

# Unfailingly flat

## Technology produces flat material by overcoming defects

BY GRETCHEN SALOIS

**W**hen deciding to install a temper mill in your shop, many factors must be considered. It is a large capital investment with significant operations and maintenance considerations.

"You're married to it," says Wes Dias, ELT (Enhanced Leveling Technology) product manager at Herr-Voss Stamco, Callery, Pa. Stretcher levelers do their job stretching material but can fall short in other areas. The company worked with Samuel & Son Co. Ltd., Mississauga, Ontario, to achieve a more elegant solution.

A long, longstanding relationship, Samuel, Son & Co. and Herr-Voss Stamco have worked together in prototyping and experimenting with strand extensioner technology and tension leveling technology for leveling light-gauge carbon steel products in the past. "So there is no surprise we took the opportunity to work with Herr-Voss Stamco on this project," says John Mrkonjic, corporate vice president, engineering at Samuel, Son & Co. "Based on our previous work and experiments we conducted,

and after analyzing our customers' problems, we felt this new technology might be a solution to the problems the industry is facing with material spring back.

"Samuel, Son & Co. takes pride in its efforts to find and develop technology to help improve processes and move the industry forward," Mrkonjic continues. Samuel, Son & Co.'s customers span a number of industries and use carbon steel, aluminum and stainless steel sheet and coil products. It processes and fabricates carbon steel, HSLA steel and stainless steel. The company needed a way to provide its customers with flat sheet that stays flat after secondary processing. Customers require sheet that has no surface marks and is produced in a cost-effective manner. Samuel, Son & Co. cuts 1/8 inch to 1/2 inch thicknesses using the Herr-Voss Stamco line.

A stretcher leveler stretches material but Herr-Voss Stamco and Samuel, Son & Co. found production to be slow. Each time the line indexes 20 feet or 30 feet, the stretcher stops or grips or stretches. "It impedes the tonnage that service centers like to see come off their lines," Dias says.

The stretcher leveler only stretches ma-

terial in the longitudinal direction, therefore, having marginal effect on material deficiencies, such as crossbow, in the transverse direction of the product. "Stretching in the longitudinal direction only cannot completely mitigate that sort of deformity," Dias says, adding with both those technologies, the temper mill and stretcher leveler, there still needs to be corrective leveling work done, whether prior to or after using these techniques. Herr-Voss Stamco feels the end goal of achieving uniform strain or "stay-flat" material for laser cutting and fabrication increasingly will be demanded by the market. To this end, Herr-Voss Stamco has expanded its ELT delivery system capability to include material as thin as 0.060 inches.

When flat material was cut on laser or plasma cutting machines, Samuel, Son & Co.'s customers experienced spring back issues. Although there are technologies available that prevent spring back from occurring, "some of these are very expensive and some have other inherent limitations and drawbacks," Mrkonjic says.

### A new solution

Several years ago, Herr-Voss Stamco began



**Above:** Un-enhanced material processed with traditional leveling.

**Below:** Stay-flat material after going through Herr-Voss Stamco's enhanced leveling process.



developing a process that would address not only the ability to produce stay-flat material but also overcome some of the shortfalls of other processes. Enhanced Leveling Technology creates flat material that stays flat by subjecting it to very severe and uniform bending work. This technique works materials longitudinally and through 100 percent of the material's width. "And by that work, mitigates non-uniform strains in two directions as well as the crossbow defect," Dias says.

Working directly with Samuel, Son & Co., Herr-Voss Stamco focused on how its new technology would help the company with its post-processing, fabrication component of the business. "We started looking beyond corrective leveling and looked at what happens when we really put severe bending into material and from there, we developed this process—working with Samuel, Son & Co.—and installed the final equipment over a year ago," Dias says.

After running hundreds of trials of the material through the process, Herr-Voss Stamco validated this technique to produce material that would stay flat during laser cutting. The company was able to achieve a consistent result with the material, which is very important, according to Dias. "If you have material that has internal strain, when you release that strain, it can deform in various ways, which, depending what they're doing, may shut down the laser," he says. "You'd have to remove the distorted portion and restart the process, which is counter-productive from a cost standpoint."

If the laser head is moving rapidly from one point to another and the material has been deformed, the laser head can be damaged, which is an additional cost to the downtime incurred. If material doesn't stay flat during and after processing, the deformity in the material can have an adverse effect on the next process. A customer might have to use an additional method to

process material to fix the problem, resulting in lost time and additional costs.

**Process in practice**

Once a coil of steel is unwound, goes through the corrective leveling process and is sheared to a specified length, it then goes through the Herr-Voss Stamco ELT process. Typically, if the material gets cut to length and then is cut using a laser or plasma cutting machine without enhanced processing, the material will distort or spring back, losing its flatness.

During the enhanced leveling process, "we are monitoring dozens of parameters, measuring precisely how much energy or work is being put into a piece of material," Dias says. "The operator controls display an active meter that takes into consideration material thickness, width and yield strength, then creates a target that tells the operator if you have achieved the amount of work you need to guarantee the material has uniform strain." After the process, there is no need for additional corrective leveling because that has occurred upstream. "We know that sheet of metal will be a very consistent product and the process is very repeatable," he adds.

Using this control system, operators can record settings used for current jobs and save them for future runs. Past settings can be recalled easily and the software tracks the settings and history of materials. The operator can easily detect any material changes during the enhanced leveling process and can immediately make necessary adjustments.

Installation proved to be an easy transition. "Herr-Voss Stamco worked with our operations team in developing the current database over a period of weeks," Mrkonjic says. "They helped us develop the current database, which today forms starting points for our operators."

From start to finish, Mrkonjic says, "Even though we believed in this technology from the onset of the development stage, the actual results have performed beyond our expectations." ■

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