TATA STEEL

LASER-TEXTURED SURFACE FOR TAILORED STEEL STRIP

PILOTED TECHNOLOGIES

As an industry-first, Tata Steel Europe has piloted a new laser-based technology that will enable it to tailor the surface texture on steel strips.

THE CONTEXT

Automotive manufacturers have to often strike a compromise between the final paint job of a vehicle and the requirement for good press performance. This is because the surface properties of low waviness and high roughness are strongly coupled in conventional steel strips. Moreover, existing steel strips can only have a single texture across the entire surface area.

THE INNOVATION

Tata Steel Europe has developed a new laser texturing technology in partnership with the University of Twente of Netherlands. This path-breaking technology enables it to tailor surface textures anywhere on a steel strip. The technology, which is based on the ability of lasers to accurately remove material, has also decoupled the waviness and roughness parameters of steel strips. Hence, it will enable vehicle manufacturers to both improve the paint's appearance and optimise friction properties for better deep drawability.

The company has already produced samples and demonstrated the benefits of its new laser-textured strips including improved paint appearance, reduced galling and improved frictional behaviour to enhance press performance. The company is now working with industrial partners to refine the technology in order to realise the required process speeds for its factory lines.

KEY CHALLENGE

TO TRANSLATE THE CONCEPT OF MAKING LASER-TEXTURED SURFACES INTO REALITY

As a first step, the team worked with experts at the University of Twente to explore the fundamentals of laser texturing as part of a PhD project over four years. This helped it gain insights in high-speed laser processing of steel strips. It then accelerated the project by teaming up with industrial partners, along with the university experts, to start developing technical solutions for high-speed laser texturing in an industrial environment. The team also worked on optimising the elongation step prior to laser texturing besides demonstrating the benefits of the laser-textured strips in functional tests and developing tools for automated surface inspections as a quality control.

POTENTIAL IMPACT

The new technology has the potential to boost the company's EBITDA by between

€20 AND €100 PER TONNE OF STEEL

against an additional cost of less than 10 euro per tonne. This innovation will enable Tata Steel Europe to offer differentiated products to customers in the high-value automotive, packaging, engineering and building segments.

TATA INNOVISTA