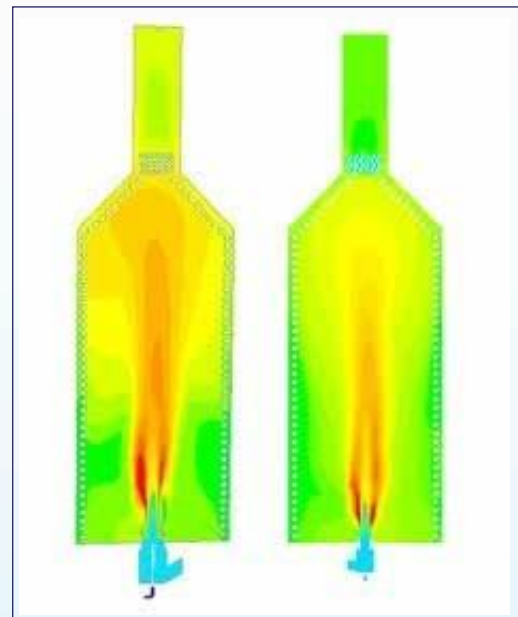
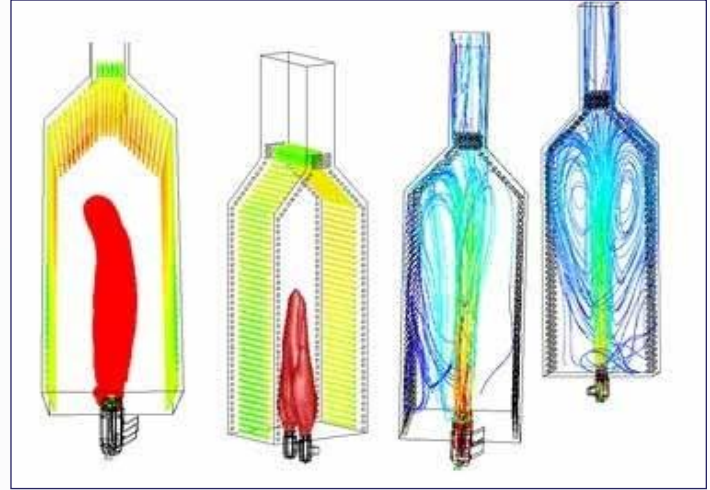


# Improving Fired Heater Performance using CFD

## Case Study 1 : Optimizing Burner Layout by Combustion Analysis

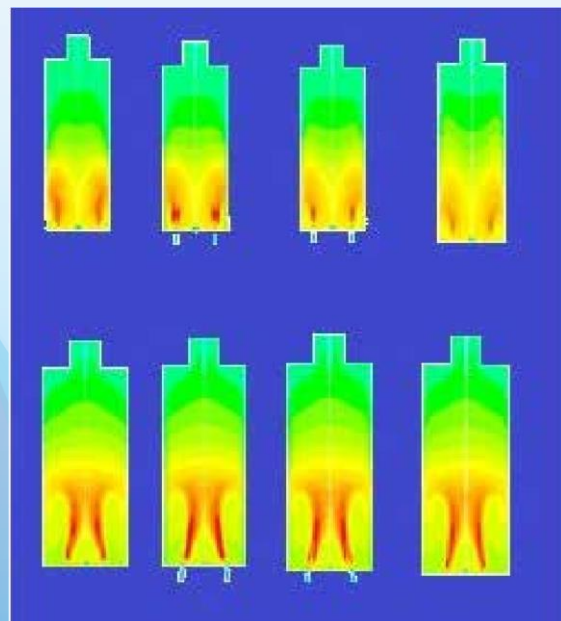
A cabin type crude heater was experiencing high tube metal temperatures in the top region of the heater. Hot flue gases were hitting the radiant tubes in the top region. Detailed combustion modelling simulations were carried out to match the field observations and identify the issue. Proposed burner layout was evaluated to check the improvement in flue gas flow patterns, flame profiles, radiant tube metal temperatures.

Comparison of temperature profile shows that high temperature region is concentrated in the centre and the top radiant section is relatively cooler.



Comparison of flame profiles and path lines show that proposed case flames are shorter and better flue gas circulation pattern in the heater to reduce radiant tube metal temperatures.

FIS has patented inclined firing technique which is effective in reducing the flame and flue gas impingement on radiant tubes. Inclined firing technique has been implemented in a vertical cylindrical vacuum heater, which had issues of high tube metal temperatures and flame impingement on the radiant tubes.



Temperature contours on various angular planes in the heater were compared for the existing and inclined firing case. Inclined firing clearly shows the flue gas temperatures around the radiant tubes is reduced which helped in increasing the run time of the heater.