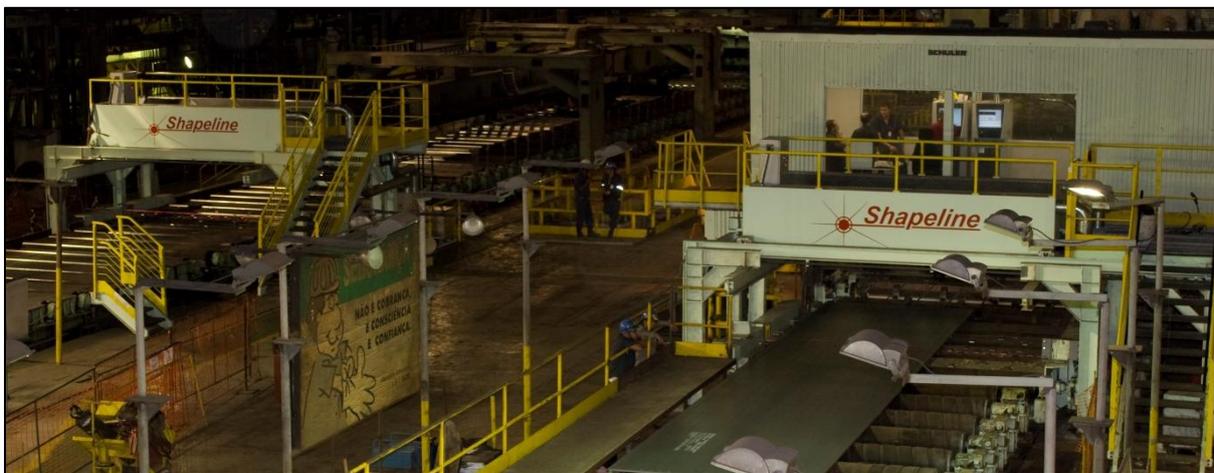


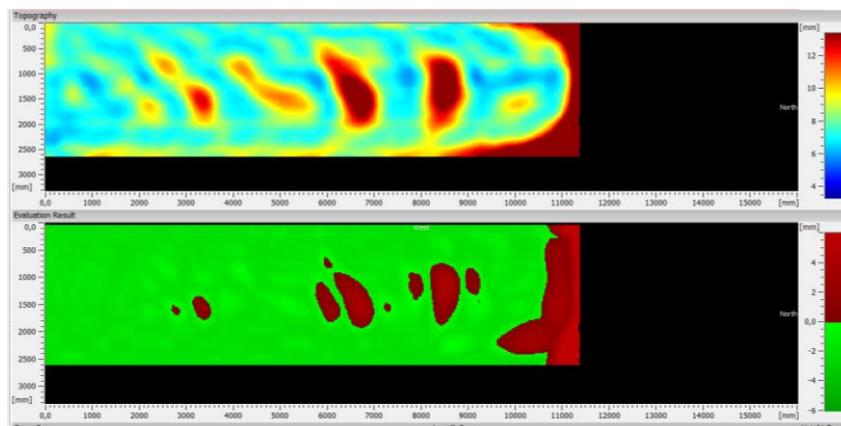
Usiminas reduces plate processing by flatness measurement

Usiminas Ipatinga, Brazil installed a new processing line for heavy plates in 2010. The line consists of one plate quenching line, two shearing lines and one leveling line. There are three plate flatness measurement systems from the Swedish company Shapeline, one in each shearing line and one in the leveling line. Since the start-up of the lines, Usiminas has systematically improved the production process to improve plate flatness and reduce plate handling and leveling.



Usiminas two shearing lines with the Shapeline flatness gauges.

After quenching and shearing, the flatness of each plate is measured and checked against the norm valid for the individual plate. If the plate flatness is out-of-specification, the plate is forwarded to the leveling line for flattening. The third Flatness Gauge is located directly downstream from the plate Leveler and is used for two purposes; to guide the operators on the leveling process and to check plate flatness after leveling. Since the plate flatness is checked after each leveling pass, no unnecessary leveling passes are necessary.

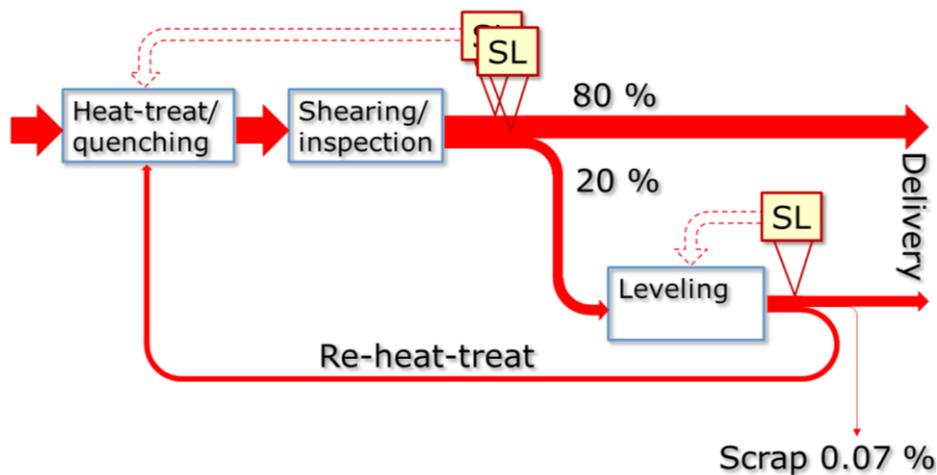


Part of the operator user interface. The bottom map shows the parts of the plate out-of-specification. Every portion of each plate is checked. No plates leave the production with a flatness out-of-specification.

A small percentage of the plates do not pass the measurement after leveling. These plates are again heat-treated and then again leveled. If they still do not fulfil the norms, they are sent back to the melt-shop.

Benefits

Since the start-up of the line, the flatness data has been used to systematically improve the heat-treatment and quenching of the plates. Especially the water quench has been adjusted to reach an even cooling profile. This has improved flatness. The result of this work is a gradual improvement of plate flatness after quenching but also uniformity of the plate mechanical properties. This has reduced the need for leveling to only 20 % of the plates. In addition, the number of leveling passes has been reduced from seven to normally 1-3 passes. Since the overall plate flatness is so high, only 0.07 % of the plates now need to be scrapped due to flatness.



This figure shows a schematic diagram of Usiminas production flow. SL indicates the Shapeline flatness measurement systems. The dashed lines show data feedback for process control and adjustments.

The other benefits include documentation of plate flatness for each plate and a better understanding of end-customers' needs based on traceable measurement data.

“These results would never have been reached without a systematic, reliable and precise flatness measurement” says Wilson Moreira de Souza, Technical project coordinator and continues: “These systems have been a good investment since they have paid-back many times and also give us confidence in what we deliver to our customers”.

About Shapeline - Shapeline AB develops, markets and implements high-tech in-line measurement systems for flatness measurements on plate and strip products within the global steel and metals industry. The systems supplied create big values for the users by offering new possibilities to efficiently control the processes and products. Shapeline has today a leading position within their market niche. The company is based in Linköping, Sweden.

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