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Mechanical Option

George W. Hays PK-8
Technical Assignment #3



Executive Summary

This report looks at the initial mechanical design goals of the Architect, Owner, and Mechanical Engineer of the George W. Hays PK-8 School in Cincinnati, OH, and then looks at the individual design components to see how well the building met with its design goals. Initial goals of the design team included goals of energy use, thermal comfort, adequate ventilation, and mechanical space equipment usage. In general these goals were met by the final design of the building system.

The 66,000 ft² Public School design team looked towards ASHRAE Standard 90.1 as a guide to reduce energy consumption of the building. Analysis of the structure shows an expected HVAC equipment energy consumption of 53 kBTU/ft²/yr. This consumption is a mixture of electricity used to run fans and pumps, electricity used to create chilled water, and natural gas energy used for the hot water system.

To obtain thermal comfort in all spaces, a careful controls system was mapped out, along with research into the best type of system for educational spaces. Design experience produced a system containing one chiller, two boilers, three air handling units, three total energy wheels, two radiant panels, and the ability for each system to enter into full economizer mode. This system was also carefully controlled to ensure optimum space conditions in all seasons and during all occupied hours.

Ventilation requirements for the space were found by local code requirements. The design ventilation goals were met, even though they fell below ASHRAE Standard 62.1. A carefully thought out controls system was implemented to ensure each space was always provided an adequate amount of minimum OA.

Design goals regarding the area used by mechanical equipment were obtained by a good interaction between the engineer and architect to ensure the integrity of the building aesthetics was maintained while allowing adequate space for the building mechanical components.