

Featured Company: Lufer Industria Mecanica SA

Meta-Lax for stress relief reduces costs by more than 90 percent and stress relieving time by 97.5 percent in Lufer Industria's manufacturing process

Lufer Industria Mecanica SA, a Brazilian company located in Sao Jose dos Pinhais in the state of Parana, has more than 30 years of experience specializing in reconditioning of large parts for customers using heavy recovery and material handling equipment.

The company is currently one of the largest and most respected manufacturers in the world for spare parts for heavy material handling equipment with a product mix of more than 8,000 items and an industrial facility of 9,500 square meters.

Lufer stocks heavy duty replacement parts for Caterpillar, Komatsu, Volvo, Liebherr, FiatAllis, New Holland, Case, Le Tourneau, Atlas Copco, Timberjack, Cummins and others.

As an important aspect of their business Lufer provides stress relief services for large size parts with their own furnace being 4500mm x 1200mm x 800 mm. The company has used its thermal stress relief furnace since they started in 1975.

Challenge

To be cost effective and use its time more wisely, Lufer felt they needed to consider a new direction for stress relief. Lufer's process of thermal stress relieving had a number of shortcomings. The process was very expensive and time consuming since the parts were put in an large industrial oven, heated up until 530° C (1000 F) and then slowly cooled, using more than 100 kW of power per hour.



Lufer used Meta-Lax to stress relieve a bulldozer table, Hyundai model R210-LC made of material ASTM-A36 and weighing 13,600 kgs. (30,000 lbs.). After stress relieving with Meta-Lax, which took less than one hour, the table was ready to install in the bulldozer without any waiting for thermal treatment or cooling of the part after thermal processing.

The parts also needed to be put into the furnace using a crane, which required extra handling. In addition, after removing from the furnace, the work pieces would still need a long cool down period down to room temperature.

Lufer also lacked a way to measure results. With these and many other issues associated with their current thermal stress relief process, Lufer felt it was time to find a new way to help them overcome these hurdles in this manufacturing process.

(page 1 of 3)

Article was Customer Approved Prior to Initial Publication.

Brazilian Company is reducing stress relief costs by 90 percent

Solution

Lufer received materials about the Meta-Lax system from Bonal Technologies and after reviewing the information, decided to try the Meta-Lax Model 2720-CC computer controlled system equipped with a 2A force inducer. After 30 years of using the same process to provide stress relief, the company was tentative. However, immediately after receiving and using the system in June 2007, the company noticed substantial improvements in the reduction of processing time and the amount of power necessary to run the equipment. In addition, the Meta-Lax system also provided the opportunity to certify stress relief and measure results in time savings, cost savings and in quality improvement.

Results - Time and Cost Savings

With the original thermal method, stress relieving took 20 hours to complete, seven hours in the furnace with an additional 13 hour period to wait for the part to resume room temperature. **Using the Meta-Lax system reduced this time significantly, to 30-60 minutes, at least a 97.5 percent reduction in time.** Reducing time allows for a measurable savings in costs, along with the overall benefit of being able to ship parts to customers more quickly.

For example, Lufer used Meta-Lax to stress relieve a bulldozer table, Hyundai model R210-LC made of material ASTM-A36 and weighing 13,600 kgs. (30,000 lbs.). After stress relieving with Meta-Lax, which took less than one hour, the table was ready to install in the bulldozer without any waiting for thermal treatment or cooling of the part after thermal processing.

“The reduction in cycle time has a direct impact in the cost, however, just as important is the reduction in the cost of power,” said Marco Sampaio, chief engineer. “Before using Meta-Lax, we used 100kW of power per hour for an average part. In terms of financial savings, the **Meta-Lax system has reduced more than 90% Lufer’s costs involved in the stress relieving process,** which is a very significant savings.”

Results - Quality

Lufer is impressed with the quality of Meta-Lax processing for two reasons – quality assurance and quality improvement. First, Lufer likes the fact that the quality of the product can be assured. With the Meta-Lax system the company can now certify the completion of the stress relief treatment and generate a certification report for each project. Second, Lufer is impressed with the quality improvement on the parts that are Meta-Lax treated. For example, the company noticed a considerable reduction in the warpage of ASTM A36 and SAE 1524 side plates weighing 2,000 kg. (4,000 lbs.) that they machined which meant that there was less distortion in the completed 980H Frame that the side plates went in.



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“The big benefit for us is the reduction in the distortion with this particular part,” said Sampaio. “Also important to us is that we don’t have to wait for the part to cool to go on to our next process.”

(page 2 of 3)

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In comparison with the companies' prior thermal stress relief system, the Meta-Lax system allows for much more flexibility in the parts they treat and where they treat them. The equipment is much simpler to use and is portable allowing it to be taken to the job if necessary.

To date, Lufer has offered a Meta-Lax stress relief service to its customers wherever it is most convenient - at Lufer, at the customer's facility, or in the field where the job happens to be. In the near future, Lufer plans to acquire more equipment to use the Meta-Lax system during the welding process as well.

Details

The Meta-Lax process vibrates a workpiece at its sub-harmonic energy level. The sub-harmonic zone is the optimum zone when using vibration for stress relief. All metal structures exhibit harmonic and non-harmonic behavior. A metal component that contains thermal stress displays its harmonic curve as being out of phase from its natural frequency location, much like a musical instrument being out of tune. By applying sub-harmonic vibrational energy, the pockets of high stress concentrations are redistributed, thereby reducing the effects of the residual thermal stress. Graphically, the harmonic curve shifts slightly but stabilizes into its natural frequency as the workpiece becomes relieved of thermal stress. In a sense, the Meta-Lax massages the metal to relieve the stress.

The Meta-Lax system can be used with all types of materials such as low and medium carbon steel, tool steel, aluminum, stainless steel, cast iron (gray, nodular and meehanite) and exotic metals like titanium, inconel, magnesium and gold.

Meta-Lax Weld Conditioning is applying the Meta-Lax stress relief process during welding. Weld conditioning relieves thermal stress as it is being induced during weld solidification. Metallurgically, a finer, more uniform weld grain results. Ductility and impact values are significantly higher, up to 400% and 75% respectively.

Conclusion

"Meta-Lax has made a revolution in our manufacturing process and in part recovery. We can consider that a new age of gains has begun," said Sampaio. "We have already used the Meta-Lax equipment to stress relieve more than 50 different types of parts and the results have been great. The effectiveness that the system provides and the new reporting capability of Meta-Lax increases our competitiveness. It's added a new level of technology at our facility."

Lufer had a return on the investment with the Meta-Lax system within one year.

To learn more about Lufer Industria Mecanica, visit www.lufer.com.br or call +554121113500.

(page 3 of 3)

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