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USE IN FOUNDRY PRODUCTION OF MOLDING SANDS OF UZBEKISTAN

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Annotation
In the scientific article is considered the main methods of evaluating risks of foundry production, the principles and a technique according to the requirement of a quality management system. The key moments of risks in foundry production are revealed. The way of risk assessment – the method is offered, the program of risk analysis with a ranging order, relevant for the operating production is provided.

Keywords: The method, risk assessment, a quality management system, risks in foundry production.

INTRODUCTION

As you know, foundry production is the main procurement base of mechanical engineering. The casting method produces parts from a few grams to 100 tons and more, which is difficult to obtain in other ways. The foundry is dominated by sand-clay molds due to their simplicity, low cost and availability. Sand-clay molds have been used for over 500 years. they have not lost their significance even today. If we take all foundry production as 100%, then up to 75–80% of all castings are made in single molds. Very good results in terms of casting quality are obtained with special casting methods, such as die casting, centrifugal casting, investment casting, gasifying patterns, pressure casting, shell casting and others. However, the cost of casting can be 4-5 times more expensive with special methods than in sand-clay. Consumption of mixtures is higher than in developed countries; up to 8–10 tons of molding and core mixtures are consumed per ton of good casting. Foundry production is also developed in Uzbekistan, the number of enterprises for the production of cars, railway cars, mining and metallurgical equipment is growing, which requires a constant consumption of molding sands. There are no installations for the regeneration of sands and mixtures in the republic yet, so the number of mixtures is growing every year. For the manufacture of molds and mixtures, Lyubertsy, Kichichininsky, Darbozinsky, Proletersky, May Day and other sands were used. However, in connection with the division of the republics, the task of developing local mineral and cheese resources, localizing production, casting, became a task, so significant funds are spent on the purchase of sands and clays. In Uzbekistan, there are sufficient reserves of quartz and quartz-feldspar sands. The Himgeologonerud organization has explored significant reserves of these minerals, but it should be noted that they are not yet sufficiently studied for widespread use in the glass, chemical and foundry industries. Sand is a loose non-cemented granular material, the grains, the frame-forming elements of which have sizes from 0.0625 to 22 mm, consist of shell mineral grains (quartz, feldspar, mica, etc.), less often from carbonate rocks. Through the efforts of geologists on the territory of Uzbekistan, more than 96 deposits and manifestations of quartz and quartz-feldspar sands have been identified and studied. Of these, the following have been studied in more detail and brought to industrial standards: Dzheroiskoe, Kulataiskoe, Karmaninskoe, Maiskoe, Elanskoe and others. Despite these data, many organizations use long-distance sands. The chemical and technological characteristics of most deposits of quartz and quartz-feldspar sands show their suitability for many industries, including foundry.

Risk assessment is aimed at identifying, preventing and reducing the negative impact of risk in the manufacture of elements, in the future when using products, operating equipment, to improve the financial

well-being and efficiency, performance of the organization and is an integral part of the successful functioning and competition of the organization in the domestic and foreign markets. The risk analysis procedure is a process of systematically using information to evaluate external and internal factors influencing risks and developing appropriate measures. Possible causes of danger are analyzed in order to determine the frequency of its occurrence, duration, as well as the nature of the technological process (quantitative characteristics, technological properties of the feedstock, holding time, pressing, type of release coatings used in mold lubrication, waste management, etc.). In the process of analysis, it may be necessary to determine an estimate of the likelihood of a hazard causing undesirable consequences and to conduct analyzes of the sequence of contributing events.

There are a number of directions and methods corresponding to them for risk assessment. When considering methods, the HAZOP method was found to be the most suitable for research and assessment of risks in foundries. The implementation of the method provides safe and cost-effective process control and implies a minimum cost for making changes to the design documentation and production technology at the contracting stage The method (Hazard and Operability Study) is a set of fundamental hazard identification techniques that assesses each part of a system to find out if deviations from the design intent may occur and what consequences this may entail. General process for identifying potential hazards , aimed at identifying possible weaknesses or deviations in the ways of performing work (intended or intended).The method is based on the use of a system of control words.At the same time, the criticality of the identified deviations is also assessed.

The main objectives of the method are:

a) A complete description of the product or process, including expected design states;

b) Systematically checking each part of a product or process element to detect deviations from the design solution;

c) Decision-making in case of possible occurrence of hazards associated with these deviations.

The method is a detailed process aimed at solving the problem of hazard identification, carried out by a special team - qualified personnel. The method includes the identification of possible deviations from the intended use, the examination of their possible causes and their evaluation . The principles of research can be applied to technical objects in the course of their operation, and purposefully divides the system into parts (technological blocks).

Advantages of the method:

•Applicable for complex systems and for the development of new types of products;

•Identification of specific hazards in the process of developing design documentation, various design solutions for production technology, technological process;

•The ability to develop a list of typical hazards and consequences for a more detailed analysis of hazards and risks at any stage of the production life cycle;

•Identification of ambiguities and inaccuracies in technological instructions and in the section of labor protection instructions. In particular, at the stage of manufacturing work, technological documentation is developed taking into account the analysis method: in the instructions for the manufacture of products, flow sheets, the criteria and (or) parameters to be controlled and the permissible deviation ranges of parameters during the manufacturing process are highlighted in a separate section;

•The use of different skills and knowledge of a team of qualified specialists, each of which should be familiar with different aspects of the study of the system.

Grain size is determined by the size of the sides of the sieve cells on which the grain remains after passing through the previous sieve. The main fraction of sand is considered to be the largest amount of residues on three adjacent sieves. The sand group is the number of the middle sieve of the main fraction. It can be seen

from the tables that 75–80% or more sands consist of quartz [1] in their natural state and, especially after enrichment, can be used in many industries. For foundry and metallurgical production, sands must have a quartz composition without harmful impurities that reduce the melting point of quartz. The appearance of quartz occurs at 1713°C; the chemical composition of quartz sands must comply with GOST 2138–91. In the manufacture of molds and cores for simple iron castings, quartz-spar and quartz sands are also used. Polymictic sands are used only for pouring aluminum and other low-melting metals. Let us analyze the characteristics of individual sand deposits. Maiskoye, not far from Tashkent, the chemical composition of the main components ranges from SiO2–92 to 97.85%, on average 95%. The bulk is concentrated on three adjacent sieves. 0.4; 0.315; 0.200mm. The mineralogical composition of quartz is 69.11–95–6 [2]. The Jerooy sands of the Navoi region also deserve attention. The mineralogical composition is quite homogeneous, 80–98% quartz. According to the size of the grains of the middle and main part of the fraction, the sands of the Jerooy deposit belong to the medium-grained group (group 02), the main fraction is concentrated on sieves 0.315, 02, 016.

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