

Featured Company: US Army - Watervliet Arsenal

Meta-Lax Helps Military Stay on Target

The **Watervliet Arsenal** in New York state produces nearly all of the gun barrels for large caliber weapons used by the U.S. Military, including mortars, field and tank cannons as well as the giant 16-inch guns of battleships. The barrels are forged straight cylinders which are bored on the inside and turned on the outside. But during the heat treat metal hardening process, residual stress develops in the metal and the barrels become distorted and are no longer straight. For one weapon, the 120 mm smooth-bore mortar, the facility was forced to scrap over 50 percent of the barrels due to this distortion problem.

In an effort to correct this recurrent warping problem, the Arsenal tried various forms of stress relief including thermal stress relief. But according to Tim O'Connor, a mechanical engineering technician for Benet Laboratories at Watervliet, "Nothing really worked consistently. And thermal stress relief at best was only a hit and miss process. Sometimes it seemed to work but most of the time it didn't."

It was Tim O'Connor who brought Meta-Lax to the attention of Watervliet Arsenal in 1991. "I came across an article about Meta-Lax in a metalworking trade publication and thought it might be a solution to the distortion and scrap problem we were having with the 120mm mortars," said O'Connor. "I called Bonal Technologies to get more information about the Meta-Lax process and learned to my surprise that we already had an older Model 2200 unit at the arsenal. However, I discovered that because of an earlier poor experience with a competing vibratory system, the Bonal unit was not used.

"After some searching I found the unit sitting idle in a corner. So I enrolled in one of Bonal's regularly scheduled training classes. The training was excellent - both on the scientific level and on



Reduced scrape rate from 50% to 0.

the everyday level. The staff explained not only how the equipment works but also gave clear explanation of why it works."

Under O'Connor's guidance, the arsenal first used its existing Meta-Lax unit to stress relieve the 120mm mortar barrels. "The results were astounding," said O'Connor. **"We saw our scrap rate go from 50 percent to 0 and stay there.** What's even more amazing is that we were able to accomplish this feat at a fraction of the cost and time required for thermal stress relief. **We achieved a \$230,000 annual savings in energy costs for that one weapons system alone.**

And we've cut time required for the stress relief process from several hours in a furnace to 30 minutes on a Meta-Lax table."

The Arsenal now has been using Meta-Lax daily for nearly four years. And according to O'Connor, "Meta-Lax

has performed flawlessly. It's worked so well that we've purchased two of the computerized Meta-Lax units, written Meta-Lax into our production process plans and expanded its application. In addition to the 120mm mortar, we now use Meta-Lax to stress relieve the barrels of the 90mm mortar and the breach rings on the 105mm Howitzer.

"We're currently looking at the feasibility of also using Meta-Lax on our larger guns," O'Connor added. "The barrels on these guns average anywhere from 12-to-20 feet in length and have to be hydraulically pressed straight when they become warped during the manufacturing and heat treat process. This pressing process is very time consuming and has to be repeated every time metal is worked on the barrel. If we can develop a method for Meta-Laxing these barrels, then we could save a lot of time and money."

The Arsenal has also used Meta-Lax for weld conditioning on the base plates for mortars. "We were having a problem with welds on the base plate cracking," said O'Connor. "We were finding anywhere from 40-to-50 indications on each base plate which required re-welding. But by using Meta-Lax to condition these welds, we've reduced the number of indications to 2 or 3 on a really bad day."

In today's business battleground, the quality of a company's tool and products need to match its aim if it's going to hit its target. While Meta-Lax is helping the military reach its target, this same technology can also help your company achieve its profit objectives.

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