Innovent®
Air Handling Equipment

**Project:** **Burdick Hall Natatorium**
**Towson University**
Towson, MD

**Engineer:** Henry Adams, LLC

**Innovent Rep:** Maryland Trane

# Delivering a Healthy Pool Atmosphere and Energy Efficiency at Towson University

- **Improve IAQ through reduced chloramine levels above pool surface.**
- **Maintain comfortable temperature, humidity, and airflow per standards.**
- **Operate with high overall energy efficiency in all seasons.**
- **Replace aging, ineffective HVAC system.**

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## The Challenge

The Burdick Hall Natatorium on the campus of Towson University houses a busy swimming pool that is host to intercollegiate athletics swim meets, kinesiology classes, students, summer campers, and community open swims. It is also the home base for the Towson Tigers aquatics teams, which boast of several championships.

The natatorium, constructed in 1968, lacked air conditioning and was originally only ventilated and heated, resulting in a significant lack of temperature and humidity control. Furthermore, the existing ventilating equipment was in poor operating condition and well past its economic life.

Swimmers using the pool had long complained of respiratory problems, especially an ailment known as swimmers' cough. The swim coach knew the issue was the build-up of chloramine gas above the water surface due to the lack of good air movement and persistently raised this issue to Towson University's facilities management and environmental health and safety departments. The pool's construction with the deck 18 inches above the water exacerbated the problem. The swim coach compensated for these conditions for years by opening the outside doors and staging pedestal fans at the doorway to create some ventilation.

## The Challenge (continued)

Dennis Bohlayer, Associate Director of Engineering for Towson University's Facilities Management Department, headed the HVAC equipment replacement project to resolve the issues. Bohlayer has a personal passion for seeking out energy efficiency as a top priority in any equipment replacement project. His goal was to improve the indoor air quality of the natatorium in the most energy-conserving and sustainable manner available. Bohlayer said, "You only get these opportunities every 20-25 years, so you really need to solve the problem well with the long term objectives in mind."

For engineering assistance, Bohlayer turned to Henry Adams consulting engineers, based on a trusted relationship and their experience with other pool environments. Senior Mechanical Engineer Nathaniel Krumpe, PE, was very cognizant of the need to "bring the natatorium up to code in terms of ASHRAE and other standards in order to meet ventilation requirements." Another challenging issue included handling the requirements for a widely varying number of swimmers and spectators, depending on the type of event.

## The Innovent Solution

Henry Adams and Bohlayer began digging into the distinctly different natatorium control strategies of various pool dehumidification equipment manufacturers. The design team believed Innovent's strategy of using high amounts of outside air for ventilation and dehumidification, coupled with use of flat plate heat exchangers to recover energy from return air, was the most energy efficient system for their application, especially since utilizing heat recovery to heat the pool water was not an economical option due to its relatively high construction costs. Bohlayer attended an educational Engineer's Breakfast held at Maryland Trane which reinforced his interest in this strategy.

Two Innovent Natatorium Dehumidification Units (NDHU) on the Burdick Hall roof.

The diligent team developed and issued an Invitation for Bid (IFB) package to suppliers, detailing its required criteria for a flat plate heat exchanger. Bohlayer said "Henry Adams exposed us to the options in the marketplace and we made the decision to stick with the flat plate heat exchanger as the most energy efficient solution out there for our particular application."

Because of his commitment and passion for energy efficiency, Bohlayer was determined to "evaluate the suppliers not on first cost alone, but rather on the basis of total life cycle cost." Bohlayer and Henry Adams developed detailed requirements in the IFB which included calculations for projected energy performance based on manufacturers' inputs with subsequent performance verification through factory testing.

Bohlayer wanted "not just numbers, but to see for myself that the manufacturer's projections were honest and realistic." Following the contract award, he toured the Innovent manufacturing facility in Minneapolis, MN "to be able to see the attention to detail that goes into the construction; not just regular units in production, but your own unit; and witness it undergoing its performance testing."

He came away "impressed with the quality of the workmanship and the testing procedures and results" and advises "a factory visit is well worth the time and travel." He still keeps a sample of the aluminum flat plate heat exchanger material formed by a special machine in the factory.

After an extensive analysis of the bids, the equipment contract was awarded to Innovent. The team favored the Innovent approach for offering:

- **Lower operating costs than traditional systems**
- **Less maintenance than mechanical dehumidification systems**
- **Healthier IAQ with increased outside air**
- **Increased energy efficiency through use of a flat plate, air-to-air, heat exchanger**
- **Interface to the campus Building Automation System (BAS)**

**Dennis Bohlayer, Associate Director of Engineering for Towson University's Facilities Management Department; left; with Mechanical Engineer Nathaniel Krumpe of Henry Adams.**

Towson pre-purchased a pair of Innovent Natatorium Dehumidification Units (NDHU) for just-in-time delivery for July 2008. But as can happen with complex projects, a contracting issue for the overall pool renovation and equipment installation caused the team to miss the narrow construction window of the summer. Consequently, the units were stored in place on the roof until the next construction window, which was summer 2009. An Innovent factory expert assisted with the unit start-up and training of the maintenance staff. Bohlayer stated, "The training he provided us was very valuable." Consulting engineer Krumpe added his endorsement, "While intended for the facilities department, we also sat in on it and felt that it was highly informative."

## The Results

**"We've been very pleased with the Innovent product," states Bohlayer. He reports the response from the swim coach who had been concerned for years about the poor ventilation has been very, very positive and the pool environment now compared to before is like "night and day."**

Due to the rugged aluminum construction and high quality component coatings, Bohlayer expects freedom from the corrosion issues that plagued and disabled the previous HVAC components. He and Henry Adams anticipate the ease of maintenance for the campus facility staff will enable sustainable performance well into the future. With convenient monitoring of natatorium environmental conditions and HVAC units through the campus BAS, Bohlayer can keep a watchful eye that the system is performing to the intended design standards while meeting his demanding standards for indoor air quality and energy efficiency.


The Burdick Hall pool environment was substantially improved by the energy-efficient Innovent solution.



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60 28TH AVENUE NORTH
MINNEAPOLIS, MINNESOTA 55411-1636
T - 612.877.4800
inventair.com