Unlocking the Secrets to a Successful Blast Equipment Investment: A Guide to Planning, Communication, and Documentation

In my numerous years in this business, I've been fortunate to work with many skillful and intelligent engineers and plant managers, well-schooled in their lines of work and areas of expertise. They bring me projects that challenge me, which makes my job interesting, as I enjoy solving problems. While my involvement is always at the front-end of the project, my objective is a satisfied customer for the long-term. Solving the problem in the lab is only part of the successful purchase equation.

Frequently, customers are bringing a process in-house that they had been jobbing out and, as a result, are now investing in new equipment. Much of the time, these customers don't have a complete grasp of the impact of their decision. In the ideal situation, we process their samples and work together to achieve often lofty objectives and expectations.

The early discussions entail general process requirements and whether an automated system is needed. Usually, there are two primary drivers leading to the decision to choose automation: high production volume and/or the need for precision processing and exact repeatability. For some jobs, it is essential to produce identical parts each time, and that requires removing the human element.

Sometimes, without the customer realizing it, we've worked through a long list of requirements, which, when carefully considered as a whole, form the basis for the design of the machine that will meet their production goals and budget constraints.

Whether the process is shot peening or blast cleaning or finishing, the preparation drill remains the same. Fully understanding the process (that's where I come in) and considering the gamut of work-flow issues (considerations and limitations that exist at the customer's facility) are essential to a successful outcome.

To help my customers, I've come up with two "top ten" lists of planning considerations.

The first one involves what I call the environmental considerations of their business and workplace, which include:

1. Production objectives-it's important to consider the number of parts that need to be completed in each period. How the production rate can be met must include allowances for the loading and unloading of parts by the operator. It's important to set reasonable and achievable goals.
2. Available air supply and electrical service-all blast processes require dry air of sufficient volume and pressure for the number and size of nozzles or orifices specified. A baseline for the air supply should be established. It's important to understand that the volume necessary for operation must take into consideration wear of nozzles, which as they wear consume

more air. Sufficient electrical amperage is needed to power blowers and other equipment. How much is currently available, and will additional amperage be needed?

3. Available space in and around the process area, the height, width, and depth needed for the equipment plus ducting, space available for parts staging, and for access to the equipment for service and maintenance. Are there ceiling height or other limitations?
4. If the equipment will require a pit, are there water-table issues to consider?
5. Condition of the parts prior to blasting-are they greasy, or hot, or cold, or do they have flashing that might impact the blast process equipment? Hot parts can melt plastic media or be too hot for the operator to handle. As parts cool, condensation can cause moisture issues. Moisture is the enemy of blasting.
6. Pre-process treatment before blasting/peening-how will the degreasing, cooling, warming, or other prep work take place-where and by whom and how will the part be brought to the blast cabinet or room?
7. Post-process part handling-where will the parts go next and how will they get there? Will the same operator who services the blast cabinet be responsible for parts' transport? How will this affect production rate?
8. The production line-how will the blast cabinet fit into the existing workflow. Is there sufficient space for one or more operators to work in the area? Will their movements be efficient? Wasted movement costs money in indirect labor.
9. Skill level of the operator(s)-will they be capable of working with PLCs (programmable-logic controllers) or should the equipment be equipped with manual pushbuttons?
10. Budget as it relates to current and future production requirements-it's wise to try to anticipate changes to production requirements in the near and medium term. A rule of thumb might be to build into the project an increase of 10% to 20%. Sometimes, that is not possible, of course. But the issue should be carefully considered.

The second list involves the process, the technical considerations surrounding the blasting or shot peening, including:

1. Recognizing the need to learn about shot peening and understanding the meaning of intensity, saturation, and coverage.
2. Reading and understanding the applicable specification as well as the requirements shown "on the print" for the part to be processed. For shot peening, there are specific documents that govern all aspects of processing a particular part.

3. Carefully reviewing the geometry of the part that will dictate how the blasting or peening will be done. The shape and size and configuration of the parts impact how they are processed. This is one of the reasons that sample processing in my lab is so important. Each part has specific process differences. Some parts have small holes that require pressure blasting with a side-angle lance.
4. Designing and fabricating the part holding fixtures for easy part placement and removal—I the fixturing can impact production rate.
5. Is masking necessary? Depending upon the desired blasting or peening coverage, designing, and fabricating appropriate masking is critical to ensure that the integrity of the part is maintained and covered as necessary and the area to be blasted is properly exposed.
6. Selecting the type and size of the blast media. Here again, sample processing is critical to making the proper choice. Lab tests and understanding the environmental considerations that impact media selection would be done during sample processing.
7. Is media classification required? In shot peening, keeping a good working mix of media requires classification equipment that will dispose of over-sized or under-sized particles and produce a mix that will ensure process consistency. Separation equipment can also discard unwanted out-of-round or broken media.
8. Controlling the process and ensuring repeatability—will the process require computer controls to meet the relevant specifications?
9. Achieving desired peening intensity—deciding whether suction or pressure blasting will produce good parts—here again, careful testing and sample processing will dictate how a part needs to be processed.
10. Establishing required recordkeeping procedures. Attention to detail is critical in shot peening operations. Specifications frequently dictate the scope and methods to be put into place to satisfy the end user of the parts, which may go into aircraft engines, automobiles, spacecraft, or other equipment that depend on proper procedure to ensure public safety.

In summary, if we've learned anything over the years, it is that the human animal detests filling out forms. Unfortunately, this distaste for procedure represents perhaps the greatest obstacle to ensuring a successful outcome.

The two lists we've offered are intended to encourage the free flow of information between the customer and the equipment supplier. Each bit of information represents a springboard for development of a comprehensive plan to design and deliver equipment that will achieve the customer's objectives and expectations. Communication is key. Documentation is extremely useful both for the customer and the supplier as, on occasion, personnel changes occur during the procurement process. A seamless transition is possible only when everything is spelled out and documented as the project moves forward. Documentation is useful for design reference and for being the brains that recollect an agreement to certain stipulations. It provides insurance and peace of mind...a small effort for a large pay out. Certainly, every investment in new equipment demands a measurable payback. Careful planning, good communication, and diligent documentation are keys to a successful outcome. ■