Written by MT Staff
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The Operating Engineers Trust Fund Building…

If you're a Union Pension Trust Fund that owns real estate and demands the highest level of operating efficiency for your buildings, you need to continually implement cutting-edge energy conservation measures. This is done by maximizing the long-term financial performance of the investment.

Those who work for the Operating Engineers Pension Trust, Local 12, out of Pasadena, CA, want to be the best when it comes to HVAC systems optimization and performance. As the chief engineer for this Trust Fund, Bruce Manning admits to being obsessed with finding ways to minimize energy use in the buildings for which he is responsible.

One of those sites is the Trust Fund headquarters located at 100 E. Corson St. in Pasadena. Manning's obsession is why he is so excited about the performance of the new Danfoss Turbocor technology. The newly installed oil-free compressors in the building have opened the door to additional cooling savings. He predicts these could be as high as 50-70% versus his older compressors.

Supporting the system

The four-story office building was completed in 1988 and encompasses 210,000 gross square feet. The heart of the original cooling system was two 120-ton, open-drive reciprocating compressors connected to a built-up direct-expansion (DX) coil with 16 expansion valves.

Conditioned air is delivered to four floors of VAV boxes from the centralized penthouse

air-handling system with dual, side-by-side DX coils and associated face-off dampers, variable-speed driven supply and return-air fans. The system also features a fully functional, 100% outside air (O/A) enthalpy-controlled economizer system.

The road to improvements

When Manning, a 30-year engineering and energy analysis veteran, took over in 1993, he performed extensive maintenance management and energy management evaluations of the entire real estate portfolio, including this facility. Over time, he installed VFDs on the supply and return fans, as well as the cooling tower fans to conserve energy by eliminating the previous constant-volume fan operation using inlet-guide vane control. He then retrofitted and overlaid a point-intensive DDC energy management control system on all mechanical equipment and floor VAV boxes.

Manning developed his “Energy Report Card,” which utilizes kBtu/sq. ft. as the primary benchmark to evaluate and sustain the energy efficiency of his buildings. After evaluating all possible plant retrofit options for years, he knew that additional efficiency improvements were possible, but not at the right cost/benefit and associated return-on-investment ratios. He became particularly interested in refrigeration compressor improvements and began studying and tracking a new low-friction, oil-free refrigeration compressor. This technology was developed by Danfoss Turbocor and was beginning to appear in California. Manning says, “I had been following the development of this technology since its inception.”

Manning concluded that the technology with its oil-free design, variable-frequency speed control, floating magnetic bearings, centrifugal compression and digital controls was the ideal replacement compressor for his building. Since then, the technology has exceeded his expectations.

“For the first time,” he concludes, “I have seen a refrigeration system that can be so precisely tuned that there is zero operating slop.” **MT**

Danfoss Turbocor
Tallahassee, FL