Solutions in Automated Blast Cleaning

The following article is reprinted from the ZERO Update newsletter and covers the work of Herb Tobben, the manager of ZERO's Sample Processing Lab.

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WHAT WAS THAT MASKED PART?

Some customers are inclined to dismiss the production gains inherent in abrasive blasting because they consider it an exclusively all-over process. When you bring up masking, they think of tapes, adhesives, and the added labor needed to apply and remove them.

Solution

Blasting a limited area of a part does add some complexity but, as you'll see in the following examples, masking can be integrated into most ZERO automated systems. A well-designed fixture can both hold and mask the part during blasting or peening.

An auto parts manufacturer uses a simple dowel jig and overlapping metal template to precisely control the areas blasted in a metal-rubber laminate gasket. The jig rides on a simple pass-through conveyor. The metal template withstands thousands of blast cycles.

Some ZERO cabinets mount the gun and masking as a unit, blasting through openings in a template just as the parts pass into range.

One recent A-200 cabinet incorporates an oscillating arm that lowers durable rubber masks onto the parts as they enter the blast chamber. The masks swing with the satellite, holding the small parts firmly against the fixture and covering the non-blast area. The masks lift off just as the parts leave the blast chamber.

For those truly hard-to-mask parts, ZERO works with mask manufacturers to design the caps, plugs, wraps, templates, and fixtures needed to ensure a perfect finish for your parts. Your ZERO Distributor can arrange sample processing to help you determine the best technique for cleaning, peening, or finishing your parts—and recommend a masking technique to speed production.

CLEANING STEEL TUBE AND PIPE INSIDE AND OUT—ALL AT ONCE

A refrigeration equipment manufacturer came to ZERO looking for a way to speed things up. Steel tubes, varying in length from 1 to 10 feet and in diameter from 8 to 30 inches, had to be cleaned inside and out. The tubes were welded from new steel plate, and arrived for cleaning thoroughly covered with mill scale and rust. They would eventually be sealed at both ends to become pressure vessels for refrigerant, so they had to be completely clean.

The company was using an acid dip that processed just two pieces per hour. An increase in sales and a decision to automate some of the manufacturing processes led the company's product supervisor to look to an automated dry blast system. The goal: Process each part in under five minutes.

Note the two red flags in this true case history. First, the extremely wide range of part sizes raises questions of run quantities and set-up times. Second, the blast equipment has to effectively interface with other, as yet unknown, automated equipment.

Solution

The Distributor determined that the parts would arrive in relatively small batches of same-size parts and that the parts would be loaded and unloaded by an overhead hoist. The small batch size demands that the system allow for quick changeovers.

The solution is a cabinet 12 feet long with air-powered doors on both sides that open the entire length. Employees lower a steel tube onto a worktable beside the cabinet, then roll the tube inside. When the doors close, powered rollers rotate the tube while four suction guns overhead move slowly along its length to blast the outside clean.

To blast the inside of the tube, four suction guns are mounted face-down and tilted slightly forward on the end of a rigid, box beam. The box beam doubles as a supporting wand and air manifold for the guns. Pointing all the blast guns down allows the entire assembly to fit easily into the smallest tube—8-inch I.D., yet it produces a large blast pattern to quickly clean the greater area inside the 30-inch tube. Tilting the guns forward and blasting on the entry stroke pushes the media ahead as the wand moves through the tube.

After blasting, the system switches the nozzles to air-only, which blows the dust and media off and out of the tube, while the 2,500-cfm reverse-pulse cartridge dust collector quickly clears the enclosure of airborne dust. The high-capacity dust collector is important, because the cabinet opens so completely the inside must be cleared thoroughly to prevent dust from contaminating the area outside the cabinet.

Innovation can be expensive and the ZERO machine proved more costly than those proposed by competitors. Still, the customer bought the machine because ZERO's Technical Sales Staff and the Distributor Sales Representative worked closely with the customer's employees. They refined the design at each step, from initial proposal to final drawings—all to ensure the cabinet precisely fit the application. "Price was not the deciding factor," the company's product supervisor said, "The ZERO people were willing to work with me on changes we needed to make."

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