

**TATA STEEL**



# Direct strip texturing using laser

Challenges for laser texturing at industrial scale

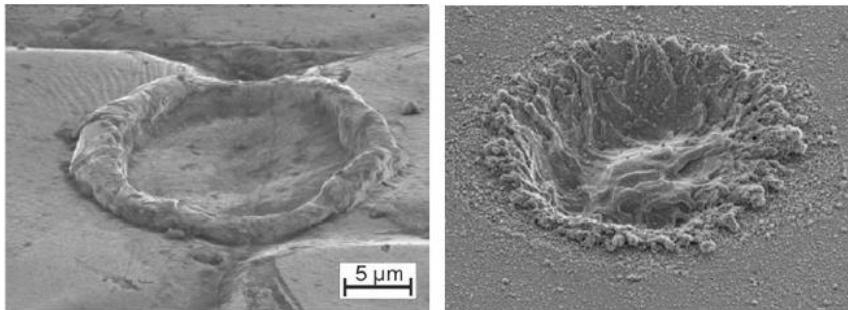
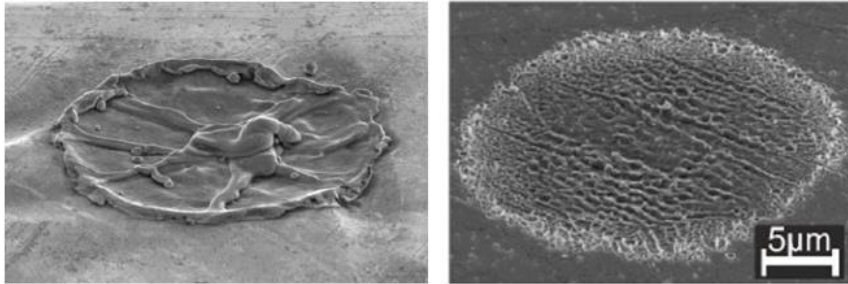


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## Laser applications

(Zinc-coated) steel strip surface texturing

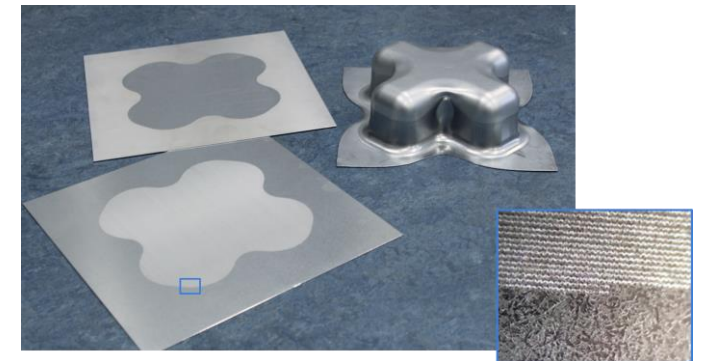


**Nano-second pulsed laser**

**Pico-second pulsed laser**



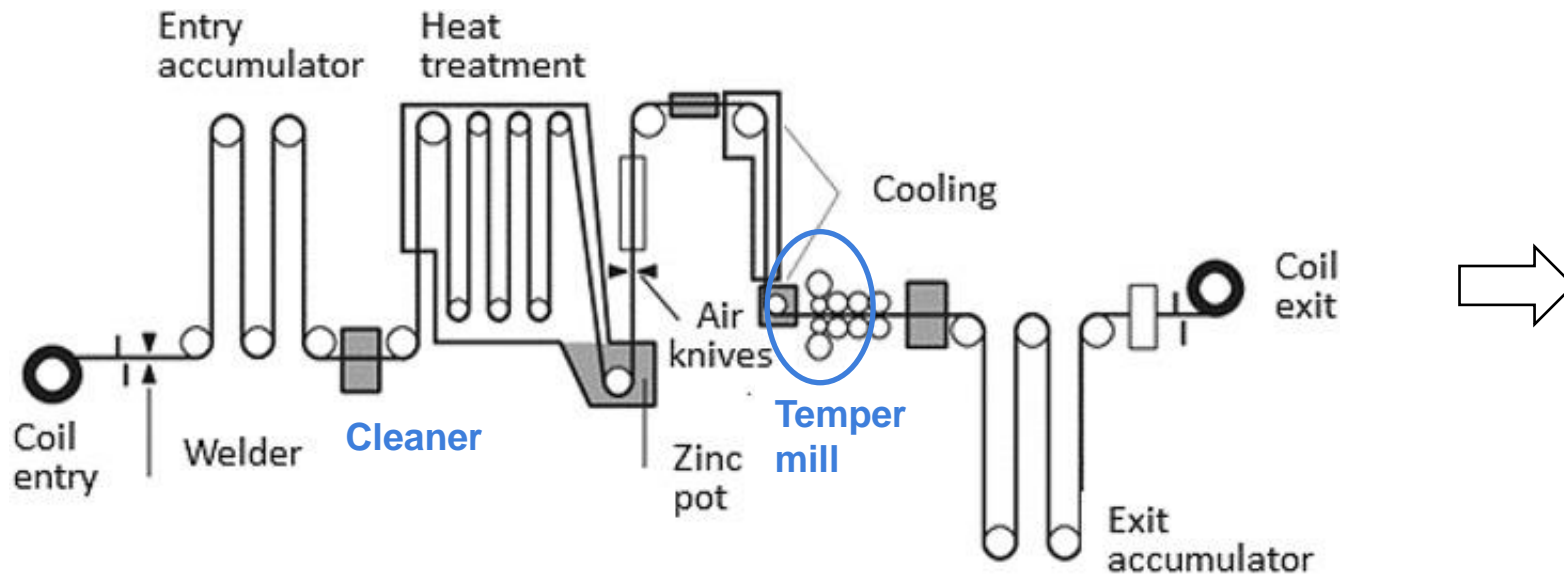
Improved surface appearance / quality



Tailored textured blanks (on coil)

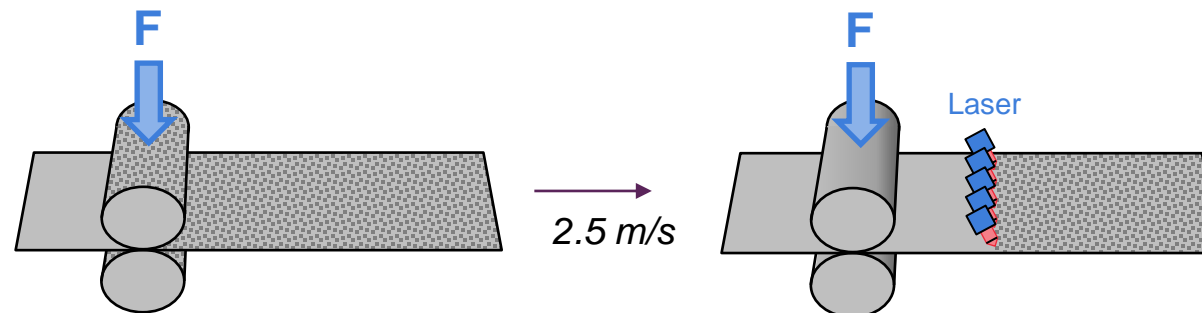
## Example: hot dip galvanizing line for end product

'High value' product for automotive exposed outer panels



### Temper mill:

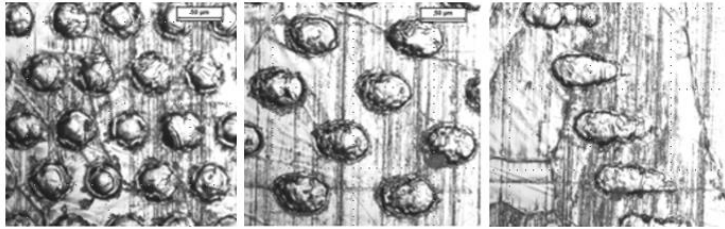
1. Mechanical properties (0.5-2.5% reduction)
2. Shape control
3. Apply strip surface texture



## Technical challenges

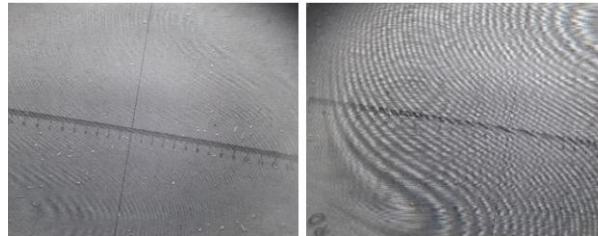
### Process speed

Beam scan speed limitation  
(single 60-120 ns-pulse)



### Pseudo-deterministic

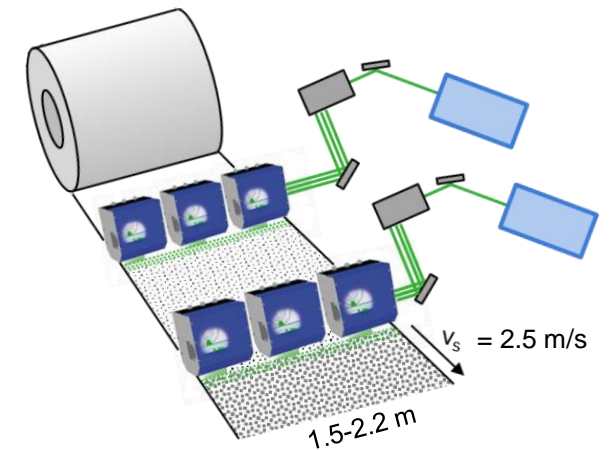
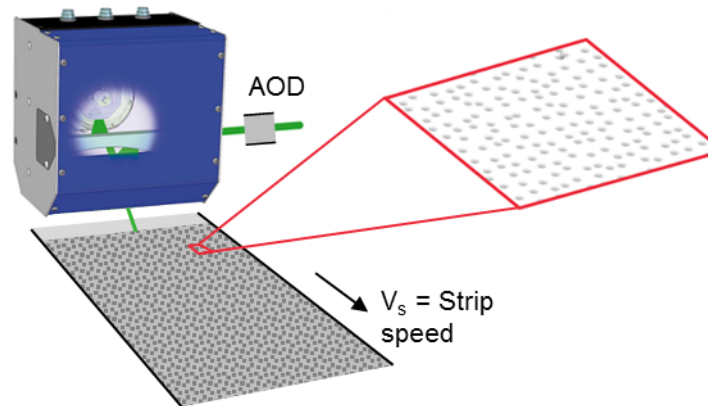
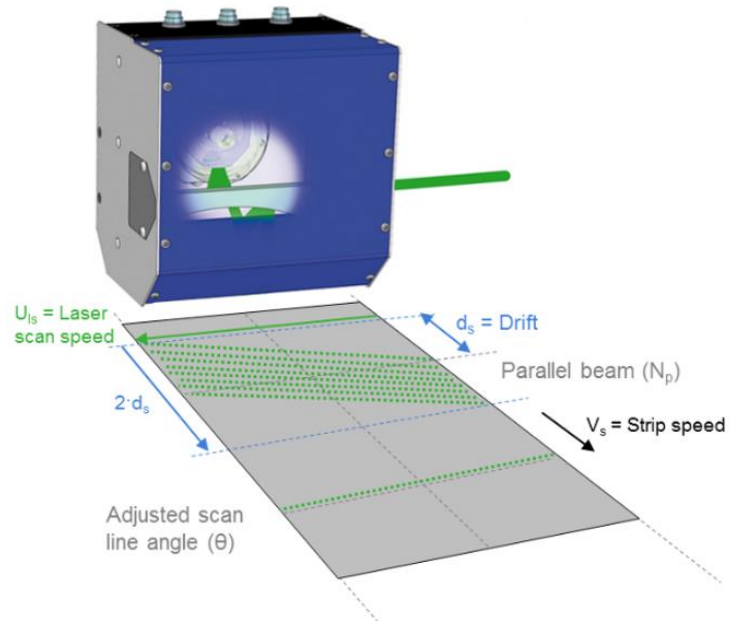
Deterministic risks Moiré effects  
(level of randomization required)



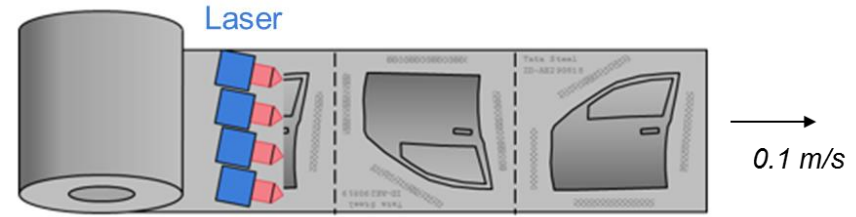
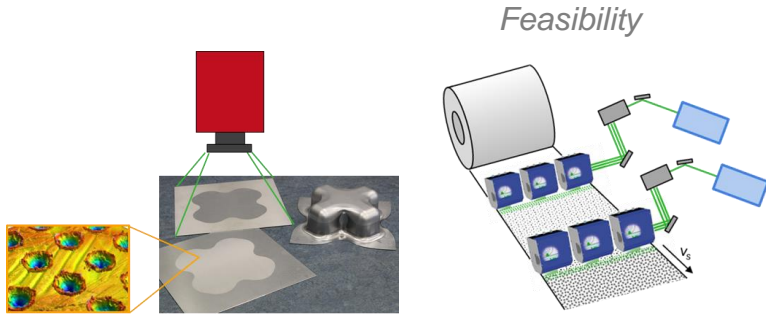
### System integration

Hot dip galvanizing line:

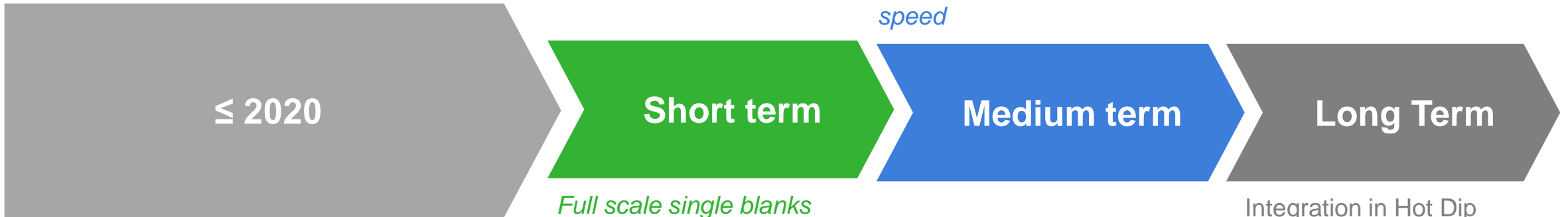
- 380 kW pulsed laser output power
- 1800-3400 “parallel” beams



# Roadmap



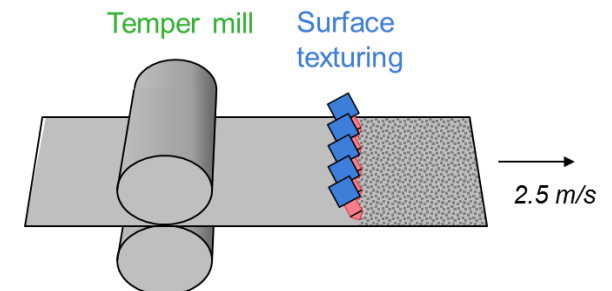
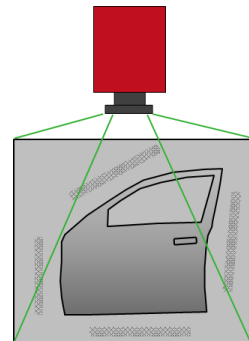
*Research and Development*



*Series production at low speed*

*Full scale single blanks*

Integration in Hot Dip Galvanizing Line



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**Questions**



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