ABSTRACT

THE PURPOSE OF THIS PAPER IS TO WRITE A COMPUTER ASSISTED WEBPAGE DATABASE DESIGN SOFTWARE OVER SHELL TUBE HEAT EXCHANGERS SUITABLE FOR USE ON PERSONAL COMPUTERS, WHICH AT THE SAME TIME, PROVIDES A HUMANIZED DIALOGUE-BASED OPERATING INTERFACE. THE OBJECTIVE IS ACHIEVED BY UTILIZING A FREE SHAREWARE NAMED PHP LANGUAGE WHICH IS EXECUTABLE ON UNIX, LINUX AND WINDOWS PLATFORMS; COMBINED WITH MYSQL DATABASE CAPABLE OF PROCESSING EXTENSIVE DATABASES. FURTHERMORE, TAKING ADVANTAGES OF THE EXTENSIVE STORAGE CAPACITY, PRECISE AND FAST COMPUTING ABILITY OF THE COMPUTER, IT IS POSSIBLE TO SIMPLIFY SOME GENERALLY TRIVIAL, TIME-CONSUMING ACTIVITIES SUCH AS GRAPHIC CHART CONSULTATION AND COMPLEX CALCULATIONS ENCOUNTERED IN THE PROCESS OF DESIGNING SHELL TUBE HEAT EXCHANGER. THE ABOVE MENTIONED WILL PERMIT THE USER TO EASILY AND QUICKLY OBTAIN RELIABLE RESULTS FOR FURTHER REFERENCE AND UTILIZATION. MEANWHILE, IT DOESN'T ONLY MEET WITH THE GEOMETRIC AND PERFORMANCE REQUIREMENTS WHEN DESIGNING SHELL TUBE HEAT EXCHANGER, BUT ALSO WITH THE REQUIREMENTS OF THE REGULATIONS. THE METHODOLOGY EMPLOYED IN THIS PAPER IS AS FOLLOWS: TO CALCULATE WORKING FLUID OF SHELL SIDE AND TUBE SIDE, HEAT TRANSFER COEFFICIENT, HEAT TRANSMISSION AREA, SHELL BORE BY APPLYING THEORIES, DATA, AND EMPIRICAL FORMULATION REQUIRED FOR THE DESIGNING OF SHELL TUBE HEAT EXCHANGER STORED IN THE COMPUTER. THIS WILL ALLOW MORE SELECTIVITY TO THE DESIGNER ENGAGED IN THE DESIGNING PROCESS. FURTHERMORE, IT IS POSSIBLE TO CHANGE INPUT PARAMETERS CONVENIENTLY AND QUICKLY IN A VERY SHORT PERIOD OF TIME AND THUS, OBTAIN VARIOUS DIMENSIONS OF HEAT EXCHANGERS SUITED FOR RESPECTIVE PERFORMANCES. Owing TO ITS COMPATIBILITY AND SELECTIVITY, ITS VALUE ON ENGINEERING APPLICABILITY INCREASES. THIS COMPUTER ASSISTED WEBPAGE DATABASE DESIGN PROGRAM FEATURES THE FOLLOWING FUNCTIONS: (A) PERFORMANCE ASSESSMENT OF A SHELL- AND-TUBE HEAT EXCHANGER. (B) PERFORM DIMENSIONAL DESIGN AFTER I/O TEMPERATURE OF THE WORKING FLUID OF SHELL SIDE AND TUBE SIDE, SHELL SIDE MASS FLOW RATE AND THE NUMBER OF TUBES ARE PROVIDED. THE ACTIVITY OF STRUCTURAL DESIGNS SHALL FOLLOW THE REGULATIONS ESTABLISHED BY THE "HEAT EXCHANGER DESIGN HANDBOOK", BY T. KUPPAN[1] AND THE TEMA[2][3] (TUBULAR EXCHANGER MANUFACTURES ASSOCIATION). INFORMATION ON WIDELY USED MATERIALS AND THEIR CHARACTERISTICS ARE TO BE EMBEDDED INTO THE PROGRAM IN ORDER TO AVOID EXCESSIVE AND COMPLEX PROCEDURES ENCOUNTERED ON THE DESIGNING PROCESS; HENCEFORTH, ACHIEVING OPTIMUM OPERATION AS WELL AS THE ECONOMIZATION OF TIME AND FUND REQUIRED FOR LAB EXPERIMENTS.

Keywords : PHP WEB PROGRAMS, TURBULENT FLOW HEAT EXCHANGE, SHELL-AND-TUBE HEAT EXCHANGER, TEMA, OPTIMAL DESIGN.

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