Power Makers are Having a Blast: Our Products Make Their Products Better

by Herb Tobben

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It is my opinion that for perhaps too many of you out there, blasting is a well-kept secret. How many people realize that an end product goes through so many processes and treatments to function and to look the way it does? In this column, we frequently speak about shot peening and its contribution to society: that shot peening relieves residual stress and improves the performance of critical aircraft engine components that provide for the safety and well-being of all of us who fly. We trust that the important aircraft parts have been manufactured correctly and, just as important, maintained in a timely and correct manner.

Herb Tobben, Manager of the Sample Processing Lab for ZERO Automation, creates solutions to customer problems.

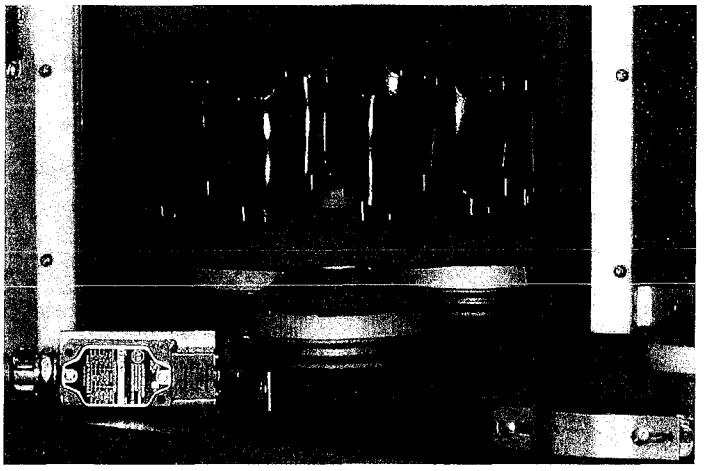
Beyond shot peening, however, blasting plays an important role in the surface preparation of many of those same critical parts for aircraft and for other very important machines that keep the world running, its people moving, safe, and comfortable.

The turbomachinery market is full of applications for abrasive blasting including components of jet, turboprop, and turboshaft engines that power aircraft from cargo, executive, and passenger jets to bombers and helicopters. Similar engines are used in propulsion and industrial stationary power sources in marine, naval, electric power, oil and gas sectors.

This market's engineered components are subjected to aggressive environments, such as high speed, corrosive media, extreme temperature, and cyclic stresses, which result in degradation and failure from wear, abrasion, and corrosion. Those OEMs constantly examine processes and procedures to ensure the integrity of the components for long wear life. High-grade materials are frequently cost prohibitive, making the use of proper surface preparation for high-performance coatings all the more important.

The most important step toward the successful application of any coating or repair material is surface preparation and compatibility with the surface upon which the coating is applied. Air blasting is used for preparing parts for thermal spraying (frequently the only surface preparation required for that process), and for application of other types of coatings as well as for coating removal during maintenance and refurbishing. Depending upon the type of coating, its thickness and hardness will vary and either suction or pressure blasting will be used. Tough, heat-resistant coatings demand pressure blasting. The nozzle pressure will depend upon the substrate, the coating, and the profile needed for successful coating adherence. Taking the time to do the job right assures a quality result and the endurance of the coating and product service life.

Corrosion of turbine blades causes pitting or cracking and results in costly maintenance and downtime. Failure to maintain the highest standards throughout the repair process can result in debonding of the coating or repair material.



Teach-and-repeat program controls unique blast gun positions for all components.

Land-based turbines are more and more frequently subjected to aggressive environments in the hot or exhaust section of engines. Therefore, they are subject to attack by contaminants in the fuel or from high temperature oxidation. High-performance coatings have been developed to protect the turbine components operating under such conditions.

All profit-motivated companies are interested in improved productivity, which comes from less frequent repairs and downtime. Advanced coatings play an extremely important role in achieving higher performance, such as those used on gas turbine enabling the engine to run at ultra-high speeds.

Air blasting is common among the auxiliary processes for manufacturing and repairing these very expensive, highly-engineered components. It is used for surface preparation and cleaning, and also for descaling, peening, deburring, and surface finishing. In most cases, air blasting is the only process that can achieve peening or profile specifications, especially when the interior surface of a component needs to be peened or prepared for coating. Air blasting is ideal for easily treating awkward contours difficult or impossible to reach with

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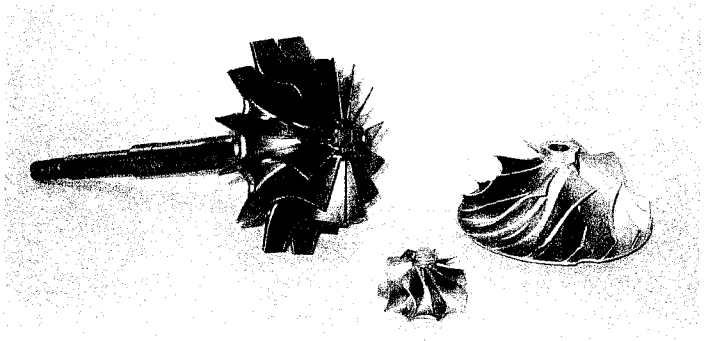

Turbocharger parts and jet engine parts: Typical turbomachinery parts processed with air blasting.

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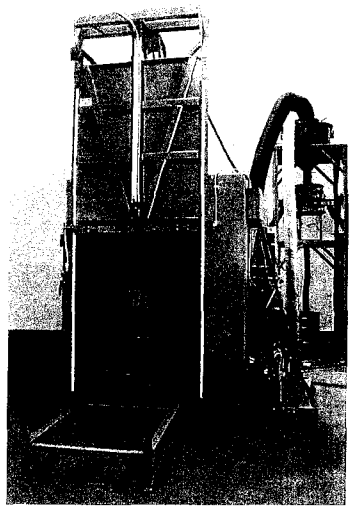
manual sanding or grinding methods.

Clemco has made air blast systems for these support processes in the form of small rooms, manual blast cabinets, semi-automated blast cabinets, or fully-automated purpose-built systems designed for specific production runs.

We have designed engineered air blast systems to accommodate one or more components using sophisticated CNC controls and multiple nozzles that can streamline the blasting process. When the cabinet is designed for multiple components, users simply change fixtures and adjust the computer program to suit the geometry of a different component. These electronic devices can control nozzle on and off time, nozzle positioning, media flow control, etc. Such flexibility can help manufacturers or repair facility managers maintain significant throughput, thus achieving high quality parts in an efficient timeframe.



Automated cabinet designed to process fan disks and a variety of other aircraft engine components.