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OPTIMISING PERFORMANCE OF HEAT EXCHANGER AGAINST FOULING

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ABSTRACT

Heat Exchangers (HEs) are used widely in industries where transfer of heat between two or more mediums is a necessity. The fouling of a heat exchanger is a natural phenomenon and depends upon various factors like fluid - velocity & composition, working temperatures, material of HE, flow geometry, etc. The various fouling reduction techniques are being used in Industries for increasing the performance of the HE. The present paper utilizes the methodology prescribed in the available literature for prediction of Net Transfer Unit (NTU): clean and fouled values, for predicting corresponding clean and fouled Effectiveness. The predicted fouled and clean values of effectiveness compare to the corresponding measured effectiveness of a heat exchanger. The real time operational parametric trending is taken from the available literature for A unit HE of Urea process plant for Nortore Nigeria Plc. The imbibed parameters were used for predicting "Predicted Clean" and "Predicted Fouled" and calculating "Actual Measured" effectiveness of the HE, for a span of ten weeks before maintenance and, ten weeks after maintenance. Thereafter, using "Predicted Clean", "Predicted Fouled" and "Actual Measured" values of effectiveness, Index of fouling "IF" has been calculated for complete twenty weeks of operation of the unit. The IF values confirmed high fouling for the first ten weeks of operation and therefore heat transfer rate was also lower than the design value. The plant undertook a maintenance post tenth week of operation when the heat transfer rate was minimum i.e. 9778.4 W. The calculated value of fouling index has been found to be the maximum during the tenth week, indicating fouled HE. The trend between the heat transfer rate and IF shows close compliance during both before and after the maintenance period.

KEYWORDS: Heat Exchanger, Fouling