

# **CONTROL OF HEAT FLOW IN CALENDER SHAFT USING FUNCTIONALLY GRADIENT MATERIALS**

Summary – In the paper the analysis of a heat flow in a calender shaft, which elements can be made of functionally gradient materials, is considered. The main operational problem of calenders is nonuniform temperature distribution along the working surface. The uniformness of temperature distribution may be controlled by introducing the layer, made of gradient materials with well defined thermal properties, which should be introduced between heating elements and working surface. As part of the work, the optimization process was performed to find the proper distribution of heat conduction coefficient in this layer, assuming that the layer is composed of a mixture of two materials having significantly different heat conduction properties. During optimization process hybrid algorithm, consisted with evolutionary algorithm combined, in series, with Hooke-Jeeves method was used. The analysis of the state of the calendar was done with finite element method.