

BRANDING: ON-THE-FLY LASER MARKING OF HR COILS



An innovative Tata Steel logo marking system for hot rolled steel will help the company to optimally leverage its brand premium.

THE CONTEXT



Tata Steel sells branded hot rolled coils directly to retail customers through a brand called 'Tata Astrum' which attracts a price premium in the market. The logo is marked on the rolls with using inkjet printers by distributors. The issue is that the distributors are not exclusive to Tata Steel, which means there is a chance that non-Tata products can be marked with the Tata brand to profit from the difference in price. This can adversely impact the Tata brand value and revenue. Moreover, the inkjet markings can be duplicated by anyone. Tata Steel needed a way to mark the steel with its brand at the plant while the coils are being rolled. But there was no technology available for this.

THE INNOVATION



Engraving the hot rolled coils of steel with 'Tata Astrum' logo was a huge challenge. The coil is rolled at a very high temperature (~650 degrees Celsius) and speed (4 to 10 metres per second). Existing technologies (such as chemical marking or mechanical embossing) could not be used. The team took inspiration from a video that showed how Apple marked its logos using a laser system where the laser moves and the device is stationary. The challenge was to adopt it to the scale of the steel industry. The team came up with a way to use lasers on-the-fly, moving at the same speed as the steel, keeping the relative speed between the two as zero. To steer the beam at high speeds, the team innovated a rotating gold polished polygon mirror assembly which moves synchronously with the steel object so that it appears stationary to the laser. For this, the control system for the laser uses the input parameters of the steel rolling process.

KEY CHALLENGE



COBBLING

There were several challenges such as dealing with adverse ambient conditions, development of control philosophy, etc, but the biggest installation challenge was due to a common mishap called cobbling which occurs nearly twice a month. Cobbling occurs in continuous rolling mills when there is a mismatch of speed between rollers. The hot steel — hundreds of metres long and weighing in tonnes — can coil and bunch randomly and can destroy any expensive equipment housed in its path. Hence, to protect the equipment, an innovative cobble sensor was developed, which was placed in strategic locations with the ability to detect cobbles within fractions of a second.

THE IMPACT



This innovation aims to fully extract the value of the brand premium of Tata Astrum over and above the base price of HR coil.

This works out to an additional revenue of

₹2400/TONNE

directly contributing to the bottom line of the company

In the last six months, nearly

₹3 CR

have been realised as profits