

SIMULATION OF INDUCTION HEATING FURNACE

VERTICAL:
**INDUSTRIAL & FLUID
MACHINERY**

SERVICE:
**CUSTOMIZED CAE
SOFTWARE**

TECHNOLOGY:
**COMPUTATIONAL
ELECTROMAGNETICS**

Our customer belongs to the R&D division of a Fortune 500 company that is focused towards design and performance optimization of Induction Heating Furnace. This furnace uses concentric circular coils to generate magnetic field and eddy currents for heating of metal in the crucible. A mathematical model of induction heating furnace was sought by customer to help him analyze the distribution of heat generation and temperature.

Zeus Numerix developed a specialized & custom tool for simulation of furnace based on solution of Maxwell's equations. A 2-D finite volume time domain technique was used to simulate the problem and to determine the vector potential distribution in the domain. The problem was simulated at GHz frequencies and a current of kA magnitude was passed through the coils as input. The tool simulated magnetic field, induced currents & heat generation inside the furnace.

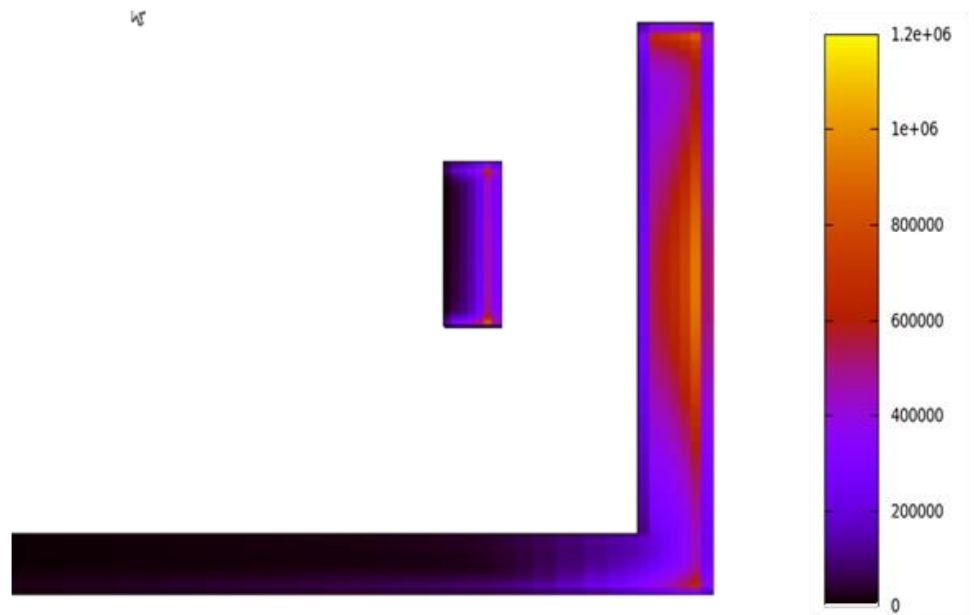
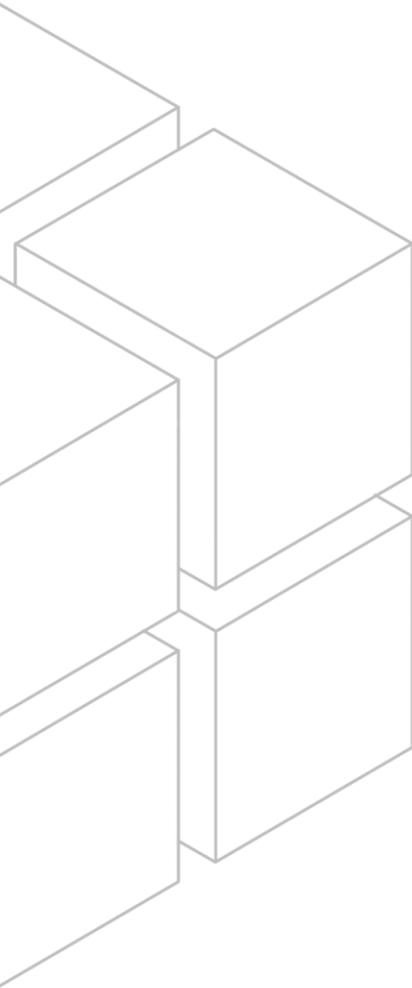


Figure 60: Distribution of power in induction heating furnace

The customer was delivered with the power and current distribution in the furnace. It was found that the maximum power dissipated was in the heater, which was expected. The customer used the power dissipation output to estimate temperature distribution & benchmarking of simulation model with experimental observation.