industry and others.

The visual control method can detect different types of discrepancies, some of which may be: poor coating quality, cracks, deviation from shape,

presence of foreign inclusions, scratches, lack of element according to design documentation.

The organoleptic method is applicable in the automotive industry to determine some of the following requirements, criteria and features:

- to evaluate and control the appearance; example: adhering to a particular customer requirement on appearance.

- to determine the quality of the weld.

- performing tests in a test laboratory. Visually monitor the fluid level or sequence of operations described in a specific procedure (normative document).

For the implementation and implementation of the present study, where an organoleptic method of control and evaluation is applied, we will consider the second option from the above and more precisely: Visual evaluation with the corresponding optical apparatus for control obtained by the electrode welding method.

For this purpose, we will describe the methodology of the sequence of the activities related to the collection and preparation of the grate for evaluation of weld welded by the method of electro-beam welding.

Required equipment and materials: Equipment for cutting of a welded element and cutting; Abrasive particle size grains 400, 800, 1000 and 1500; NaOH solution at 5% concentration; Laboratory glassware and tweezers; Laboratory microscope with built-in measurement scale; Welded workpiece by arc welding method.

Operations performed: A qualified person receives a welded workpiece from the electric beam welding machine operator (BEAM). Visual inspection of the welded detail is performed.

Ineligible defects in which the product is rejected are:

- uncovered sections between the welded elements;

- melted portions of the contact surfaces of the two elements;

- splashes on the welding seam;

- cracks on the surface of the welding seam;

- visible dents or protruding segments of the stitch higher than 0,5 mm;

- weld seam with included other than the base material.

Cutting mode of welded workpiece: The first cut is made through the axis of symmetry of the cylindrical part and the second cut is rotated 90 ° to the first. The third cut separates the cut segment from the cylindrical part; All sharp edges and ridges are cleaned with a fine file or shader.

The radial surface of abrasive sandpaper 400, 800, 1000 and 1500 is successively sanded, alternating rectilinear movements, first in one direction, then in a direction perpendicular to the first, before passing to a higher number of sandpaper.

Clean with air to remove chips, abrasive particles and dirt. A 5% solution of NaOH is poured into a laboratory. Immerse the resulting sanding for a minimum of 10 minutes. The coat is removed with tweezers and, after drying, the welding seam parameters are evaluated using a laboratory, digital microscope with a measurement scale.

Geometric parameters of the welding seam Fig.1

- the depth of penetration of the weld must be within the limits

$1.5t \leq a \leq 3t$ mm (t is the thickness of the wall, the housing).

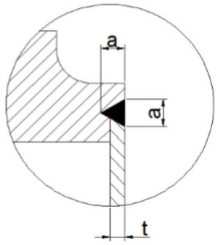

Fig. 1. Geometric parameters of the weld seam.

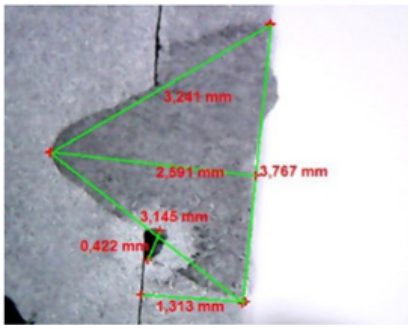

Fig.2. Shape of the weld seam.

- the shape of the stitch must reach as close as possible to an isosceles triangle.

- A sharp tip of the weld seam is not allowed in the penetration zone.

The presence of defects in the seam and its adjacent areas:

- no protruding or concave areas with deviations of more than 0.5 mm are shown (figure 3 shows a protruding section of welding seam area D);

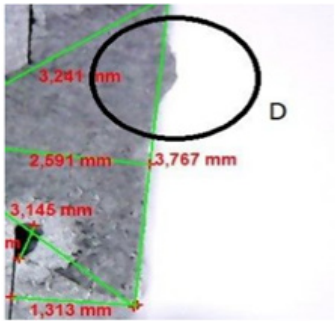

Fig.3. A protruding section of the weld seam.

- no pores, puffs or inclusions of bodies other than the parent material of a size greater than 0.5mm

To validate this method it is necessary to perform a comparative analysis of the methods.

Validation is presented as a requirement in the international standard ISO 9001. Since this standard is a universal standard for documenting and managing documents and processes in companies and organizations, it is necessary and applicable in the industry, helping to improve quality and giving opportunities for validation the image of the implementing organizations [3].

Among the advantages of modern methods of validation are:

- Achieving the planned quality by improving processes.

- protectivity of the processes, documentation and storage of records. Use of technical means of control and measurement.

-According to the qualification of the personnel.

- the adoption and implementation of new methods, etc.

The aforementioned advantages are applicable to companies and organizations in different types of industries and also apply visual control methods [7].

There are also a number of other international standards that apply to goods and services businesses.

- BDS EN ISO / IEC 17025: 2006 General Requirements for Competence of Testing and Calibration Laboratories.

- Standard ISO 4020.

- IATF 16949-2016. Requirements for application of ISO 9001: 20015 in the automotive industry.

The perspective of the method of measuring an object through vision can be the following:

- By means of the visual control method, a series of indicators can be controlled where the classical methods are inapplicable.

- Creating standards and devices to facilitate the application of the method and speeding up the learning process.

In industries where the measurable metrological characteristics are set with great tolerances no high precision is required then metrological characteristics are not relied on while the visual ones are emphasized by the appearance, condition, symmetry and other parameters that reach end user would be noticed and may not affect the function of the finished product but be called visual defects or deviations. By discovering these we in AL filter Bulgaria have bet on their definition and research. With our years of experience in the automotive parts market, we strive to comply with global quality standards and also have our own laboratory equipped with the necessary equipment to perform the required tests according to the world automobile standards to determine the batch quality of the manufactured by us parts.

It turns out, however, that the end user of the parts we manufacture does not have the slightest idea of all this and basically holds the appearance of the product.

Appropriate implementation of visual control reduces unproductive production, improves the quality of the end product, and satisfies our customers who are market leaders with parts for the automotive industry.

4. Conclusion.

The state of the art and the problems of the visual evaluation as well as the methodologies for applying the organoleptic measurement method are analyzed. An experimental study was carried out to verify the applicability of the method under analysis in the modern industry. The effectiveness of the method and the potential for application in the industry have been proven.

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