



AN INSIDER'S PERSPECTIVE

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Contract Services Cleaning and Peening

INDUSTRY STRUCTURE

Most of us are familiar with the two primary segments in our industry—equipment manufacturers and end-users. However, there is a third segment that governs a significant part of the industry's revenue, Contract Service Providers. Of course, all three sectors are supported by a team of service and consumable providers that are key in keeping them performing at their peak.

Contract service providers could be of two types: metal "laundries" that blast clean parts, and the companies that specialize in shot peening services. Shot peening service providers, the unsung heroes of our industry, play a pivotal role for several reasons. Equipped with certifications and up-to-date audits, they complement those companies that may not have the part volume to justify the purchase of a new machine and the manpower to maintain certification that would allow them topeen mission-critical parts. Contract service providers are often involved in the initial stages of determining the validity and value of cleaning or peening a component before an end-user decides to invest capital in equipment purchase.

If you are reading this, you might be a service provider, or perhaps looking to use such a service in the future and our topic will certainly interest you. We will discuss salient features of this sub-sector, the type of industries that commonly use this service, the economics of operation, machine types employed by these shops, issues faced, and supplementary services offered. The material here has been gathered by interviewing multiple providers in Canada and the United States. This business offers considerable barriers to entry, some of which will also be elaborated upon here.

WHY CHOOSE CONTRACT SERVICES?

In my career, I have been fortunate to work for companies that were equipped with fully functional test/demo labs. During demos, the consensus among my colleagues was that any test carried out for a prospect almost always resulted in an equipment sale in our favor. The reasoning is flawless—customer arrives with a problem; the solution is in the visual

affirmation of the part being cleaned or peened in a demo machine. A combination of satisfying evidence and the prospect's investment prowess helped make the sale.

I spoke to end-users in the automotive industry who explained that this process is a lot more involved since all new projects required more than a sample test of five or ten parts. Automotive requires five levels of PPAP (Production Part Approval Process) to be successful before certifying a process as being capable of generating a production part. When multiple batches of parts must be cleaned or peened while developing a process, contract service providers offer a viable alternative.

For those of us in the automotive and aerospace industries, our expectation of cleaning and peening processes is well-established. This is typically not the case in industries such as power, medical, nuclear, etc., that are relatively new adopters. Such industries rely on service providers to take on this responsibility at least until the point this expertise can be brought in-house.

Most peening projects are driven by specification requirements. Though a specification may not be current in terms of information, adherence is a non-compromising expectation. Whether it is MIL-13165-C or the latest version of AMS 2430 and 2432, the purpose of specifications is to ensure consistency, repeatability and accuracy of the process. OEM specifications such as BAC5730 (Boeing) and P11TF3 (GE Aircraft Engines) are all derived from the documents listed earlier. Therefore, knowledge of these specifications, their applicability and proper usage is important. Contract peening services that work with these specifications on a regular basis are better placed to interpret and explain their nuances when you must get your parts processed to these specs.

Though cleaning and peening machines are differentiated on several functional factors such as the type of media propulsion (wheel/air), media reclaim (mechanical/vacuum), a primary differentiation is the type of work handling. This is determined by the part style and area of the part needing processing. Non-metallic media types such as AlOx in grit

blasting and glass bead in peening are best propelled from an airblast nozzle. This is yet another reason a contract service provider will come in handy. Job shops often offer a variety of machine types; each with its unique characteristic based on the differentiations listed earlier.

An example is Latem Industries in Cambridge, Ontario (Canada). Liam Nother, President and his team regularly collaborate with Tier 1, 2 and 3 suppliers to the automotive industry in North America by providing cleaning, peening and other complementary services. "Build it and they'll come, is what I've always told my people. We are often challenged with applications that are out of the ordinary in terms of work handling. It's not always the traditional tumblasts (Latem has three such machines dedicated to specific media sizes) and spinner hangers that are employed in a job shop. We installed a skew roll machine to cater to the needs of a customer that wanted to outsource processing of rods. When we started processing parts for shot peening automotive parts, we installed multiple airblast peening machines," explained Liam.

As a side note, Latem engineers and production personnel are graduates of the Electronics Inc. on-site Shot Peening Training program.

MACHINE MIX MATRIX – NEEDS AND CHALLENGES

Dedicating machines for specific cleaning or peening projects might seem like a luxury. However, operationally speaking, it makes the most sense. Efficient cleaning relies on the selection of the correct media size and maintenance of a balanced operating mix in the machine. This can only be accomplished if the machine is filled with the same size and type of media (while permitting different part styles that require this media type and size). In certain cleaning applications, the type of contaminant being cleaned should also be a consideration when dedicating machine types since reclaim systems must be tuned appropriately to handle the contaminant. For example: Sand loading in foundry applications.

The need for machine dedication is of great importance in shot peening applications. Even the smallest machine type will be threatened with cross-contamination when changing over from one media size to another to cater to two different peening projects requiring different media sizes. Several hours of time investment for the changeover and the ordeal of an impossible saturation curve will add to the frustration of your operators!

In the wheelblast world, the machines commonly seen in blast cleaning are tables, tumblasts and spinner hangers. For airblast applications, multi-tables (main table with satellites), batch type robotic machines provide efficient processing in job shops. Every machine and process developed by a job shop for shot peening will need to be audited and approved prior

to processing parts. Innovation in machine design in the form of hybrid machines (wheel and airblast combination) could help reduce the inventory count of machines, particularly in a small facility. This will also help pivot from one process to the other when part styles demand so. For example, parts requiring complete processing versus those that need certain areas protected/masked from the impact of media. However, this can only work when the media type and size remain the same between the two propulsion systems. Controls (PLC, sensors, HMI, programming, etc.) in a peening machine have the greatest impact on capital cost. A hybrid concept could eliminate the need for two separate machines to invest in and certify for use.

Fixture design adds to the operating cost and ultimately the profitability of the process. Universal fixture design is a "nice-to-have" concept, but seldom works in the practical world. Controlling different fixtures by way of unique identification and stipulating/maximizing their use for common part styles are general challenges commonly faced by most contract peening services.

ESTABLISHING A CONTRACT SERVICE

Zach McGillivray is Director of Operations at VibraFinish. VibraFinish is a large contract services provider located near Pearson International Airport in Toronto, Canada. He is part of the latest generation of blast cleaning and shot peening professionals that is a much-needed asset in our industry. "The recent situation with non-availability of micro-chips and other supply chain challenges has impacted several of our customers. Adding to that is the perfect storm of the pandemic and culminating in a labor shortage. VibraFinish has been fortunate over the years with a stable workforce, and we ensured that this talent is retained during difficult times. One of the ways we managed to do that was by diversifying our portfolio of services. Companies that plan for the stretch often invest in re-tooling during downturns. At VibraFinish, we invested in developing Vibratory Peening as a process with key aerospace customers. This has opened new avenues and enabled offering enhanced services to our cleaning and vibratory finishing customers."

Zach's comments give us insight into how traditional technologies need to be expanded for sustainability and growth. VibraFinish operates 18 traditional blast cleaning machines, eight high-output washing machines and 65 vibratory finishing machines. The company is also Canada's only manufacturer of vibratory finishing machines. VibraFinish recently commissioned an automated lab for vibratory peening.

But what does it take to establish a contract service from scratch? My analysis is based on insights from several industry professionals. A common theme that supports establishment of this business is fulfilling a "need" or bridging a "gap". Most

job shops established themselves to address a need expressed by an end-user.

Walter Beach is Vice President at Peening Technologies in East Hartford, Connecticut with a second facility in Georgia. “We have been processing parts for aerospace companies in our geography for over five decades. Our customers regularly conduct audits on our operations and our operators are highly conversant with conformance to commonly used aerospace specifications.” Walter is the vice-chair of SAE and AMEC committees and most recently finalized the latest version of AMS 2432, Shot Peening, Computer Monitored.

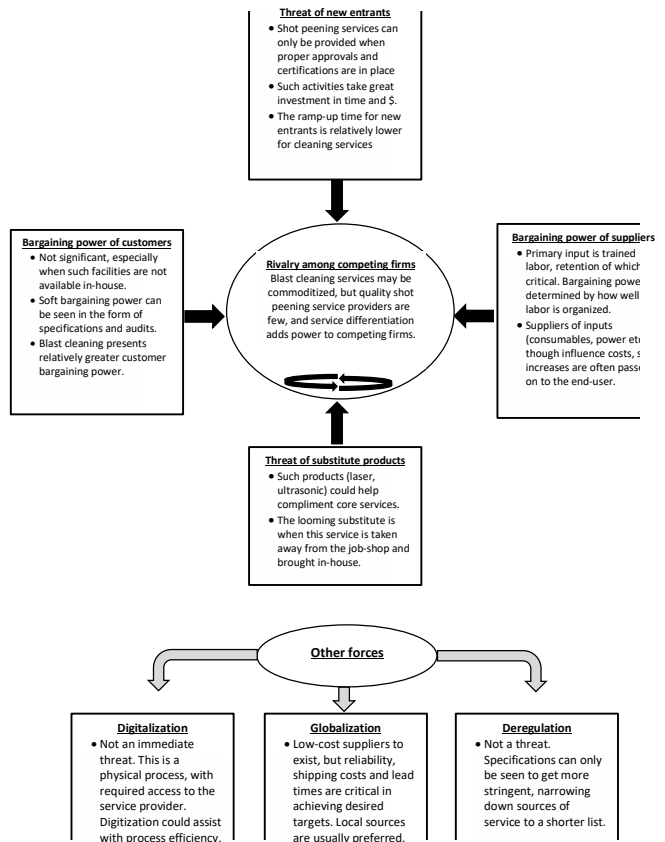
Walter adds, “There is no ‘cutting corners’ when peening critical aerospace components. Regardless of whether an audit is conducted or not, one can never ignore key points such as regular media inspection for shape, size and other attributes. Calibration of the process in terms of media flow, velocity (air pressure/wheel speed), etc., must be maintained as prescribed.” Peening Technologies have taken their offering one step further and are currently also a manufacturer of computer-controlled shot peening machines.

In addition to job shop services and equipment manufacture, Peening Technologies also offers a complete package of machine programming services, part holding and masking fixtures, machine maintenance and calibration, as well as operator and maintenance technician training.

Valuable comments from industry professionals prompt me to utilize a Five Forces model by Michael E. Porter, a Harvard Business School professor, to understand and explain the five competitive forces that shape our industry. Created in 1979, this model is very effective for our discussion in spite of certain known limitations such as the impact of globalization, and industry overlap.

CONCLUDING SUMMARY

- A large part of the industry’s revenue is derived from blast cleaning in terms of equipment and services. Therefore, establishment of a quality peening services may have to be through the route of a metal laundry for economic and recognition reasons.
- Design of components for electric vehicles, increased use of high-strength alloys, and the high-residual compressive stress demands created by newly designed auto parts create opportunities for equipment manufacturers and contract services alike. Though it is not a race to the finish line, it certainly places the onus on such contenders to devise unique techniques to address updated peening requirements in a timely fashion.
- In the current environment, capital is expensive and investment in new equipment is likely to be subdued for the



The Five Forces Model by Michael E. Porter: Competitive Forces Influencing Contract Services

immediate future. The incubation period for newly installed equipment to be production-ready is an additional six to eight months with the need for audits and certification. This presents a unique opportunity for established contract providers to grow their business without the above-mentioned lag.

- I dislike highlighting the distressing fact that we are part of an industry that does not attract new talent in droves. This increases the reliance on existing talent to not just sustain but also grow into new areas. For a contract service, such areas could include X-ray diffraction, specialized thermal spray techniques, exploring the practical benefits of digitization. (For example: Industry 4.0 / IOT.)
- Build-Operate-Transfer. Consider the possibility of “expertise transfer”. Nothing is more valuable to an OEM than a robust, developed process. Companies that prefer to bring the process in-house in the future could “acquire” the process and equipment developed by the contract service provider at a suitable time. ●