A Study on Characteristic of High Frequency Induction Heating for Local Heating

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Abstract

Since the curved hull plate was made by a series of manufacturing process including cold bending, manual local heating and correction work, the accuracy of curved plate strongly depends on the proficiency of worker. So the demands on the automatic local heating system for curved hull plate have continuously increased and the various researches relevant to it have been performed. Generally, the heat sources used for local heating were flame and induction heat. In terms of initial cost, flame heating is in a better favorable position than induction heating. However, from the viewpoint of the control of heat, induction heating has more advantage. So the various researches related to apply the induction heating to the automatic forming system has been performed.

The purpose of this study is to establish the proper capacity of high frequency induction heating system for forming the curved hull plate. In order to do it, the proper coil shape for local heating was designed and the efficiency of induction heating system was determined by comparing of temperature results obtained by FEA and experiment. With the results, the extensive FEA was performed to identify the effect of heated plate dimension, cooling method and the capacity of induction heating system on the amount of heat loss introduced by induction heating. Based on the results, the proper capacity of high frequency induction heating system was proposed.

Key Words: Local heating, High frequency induction heating, Finite element analysis