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CASE STUDY

Hazardous Material Storage Building/Cross Junction, Virginia

Hybrid Hatch Solution Solves Dilemma With Corrosion

The corrosive nature of salt can adversely impact almost any building material. Architects sought a unique remedy in a hazardous material storage building owned by the Virginia Department of Transportation.

The building in Cross Junction, near the West Virginia border, is used to store salt and de-icing products that are used on roadways in the region during snow and ice weather patterns. Interstate 81, a major north-south thoroughfare, cuts through the region and rolls into West Virginia and Maryland and southern Virginia and Tennessee. It is a major vein for the trucking industry.

Some building materials, especially roofing components, had deteriorated over time due to the salt that is stored in the building. The architectural team from Gauthier Alvarado Associates developed a hybrid solution that is efficient, cost-saving and durable, checking off three of the most important boxes on VDOT's project requirements.

Salt is loaded at the facility through the roof hatches. The design saves time and labor, as it eliminates the need for salt to be moved via front-end loaders or some other means of conveyance.

When salt is stored, it retains water, which then promotes condensation. The water absorption allows corrosion to occur at lower humidity and for longer periods of time than otherwise expected. Salt increases water's ability to carry current and speeds up the corrosion process. As the building ages, the overall salt content of the building increases. The building fabric tends to become damper over time. When the salt dries out, it crystalizes and expands, causing crumbling, spalling, flaking and cracking of the building fabric. That is precisely what happened in the VDOT building.

Architects created a unique hybrid solution with roof hatches from BILCO to solve the problem.

They specified three aluminum models, each 3-feet, 11-inches wide and 11-feet long. The custom-made hatches include Type 316L stainless steel hardware, which is the most corrosion-resistant type of stainless steel.

As another layer of protection, the roof hatches include a liner, which is similar to the lining on truck beds. Installed by Rhino Linings of Winchester, Va., the spray-on material protects against corrosion



while also providing abrasion, impact, and chemical resistance. The aluminum hatches with the liner were more cost-efficient than stainless steel roof hatches.

"With this solution, we combined the durability associated with the BILCO pre-manufactured aluminum roof hatches with the corrosion-resistant properties of the truck bed liner," said Stephanie Stein, lead architect on the project for Gauthier Alvarado.

Dinks Construction, the general contractor, procured the roof hatches from Scott Lau of Marcor Building Products and installed them. Don Largent Roofing installed EPDM, a durable, synthetic membrane on the remainder of the roof. The materials are expected to extend the roof's durability for up to 35 years.

One other critical design component are steel bumpers that support the roof hatch during loading operations. "The additional force applied to the roof hatch covers during the salt loading is then directly transferred to the steel bumpers to protect the structural integrity of the roof hatches," Stein said.

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