New College Natatorium Becomes Student Social Hub Thanks to Comfortable IAQ

The drive-in movie might be quickly fading from Western culture, but the dive-in movie is a floating sensation at the new $27 million Student Recreation Center's natatorium at Appalachian State University, Boone, N.C.

Students dive into the 24,000-square-foot natatorium's 50-meter pool and float while watching a student film society movie on a wall purposely kept blank for movie projection. The dive-in movie, plus a submerged jetted therapy bench for sore muscles and other student inputs solicited by the center's design committee have helped create a unique indoor pool that seconds as a trendy social hub.

While the Dive-In Movie and other student ideas are a novel approach, it is the indoor air quality (IAQ) design of James Giles, vice president/project manager, and Atul Nerurkar, P.E., vice president and senior design engineer, United Engineering Group, Charlotte, N.C., that makes these unconventional natatorium functions comfortable experiences.

"These facilities are more than gyms or recreation space," said Mark Zack, AIA, partner, Corley Redfoot Zack, a Chapel Hill, N.C.-based architectural/engineering firm with similar facility designs at East Carolina University, UNC-Wilmington, and Western Carolina University. "They are also social hubs of the campus to the extent they are surpassing the student union as a gathering place."

Because the recreational facility seconds as a social hub with a 24 hours/day occupied cycle on ASU's 250-acre campus built into the Blue Ridge Mountains, energy efficiency was a major HVAC design goal. Thus, heat recovery was a major option in United's dehumidifier performance specification. Custom manufactured by Dectron Inc., Roswell, Ga., the dehumidifiers not only keep the center a comfortable 55 percent relative humidity (RH), but also save energy by efficiently providing free pool water heating while simultaneously heating or cooling the space.

Besides free pool water heating, another energy measure the design team specified is an Econo-Saver powered exhaust system option on the dehumidifiers that uses exhaust air heat transfer to pre-heat incoming outside air that is approximately 25-percent of the natatorium's total 56,900-cfm.

The DRY-O-TRON units' onboard Supervisaire microprocessor controls the natatorium humidity, however a Johnson Controls **(CSP)**, Milwaukee, Wis., Metasys building automation system monitors/alarms the dehumidifier operation and controls the center's non-pool spaces such as the weight room, gym, rock climbing wall, and other areas.

Constructed by Shelco, Winston Salem, N.C., under the North Carolina State Construction Office's CM@Risk program, the project was packed with energy-saving equipment options outlined in the performance specification by United. The energy-saving options custom manufactured into the equipment would not only provide a quick payback, but also save the university hundreds of thousands of dollars in energy costs over the life of the equipment. Faulkner/ Haynes Inc., a Raleigh, N.C.-based manufacturer's representative acted as a liaison to ensure United's performance specifications were all met at the manufacturing level.

Besides energy efficiency, airflow was another major design concern. Supply air is strong enough to prevent stratification or condensation from forming on the center's wall of floor-to-ceiling panoramic view windows, but not strong enough to unnecessarily increase pool surface evaporative rates or chill participants, according to Nerurkar. Additionally, the natatorium's opposite wall has interior windows allowing weight-room participants an excellent view through the natatorium's two exterior walls of windows. To assure these requirements, United's air distribution uses a conventional overhead perimeter aluminum duct system, but also an under deck duct system in a utility tunnel provided by the architect's design. While the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE), recommends under deck air distribution for proper window coverage, many pool facilities omit it because of cost.

An underground tunnel that's large enough to accommodate HVAC ductwork is an example of how important it is for consulting engineers and architects to work in concert on projects, according to Giles. Fortunately, Corley Redfoot Zack realized the value of such a space after having finished a natatorium with underground utility tunnels. "Winter outside temperatures in the mountains can go as low as 10 or 15 degrees below 0° Fahrenheit, so it was important to keep the windows evenly bathed in warm, dry air from above and below to eliminate condensation," said Giles.

Associated Heating & Air Conditioning, North Wilkesboro, N.C., fabricated the under deck aluminum duct and installed it along with the overhead aluminum perimeter spiral round duct system. Associated also installed the three Dectron dehumidifiers. Two dehumidifiers—DSFA-242 models--are located in one mechanical room. The third unit, a remotely located DA5-080 was added when the pool size increased during the planning stages without equal mechanical room enlargement.

Other equipment in the project include Aerco International, Northvale, N.J., domestic hot water heat exchangers; Armstrong International **(CSP)**, Three Rivers, Mich., pumps; and a 300-ton chiller by Trane **(CSP)**, Tyler, Texas.

The new recreation center has added a new twist to student social gatherings in the unique environment of an indoor pool. “The air quality in the natatorium is very good,” said Joe Carter, director of university recreation.

International Facility Management Association
1 E. Greenway Plaza, Suite 1100 • Houston, TX • 77046-0194 USA
Phone: 713-623-4362 • Fax: 713-623-6124 • webmaster@ifma.org