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# Dual Peening

**DUAL PEENING** is used to further enhance the performance of traditional shot peening. Whereas traditional shot peening uses one shot media at a specified intensity range, dual peening adds a secondary shot peening operation. The second peening operation usually uses a smaller diameter media that is peened at a lower intensity than the first peening operation. When the secondary peening is performed, the smaller media is able to pound the high points from the first shot peen into the surface. This has the effect of driving additional residual compressive stress at the outer surface.

Figure 1 shows a magnified view of a single peen using 230H shot media.

Figure 2 shows the same magnification of a dual peen of the same surface. The original 230H shot peening operation has been followed by a 110H shot peening operation. This surface shows a better surface finish as a result of the peaks from the 230H shot peening being pounded in the surface.

Figure 3 shows the effect of greater residual compressive stress at the surface of a carburized gear from the dual peen (solid line).

Since almost all fatigue cracks initiate at a component's surface, the residual compressive stress in the near-surface region (up to 0.002" depth) is very important. Readers of *The Shot Peener* magazine are aware that applications that operate in higher cycle (lower stress) fatigue regimes respond better to shot peening. Therefore, if a single peen operation moves the component into a higher cycle fatigue regime, the second peen is able to further expand the benefits of first peen.

There are two common reasons to dual peen. In some industries, such as Formula One or NASCAR racing and medical implant manufacturing, it is common to 'pay up' for performance. Therefore, design engineers in these industries will often ask for the best peening process with less concern about cost.

The second reason is increased performance demands to existing parts. It is not unusual for either loads to be increased or life requirements to be lengthened. When the fatigue performance demands outgrow the initial peening requirements, it is likely that the lowest cost improvement to the part is to add a dual peen to the part in the assembly that fails (providing that it is already shot peened). For example, an engine manufacturer had recently uprated the horsepower output going to the transmission. Accelerated engine load testing was failing on a carburized and shot peened transmission gear at 19 hours of testing. The design engineers required 50 hours of testing to validate the engine and transmission for release. By changing the original shot

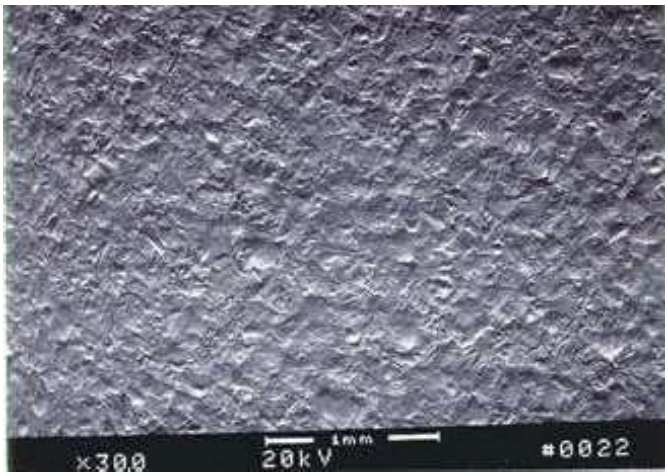


*Figure 1. Single peen using 230H shot media*

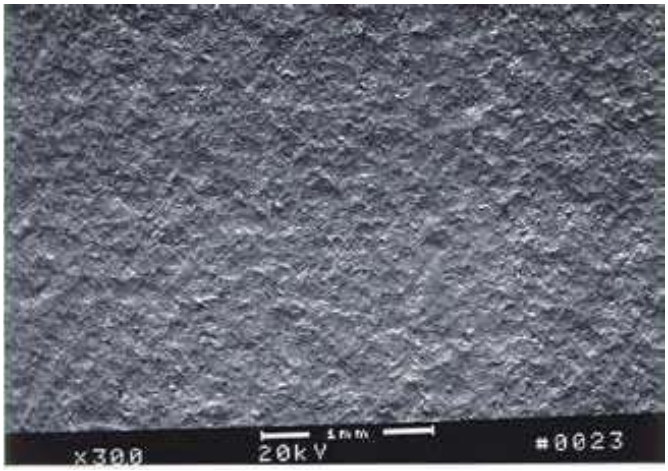


*Figure 2. Dual peen using 230 H media, followed by 110H peen*

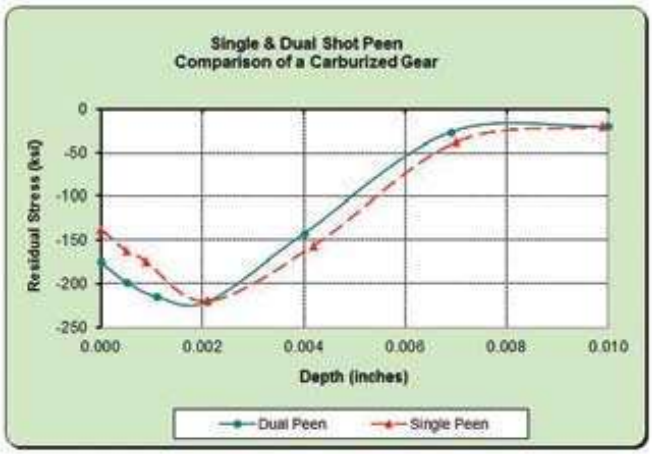


*Figure 3. Single and Dual Shot Peen Comparison of a Carburized Gear*

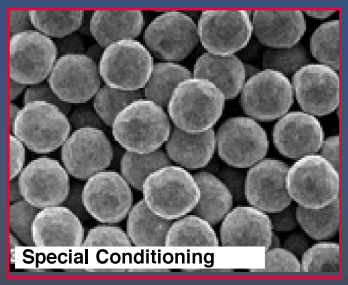
# Premier Shot
# A cut above

## The advantages of Premier Cut Wire Shot

- **Highest Durability -** Due to its wrought internal structure with almost no internal defects (cracks, porosity, shrinkage, etc.) the durability of Premier Cut Wire Shot can be many times that of other commonly used peening media.
- **Improved Consistency -** Highest consistency from particle to particle in size, shape, hardness and density compared to commonly used metallic media.
- **Highest Resistance to Fracture -** Cut Wire Shot media tends to wear down and become smaller in size rather than fracture into sharp-edge broken particles which may cause damage to the surface of the part being peened.
- **Lower Dust Generation -** Highest durability equals lowest dust levels.
- **Lower Surface Contamination -** Cut Wire Shot doesn't have an Iron Oxide coating or leave Iron Oxide residue - parts are cleaner and brighter.
- **Improved Part Life -** Parts exhibit higher and more consistent life than those peened with equivalent size and hardness cast steel shot.
- **Substantial Cost Savings -** The increase in useful life of Premier Cut Wire Shot results in savings in media consumption and reclamation, dust removal and containment, surface contamination and equipment maintenance.


As-cut


Normal Conditioning


Special Conditioning

PREMIER SHOT COMPANY

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