Charleston Area Medical Center

Memorial Division - Charleston, West Virginia

5th Floor Patient Occupancy Project

Project Summary

Project Type: Renovation of an Existing Facility

Completed: 2011

Square Footage Renovated: 1,500 Square Feet

Products Used: Price ACB2 2-Way Active Beams

Price Representative: Mason & Barry Inc.

The Facility:

The Charleston Area Medical Center is a non-profit, 838 bed, regional referral and academic medical center with more than 6,000 employees. It is comprised of three primary divisions: General, Memorial and Women's & Children's hospitals. CAMC is home to one of the largest heart care programs in the United States; the only kidney transplant center in West Virginia; the state's highest level trauma center; and the state's only freestanding children's hospital.

The Memorial Division houses one of the highest volume heart programs in the US. Each year physicians perform about 8,000 procedures in the cardiac catheterization labs and more than 1,600 open-heart surgeries. Comprehensive cancer care is also housed at Memorial with multidisciplinary teams including radiation, gynecologic and medical oncologists as well as pharmacists and psychologists dedicated to the care of cancer patients and their families. CAMC cancer services have been accredited since 1956 and provide the most, highest trained and nationally certified health care professionals in the region.

A comprehensive diabetes center, family and internal medicine clinics, the Vascular Center of Excellence and general medical-surgical in-patient services reside at the Memorial location as well. Additionally, the Robert C. Byrd Health Sciences Center of the West Virginia University is also located on this campus.

In 2009, Memorial was faced with the challenge of renovating 15,000 square feet of patient space on their 5th floor. The goal was to create a safe, healthy, comfortable environment that would be more energy efficient as well as reduce operational costs. By using Price active beam technology, the design team was able to overcome the challenges inherent in the existing

space and create an environment that achieved their design criteria.

The Challenge: *Reduce Energy Consumption, Operation Costs and Duct-work Requirements*

The CAMC design team faced two key challenges: reducing energy consumption (and subsequently operation costs) and selecting a system with reduced ductwork to function within the limited plenum space available. The facilities team at Memorial was anxious to improve on the below window, induction units previously in use. Additionally, the availability of ceiling space and appropriately sized air handling units made an all-air solution impractical.

Consequently, they were open to new ideas to deal with their circumstances as well as the high levels of humidity that are experienced during Charleston's periods of heavy rainfall in the spring and summer. Moreover, the design team needed to be cognizant of the many regulatory and statutory requirements related to the room environment and mechanical systems where patients are to be housed.

Engineer Profile:

BSA Lifestuctures is a multi-disciplinary design firm that offers its clientele a broad spectrum of services including architectural and mechanical design. The name "BSA Lifestructures" reflects the company's focus on creating positive environments for "healing, learning and discovery". With a goal of "creating inspired solutions that improve lives," the firm has offices in Indianapolis, Chicago, Austin and St. Louis, and is one of the largest full service architecture and engineering firms in the Midwest.

Price Solution:

Mason & Barry Inc., West Virginia's factory representative for Price products, supplied active beams that were the ideal solution for this project. Water is several times more efficient than air at transporting thermal energy, and by selecting a hydronic solution such as beams, BSA Lifestyles was able to increase the energy efficiency of the system by reducing the size of the air handler and ductwork required to service the space. This was a more efficient alternative than had previously been utilized in these patient rooms.

The use of smaller piping in active beam systems also addressed the challenge of extremely low floor-to-floor heights and restricted plenum space by eliminating the need for large ductwork. Humidity was not an issue in the space, as this was readily controlled through the primary air handler, ensuring that only air with the desired moisture level would be delivered into the space. Moisture sensors were incorporated into the Price Active Beams as well.

Utilizing active beam technology also has a positive impact on patient room air exchange

rates. Typically, patient occupied rooms require 6 ACH of supply air; however by using radiant panels, the allowable air change rate is dropped to 4 ACH making the chilled beam an even more viable solution for this application.

Since the hospital does not run chillers during the winter months, the need for an alternate cooling source became essential. Innovative engineering by BSA incorporated the cooling coils of two existing air handlers in the mechanical room as dry-coolers for the chilled beam system. Ultimately this arrangement provides "free cooling" for CAMC during the winter months.

Control Solution:

The space temperature is regulated by means of hot water and chilled water control valves. In order to prevent condensation on the exposed coil, a chilled water temperature of 57° F is maintained. Condensation is monitored by zoned moisture sensors attached to the chilled water piping in the plenum space. Should any condensate form, it will be detected before it becomes visible and the chilled water valves in that zone will be closed until the moisture sensor determines that levels are back within tolerance and reactivates the valves.

In Conclusion:

The active beam system has been operational at the Memorial Division for over two years and both the design team and the owner are pleased with the system's operation and its reduced energy consumption.
Consequently, as other renovations are initiated at CAMC, utilization of chilled beam technology has become a viable consideration. According to hospital officials, it ranks high on their priority list of potential solutions for creating and controlling the environment in patient occupied spaces.