

## Executive Summary

Technical Assignment 3 is written as a clear, succinct summary of the mechanical system of the DASCO Medical Office Building. Final design of a mechanical system is engineered after many factors are considered such as building use, external influences, control logic, and system configuration. These factors are chosen in order to meet requirements of building code and propose designs that will meet owner needs. This report discusses the various design goals and factors influencing design that the engineers needed to consider when choosing the mechanical system.

Overall mechanical system performance is discussed in this report. Original designer data for load and energy estimation and operating costs are compared to the estimated values used for the building model in a previous assignment. As with any client motivated project, the owner's desires for cost, maintainability, compatibility, etc. are usually the biggest influence on the design. Sometimes, engineers can propose different ideas to the owner through the conceptual design phase if energy savings or system longevity issues are explored. However, in this project, first cost played a major role in the mechanical system design. This was assumed since the owner does not occupy the building, and therefore initial cost should be kept at a minimum in order to try and maximize profit when leasing the rentable space. Another goal, since the building was designed as a shell and core, without knowledge of the space layout when the building is occupied, was to design an adaptable system. The fan powered VAV boxes can be moved or added depending on where larger loads occur, in the attempt to provide the most comfortable and healthy space for the occupants.

Ventilation was evaluated using AHSRAE Standard 62.1-2007. The calculations in Technical Assignment 1 proved that outdoor air requirements are met based on the 20% outdoor air each air handling unit is capable of providing. A building model was constructed for Technical Assignment 2 in order to estimate design heating and cooling loads. The model also allows for occupancy schedules and energy rates to be entered into the computer and then generates equipment performance data, operating costs, and building energy consumption. These items are also discussed in this report.

System operation and control logic are also discussed, although limited, since packaged units were used as the main mechanical components. The entire system is direct digital control, allowing for complete building automation. The AHUs operate within occupied/unoccupied modes that are adjustable through user interface control panels. Room thermostats modulate integral box controllers to adjust the amount of supply air and the need for reheat.

Overall the mechanical system works for its intended application. Without knowing occupancy makes it difficult to engineer the most efficient and optimized system. Continual fit-out projects created the need for added equipment, but the adaptability of the VAV system seems to make renovations and changing tenant needs easier to accommodate.