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To a question research of the technological process of electrode production

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ABSTRACT: This article provides a study of the technological process for the production of surfacing electrodes

KEY WORDS: arc welding, flux, low alloy steel, slag, oxide

I. INTRODUCTION

In the world, the level of development of industry in advanced countries at the present stage, characterized by production volume, range of products and competitiveness in the world market, is of particular importance. In this regard, increasing the reliability and durability of structures, the safety of machines, mechanisms and equipment is one of the urgent tasks. In this regard, in developed countries, including the USA, Germany, Spain, China and Russia, special attention is paid to the development of welding production technology, which has a major role in the global industry [1,2].
Currently, research work is being carried out to improve the quality characteristics of electrodes based on modernizing the composition of the coating mixture to reduce their cost.
In this direction, the optimization of the composition of the coating charge of surfacing electrodes in terms of the quality and quantity of ferroalloys and other components deserves special attention. It is also considered important to improve the quality characteristics of the deposited metal due to the composition of the charge, which determines its chemical composition. [2,3].

II. LITERATURE SURVEY

In world practice, numerous studies have been carried out to study the formation of a drop of metal and slag during manual arc surfacing with coated electrodes, which determines the composition of the deposited metal and the welding and technological properties of the materials: the formation of the surface of the deposited metal, the detachability of the slag crust, the possibility of surfacing in various spatial positions, etc. Leading World scientists, including Italian scientists Ramini De Rissone and G. Glaussen, studied the formation of a drop when the rod and electrode coating melted and the interaction of the resulting phases with each other and with the gas.
Scientists from India P. Kanjilal, S. Majumdar studied the processes of interaction of phases that occur at various stages of heating and melting of the electrode, determining their final composition. [4,5]

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Scientists from the CIS countries I.K. Pokhodney, V.V. Podgaetsky, A.A. Erokhina, G.L. Petrov, A.A. Buk, N.N. Potapova, V.N. Boronenkova, E. Votinova conducted studies of the transition process of individual elements based on a comparison of the initial composition and the composition of the deposited metal.
In Uzbekistan, the work of scientists N.S. Dunyashina, Z.D. Ermatova, J.N. Sadikova is devoted to the creation of surfacing electrodes based on local raw materials. [1,2]
Despite the achieved scientific results in the field of creation and development of the coating composition of surfacing electrodes, many unresolved problems remain: Models and methods for predicting the composition of the deposited metal during manual arc surfacing have not been sufficiently studied, which cannot be used in practice. [6]

III. METODOLOGY

The electrode manufacturing process involves a series of strictly sequential operations for preparing the wire, coating components, dry mixture of components and coating mass, applying it to the rod, followed by drying and calcining the electrodes in order to impart the necessary strength to the coating.
The sequence of technological operations in the manufacture of coated electrodes:

I. Recycling of welding wire
In electrode production, wire supplied by the metallurgical industry (in coils) is straightened, cut to length into rods and cleaned of various surface contaminants.

II. Preparation of powders from ore concentrates (ferroalloys: ferromanganese, ferrosilicon, ferrotitanium).
- ore warehouse;
- drying;
- grinding;
- separation of large particles and dust;
- filling of finished powders;

III. Preparation of powders from minerals (marble, fluorspar, quartz sand).
- mineral storage;
- preliminary crushing of pieces larger than 350 mm;
- washing;
- coarse crushing to pieces measuring 25 mm;
- medium crushing to pieces measuring 5-10mm;
- grinding and separation;
- finished finely ground product.

IV. Preparation of dry mixture.
- finely ground components;
- preparation of the charge according to the recipe;
- mixing of dry mixture;
- filling the finished mixture into dispensing bunkers for the production of coating mass.

V. Boiling the silicate block and preparing a solution of liquid glass.
To produce liquid glass from the incoming silicate block, a boiling operation is required, carried out using a rotating autoclave with a capacity of 1.5 to 6 m3. The silicate block is fed to the autoclave and loaded into it. The autoclave is then filled with water to rinse the block while rotating. Depending on the contamination of the block, the water is changed 2-3 times. The autoclave is then filled with water again, completely sealed, and hot steam is supplied to it at a pressure of about 6 kPcm2. The autoclave rotates during welding. The welding process lasts 2-3 hours.
After welding is completed, the glass is distilled into settling tanks, where it settles for 7-10 days to obtain better adhesive properties. Then the glass is distilled into supply tanks and from them into the production line for preparing the coating mixture.

VI. Preparation of coating mixture and briquettes.
- mixing dry charge and liquid glass with a passivating additive;

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- preparation of coating mass;
- preparation of briquettes.

VII. Coating.
- supply of finished rods and supply of coating mixture to the installation;
- coating in special presses;
- cleaning the ends and contact ends of the electrodes.

VIII. Drying and calcination.
- laying electrodes on frames for drying - calcination;
- feeding into a continuous drying-calcining conveyor oven.

IX. Sorting, certification tests, packaging.
Sorting and packaging are the final technological operations of the electrode manufacturing cycle. They are carried out after receiving positive results of certification tests. When sorting electrodes, the presence of defects on the coating surface that exceed the established standards is visually determined. Electrodes with defects are sorted and placed in a defect insulator. Suitable electrodes are placed in packs. The mass of the pack depends on the diameter of the electrode and should not exceed 3 kg - for electrodes with a diameter of 2 and 2.5 mm, 5 kg - with a diameter of 3 - 4 mm, 8 kg - with a diameter of 5 - 8 mm.

IV.CONCLUSION

The results of the research performed were the necessary basis for the development and implementation of technology for the preparation of electrode coatings from local raw materials in order to improve the characteristics of the deposited metal.

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