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Sarclad Rolltex EDT technology & developments – The future of roll texturing
Presentation overview

Sarclad

Rolltex EDT range

Rolltex Eco EDT for low volume mills

EDC – a new development project to replace chrome plating of textured rolls
Sarclad Ltd Headquarters, Sheffield UK

- Sales & marketing
- Design & development
- Commissioning & service
- Spare parts

Sarclad NA, Pittsburgh USA

- Sales & marketing
- Commissioning & service
- Spare parts

Sarclad China, Shanghai
Sarclad Limited
Providing Technology Based Equipment to The Metals Industry since 1977

- Global supplier to 46 countries
  - 3 main products

- Strand Condition Monitors for Continuous Casters
  > 400 units supplied

- Rollscan Inspection for Roll Grinding Shops
  > 380 units supplied

- Rolltex EDT for Roll Texturing
  > 85 units supplied
What is EDT?

Principle of EDT process – Single spark

- Spark created between electrode and roll
- Gas bubble forms
- Spark melts roll surface forming a crater
- Gas bubble grows
What is EDT?

Principle of EDT process – Single crater
What is EDT?
Principle of EDT process – Textured Surface
What is EDT used for?
EDT in Production of Auto body and strip for domestic white goods

5 Stand Tandem

1 2 3 4 5

Chrome Plated 1,2,3,4

Textured & Chrome Plated

EDT & Chrome Plating

Batch Anneal

Temper 56 inch (1424mm)

Auto body Strip
White Product
Electro Zinc

Temper 80 inch (2000mm)

Textured

Hot Dip Galvanising

Skin Pass

Textured & Chrome Plated
EDT benefits

EDT in Production of Auto body and strip for domestic white goods

Surface Preparation for Coating
- Removes minor defects or imperfections
- Better surface ‘keying’ aiding better bonding of surface coatings
- Industry required flat & even appearance for Automotive applications (stochastic & isotropic)

Improves Formability
- Retains even coating of lubricant for press
- Reduces flow friction in the press
- Retains surface appearance after forming
Sarclad Rolltex EDT machine range

- 72 Electrodes for typical production of up to 1000 rolls per month
- 36 Electrodes for typical production of up to 600 rolls per month
- 12 Electrode for narrow strip, Z mills or low roll volume texturing
- Eco EDT for aluminium & low volume steel strip production up to 1000 rolls per year
- PLUS Integrated automatic roll loaders
Sarclad Rolltex EDT machine range – 72 electrodes
Sarclad Rolltex EDT machine range – 12 electrodes
Sarclad Rolltex EDT machine main components

Saddle & texturing head
Sarclad Rolltex EDT machine process simulation
Sarclad Rolltex EDT – Worldwide market

85 EDT installations
Rolltex Eco EDT – Sarclad innovation

Dedicated texturing for low volume requirements, steel & aluminium
Rolltex Eco EDT – Main features

- Will accommodate up to 3 different roll types
- 750 - 1000 rolls textured per year
- Selectable Roughness (Ra) and Peak count (Pc)
- Latest generation of power rack technology and servo control
- Floor level installation, no pits or troughs
Rolltex Eco EDT – First machine
Electrical Discharge Coating (EDC)

- Collaborative project involving Sarclad, Tata NL and CRM
- EU-funded project – CrFreeRolls
- Objective to find replacement for Cr-VI plating of temper mill work rolls
- Several options considered – EDC gave promising results
Electrical Discharge Coating (EDC)

Texturing and surface hardening in one process
EDC - Research

Tungsten carbide electrode

XRD analysis

$\gamma$ ray inspection

Optimised electrode manufacture for stable operation
EDC - Research

- Ability to control Ra, Rsk and Rpc
- Electrode wear rate slower than conventional EDT

Optimised texturing parameters for best performance
Significant influence of the applied current on the layer thickness
EDC validation

- 2 pairs of Tata standard work rolls textured with EDC
- Texturing time around twice as long as EDT

EDC of rolls at Sarclad for industrial trials at Tata Steel NL
Sarclad validation – 3D topology of rolls

Very homogeneous EDC surface finish across the roll
EDC validation – Tata NL temper mill 21

EDC rolls ready for industrial trials
EDC validation – Industrial trial roughness retention

- Ra constant during full-length 900 tons campaign
- Good strip surface quality

Promising results prompting further industrial trials
EDC Summary

- Electrode manufacture optimised
- Isotropic EDC coated surface produced with hard constituents
- Thickness of recast layer can be controlled
- Laboratory tests – roughness retention of EDC coating comparable to EDT + Cr-plating
- First industrial trials very promising

- Additional benefit is the potential for cost savings due to the elimination of chrome plating
EDC Future

• Phase 2 testing – 30 pairs of EDC rolls for Tata
• 6 months further validation and learning
• Commercialisation of EDC
• Available on all new Sarclad Rolltex EDT machines
• Upgrades of existing Sarclad machines
• Patents
  • EDC electrodes
  • EDC coating with carbide electrodes in EDT process
  • EDC coating in EDT process
Thank you for listening