



## The Parting Shot Jack Champaigne

### In with the New...

Gears. That's what makes the world go 'round. And, in many cases, without shot peening these gears wouldn't be around for very long. Peening will increase the fatigue strength and extend the fatigue life of gears while allowing a significant reduction in their weight. So, what prevents more people from peening gears? Our two nemesis: Ignorance and apathy. There are people that don't know about peening benefits and people that don't care about peening benefits. The fear is that it's either a dirty and messy process or a process not well understood and then we hear "I don't want to be blamed if something goes wrong." Despite these fears, gear peening does have a very long history. Consider the following quotation:

"When a pair of gears is required to operate at high loads or high speeds or both, particularly where weight and size are at a premium, it becomes important to consider shot peening in the design. The greater the required horsepower per pound of transmission equipment, the more vital becomes the design of the gears called upon to do the job. Shot Peening: In gears which are intended to carry high stresses, a pronounced increase in fatigue strength can be obtained by shot peening the teeth. Effectiveness of shot peening in overcoming fatigue failures in a given design of a machine part is well known. But its advantages in designing for greater fatigue strength and greater utilization of material are often overlooked. The increase in allowable stress for a given fatigue life requirement will vary with that life requirement. That is, the greater the required life, the greater will be the benefit derived from shot peening."

This was written in:

1927  
1951  
1968  
1982

Find the answer at the end of the article. Did you notice that even though the information is relevant today, this article wasn't written in the 21st century? If any of our readers are researching the shot peening of gears and would like to share it with our readers, please contact me at [jack.champaigne@shotpeener.com](mailto:jack.champaigne@shotpeener.com).

What is being done today to employ technology to combat fatigue and reduce weight? In the fuel-efficient car by Honda, a new technique to reduce friction has been applied to the pistons:

"The lightweight aluminum alloy pistons have a minimal skirt area and the surface of the skirt has been shot-peened. Shot-peening produces a special 'micro dimple' surface which improves the retention of the oil film between the piston and the cylinder reducing friction by approximately 30 per cent."

In the muscle-car category, the Ford GT designers applied shot peening to connecting rods, a long-standing practice in the NASCAR circuit.

"The resulting power output is 500 horsepower and 500 foot-pounds of torque. To bear the stresses necessary to produce 500 horsepower, a forged-steel crankshaft, shotpeened H-beam connecting rods and forged aluminum pistons are used."

These are just two good examples of how shot peening technology can lead to better products. During WWII, with many material shortages, we had to rely upon shot peening to attain higher performance objectives. Today we can turn to this technology to attain better quality (and lower cost) products.

Before Thanksgiving, Dave Eggleston, an Electronics Inc. Senior Application Engineer, visited DAEWON SPRING in Changwon, Korea. They have two four-wheel Leaf Spring Peeners that they designed themselves. One has been upgraded and has VLP-24 MagnaValves and AC-24 controllers. The second machine will be upgraded this year and a new, more powerful machine is being designed. Dave toured their facility and saw numerous potential applications for MagnaValves plus a four-wheel coil spring peener already upgraded with MagnaValves.

The exceptional thing about DAEWON SPRING is that they not only produce a large array of coil, leaf and torsion springs, but also design and manufacture the machines that make the springs as well. Other spring makers buy production and testing equipment from DAEWON. This gives DAEWON (along with their own affiliated steel companies) and their worldwide distribution, a unique advantage.

We want to give a special thanks to the exhibitors at our annual workshop in Dearborn. The Wheelabrator and Engineered Abrasives hospitality nights and the GMA plant tour were especially well-attended. These events provided an opportunity to meet with peers and exchange ideas. We are already looking forward to our 2005 workshop in Dallas, Texas.

And finally, abstracts have been submitted for ICSP9. For a complete listing of the papers, visit [icsp9.iitt.com](http://icsp9.iitt.com). The topics include:

- Technological Aspects
- Processes
- Surface Characteristics and Stability
- Modeling and Simulation
- Fracture and Fatigue Properties

We encourage you to make plans to attend ICSP9. The co-hosts, Volker Schulze, Universitat Karlsruhe, and A. Niku-Lari, IITT-International, are doing an outstanding job of organizing this event. You will be exposed to new concepts and research by innovators in industry and academics. See you in Paris.

Answer: 1951 "Shot Peening as a Factor in the Design of Gears by J.C. Straub. Available from the [www.shotpeener.com](http://www.shotpeener.com) library - article #1951005.