Stealth Comfort—High Security Command Center Opts for Chilled Beams

Highly classified and on the cutting-edge, some of the world's most advanced military technology is housed within the new Emergency Operations Center (EOC) at Joint Base Elmendorf Richardson (JBER), near Anchorage, AK. In the event of an attack or other catastrophe, base operations can be managed from this subterranean stronghold.

Though only 8,000 square-feet in size, the EOC has computers and work stations for more than 100 officers. The facility serves central command and control operations for strategic preparedness and management in an emergency.

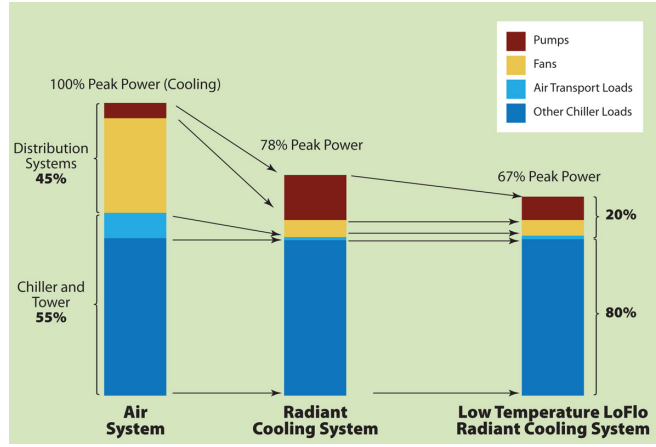
With all of the high-tech equipment inside the building, the facility requires substantial cooling, even during an Alaskan winter.

Overhead clearance was a challenge. The main facility's floor is built on top of a 12-inch plenum that acts as a conduit for the maze of electric and communications wires, so there was no vertical space to spare for ductwork.

Chillin' in Alaska

Never before used in the state of Alaska, hydronic chilled beam technology was specified to heat and cool the EOC. The Mechanical Division of Palmer, AK-based Weldin Construction was hired to do the design and installation work.

"Concerns that the new chilled beam system wouldn't operate as planned were quickly settled," said Steve Nazaroff, mechanical division manager at Weldin Construction.



Chilled beams are a method of delivering ultra-high efficiency heating and cooling. Systems can approach 400 btuh/s.f. for active systems – like those installed by Weldin at EOC.

Because chilled beams are ceiling-mounted and do not require the use of drain pans, chilled water supply temperatures must be above the ambient dew point. As a result, dehumidification, or latent cooling, is usually handled by a separate, dedicated outdoor system (or DOAS) supplying dry, conditioned air to the space.

"What makes chilled beam technology so interesting is its broad applicability for commercial structures, and extreme energy and thermal efficiency," said Greg Cunniff, P.E., application engineering manager for Taco, Inc.

Until recently the challenge has been that pump energy demand doubles when compared to a VAV system. Taco's new, pre-packaged LOFlo injection mixing system solves the problem. It consists of a variable speed injection circulator on the chiller side of the mixing block, and a constant-speed zone circulator on the beam side.

The system reduces the electrical energy demand of an all-air system by up to 40 percent. Also, it accomplishes heat transfer with only one-third of the energy needed by chilled beam systems without injection mixing. Unlike most chilled beam applications, the use of LOFlo mixing blocks eliminates the need for a separate chiller or air conditioning system to handle the latent load.

"With a LOFlo system we're able to use one chiller," said Cunniff. "Water comes out of the chiller at 45°F. It supplies the DOAS coil for latent cooling, and goes to the mixing blocks where it's mixed to the exact temperature needed in the chilled beams. Return water is generally around 60°F." In this manner, a 20-ton chiller supplies water to 32 chilled beam fixtures.

Nazaroff refers to it as a "stealth comfort system." Occasionally, civilians can teach a few new tricks to the military.