

KEYS TO VICTORY: INNOVATIVE DESIGN AND ADVANCED MANUFACTURING EQUALS PRODUCT LEADERSHIP FOR DEFENSE MANUFACTURER



Wilcox Associates CEO James W. Teetzel and one of his two-tier Palletech Manufacturing Cells.

An operator adjusts a tombstone out of one of Wilcox Associates' Palletech systems.

A chassis part for a Power Grip, machined on a Mazak PFH 4800 horizontal machining center.



You're a soldier on night patrol and you spot what you think are enemy combatants over the next hill. You're a police officer with weapon drawn ready to break down a door. Or you're a firefighter entering a burning chemical plant. How important is it having the best and most reliable equipment at your disposal?

Wilcox Industries Corp. (Newington, New Hampshire) answers this question every day. Visit the company's lobby and you'll see wall-length murals of soldiers or law-enforcement personnel with company products in use. Go any further and you'll have to be escorted by a staff member. Wilcox describes its products as "combat-proven," and their customers' lives have come to depend on their performance. Wilcox manufactures weapon laser designators, weapon optic mounts, trajectory sights, friend/foe systems, hybrid life-support systems, and numerous custom products for the U.S. military and state and local law-enforcement agencies. It supplies these and other products under contract with the U.S. military, federal, and local governmental agencies.

"Very diversified within a very specialized niche" is how Wilcox CEO James W. Teetzel describes his company. With such highly specialized, low-volume products, Teetzel's company manufactures the vast majority of its own components. (One hybrid life-support system, a scuba-like breathing apparatus for working in hazardous breathing environ-

ments, can have as many as 90 different fittings.) Staying on top of production and deliveries is critical for the growing company.

"Every manufacturer has a different problem, mine is capacity," he says. "Resolving capacity problems isn't simply a question of manufacturing methodology, it affects every aspect of our business. Throughput affects just-in-time responsiveness. Reducing setup time increases production run time. Kitting possibilities affect inventory considerations. Everyone in business has to justify their reasons for making the investments they make."

Started in Aerospace

Teetzel began his manufacturing career in 1982 starting up and running a job shop. "I was 22 years old, specializing in aerospace and medical parts," he says. The company was known as UITC Aerospace, which stood for United Industrial Technologies Corp. By the early '90s, Teetzel was facing two pressing concerns: his main customer was demanding mandatory cost reductions while at the same time his bank was being taken over by the Federal Deposit Insurance Corporation. "We needed to diversify," he says succinctly.

A shooting sports enthusiast, Teetzel purchased what he called an inferior laser sight for one of his handguns and determined

he could produce a better one. His subsequent design for an integrated laser sight for a handgun made the cover of Guns & Ammo magazine. The U.S. Navy saw the article, and in Teetzel's words, "one thing led to another."

By 1993, Teetzel was operating two companies: UITC Aerospace and UITC Armaments. By 1997, he decided to pursue the armaments components business full time and Wilcox (the W in James W. Teetzel) Industries was born.

Investing in Technology

With an engineering education and a machine shop background, Teetzel keeps a close eye on developments in machine tool and processing technology. He first began purchasing Mazak machines in 1982, and although he explored combining processes with a mill-turn machine in 1988, he initially shied away from multi-tasking machining centers like Mazak's Integrex as being too complicated to set up for small runs.

But as Mazak steadily added improvements, including more powerful and compact motors, higher indexing and positioning accuracy, and increased production flexibility with a lower turret, the Integrex became a high-variety workpiece production machine.

He now runs two multi-tasking machines: the Integrex 100-III and Integrex 200-IIIS, both equipped with quick-load bar feeders for

unattended operation. The Integrex 100-III has a 6-inch chuck, 2-inch bar capacity and parts catcher, while the Integrex 200-IIIS is sized for 2.5-inch bar capacity with two 8-inch chucks for the first and second spindles. Both Integrex models are equipped with 40-tool magazines and a 12,000-rpm milling spindle.

Always interested in pursuing production flexibility further, Teetzel also was aware of another New England-area manufacturer, Little Enterprises (Ipswich, MA) that realized dramatic growth and success with Mazak's Pallettech Manufacturing Cells. Little uses Mazak horizontal machining centers together with the Pallettech automated system for prototype and volume runs for the semiconductor business. Little maximized spindle up-time on each of his horizontal machining centers by setting up parts on offline pallets on the Pallettech system. Furthermore, he could keep production running unattended.

"What really made me go in this direction was Scott Little and his experience at Little Enterprises," Teetzel says. "Many people would initially look at Pallettech systems and consider them expensive and complicated. But in reality, with a Pallettech you're buying real estate. With a two-tier pallet system, we've saved more than 500 hours of setup time, and we can shelf, archive, and retrieve jobs virtually automatically."

Flexibility and Economy

Now Teetzel, a highly diversified manufacturer of specialty products, runs not one but two Pallettech systems, with a third on order. One consists of two Mazak PFH-4800 horizontal machining centers integrated with a two-level pallet-stocking system with 52 pallets and two load/unload stations. The second consists of three PFH-4800 horizontal machining centers with a 72-pallet, two-level Pallettech system with two load/unload stations. "We have complete kits on the Pallettech systems," Teetzel says. "Conventional machine shops like we used to be have to constantly amortize setup costs. With our Pallettechs, when you've paid for an initial setup, it no longer becomes price-sensitive. In addition, our Pallettech systems give us inventory contingency, so we can remove setup and inventory considerations from our equations. We gain a tremendous amount of flexibility."

For example, Wilcox Industries manufactures

parts for its Power Grip MAD (multi-aiming device) on the Mazak PFH-4800 horizontal machining center in the Pallettech system. Dan Desrosiers, Wilcox vice president of manufacturing, describes the manufacturing process for a particular chassis part. "As a first operation, stock is cut and 12 pieces are loaded on each tombstone," he says. "We then rough-mill the top and length, and rough-contour the pin slot and pockets. To finish the operation, we drill, countersink, and tap four holes. In a second operation, 12 pieces are loaded on each tombstone. We then rough-mill weight-reduction pockets, and drill, countersink, and tap three holes."

Process time for these operations totals 26 minutes per part on the PFH-4800 horizontal machining center. "This process saves us 24 minutes per piece (or 4 hours and 48 minutes per tombstone), and all parts are retrievable from the Pallettech," Desrosiers says. "A further savings of 5.5 hours is achieved per run after the second lot run because machine setup is no longer required. In addition, this process has allowed us to add an unmanned third shift to our operation, allowing us to increase overall manufacturing capacity by 50%."

People are another factor. "Setup people are key to a machine shop's success, but hard to come by," says Jim Teetzel. "We want to maximize the skills of the people we have. By virtue of having jobs set up in advance, we maximize our people's time and talents and service the customer more efficiently."

In addition, Teetzel's shop completes part production with Mazak Nexus vertical machining centers and Nexus Quick Turn CNC turning centers. Teetzel sees Mazak as a close partner not only in his company's growth, but also in growing a culture of world-class manufacturing. By design, Wilcox Industries is continually moving forward in production innovation. "After all," Teetzel says with a smile, "where would I be had I put everything in Warner & Swasey?"

The Power Grip: Laser Light From a Vertical Handle *(sidebar)*

The high-quality electronic targeting devices Wilcox Industries supplies for firearms are so cutting-edge that following Sept. 11, 2001, CEO James W. Teetzel decided to stop selling certain Wilcox products on the open market where they could end up in the wrong hands.

The Power Grip Multi-Aiming Device is one of those products, available only to military or law-enforcement agencies. The Power Grip is a vertical forend grip for a combat rifle that



From top: An Integrex 200-IIIS at Wilcox is set up with a bar feeder for unattended operation.

A bank of Nexus vertical machining centers supplements part production at Wilcox Industries.

Completed Power Grips ready for shipping.

combines a visible laser system, a Surefire Xenon flashlight, and an infrared illuminator with internal electronics that allow the operator to choose between the three.

Non-integrated lights can be bulky, require multiple system components and batteries, and have external wiring and tethers. The Power Grip's design included input from the Navy and has a modular chassis that eliminates the need for external wires and multiple pressure pads found in non-integrated systems.

There are seven different settings:

- infrared laser, an invisible dot calibrated to point-of-aim, visible only to night-vision devices (NVD).
- infrared illuminator, an infrared flashlight, also seen only with NVDs.
- combined infrared laser and infrared illuminator
- visible laser, calibrated to point-of-aim
- visible flashlight rated at 125 lumens radiated by a Xenon bulb
- combined visible laser and visible flashlight
- off

A separate selector switch gives the option of dialing both lasers to either training mode, where the lasers are eye-safe, or the higher-intensity combat mode. Additionally each laser mode has eight patented user-selectable blink rates, a feature that grew out of feedback Teetzel received from military users. They said in close-quarters combat, it's difficult to tell whose dot is whose. Now users can set a blink rate from 1/16th of a second up to full-on. Not only does an operator or team know which dots are theirs, blinking dots are often easier to pick up visually. Such a feature also allows the operator to communicate, day or night.

A master "on" button for the flashlight is located just behind the housing, easy to find in the dark. If circumstances required it, the blinding flash of white light could be a weapon in itself.

If the fully integrated Power Grip system is not desired, the four basic components: laser module, grip module (available in right-handed and left-handed versions), flashlight module, and floating rail module can be purchased and configured separately.

Wilcox Industries Corp. publicity photos exhibiting Power Grip system in use for military applications.

