SEPTEMBER - 19 - 2022
ISSN 2644-2493

MANUFACTURING TECHNOLOGY INSIGHTS

manufacturingtechnologyinsights.com

METAL WORKING AND MACHINE TOOLS
EDITION

THOMAS E HEBEL,
PRESIDENT

BONAL TECHNOLOGIES

THE NEW ERA OF METAL STRESS RELIEF

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ISSN 2644-2493
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MANUFACTURING TECHNOLOGY INSIGHTS TOP 10 METAL WORKING COMPANIES - 2022

BONAL TECHNOLOGIES

THE NEW ERA OF METAL STRESS RELIEF

BY LAURA DAVIS

Thermal Stress Relief is one of the oldest and most conventional methods for relieving internal stress in metals. However, heating metals above 600 degrees centigrade can lead to distortion, surface oxidation and other contamination. Thermal stress relief is also notorious for degrading material strength.

Technology has caught up, and Vibrational Stress Relief has emerged as a viable alternative.

Historically, vibrational stress relief had not been a great option due to its inconsistency. But now, Bonal Technologies has developed a vibrational stress relief process that is as good as or better than heat treat stress relief on a consistent basis.

Their novel vibrational stress relief-based solution, Meta-Lax—which stands for metal relaxation—is more effective than thermal stress relief and can verify when the metal part has reached its stress-relieved state. As a result, Meta-Lax consistently assures effective results.

With Meta-Lax, Bonal has become manufacturers' go-to partner for stress relief solutions in two important areas:

- Helping manufacturers improve the quality of the product.
- Reducing the time and cost of stress relieving while maintaining product quality.

Meta-Lax—The Future of Metal Stress Relief

Bonal's competent engineers realize that consistency is the biggest concern regarding vibratory stress relief processes. They discovered the two key principles to address this issue and achieve superior stress relief.

> **With the ability to solve many of the metalworking industry's distortion and cracking problems, I believe the use of Meta-Lax technology is the avenue to make that goal a reality**

THOMAS E HEBEL,
PRESIDENT

"Our solution first, uses sub-harmonic vibrational energy during the stress relief dwell time and second, ensures complete stress relief by verifying that the harmonic curve of a stressed part shifts and eventually repeats at a new frequency location," explains Thomas E Hebel, President, Bonal Technologies.

Bonal has perfected the Meta-Lax process over the years by conducting comprehensive research and developing the equipment to apply it more efficiently. Meta-Lax today ensures complete stress relief of low and medium strength metals and, with minor adjustments to its standard approach, stress relieves high-strength and exotic metals—HY-80 and HY-100 steel, stainless steel, high-strength aluminum, tungsten carbide, titanium, and Inconel. It can also work on hardened materials without altering the hardness.

The sub-harmonic vibrations used in Meta-Lax are so mild that they can be used during welding, eliminating the need for post-weld stress relief. This application of the process also results in excellent weld distortion control and minimizes the susceptibility of the welds to cracking without a separate post weld stress relief treatment. Bonal's development has yielded three separate product lines and three levels of sophistication for the Meta-Lax control consoles– manual, semi-automatic, and computerized.

More than Just Tech, a Whole New World of Metal Stress Relief

In addition to producing their most excellent Meta-Lax solution, Bonal also provides a highly specialized consulting and program design service to advise clients on achieving the full power of Meta-Lax processing. It also provides Meta-Lax training via a one-day classroom training session conducted at Bonal's facilities in the Detroit area.

During this training, Bonal conducts a technical discussion about the concept of stress relief, its importance in producing high precision parts, and the common denominator between all stress relieving processes. Bonal then presents an overview of Meta-Lax technology, along with the similarities and differences compared to heat treat stress relief.

From an engineering perspective, Bonal also discusses with their clients how Meta-Lax can treat various

shapes of parts, the changes needed when treating different metals, reasonable expectations, good and poor applications, and the best times to use Meta-Lax processing for various kinds of applications and desired results. After learning the technical intricacies of Meta-Lax, trainees apply this knowledge to actual stress relieving, with a focus on step-by-step operation. Client trainees will use the same Meta-Lax system as they would at their plant, giving them the confidence to apply Meta-Lax processing in a way that surpasses the scope of an instruction manual.

Occasionally, customers want a Bonal trainer to come to their plant to help them become accustomed to the Meta-Lax equipment. This request is common, especially for companies working on extremely unique or expensive parts. Experts from Bonal work very closely with their clients throughout the training process, enabling them to fully utilize Meta-Lax.

A Revolution in Engineering, Etched in Metal

To up the ante in the stress relief equipment and technology space, Bonal has plans to market a computerized control console with the ability to operate two force inducers at the same time. With a second force inducer, customers will double their stress relief capacity without the need for a second console. A single operator will be able to stress relieve two different parts at the same time. Bonal has a concept design for an all-new force inducer that will make it even easier to use, particularly when welding.

Looking back at the history of stress relief, Bonal acknowledges how thermal stress relief has been the industry standard for over a century. But with the addition of Meta-Lax stress relief as an acceptable alternative, the metalworking industry finally has a practical choice in how it can stress relieve parts.

Many progressive heat-treaters already have Meta-Lax equipment and use it to complement their existing heat treat services with this non-thermal stress relief equipment.

With Meta-Lax, companies will be able to improve product quality with this new ability to stress relieve in at least 15 areas that were impossible or impractical before. Some of these areas include having the ability to stress relieve without size or weight limitations, on-site, semi-finished, finished, assembled parts, hardened material, stationary parts, non-ferrous and exotic metals, while-you-wait service, tubular, quality assurance inspection of incoming or outgoing material, and during welding to prevent most weld related problems.

Our solution first, uses sub-harmonic vibrational energy during the stress relief dwell time and second, ensures complete stress relief by verifying that the harmonic curve of a stressed part shifts and eventually repeats at a new frequency location

"I have a personal goal of elevating the entire metalworking industry, not just a few thousand companies. With the ability to solve many of the metalworking industry's distortion and cracking problems, I believe the use of Meta-Lax technology is the avenue to make that goal a reality," says Hebel.

Needless to say, the metalworking industry has an extremely effective solution to their distortion and cracking challenges. Meta-Lax stress relief is already helping thousands of companies produce higher quality products at less cost and in less time. By using a system that runs on the same electricity as a coffee pot, Bonal's customers will quickly recoup their investment and make great advancements on sustainability goals.

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