MODIPLANT Newsletter

Modular Hybrid Technology in Steel Plant production - June 2025

Welcome to the 2nd edition of the MODIPLANT newsletter! In this issue, we share updates on our progress, key achievements, and upcoming events. Thank you for being part of our journey toward innovative and sustainable steel production.

Project updates

The last MODIPLANT General Assembly was held online on February 4th.

- Discussions focused on recent advancements and upcoming activities.
- The next General Assembly will take place in person at TUBAF (Freiberg, Germany) on June 25th.

Key Achievements & Insights

Process optimization & testing

Identification of new process conditions for Induction Heating (IH) treatment on flat steel samples in terms of heating rate and temperature range. Two test sets were completed on the experimental pilot line:

- the first, at lower power levels (20-30 kW), explored the line's minimum operating conditions.
- The second, at higher power levels (50-65 kW), helped establish operational parameters for future tests on the upgraded pilot line.

Investigation and calculations of processes of inductive and conductive heating of billets have been carried out.

Material characterization & modelling

- Micro-structural characterization of Interstitial Free (IF) and Dual Phase (DP) steel has been completed, while work on the Structural steel is currently underway.
- Models for IF and DP steels are nearly complete, and modelling of the Structural grade has started.

Pilot line development

The new pilot line setup to perform Ultra Rapid annealing tests has been designed. Key components have been identified for installation.

- Ultra Rapid annealing tests will be performed through IH system.
- Tests will be performed under the following conditions: controlled atmosphere and varying soaking temperatures.

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Research & Technological Developments

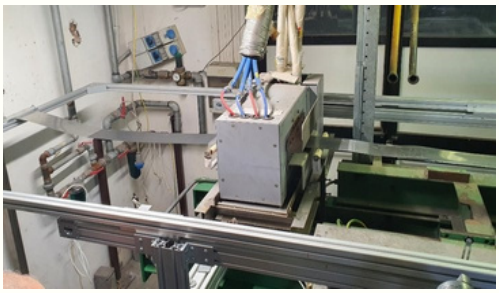
Project research activities

Industrial partners focused on several key topics:

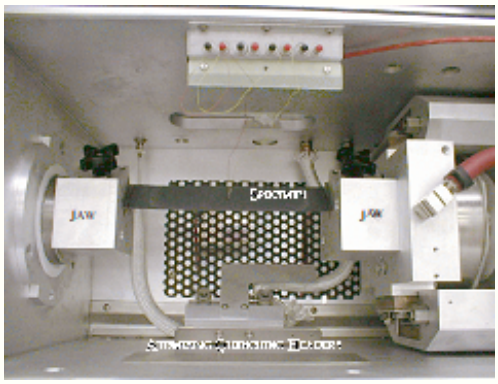
- Selection of the best technological options for the hybridization of the Hot Dipped Galvanizing lines.
- Development of a thermal model considering the specific furnace characteristics.
- CFD analysis of radiant tubes to compare the performance of electric radiant tubes with NG radiant tubes.
- Energy OPEX analysis of various layout options, evaluating different levels of hybrid electrification using inductors and electric radiant tubes in relation to NG/electric power cost ratios.

Project activities are also focused on evaluating induction and conduction heating systems for pre-rolling of industrial ingots. The assessment of processes electrical efficiency and energy balance studies have been carried out.

- One of the main goal of these efforts is to reduce the steel industry's reliance on fossil fuels and significantly lower CO_2 emissions.



Two sets of tests have been performed on the current pilot line configuration (see the figure on the left). The second set of experimental trials tested high Heating Rate (HR), ranging from 160 °C/s to over 200 °C/s. After tests, metallurgical and mechanical characterizations have been started. The main objective is to study the effect of high HR on the steel samples properties.



The effect of continuous annealing process parameters on the micro-structure evolution and mechanical properties of the strips have been studied. The continuous annealing process was simulated in Dilatometer and in Gleeble thermal-mechanical simulator. Most of the experimental activities concerned the physical simulation of HDG process and were performed in the dedicated unit of Gleeble simulator

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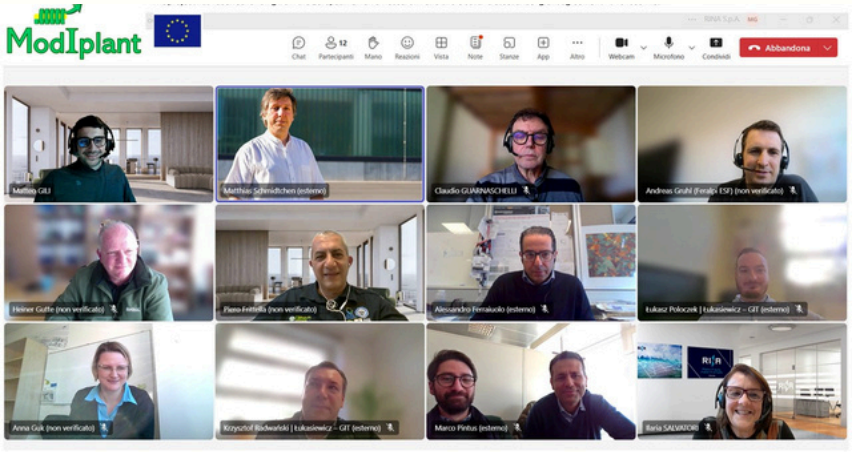
Upcoming events & Dissemination

Upcoming events

- Next General Assembly at TUBAF (June 24-25, 2025)
- ESTAD Conference in Verona, Italy (October 6-9, 2025)

Dissemination activities

- The abstract for the ESTAD Conference (Verona, Italy - October 6-9, 2025) has been accepted. Paper submission must be completed by July 25th.
- The abstract for the AIKW Conference has been uploaded.
- Participation at the NetZero Milan expo & conference (May 15-16, 2025).
- MODIPLANT logo has a new version.



Our TEAM at the last General Assembly meeting

New project logo

Participation at NetZero Milan 2025

Upcoming events

Get Involved

Are you interested in hybrid heating technologies in the steel sector? See more details at www.modiplant.eu to explore opportunities for collaboration or explore our LinkedIn pag at https://www.linkedin.com/company/modiplant-rfcs-project.

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