



The Fourth Annual Research Symposium (ARS-2017)
Faculty of Engineering, University of Ruhuna, Hapugala, Galle.



ARS 2017/ M/21

Development of a Computer Integrated Heat Exchanger Test Apparatus

Maitipe P. C., Rajasinghe R.A.D.P.M., Wimukthi K. A. H. and
Karunasena H. C. P.

*Department of Mechanical and Manufacturing Engineering, Faculty of Engineering,
University of Ruhuna*

Corresponding Author: chaminda@mme.ruh.ac.lk

Heat exchangers are most common and useful components in industrial machinery and processes. Different lab scale test apparatuses are used in order to fundamentally investigate the characteristics and performance of different types of heat exchangers. Although computer integrated heat exchanger test apparatus setups are available, they are not affordable for many of the institutions due to excessive cost. In this background, a low-cost computer integrated heat exchanger test apparatus was developed in this project consisting of a double-pipe heat exchanger. Hot water is sent through the inside pipe of the heat exchanger and the cold water is sent through the annulus cross section of the heat exchanger. By measuring the flow rates and temperature differences, the overall heat transfer coefficient and other dynamic characteristics of the heat exchanger can be measured through the computer, in real time basis. The project consisted of two main phases: software development and mechatronic circuitry to have the interaction between the computer and the sensing and actuating system of the physical heat exchanger. Accordingly, an interactive software was developed using the LabVIEW software package, which can control pump speeds and record temperature values from sensors fixed at both the inlet and outlet of the heat exchanger. Also, the software interface has the option to plot graphs based on the temperature measurements and performance calculations. This software and the controlling system can be further be developed to cater different types of heat exchangers and flow conditions to be directly applicable for lab scale experimental setups.

Key words: heat exchanger test apparatus, computer integrated heat exchanger, labVIEW based controlling, Double pipe heat exchanger