

## **Fabric Duct Makes Convention Hall's Unique Cable Room Design Possible**

**Polyester HVAC duct flexes as the roof bows from snow loads, complies with strict ecological guidelines and saves project \$250,000 versus metal duct.**

PITTSBURGH, PA - Pittsburgh's great tradition of suspension bridges is paid homage by internationally known architect, Rafael Vinoly's sloping suspended cable roof design for the Pittsburgh Sports and Exposition Authority's (SEA) new David L. Lawrence Convention Center.

While the soaring stainless steel and glass crown made it possible for Rafael Vinoly Architects PC, and architectural project partner, HNTB, to design the nation's largest column-less exhibit hall, the roof's perpetual flexing presented HVAC designers with a nearly impossible challenge of effectively distributing heating and cooling throughout the space.

Because snow, rain and wind loads can flex the roof as much as three feet, ceiling-hung metal HVAC air ducts would have been impossible because of their rigidity. Instead, the project specified polyester-based fabric air dispersion, manufactured by DuctSox, Dubuque, IA, which not only floats with the roof's random flexing, but also saves the project an estimated \$250,000 versus other duct materials, according to John L. Patten II, C.I.P.E., principal, Burt Hill Kosar Rittelmann Associates. "We could have used double-walled spiral metal duct," recalls Patten, "however that would have necessitated hundreds of expansion joints (to accommodate the flexing) which would have been costly and much



**case study**



less attractive than the sloped, continuous runs of DuctSox we have now.”

Mechanical contractor, Limbach Company, installed the DuctSox in pairs that run through a series of specially fabricated metal hoop hangers that not only hold light trusses between each duct pair to cut lighting glare, but also eliminate any fabric deflation during off-peak operation. Burt Hill specified a translucent duct fabric that would help disseminate light.



Metal duct also would have needed hundreds of registers, which have proven less effective in even air distribution. Instead of registers, the DuraTex fabric has factory-engineered permeability to distribute up to 15 percent of the airflow through the material. The remaining 85 percent of air distribution is through hundreds of CAD-engineered perforations that run the entire lengths of the convention center’s ductwork. The



perforations range from 1/2-inch to 1-1/4-inch in diameter with placements depending upon the height of the duct. At the 46-foot level, the holes are largest and are arranged mostly at the bottom of each duct run to maximize air throw in the draft-free air distribution design.

Disregarding the roof flex, metal duct also would have necessitated heavy insulation to eliminate condensation, especially since the convention center’s air conditioning is delivered at an unconventionally cool 41°F.

Using fabric versus metal also saved natural resources and provided a more maintenance efficient material, which supplements the convention center’s “green” ecology mandate. ■

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