Pneumatically moving to the top

Tough slide-gate valves help a contractor quickly move heavy material to rooftops.

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Pneumatically

Placing a layer of rock ballast over the membrane of a rooftop holds the components in place, allows for future building movement, protects the membrane from potentially destructive UV sun rays and weather, and greatly extends the life of the roof. The components of a ballasted roof (insulation, thermal barrier, and waterproof membrane) are not adhered to the roof deck to reduce overall costs and installation time.

Vac-It-All, St. Louis, is a contracting company that specializes in the preparation of roof surfaces. Founded in 1979, the company has completed a wide range of projects for multi-level and industrial buildings across both North America and Europe, moving thousands of tons of rock in the process. Whether reroofing or installing ballasted single-ply or inverted roof membrane systems, Vac-It-All’s method for moving material can greatly reduce the cost of removing or placing rock ballast on the roofing surface.

Vac-It-All used a belt conveyor to convey the rock to the roof and then distributed the rock on the roof using wheelbarrows.

To speed up the process, Vac-It-All owner Dave Settlemoir designed a pressure pneumatic conveying system that’s capable of conveying decking material to roofs up to 10 stories high or 1,000 feet horizontally from the initial load point. The system is mounted on a trailer and uses a 10-inch conveying line to move material from a hopper to the rooftop, where an operator can direct the material where needed.

“‘When working commercial projects, customers want the roof installed quickly to avoid potential weather issues,’ Settlemoir says, ‘and they want contractor equipment out of the way of their daily business interactions.’

Two 10-inch Vortex TPV slide-gate valves are key to Settlemoir’s system. Vortex Valves, Salina, Kan., specializes in valves for dry bulk material handling in gravity flow or pneumatic conveying systems. Slide-gate valves have a center opening that is the same diameter as the material handling line and a blade (or gate) that, when actuated, slides across the opening to block material flow. The

Workers can now move rock across a rooftop using the conveying line instead of having to move the rock with wheelbarrows.
TPV gate valves are designed to handle abrasive dry material, such as minerals, frac sand, and fly ash. The valves’ blades and seats are made of 440 C stainless steel and can be changed out in the event of wear, increasing the life of the valves.

In Vac-It-All’s system, the gate valves are stacked vertically, separated by a chamber. The two valves work together to feed the material into a conveying system without allowing any air pressure to escape. Both gates are initially closed, and the top gate opens for 2 seconds using hydraulics to allow material to fall into the chamber from a hopper above. Then the top gate closes and the bottom gate opens for 2 seconds to allow the material to enter the conveying line below. The bottom gate closes and the process repeats as needed. The valves effectively contain the conveying line pressure within the system, and frequent batching allows for a continuous flow of material at the conveying line’s discharge.

Quickly moving material

During a recent job, the system allowed Vac-It-All to move and distribute 29 tons of rock in just over 3 hours. “It normally would have been an all day process to move this much rock,” Settlemoir says. “Employing equipment that will facilitate project completion is key to our success. The supplier provided reliable component parts for the specialized equipment we develop to help improve our customer services.”

Note: Find more information on this topic in articles listed under “Pneumatic conveying” and “Valves” in Powder and Bulk Engineering’s article index in the December 2015 issue or the Article Archive on PBE’s website, www.powderbulk.com. (All articles listed in the archive are available for free download to registered users.)

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Vac-It-All loads the system’s hopper with rock to convey pneumatically through the TPV valves.