

Abrasive Blast Cleaning News

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A Quarterly Newsletter for the Abrasive Blast Cleaning Industry

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And more!

Solutions in Automated Blast Cleaning

"Thank you" to Clemco Industries for allowing us to share with you information from their newsletter *ZERO Update*. The following covers the work of Herb Tobben, the manager of ZERO's Sample Processing Lab. Jack Champagne of Electronics Incorporated recently toured Clemco/ZERO and he especially enjoyed his visit with Herb at the Sample Processing facility. Herb has been a guest speaker at the EI annual shot peening workshops since 1996—we think that his work is very valuable and interesting.

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CREATING QUIETER, MORE DURABLE GEARS

A major U.S. manufacturer of automotive gears asked ZERO for help with two problems common in multi-step machining operations. The company makes a variety of gears for use in transmissions, transfer cases (for four-wheel drive vehicles), and differentials. The gears are machined from steel, the teeth are cut, then the gears are heat tempered to increase their hardness. Cutting the teeth produces tiny burrs at the outer edges. These burrs heat more quickly than the gear itself. Viewed under a microscope, the melted burrs resembled weld beads. Gears with these miniature weld beads were noisy and tended to fail prematurely.

Tempering, the second step in the manufacturing process, produces black scale on the gears



Herb Tobben creates solutions to customer problems at ZERO's Sample Processing facility.

that must be removed. The scale will wear off, contaminating lubricants and interfering with the close tolerances needed for smooth operation. The company solicited ideas from companies involved in several surface preparation technologies.

Solution

After the teeth are cut, the gears enter an automated cabinet for a brief blast with a fine aluminum oxide abrasive (120 mesh) that removes all the burrs. After the gears are tempered, a second automated cabinet is used to remove heat scale from the gears with #10 glass beads at 80 psi. Production rates vary based on the size of the gear. The company has reported that their gears are measurably quieter following their polishing with glass bead.

THE PERFECT FINISH

A supplier of angle, round, and flat iron cut to length for retail sale to "Do-It-Yourselfers", needed a way to remove surface rust so that the iron parts were more aesthetically appealing when displayed in lumber yards and hardware stores.

Starting with 40-foot lengths, the company cut rounds, flats, angles, and channels to assorted consumer-friendly lengths.

The raw materials arrived with varying degrees of rust. To remove the rust without removing the mill scale, the customer's employees have been using wire brushes, sanders, even scrubbing pads, depending on the amount of rust present.

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Solution

As an automation application, this project raises several red flags, most notably the inconsistency of the rust level coupled with the need to leave the mill scale in place. The customer was willing, however, to adjust the machine for each parts' run.

Using a split belt conveyor, with spring-loaded hold-down wheels to keep the parts in place, ZERO built a pass-through system with two pairs of oscillating suction guns (above and below the parts) blasting with #10 glass bead.

With the conveyor belt moving at approximately 30 fpm, the blast removes the surface rust, without taking off the mill scale. The operator monitors the condition of the parts exiting the cabinet and adjusts the belt speed until the parts are cleaned to the desired level.

THE PERFECT FINISH FOR FINISH FANATICS

A U.S.-based original equipment manufacturer (OEM) for Japanese automobiles asked ZERO to create a system for imparting a consistent, high-quality finish on intake and exhaust manifold dies. The system the car manufacturer had used in its plant in Japan would not be installed in the OEM's newly-built U.S. plant. The company's existing Japanese blast cabinet had large media hoppers under the blast enclosure, requiring the operator to climb several steps to reach the work platform. The height of the enclosure slowed the loading and unloading of the dies.

Solution

ZERO designed and built an 8 foot by 7 foot blast enclosure with a low-profile, pneumatic M-Section floor, simplifying parts handling and reducing the height of the powered turntable to just 24 inches. Three oscillating pressure nozzles direct a uniform blast of #10 glass bead onto the die as it rotates on the 2-ton capacity, 72-inch powered turntable. An exterior blasting station with a hand-held blast nozzle, view window, and door-mounted gloves, allows the operator to process small parts or touch-up big parts. An Allen Bradley SLC-500 logic controller handles everything from the variable-speed nozzle oscillator and turntable to the powered, vertical sliding door.

The Japanese quality assurance representatives, assigned to monitor progress for the OEM, were so impressed with the ZERO machine that no other proposals were even considered.

WHEN THE ONLY POWER IS AIR, POWER EVERYTHING WITH AIR

A Distributor called to request that we rush his sample processing request so he could provide quick service for an unusual customer—one with cash in hand. An Amish woodworker need to etch artistic images onto wooden panels measuring 5 1/2 inches by 19 3/4 inches. He later assembles the panels into mailboxes. Business was booming, and the woodworker needed to etch more than 1,000 panels per week—far more than his employees could do by hand. The Distributor sent samples of the panels and the metal stencils the woodworker used to mask for blast etching. So far, this is a straightforward conveyor belt automation application, but the Amish woodworker's religious beliefs do not allow him to use electric power.

Two power sources were available—the power take-off (PTO) from a farm tractor and air from a pair of 200-cfm compressors.

The tractor was dismissed as a potentially unreliable power source. Variations in rpm from the PTO would affect the conveyor speed, which could dramatically increase or decrease the amount of blasting each panel received.

Solution

The system proposed by ZERO—including a conveyor belt, oscillators, and reclaim motor—would all be powered by air motors. Reduction gearing allows the conveyor belt to use a high-speed air motor, so variations in motor rpm will have little effect on belt speed. The total air requirement for the motors and four blast guns is 385 cfm at 110 psi, which leaves little reserve air. The Distributor recommended a 500-cfm compressor, which the woodworker also purchased.

The woodworker prepaid for his machine, then hired a truck and driver to bring him to Washington, MO., to transport it back to his shop. During a follow-up visit, the Distributor helped the woodworker add two more blast guns and convert the cabinet to use aluminum oxide. All with the goal of increasing production. The Distributor reports that most of the man's neighbors in the Amish community have visited the shop to see the automated cabinet in action. Many have since brought in additional work—which has created an 8,000-piece backorder for the woodworker.

STANDARD A-200-1 HANDLES DIFFERING PARTS WITH SIMPLE FIXTURES

An electrical equipment manufacturing division of a multinational company needed to bond a lightweight steel flange into each end of an 8-inch diameter insulating glass ring. The completed part is a subassembly of a large fuse. The flanges needed to be blasted inside and out, then held in position in a mold while molten glass is injected to form the ring. Once the assembly has cooled, the junction between the glass and steel must be cleaned to remove any flashing, but without frosting the glass. The manufacturer specified that the machine had to process the one-inch tall steel flanges and the five-inch tall finished assembly without repositioning the blast nozzles. The ZERO Distributor expected the manufacturer to seek competitive bids, so price was a major concern.

Solution

Using an absolutely standard ZERO A-200-1 and two different types of fixtures, ZERO positioned four BNP guns with #6 wide spray nozzles to blast the complete subassembly, inside and outside of both installed flanges, while the satellite rotates at 20 rpm.

To blast the flanges alone, without repositioning the guns, two guns are turned off and a taller fixture is set into the satellite. Positioning tabs loosely center the flange, a light-weight steel ring, on a miniature turntable. The loose fit allows the flange to shift slightly away from the tab as it passes one of the nozzles, ensuring complete blast coverage. Precise positioning and instantaneous startup of both nozzles generates equal air pressure above and below the steel ring, so it is not blown off the fixture by the blast. Both steps of the operation use 150 mesh aluminum oxide at 80 psi. After witnessing the sample processing test, the customer agreed on the spot to purchase the A-200-1 cabinet and customer fixtures. ●