The finite element method and the Infrared Thermography principle applied to the control of homogeneity between a weld and the structure to weld

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Abstract : The main purpose of this work is to investigate by a numerical method the effect of the thermophysical nature of solder, used to connect two pipe elements, on the distribution of the surface temperature of a considered structure. The analysis of the obtained thermograms can reveal the thermophysical quality of the used solder. The finite element method is used to calculate the temperature distribution on the welded region. The thermal response of the structure, which is subjected to a thermal flux step, is presented and analyzed. The simulations results are presented in the form of surface thermographic images, to show the contrast in temperature due to the presence of the weld zone.To better quantify the contrast induced by the presence of welding on temperature distribution we present the spatial variation of the temperature along a surface axis of the pipe.

Keywords : thermographical images, finite element, Infrared thermography, surface temperature, Pipe, welding