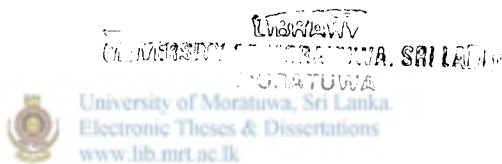


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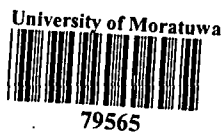
**A SOFTWARE BASED METHOD  
TO DETERMINE THE INTERMEDIATE TEMPERATURES  
OF A SHELL AND TUBE HEAT EXCHANGER**

By  
Srilal Wijesinghe



This thesis was submitted to the Department of Mechanical Engineering of the University of Moratuwa in partial fulfillment of the requirement for the degree of Master of Engineering in Energy Technology

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Department of Mechanical Engineering  
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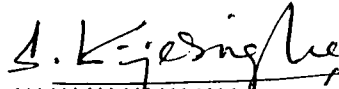
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## DECLARATION

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.....  
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## ABSTRACT

In spite of the fact that the heat exchanger is a piece of equipment that is extensively employed in the industry, still there are gray areas associated with its design and manufacture that have a very substantial potential for research and development. This research project is aimed at determining intermediate temperatures of a shell and tube heat exchanger, particularly at the interface of the tube external surface and the shell fluid using a software based method.

In carrying out the research a physical model of a heat exchanger was made, its intermediate temperatures were measured with a testing apparatus and an application programme was developed based on basic principles to determine the same. Further, a correlation was built up between the empirical and theoretical values.

Engineering design is at times based on approximation. Intermediate temperatures of a heat exchanger dictate the actual heat transferred across each portion of the tubes which is not taken into account in conventional design. This sort of study refines the design process giving detailed information.

Moreover, the software developed provides instant feedback on behavioural changes of the exchanger caused by changes in design parameters or variables for swift decision making and also indicates undesirable effects such as temperature crossing. Also, the correlations derived transform theoretical values to suit real situations in the industry and can be utilized for any other similar exchanger.



### **Acknowledgement**

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Also, I acknowledge with appreciation the service rendered by the staff of Cad-Cam Center of the university in machining some of the components of the exchanger model.



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