

**Public Abstract**

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Department:Mechanical &amp; Aerospace Engineering

Degree:MS

**Title:INVESTIGATION INTO RAPID INDUSTRIAL FURNACE THERMAL MODELING FOR IMPROVED FUEL EFFICIENCY**

The development and verification of an innovative modeling technique for industrial gas fired glass melting furnaces will be discussed. Rapid and accurate modeling of industrial furnaces is needed for the development of advanced furnace control systems. Although, computational fluid dynamics modeling of industrial furnaces has been shown to be accurate, they are computational expensive. Two variations of a new modeling technique, S2S Rapid and DO Rapid, presented use information obtained via CCD camera for calculation heat exchange within the furnace. Both utilize temperature information obtained via CCD camera for calculating heat exchange within the furnace. S2S Rapid and DO Rapid both calculated the heat flux to the glass quite fast as compared to the CFD model. In addition, the calculated heat flux to the glass using DO Rapid model is in close agreement with the CFD model.