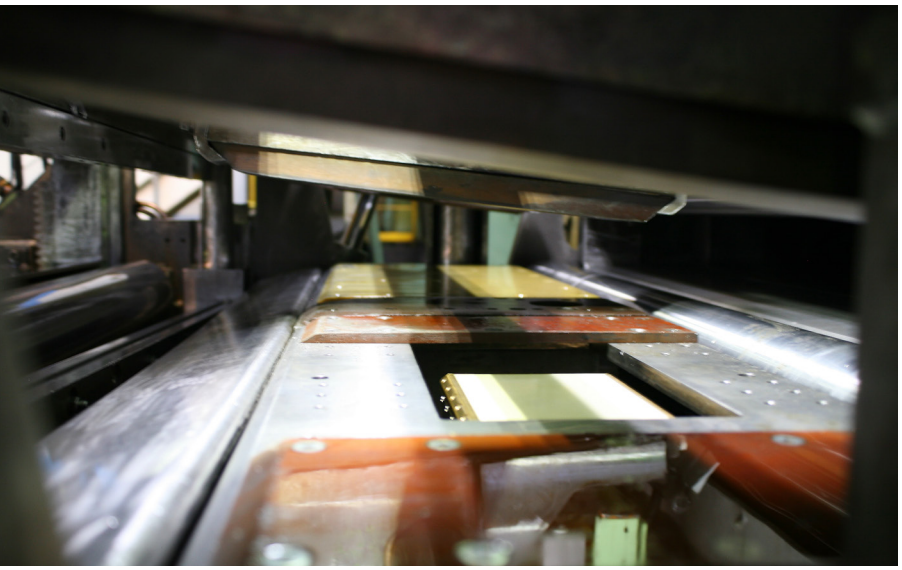
MEASUREMENT & ANALYTICS

Aluminium manufacturing company improves its production speed by 50 percent with MTG Box gauge



Faced with the challenge of meeting high market demand for aluminium can stock, an international metals manufacturing company was struggling to meet production targets due to issues with its X-ray thickness gauge equipment used in its rolling mill. By installing ABB's MTG Box Gauge, production speed has been increased significantly to meet demand.

Measurement made easy

— MTG Box gauge installed in a single stand rolling mill

Previously the mill had only X-ray gauges, but is now running with a combination of both Box Gauge and X-ray devices. ABB's MTG Box Gauge is installed in the single stand rolling mill and is used at the two final passes on the entry side. Installed in 2017, the Box Gauge is used for can body stock only, together with a well-functioning feed forward and additional controls (mass flow, and other type of control).

What has been achieved?
The improved performance achieved has helped the company to address problems with its previous X-ray devices that were affecting production output: "Historically kerosene was the problem as the entry X-ray gauge was flooded and couldn't measure thickness. We are very happy with the high-performance thickness gauging with ABB's MTG Box Gauge. The gauge withstands all coolants and lubricants and this is a great benefit for us," says the Head of Automation at the plant.

"The production speed with the X-ray gauge was not satisfactory". At higher speeds we needed to use more coolants, which flowed backwards into the gap and destroyed the measurement of the X-ray. By replacing it with the Box Gauge this problem has been overcome, enabling us to increase the production speed by 50 percent. Also, we don't have to worry about the blow-off of kerosene on the strip anymore", comments the site's Chief Power Engineer.

Thickness variation is an important factor to consider when it comes to thickness measurement. To ensure the Box Gauge would deliver the desired performance, the company carried out thorough tests at its facility to compare its measurement accuracy against the X-ray gauges, reporting fantastic results. "The results from comparative measurements have shown that the exit thickness variation is 16 percent better with Box Gauge and associated control," says the company's process engineer. "When testing the Box Gauge for 3sigma strip thickness tolerances, our target was 0.7 percent. With the Box Gauge we achieved this consistently and significantly below the target, vastly outperforming our X-ray gauges. We are very pleased with the gauge performance".

A further benefit of the Box Gauge is its ability to handle small entry flatness disturbances without it affecting the thickness measurement, due to a good slope compensation.

In summary the company concluded: "We want to add that we are handling 30 different alloys and there is no recalibration needed with the MTG Box Gauge. Further, with the investment in an efficient and well-designed MTG Box Gauge delivering good dynamic reading with high frequential bandwidth, we have seen a very short payback time, which is excellent."

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01 Finished aluminium coils
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02 MTG Box gauge
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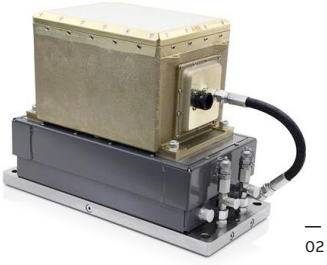
03-04 Thickness Measurement Phase. No other factors influence – ideal for rolling mill environment

ABB's MTG Box gauge with unique PEC measuring technology

PEC Measuring Principle
(Pulsed Eddy Current, PEC, technology)
The ABB Technology uses a pulse formed current in a transmitting coil to create a magnetic excitation field. This field fills up the air volume close to the coil and penetrates the metal strip, thus inducing eddy currents in the strip. The amount of magnetic energy in the strip is proportional to the strip thickness only. No other factors, such as alloy content, air gap temperature, oil films or steam influence the measurement.

When the current is turned off a transient response pulse is measured by the receiver coil. This pulse can be divided into three phases which holds information about different important properties:
1. The first part comes mainly from the air volume and contains information about the position of the strip in relation to the coil.
2. When the energy in the air volume has disappeared, the energy in the metal strip starts to leak out of the strip. A faster signal decay means higher resistivity. Thus, the second part of the signal is used to calculate the resistivity/conductivity of the strip.
3. The magnetic energy in the strip continues to leak out and after a certain time all the energy has disappeared. This creates a signal in the measuring coil that is decaying towards a zero value. The gauge electronics collect the whole signal from the energy in the metal strip. With this information, the gauge can calculate a thickness value that is independent of the material properties of the strip, as long as the strip material is non-ferrous.
Thus, from one single pulse it is possible to derive three independent properties of the strip: the vertical position, the resistivity, and the thickness.



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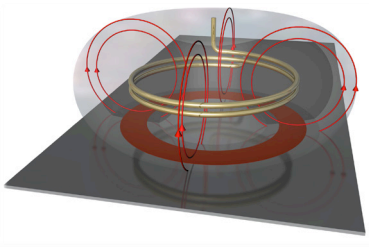

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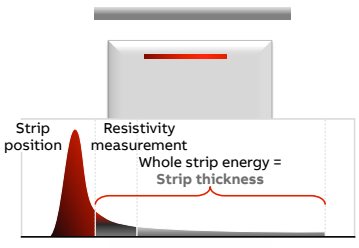

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