COCOP: plant-wide monitoring and advisory tool for steel making process

Project:
Coordinating Optimisation of Complex Industrial Processes

Project website: *www.cocop-spire.eu*

A complex industrial plant comprises continuous and/or batch unit processes where the complexity stems from its dynamic properties. In order to achieve an economically and environmentally efficient operation of a plant, the objective of the COCOP project was to **enable plant-wide monitoring and control by using the model-based, predictive, coordinating optimisation concept in integration with local control systems.**

The project also combined technological and **social innovation within a common co-creation process** in order to improve effectiveness and impact of the innovations, their implementation process and user's acceptance.

The implemented solutions were tested in **two industrial scale tests**: in a **steel** and in a **copper plant**. The test cases validated the requirements and the developed solutions. The quantitative results provided good evidence that these approaches can enable to achieve the objectives and **provide considerable economic benefits** when the solutions have been developed to the TRL 9 level.

The COCOP general concept can be applied to any large industrial production site because it relies on general methods such as modelling of dynamics, data analysis and optimization. Thus, the project also analysed the transferability to other three sectors: Wastewater Treatment, Chemical and Glass Manufacturing sectors.

COCOP was a collaborative 42-months SPIRE project (October 2016-March 2020) and the consortium consisted of 12 partners (5 research organisations and 7 companies), from 6 European countries**.** This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 723661.

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Sector:

Steel

Summary:

A steel manufacturing **plant-wide monitoring and advisory platform** to **reduce the number of surface and sub-surface defects** at the final product, ensuring a **good performance of the related sub-processes** (secondary metallurgy, continuous casting and hot rolling).

Challenges:

- Defects can be generated during Secondary Metallurgy, Continuous Casting and Hot Rolling sub-processes, but they are detected at the end of the manufacturing process.
- To optimise each sub-process without a negative impact in the other sub-process.
- To reduce the number of defects without compromising the productivity/quality of each sub-process
- To provide useful information to the workers to better understand the influence of each process parameter in the quality/productivity of the process they are working on
- To provide a quality plant wide view to the workers beyond the focus on each individual sub-process

Approach:

- Development of models of each unit process to predict relevant parameters for the process performance
- Development of a model to predict the surface defects generation in final product. The model is defined by the parameters of the three sub-processes with the greatest influence on the occurrence of such defects
- Integration with genetic algorithms for processes optimization à find the best combination of values to minimize surface defects and ensure a good performance of each sub-process

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Theme:
Plant-wide monitoring - SPIRE02-2016
Keywords:
steel, plant-wide monitoring, data analysis, process model, process control, optimization, product quality
Type:
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