

edc

ENVIRONMENTAL DESIGN + CONSTRUCTION
THE OFFICIAL MAGAZINE FOR THE LEED® PROFESSIONAL

1.13.
EDCmag.com



A bnp PUBLICATION
PUBLISHED

The HVAC manufacturer's
new building showcases energy
efficiency and sustainability



Taco, Inc.
1160 Cranston Street
Cranston, RI 02920
401-942-8000
www.taco-hvac.com



INNOVATIVE DEVELOPMENT

An HVAC manufacturer establishes a program to educate its staff while setting a green example.

BY PETER LOFGREN, AIA, RICH MEDAIROS, PE, AND KYLE LLOYD

Taco Innovation and Development Center

LOCATION: Cranston, R.I.

SIZE: 24,037 square feet; two stories

START OF CONSTRUCTION: June 2011

CONSTRUCTION COMPLETED: June 2012

Taco (“tay-co”) Inc., of Cranston, R.I., is a manufacturer of heating and cooling equipment and systems for use in building HVAC systems. The Taco green brand is well established in an industry it has served for 92 years. Taco, which is privately owned and operated, considers its workforce to be its greatest asset. The company’s first obligation, often stated, is to each of its 500 employees, who, on average, have 18 years of service with the company.

Renewing the company’s dedication to and interest in the success of its employees, customers, suppliers and community, Taco has chosen to remain in Rhode Island, consistently one of the nation’s most challenging business environments, and to re-invest in employee training and development as well as physical enhancements to its corporate facility—a building dating from 1904. Since 1992, Taco has maintained an onsite training and education center for the benefit of its employees. Throughout the last 20 years, the company has utilized its Taco Learning Center (TLC) to actively train its employees and customers. With class offerings ranging from basic math to an MBA, the TLC has allowed Taco’s employees to increase their knowledge and enhance their personal and professional lives. Furthermore,

training classes on product applications and system design have allowed Taco to train and educate architects, engineers and contractors in the HVAC industry.

TIME FOR A CHANGE

By 2010, Taco ownership and senior management understood that the TLC was stretched to its physical and functional limits. It lacked the physical space and technology to effectively support the scope of teaching being conducted on a daily basis. It also desperately needed an aesthetics and infrastructure upgrade to provide an optimal learning environment.

In addition, the brick building the company had operated in since 1954 was also in need of improvements. Taco had finally run out of space to locate offices and workstations for new employees, and the office environments were physically dated and no longer conducive to effective communication and employee interactions. The company recognized that the physical environment and work atmosphere, along with technology, equipment and amenities, were very important for attracting and retaining a knowledgeable workforce and a new generation of workers in manufacturing.

These conditions and limitations forced the company to think in a bold way once again. It had reshaped itself in the early 1990s, totally restructuring its manufacturing operations, and now twenty years later it would accomplish much the same again, although this time the emphasis would be on the learning center and the office environments. The company, with the blessing of the



Taco's TLC addition complements surrounding existing architecture as well as meets the educational needs of the Cranston, R.I., company.

IMAGES COURTESY OF TACO INC

owner, developed a Master Infrastructure Plan that would address the company's short- and long-term needs while renewing its commitment to its employees and the local community.

The plan called for a 24,000-square-foot two-story addition to the existing building, employing a red brick façade to complement the historic building behind it. Its interior space would house a new learning center, to be called the Taco Innovation and Development Center (IDC), along with second-story office areas and a library. The new facility would contain modular classrooms, a 63-seat tiered main classroom, conference spaces, computer training and testing labs, and

the building would be supported by a dedicated mechanical room. Within the main building, a similar amount of office space would be renovated and a new employee café created. The project would entail five phases of design and construction, would take two years to complete and cost approximately \$20 million.

THE BUILDING AS A TEACHING TOOL

Constructing a new learning facility would also allow Taco to showcase its range of products and systems within an energy-efficient, LEED-certified building. The IDC is the most expansive showcase for the latest in energy savings as well as sustainable products and sys-

tems available in the HVAC industry today. The building includes advanced hydronic system applications such as radiant cooling, radiant heating, snowmelt, geothermal and solar thermal in a total of 25 "Living Laboratories" that provide for hands-on learning. The building also showcases advanced hydronic products and systems such as LOFlo and LoadMatch that have been designed and developed by Taco. Taco has created a central location where industry professionals can learn about and experience the latest technology in the HVAC industry. This powerful combination of technology and education make this a truly unique and innovative facility.



Color-coding of the pipes and equipment throughout the IDC help serve the building's educational functions.

IMAGE COURTESY OF TACO INC

Sustainable Design Features

[Enhanced building envelope performance](#)

[Rooftop solar thermal](#)

[Reflective roofing](#)

[Snowmelt system](#)

[Electric vehicle charging station](#)

[Alternative transportation—bicycle storage](#)

[Water-efficient landscaping](#)

[Radiant floors](#)

[Advanced lighting controls—daylighting](#)

[Storage and collection of recyclables](#)

[Rooftop energy recovery systems](#)

[Taco LoadMatch and LOFlo technologies](#)

[Active and passive chilled beams](#)

[Variable speed pump drives](#)

[Demand ventilation control system](#)

[BTU energy metering](#)

[IAQ monitoring and control](#)

[Paper recycling](#)

Within the IDC, all building systems are monitored by many more sensors and meters than a typical building. Each zone has a flow meter and a temperature sensor for BTU monitoring. Such active performance monitoring functions as an effective system diagnostic tool and also facilitates the product development and enhancement process. Designing and manufacturing an efficient and flexible chilled beam control system, for example, requires real-time application testing and monitoring. This is exactly what the Chilled Beam Living Laboratory within the IDC offers.

The IDC's color-coded 1,800-square-foot mechanical room was specifically designed as a demonstration and teaching space in addition to its operational role. Here within a wide pathway through the room, Taco showcases how its products

functionally integrate within various operating systems: pumps with variable frequency drives supporting the chiller unit; pumps and heat exchangers with the geothermal and energy recovery systems; pumps and an air and dirt separator in the snowmelt system, and the company's modular, Web-based building management product line controlling different components in the overall mechanical system.

FOR THE SAKE OF EFFICIENCY

Maximizing energy efficiency and sustainability was the principal design objective for the IDC, with LEED certification as a necessary validation of that objective. However, not everything that Taco wanted to accomplish with the building fit into the LEED scorecard for points. Installed solar thermal for domestic hot water and the geothermal system, as examples, would not garner points under LEED because their principal function is to serve the renovated existing building, which was not a LEED objective. The design intent was never to attempt to shoehorn the project to LEED or design to LEED. Rather, the objective was to design the most efficient building possible and to see how the design translated into LEED points at the highest attainable level.

Taco's executive vice president and lead company person on the project, Chris Integlia, says, "Our approach to this project has always been to have LEED certification as a public validation of the efforts we've put into the project, and as a confirmation that our products and technologies will help not only Taco but others in our industry achieve highly sustainable green buildings. LEED is a blessing of that desire. But we're going to do the right things by Taco, and we'll see how far we can go with

Project Team

CLIENT/OWNER: Taco Inc.

DESIGN/ARCHITECTURE: Baker Design Group

GENERAL CONTRACTOR: Shawmut Design and Construction

COST ESTIMATING: Shawmut Design and Construction

MEP + FIRE PROTECTION: AKF

CIVIL ENGINEERS: Woodard and Curran

CODE COMPLIANCE: Hughes Associates Inc.

LEED COORDINATION: The Green Engineer LLP

COMMISSIONING AGENT: MAW Consulting



The normally hidden heating and cooling elements of the facility are on display, like the mechanical room (above) and radiant floor heating (right).

IMAGES COURTESY OF TACO INC

Equipment Suppliers

Taco Inc.

- ☐ Hot water + chilled water circulating pumps
- ☐ Condenser water pumps
- ☐ Snowmelt pumps
- ☐ LoadMatch circulators and LOFlo mixing blocks
- ☐ Flat plate heat exchangers
- ☐ Expansion tanks
- ☐ Air separators
- ☐ Building management controls

Daikin McQuay

- ☐ Energy recovery unit
- ☐ Chiller

ClimateMaster

- ☐ Heat pumps

Dadanco & Swegon

- ☐ Chilled beams

Baltimore Air Coil

- ☐ Cooling tower

IEC Sure Flow

- ☐ Fan coils

Runtal Radiators

- ☐ Flat panel radiation

Watts Radiant

- ☐ Radiant floor heat
- ☐ Snowmelt

Viessmann

- ☐ Solar panels
- ☐ Hot water storage tanks

Automation Components Inc.

- ☐ Temperature and gas sensors

APC

- ☐ Data center equipment

Schneider Electric

- ☐ Variable speed drives
- ☐ Access control

Clearwater Systems Corp.

- ☐ Cooling tower water treatment

that in terms of the LEED scorecard. We do know, however, that the products and technologies we intend to put into the building will achieve a very high level of certification.”

As of this writing, Taco is looking at a tally of 62 points under the six LEED categories, with a possible 16 points earned in the Energy & Atmosphere category. Additional points across the other five categories can be found in everything from use of daylighting, recycling materials, low- or no-VOC materials, FSC-certified wood, chain-of-custody documentation, drought-resistant plants and even documentation of the project.

According to a LEED energy simulation analysis conducted by an independent sustainable design consulting firm, the Taco IDC, which went operational in June 2012, will use 35 percent less energy annually than a standard building and have an energy cost savings of 29 percent more than the ASHRAE 90.1-2007 baseline code compliant building—corresponding to an ENERGY STAR rating of 88 out of 100.

Taco will report back in a year to present the operational data gained and to discuss its importance and the project lessons learned. *edc*

PETER LOFGREN, AIA, IS A PRINCIPAL WITH BAKER DESIGN GROUP INC., BOSTON.

RICH MEDAIROS, PE, IS VICE PRESIDENT WITH RDK ENGINEERS, BOSTON.

KYLE LLOYD IS SENIOR PROJECT MANAGER FOR SHAWMUT DESIGN & CONSTRUCTION, PROVIDENCE, R.I.



All Taco. All yours.

The new Taco Innovation and Development Center is Johnny White's gift to you and the industry. It's the finest HVAC training facility of its kind.

An outstanding resource

Spacious training rooms are equipped with the latest AV and internet gear. Cutaway walls, ceilings and floors expose Taco solar, radiant, chilled beam, and geothermal systems in action.

The mechanical room

Inside are LoadMatch® and LOFlo® radiant cooling systems, energy efficient boilers and chillers, geothermal, energy recovery, and solar systems controlled by iWorx®, heavy duty TA and TC pumps, vertically aligned KS and KV pumps, variable speed drives, heat exchangers, and air and dirt separators. All running and all Taco.

Visit us

Check our web site for in-depth training schedules in our new facility or call to arrange a tour with a Taco engineer. The more you know about our people and systems, the more you'll appreciate the depth of our commitment to your success.



iWorx is a registered trademark of Taco Electronic Solutions, a subsidiary of Taco, Inc.