"VAL" TYPE ON THE DETAILS OF EDIBLE POWDER MATERIALS, WELDING DIET PLAN, AND THE COMPOUND OF THE DRESSING TO LEARN TO DEATH

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Annotation. It is known that in the process of detaching the powder composition tape, it is then japed between the roller-electrode and the detail, expands, ultimately changing its technological dimensions (width and thickness). This causes disruption in the suture space, incomplete budding, as well as the formation of pores. Details of type "Val" in the article are presented on the rational scheme of welding of powder materials on the surfaces ingested, as well as information on the presence of compound dressing in contact welding.

Keywords: welding, details, metal, alloy, recovery, wear, material, electrode, welded contact, pressure, working efficiency, roller-electrode, ribbon, energy.

Introduction

Technological difficulties arose in the restoration of shaft-type worn parts using composite metal powder, ie there was a problem of transfer of the coating material to the welding surface. Several methods were used to solve the problem.

a) the coating material was poured from the bunker into the welding zone;
b) glued to the surface of steel tape;
c) glued to the eroded surface.

Not all of the methods used yielded positive results.

In the first method, the coating material consumption was high and the welding thickness to the surface was uneven. In the second method, labor and material consumption increased because the processing thickness of the coating material was large.

When the third method was used, the welding process was complicated, i.e. various irregularities, cracks and similar defects were formed on the welded surface.

To solve this problem, a certain radius shape was given to the edge on the longitudinal side of the roller-electrode. This ensures a gradual transfer of the pressure force acting on the surface.

Based on the research, the profile of the working surface of the roller-electrode was determined.

Main part

The roller-electrode has a cylindrical working part (1) and an input part (2) connected to the A plane. The inlet part (2) is profiled with radius R. The center of Radius R lies in the plane A. To perform welding, a coating material of thickness Hkm is applied.
to the surface of the part. During welding, the coating material is deformed to a value of \( \Delta D_h \). In this case, the thickness of the welded material under the working surface of the roller-electrode (1) is equal to \( h_k m \).

The radius of the input part of the roller (2) is determined using the following expression.

\[
R = \frac{l^2}{2 \Delta D_h}
\]

where - the width of the roller inlet, mm.
\( \Delta D_h \) is the absolute deformation of the coating material.

![Figure 1. Contact welding of powder welding material roller-electrode for.](image)

After the roller is exposed to the part under pressure, the part is rotated, the welding current is transmitted and the roller is moved along the axis of the part.

In the process of welding the powder composite tape to the part, it coalesces, expands, and, consequently, changes its technological dimensions (width and thickness) after falling between the roller-electrode and the part. This can lead to gaps between the seams, incomplete welding, and the formation of pores. The main way to eliminate or reduce such shortcomings is a well-chosen technological scheme.

Studies have shown that metal powder can be shaped into a tape of a certain thickness. However, the width of the tape should be as follows relative to the width of the working surface of the roller-electrode, ie \( b = (0.5 \ldots 0.7) B_p \) where \( B_p \) is the width of the working surface of the roller-electrode, mm.

The advantage of the above method is that the worn part can be welded continuously on the helical surface with the coating. However, this method requires a special and high-quality polymer material. Experiments have shown that the transfer of powder welding material to the welding zone in the form of a thin ribbon is a rational and universal method.

In this case, as mentioned earlier, the width of the tape should be slightly smaller than the width of the roller-electrode.

![Figure 2. Tape transfer device to the welding surface.](image)

1-roller, 2-powder composite tape, 3-bracket, 4-guide, 5-detail, 6-roller-electrode.

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Typically, when welding steel strips, the width of the working part of the roller-electrode is in the range of 4 ... 6 mm. When welding powdered material, it is not necessary to use these values, because the width of the tape expands slightly under the influence of the roller-electrode pressure. Therefore, when welding a narrow metal powder tape to the surface, the width of the roller-electrode should be greater than the width of the tape. This conclusion helped to determine the ratio between the metal powder tape and its widths under pressure.

\[ B_p \geq b_{kle} \left( \frac{0.5b_{kle} + 3}{b_{kle} - 0.6} + \frac{1}{2} \right)_{mm} \]

where \( b_{kle} < 10 \) mm is the width of the metal powder tape, mm (\( b_{kle} = 4 \ldots 6 \) mm), \( V_r \) is the width of the working surface of the roller-electrode, mm

As a result of studying the process of welding a strip made of powder composite material to the surface of the part, it was determined that its transfer to the welding surface should be carried out by means of a special guide. In order to continuously deliver the powder material (tape) to the welding surface, it is wrapped around the roller (usually its length 300 ... 1000 mm) and passed between the upper roller-electrode and the part (welding surface) using a guide.

In this case, the top of the guide is placed at a distance of 10 ... 15 mm from the surface of the roller and the detail. If the gap increases or the width of the tape and guide does not match, longitudinal and transverse shifts during welding can cause the tape to overlap with the weld, which in turn can lead to poor weld quality and tape breakage, possible. [8]

Joint formation in contact welding.

The weld seam generated using the contact machine rollers cannot be viewed as a separate series element element point formed by the spot contact machine electrodes. Because there is a big difference between them in terms of current distribution, heat dissipation and technological performance.

The weld points formed by the rotating rollers of the contact machine have a unique structure. The geometric shape of the weld seam core differs from the spot weld seam core. [7] During the formation of the weld, a specific shunt effect of the current occurs as a result of the rotation of the roller and the welded part relative to each other. In this case, it is observed that the current of charges generated by the current pulse in welding is attracted to the shear side along with the weld. The distribution of current across the welded part has the appearance of a separate structure (Fig. 3, a, c.). In this case, the total current is divided into welding and shunt currents. As these currents increase, the maximum values are reached at the start and end boundary points of the weld core. [6] If the current pulse and salt run times are selected accordingly with the relative speed of the roller and the part relative to each other, it will be possible to ensure that the resulting weld seams overlap the previous one by the required amount.

It can be seen from the resulting weld seam shape itself that the thickness of the weld layer is limited. The most common weld layer thickness in roller contact welding is 0.5 to 2 mm, with a maximum allowable thickness of 3 mm. This limit is determined in terms of the strength of the weld.
Figure 3. Dot formation in roller contact welding structure scheme; a-continuous choke; b-continuous choke; the scheme of current distribution along the welded part in the formation of a v-continuous weld; g is a diagram of the current distribution across the welded part in the formation of a continuous weld.

Conclusion

In the process of welding the powder composite tape to the part, it joins, expands after falling between the roller-electrode and the part, and, consequently, changes its technological dimensions (width and thickness). This causes gaps between the seams, incomplete welding, and the formation of pores. Therefore, according to the rational scheme of welding of powdered materials on the worn surfaces of "Val" type details, we have information about the formation of joints in contact welding.

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