

Rapeeporn Tananu 2011: Computer Program Development for Design and Cost Estimation of Cyclones, Wet Scrubbers and Afterburners. Master of Engineering (Environmental Engineering), Major Field: Environmental Engineering, Department of Environmental Engineering. Thesis Advisor: Ms. Peerakarn Banjerdkij, D.Tech.Sci. 247 pages.

The objective of the research was to develop the computer program assisting with Design and cost estimating for cyclones, wet scrubbers and afterburners or VOC incinerators. By using Visual Basic language, computing and designing time was greatly reduced when compared to hand calculation. The program utilized standard design methods that were described in the research, but are now contained in a simple to use program. Cyclone design involved using trial-and-error methods. Body diameter of the cyclone generally was pre-selected. Wet scrubber design for particulate removal utilized models to predict the penetration for given particulate size. Design of Packed Bed Column working as wet scrubbers for gas removal used the Two-Film Theory and U.S Stoneware's Generalized Pressure Drop Correlation to obtain the column diameter and pressure drop. Afterburner design required prior specification of the operating temperatures. Fuel consumption was calculated by using material and energy balance and then calculating the size of afterburner. Cost estimating, total capital investment and total annual cost were all calculated. Equipment costs were calculated using equipment vendor supplied equations and adjusting to present day cost by using a cost index. Annual cost items were computed from known data on the equipment size and operating mode, as well as from facility and control device parameters.

The final result of the research was a computer program for the design cyclones, wet scrubbers and afterburners or VOC incinerators. Included in the computer program were easy to use subprograms for sizing equipment, determining pressure drop, horse power and other resources for operating equipment, calculation of total capital investment and annual cost.

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