COCOP: Copper smelter optimization

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.

Sector:

Non-ferrous metails

Summary:

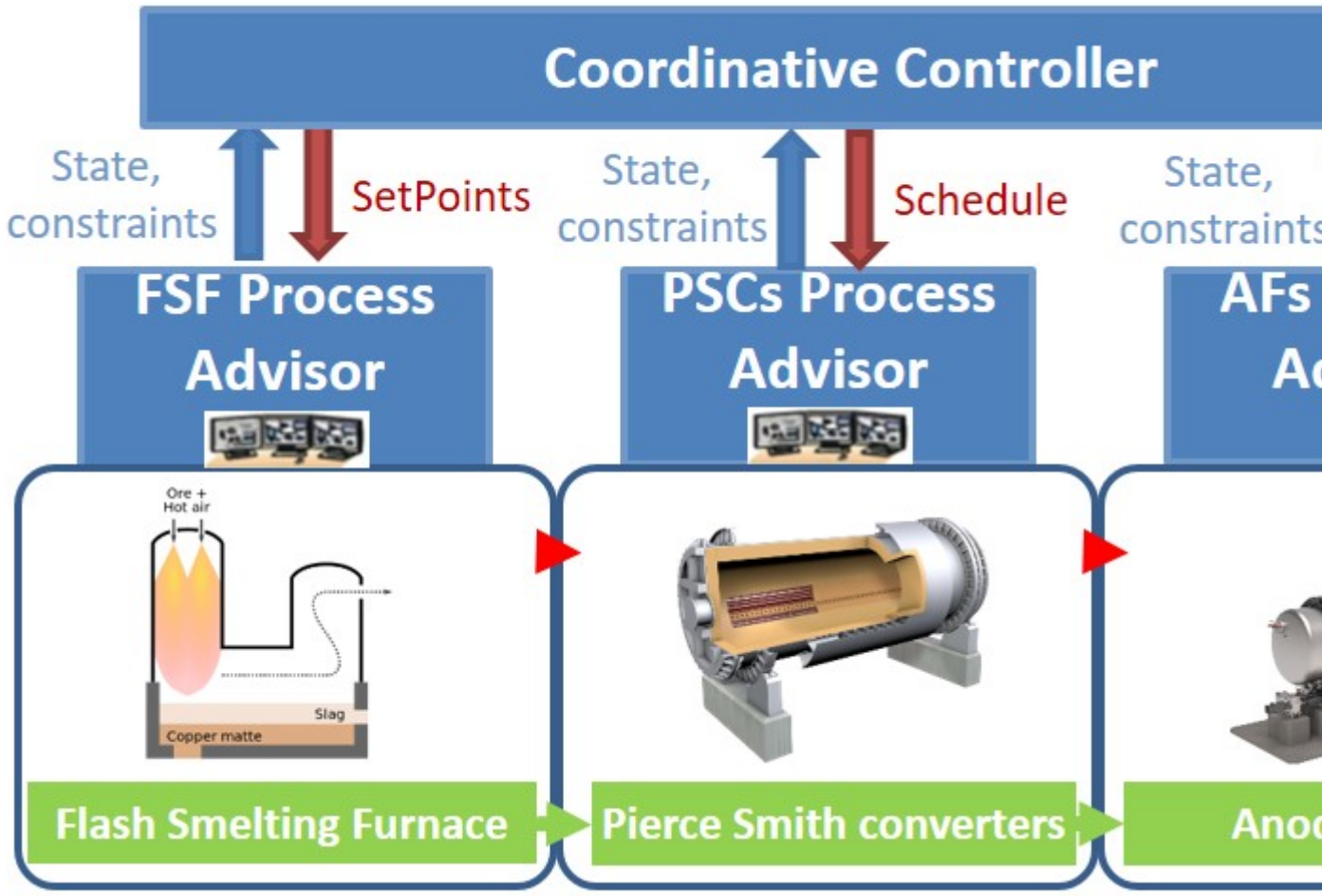
Plant-wide optimization tool for copper smelter operating flash smelting furnace, Peirce-Smith converters and anode and slag cleaning furnaces. The main goals are to maximize feed rate (increasing production rate), save resources and reduce emissions per ton produced copper.

Challenges:

- Interrelated Batch and continuous process included.
- Each process (and even equipment) have specific restrictions that need to be considered.
- Feed mixture composition changing.
- Several manual operations (cranes, tapping, Peirce-Smith converters & anode furnace operation).
- Developed systems should facilitate operator work without increasing work load.

Approach:

- Plant wide optimization to calculate schedule for future operations
- Unit process advisors to optimize unit processes
- To enable optimized operation



Theme:
Plant-wide monitoring - SPIRE02-2016
Keywords:
copper, plant-wide monitoring, data analysis, process model, process control, optimization, optimal scheduling
Type:
Case study
Video
Document
Poster
Presentation

Resources

Upload Files:
cocop_flyer_copper_case.pdf
cocop_poster_copper_case_pscadvisor.pdf
cocop_poster_copper_case_scheduling.pdf
cocop_presentation_copper_case.pdf
Link:
COCOP copper case video

- Copper pilot case flyer
- Copper pilot case poster (scheduling)
- Copper pilot case poster (PSC advisor)
- Copper pilot case presentation
- Copper pilot case video
- Paper:
    - Korpi M., Jansson J., Pihlasalo J., Suominen O. and Vilkko M. "*Plant-wide optimization of a copper smelter: how to do it in practice?*". EMC 2019 conference. 23-26 June 2019 in Dusseldorf (Germany).
    - Jansson J., Jåfs M., Keronen T. and Korpi M. "*Outotec´s fully automated smelter 2020-The vision, the status and the future*". COM 2019 hosting Copper 2019. 18-21 August 2019 in Vancouver (Canada).

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