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Recalibrate, Retune, Rebalance

An update to Rowan Hall's HVAC controls improves system performance.

BY WILLIAM WRIGHT AND JOE MONAHAN

WHEN SOME STUDENTS in a building are wearing jackets to stay warm and others are wearing shorts to stay cool, it is time for retro-commissioning. Commissioning new construction ensures that building systems are functioning as designed for a planned use; retro- or recommissioning retools older building systems while optimizing design conditions based on actual use. The goals are user comfort, right-sizing flows for actual use, energy efficiency and cost savings.

Catalyst for Growth

In Glassboro, NJ, Rowan University's new \$70.6 million engineering building already was under construction when it became clear that the 1996-built Rowan Hall needed a tune-up. The landmark structure for the Henry M. Rowan College of Engineering, Rowan Hall is occupied by 600 students, faculty and staff, morning to night, every day of the week. Designed by Ballinger nearly 20 years ago, the elegant building on a pond is home to multiple engineering disciplines, including biomedical, chemical, civil and environmental, mechanical, and electrical and computer engineering. It is the 99,349-square-foot tribute to the philanthropist whose generosity created the College of Engineering and served as the catalyst for the growth of the entire university.

Since the building opened, the engineering enrollment at the university has doubled, increasing stress to the building systems every year. At times it was uncomfortable to work there, and end users complained of temperature, humidity and airflow problems. This is not unusual. System controls in every building need to be recalibrated over time. Controls drift out of calibration, wires get snapped, dampers bind, airflow stations become dirty, devices or logic get bypassed, new equipment overloads the system, fume hoods are added, and doubling the number of users can certainly impact how well airflow is transmitted.

Recommissioning

Research and laboratory buildings in particular need to have HVAC systems in good working order and should be recommissioned ongoing with comprehensive calibration every five years. The Rowan recommissioning project began with certified balancing professionals who took readings of the current air flows/water throughout the building to establish a baseline of as-found readings. Labs have a significant amount of ventilation air brought in and contaminated air exhausted out through fume hoods and

other devices. Critical to the safety of users, fume hoods are also required to be recertified annually.

Even classrooms and lab spaces without fume hoods may have tight positive or negative pressure requirements, and flow stations and static pressure sensors can malfunction if they become dirty or clogged. Since they are indispensable to the operation of the HVAC systems, annual checking and recalibrating is required.

The next phase is to recalculate the building's loads based on actual use. Buildings are designed for a certain occupancy and program, but both change over time and the building systems don't always keep up with the modifications. There are more people using Rowan Hall now than when it was constructed, and the machines and equipment have changed.

Once the load study and air change rates have been identified, a professional engineer will redirect the systems to obtain the correct flows, and the facility will be rebalanced and recommissioned. The university may ultimately need to invest in new control sensors or other components, but they are likely to be of better quality today than when the building was built. Overall, the cost savings will far outweigh the cost of new technology.

As part of the project, an independent commissioning firm will evaluate, test and correct the existing HVAC control systems and components to meet current facility requirements, optimize function and energy efficiency and improve comfort. This process involves investigation, analysis and corrective action of the building systems.

Payback

A building like Rowan Hall is very energy-intensive, so the savings may be realized very quickly after recommissioning. As with Rowan Hall, the university's Science Building had airflow and temperature issues a few years ago. Recommissioning reduced the energy consumption in that building by 40 percent and eliminated the complaints.

Whatever the building program, system equipment and controls are constantly changing, some at a more accelerated pace than others. After two to three years, every building has drifted or changed to the point where a recommissioning effort will result in cost savings and improved comfort and operation. **CPM**

William Wright is the president of Wright Commissioning, based in Philadelphia. Joe Monahan is the assistant vice president for Planning & Construction at Rowan University.