# Shot peening basics for the operator

by Ron Wright

Over the years many articles and discussions have centered on the merits of controlled shot peening. Some of these discussions refer to the continuing progress being made on understanding the metallurgy at the surface of the part and in the sub-layer. As the technology available to analyze the results of our peening effort evolves, we tend to focus on factors such as microstructure, X-Ray diffraction, shot shape, shot hardness, part distortion and stress analysis to name a few.

All of the above are very significant and necessary studies, but what about the novice shot peener or the company that may have recently obtained its first shot peening machine? Highly technical discussions can be confusing and intimidating for those who have just entered the field of shot peening.

The truth is that the new peening machine operator does not need to understand the subtleties of metallurgy and microstructure. Over time, this type of information will become an integral part of learning. Such discussions will be of paramount importance in an operator's quest to become an accomplished shot peener, no matter what type of equipment is used.

For the novice, a good foundation will follow a methodical, common sense approach to the task. The key point at this stage is for the student to understand the relationship between the equipment and the outcome of the peening cycle.

**Wheel Speed/Air Pressure = Shot Velocity = INTENSITY**
**Shot Flow x Time = COVERAGE**

Grasping the relationships between these elements will enable the operator to predict the outcome of each cycle accurately and reduce set-up time. This is also critical when a different INTENSITY or COVERAGE is required warranting adjustments to the technique.

With this fundamental understanding, an operator can follow a basic procedure for developing a shot peening cycle, involving these four steps.

1. Establish velocity required to reach the target INTENSITY by adjusting wheel speed or air pressure.
2. Find optimal Shot Flow rate corresponding to wheel speed/air pressure required in Step 1.
3. Develop saturation curve and set intensity.
4. Determine time required to achieve 98%-100% coverage on part.
5. Expose parts to shot stream to achieve % coverage requested (100%, 150%, etc.)

Once an operator understands this procedure and becomes familiar with the reaction of the Almen strips when the machine parameters are adjusted, he/she feels empowered. At this point, the operator is well on the way to understanding the technology of peening and the relevance of the more in-depth analyses.

Discussions on the mechanics, analysis, and development of shot peening techniques will hold an entirely different meaning to the newly informed technician. It is only now that we can go forward to explore and understand the numerous facets of the constantly expanding techniques of Shot Peening. ●

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