CALCULATION PATH TO CREATE CLUTCHING EFFORTS IN ELECTRICAL COMPLEXES TO REDUCE RESIDUAL STRESS

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The parameters of the electric circuit to generate a given time and efforts clutching his actions in the electrical sector to reduce residual stresses.

Electromagnetic processes eddy current method of integral equations, inductor, leading nonferromagnetic drive.

The task of reducing residual stresses during the process of production and operation is relevant to the reliability required mechanical characteristics, durability, performance and operational safety of equipment from various sectors of agriculture.

One of the promising methods to reduce residual stresses are elektroplastychnoyi deformation method, the principle of which field in action on metal electric current density exceeds a certain threshold value of the order of 105? 106 A / cm2 and causes elastic unloading residual stresses in the metal.

In collaboration with the Institute of electrodynamics and the Institute of Electric them. EO Paton of the National Academy of Sciences of Ukraine developed an experimental system for reducing residual stresses (Fig. 1).

Which includes: current pulse generator (GIS) electrode system, the sample to be tested (one beam of elasticity of aluminum alloy AMg6) measuring system for determining residual stresses by electronic speckle interferometry.

Widespread use of the method elektroplastychnoyi deformation to reduce residual stresses constrained lack of information about the required parameters of current pulses required to discharge residual stresses are dependent on the design parameters of electrical industry.

The aim - to calculate the parameters for creating contour hugging efforts in electrotechnical sector to reduce residual stresses

Material and methods research. Electrical system for reducing residual stresses which consists of two independent circuits - circuit 1 and circuit 2, each consisting of series-connected capacitance, inductance and active resistance.

The first one is designed to provide a given pressure forces on nonferromagnetic leading drive that strictly connected with the electrode. The second circuit provides a current pulse in a given sample test.

In general, the problem requires the solution of Maxwell's equations in three-dimensional region, but a number of assumptions that do, the problem may be reduced to two-dimensional. That is, if the coil electrode and plate are cylindrical massive body with a common axis of rotation, which were combined axis of the cylindrical coordinate system (Fig. 2), the task is considered in axisymmetrical statement.

During simulation developed a mathematical model of axisymmetrical calculation of instantaneous current density in the electrode system, which is part of the complex electrical to reduce residual stresses.

Results. Defined peak values of the time and its effects and the conditions tested. If these conditions are fulfilled, formed a set of relevant parameters. After that remained dren option that satisfies.

Dependence of the force with which coil parameters are given, with a current valid on nonferromagnetic leading disk of the applied voltage across the capacitor, which allows to determine the necessary voltage for charging capacity is set to force action on the electrode.

Shows the dependence of the current in the coil and coil -komponenty force with which the coil with a current valid on nonferromagnetic leading drive occasionally. From this we see that during the discharge -komponenta electrodynamic forces pressing prerehodyt later in the negative electrode and tends to push the plate. This leads to the fact that the contact surface area of the electrode plate nonferromagnetic reduced and, consequently, increases the contact resistance, which can lead to melting of the contact area. It is therefore necessary to limit the time of the force point changes its direction.

Conclusions

Developed a mathematical model of non-stationary axially symmetric elelektrofizychnoho process in the system reduce residual stresses, which allowed to determine the parameters for contour hugging efforts to create conditions set its value and duration.