Direct Energy Deposition solution for Mill spare parts

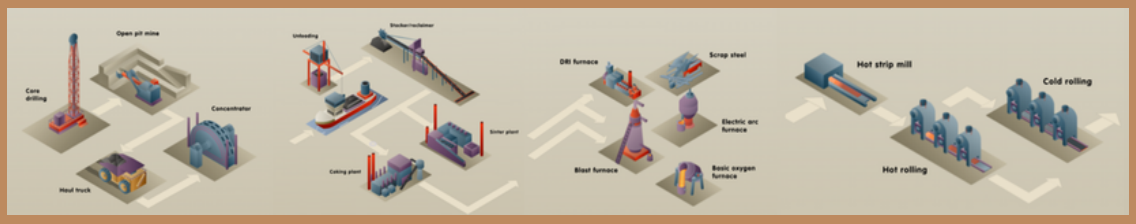
Factsheet

ArcelorMittal Global R&D Additive Manufacturing – A New Frontier in Industry can be reachable

Company: Arcelor Mittal
Founded: 2014
Location: Asturias, Spain
Technology: Laser Metal Deposition-powder (LMD-p), Direct Energy Deposition (DED) Additive Manufacturing
Industry: Automotive, Construction, Energy, Manufacturing, Maritime, Metalworks, Space, Tooling

ArcelorMittal is the world's leading steel and mining company, with approximately 158,000 employees in more than 60 countries. ArcelorMittal is the leader in all major global steel markets, including automotive, construction, household appliances and packaging, with leading R&D and technology, as well as sizeable captive supplies of raw materials and outstanding distribution networks.

In ArcelorMittal R&D Centres, new steel products, processes and solutions are conceived, tested, improved and deployed. This work allows ArcelorMittal to improve its competitiveness by developing new industrial processes and optimizing existing ones in order to reduce costs and improve product quality; contribute to sustainable development, reduce the environmental impact of our activities and, finally, increase the set of technical knowledge of workers, which will encourage the interest of young students for a promising future.



Arcelormittal: Steel Making Factory

INNOVATION

Robotic LMD Station - AMIII

The major goal of INTEGRADDE is to develop a novel end-to-end solution capable of demonstrating the potential of Directed Energy Deposition (DED) processes for the manufacturing of certified large metal components in strategic metalworking sectors.

Hence, AMIII participates totally aligned with INTEGRADDE scope targeting a full installation, integration and deployment of industrial 3D Printing Line capable to repair and re-functionalize existing parts used widely in the Factory or creating new spare parts based on previous design from old components.

Furthermore, the industry evolution to implement new sustainable frames, cost and energy effective solutions stablish a need to define the building blocks for Industry 4.0. So, the main objective is to adopt a controlled manufacturing process achieving the quality and final requirements of the application. AMIII LMD Cell will validate process control and non-destructive testing devices applied on the printing process, this challenge will be accomplished with the expertise of the partners from Consortium.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 820776.

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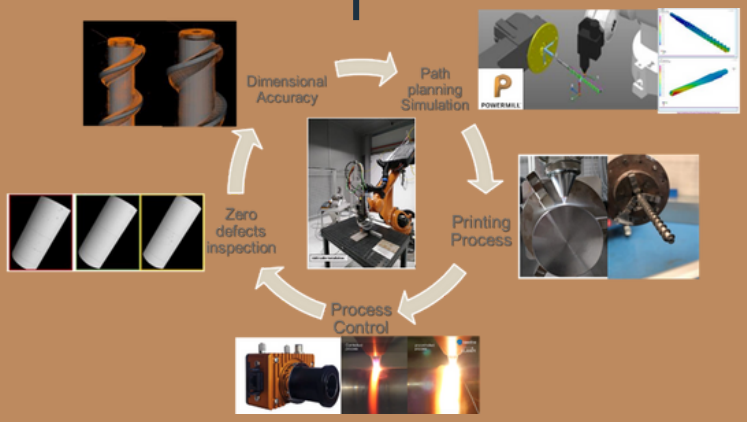
WORKFLOW

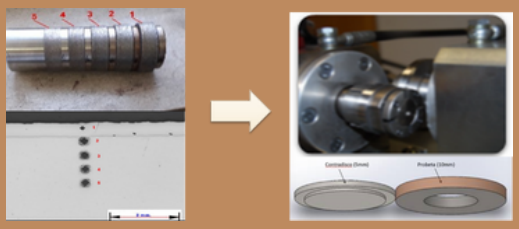


AMIII cases studies - Workflow

AMIII define two target components evaluating LMD-p technology to fulfill specific requirements for each part to be implemented in the factory chain. In order to accomplish the objectives, a methodic workflow is settled with the collaboration of the partners from Consortium. This workflow constitutes iterative steps to achieve final properties: wear resistance, dimensional accuracy, … Once, demonstrators are printed the validation will be considering ArcelorMittal Mill requirements.

VALIDATION

Two target components need to be validated after the controlled printing process. Regarding rolling roll application is adapted a Lab-Scale validation, this test consists in lifetime evaluation and wear resistance measurements (with coating adhesion) through Twin Disc technique. Endless Screw can be installed directly in the manufacturing chain to study corrosion resistance and lifetime.

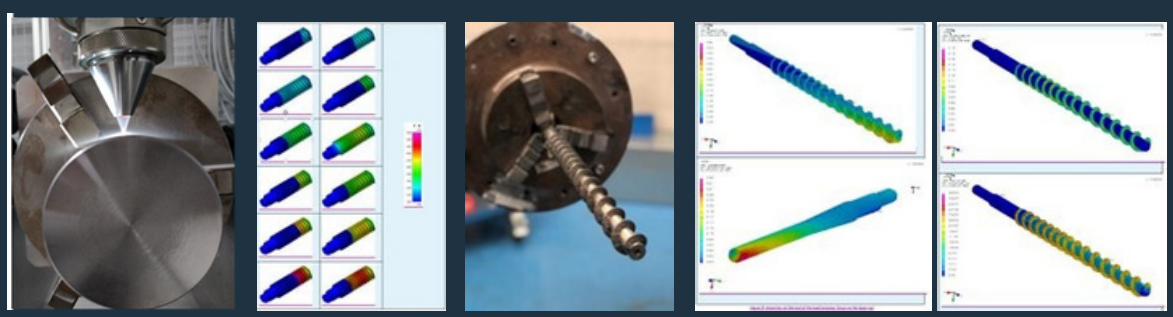


Twin Disc technique to evaluate rolling rolls conditions

Demonstrators: Repairement and Printing solutions for Mill spare parts

INTEGRADDE Project constitutes a perfect frame of collaboration with several Research Centers, Universities, Companies with wide expertise fields to build a strong knowledge in Additive Manufacturing industrial applications.

The demonstrators proposed by AMIII to consolidate this knowledge joined with Digital Thread challenge are two target components: Lab-Scale rolling roll and endless Screw which covers two potential applications working with LMD-p technology.



Target components and Thermomechanical Models for printing process

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