



# Shot Peening Adds Strength and Durability

**Peening Technologies Equipment transforms metal into reliable parts.**

Those who work with metal have known for millennia that hammering the material strengthens it. Even Bronze Age blacksmiths bolstered armor, swords, and tools by forging and pre-stressing the metal with blows from a hammer.

Thousands of years later, technology has advanced to shot peening, a technique in which metal is bombarded with millions of tiny steel balls from a small nozzle at high velocity, creating microscopic dents, or dimples, in the surfaces of metal parts.

While it sounds counterintuitive, shot peening actually makes the material more durable because the dimples convert tensile stresses, which may compromise metal integrity, into compressive stresses that hold the material together. Nearly all fatigue and stress corrosion failures start at the surface of a part, but cracks will not begin or spread in a compressively stressed zone. Because the overlapping dents from shot peening produce a uniform layer of compressive stress at metal surfaces, shot peening imparts substantial increases in the life of a part.

This increased life is especially important when it comes to mission-critical aerospace components like engine blades. “Virtually every piece of a jet engine that moves is shot peened,” explains Tom Beach, president of Connecticut-based Peening Technologies Equipment, whose computer-controlled equipment helps transform metal into reliable airplane parts. Beach says that compared with the cost of aerospace parts, shot peening is a fairly inexpensive process.

For Peening Technologies, part of that cost savings comes from the system designed with the assistance of Axis New England, their local Parker distributor. “We wanted to create a multi-axis and scalable shot peening machine that had a simple HMI interface but still offered sophisticated motion control,” says Beach. The machine they created includes BE servo motors, MPP/MPJ servo motors, PX gearboxes, Aries servo drives, ACR controllers, 6K controllers, and associated accessories, which provide up to seven axes of motion. (For now, the HMI is a custom solution Beach designed, though they have plans to upgrade to Parker’s InteractX.) “The automation we’re using is robotic, and we can jump from one complex part to the next by simply loading a program. It’s a huge time-saver for us in terms of older-style machines that might have had a single axis and maybe multiple nozzles. We typically have a multi-axis robot with a



The peening machine offers a simple HMI interface and seven axes of motion.

single nozzle. The time-saving is tremendous. Years ago, if someone had 20 parts for you to do, you'd get all 20 parts at once and you could set up and run 'em. Now, with the way material flows, we get one or two at a time, so the set-ups were killing us. Now we just load a new program and we're ready to run. It's not a very labor-intensive set-up process."

Beach is quick to credit Christian Gervin from Axis New England. "He has always been very helpful in terms of spec'ing out components and making recommendations when we're trying to do something. Christian and Axis are a great source for bouncing ideas off of."

The result has been a machine that allows for a shortened development cycle—and very happy end-users. "The best feedback is there's not a lot of feedback," says Beach. "There's nothing to complain about. Our customers have been very happy with this very reliable machine."

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