Process control project

Engineering

Process Control Process Control Inserts His/Her Inserts Grade Inserts 24, 03, From the curve below it can be noted that the steam consumption decreased to a certain level before rising up to the level of the product that was in process. The control system that was managing the flow of the steam allowed the steam to flow to a certain level before controlling it to the optimum level where the secretion level reduced. This means the operating conditions changed. The trend graph below shows the flow of steam in the system. It shows that the steam reduced by 45% as time moved on. This means, there is energy conservation by the system. Such control is made possible by the application of information technology. The following is the logical flow of the feedback control loop. Flow Diagram for a Feedback Control Loop Temperature Control for a Heat Exchanger Whereby the fluid entered the system from different sides of the system and then meets each other for heat exchange to take place. This is opposed to parallel heat exchanger systems in which the fluids would enter the system on one end and then flow parallel to each other for exchange to take place. As these fluid flows against each other, heat would be transferred from one medium of higher temperatures to the one with lower temperatures. The eventual temperature at the outlet would be different from that recorded from the initial setting. In the hot flow, the outlet temperatures would be lower than the initial one while for the cold flow the outlet temperatures would be higher than the initial temperatures. It is from these temperature differences that their mean and differences calculates efficiency of the system at various variations of flow rates. Investigations of three types of counter flow heat exchangers is the main task, these are; concentric tube heat exchanger, plate heat exchanger and the shell and tube heat exchanger. These used

cold as counter flow for the hot supply, it was necessary to keep the setting at a certain range upon which these investigations would be based on. Once the system is on, temperature changes were recorded alongside their flow rates. It is from these values that efficiency of the pump at various flow rates was calculated. In the first experimental set up on the concentric tube heat exchanger, the system gave four sets of values based on different flow rates for cold water rates at a constant hot water flow rate. In the first result where the hot water flow rate set at 50 g/sec, while its corresponding cold water flow rate of 14 g/sec the efficiency obtained was 108%. Calculated power absorbance in this case is 962 watts while power emitted is 886 watts. From this observation it is true that there were extra heat gained from the environment. Environmental conditions could have been the source of this extra heat gain because the heat exchangers system has a mechanism that can enable it to either gain or lose heat to the adjacent environment. Within the same experimental set up, variation of cold flow rates gave different temperature values for inlet and outlet upon which calculation of the overall efficiency could be done together with performance of energy balance across the heat exchanger system. In this case, it is clear that there was absorption of heat energy from the environment. In the third arrangement, the cold flow rate setting was 26 g/sec. This gave an efficiency of 130%, from the power emitted of 928 watts while that absorbed was 1205 watts; in this case it is true also to note that there were some heat gain from the environment during the transfer process. The last arrangement had the flow rate for cold section set at 34 g/sec; the hot flow rate is set at 50 g/sec. This gave an efficiency of 151 %, calculated from power emitted of 887 watts while that from the absorbed section was 1335 watts. One major observation from

these data findings is that as the flow rate for hot water was maintained constant, variation of cold flow rate from a lower value to a more significant value gave an increased thermal efficiency.