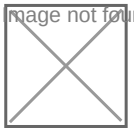
CoPro: Thermal models for process optimisation in the canning industry

Project:
Improved energy and resource efficiency by better coordination of production in the process industries



The goal of the CoPro project was to develop and to demonstrate methods and tools for process monitoring and optimal dynamic planning, scheduling and control of plants, industrial sites and clusters under dynamic market conditions, to provide decision support to operators and managers and to progress to automated closed-loop solutions to achieve an optimally energy and resource efficient production.

CoPro brought together 17 partners from 8 EU countries, including 5 industrial end users and 6 technology providing SMEs. The project developed solutions for the **plant-wide optimisation of large plants, for balancing production and consumption in industrial parks for industrial symbiosis**, and addressed **power plant scheduling** and **demand-side response**. It further developed online data analytics for **anomaly detection**, and **decision support** for plant operators and managers. The solutions can be integrated into the IT infrastructure of the plants via an **integration platform** that supports the connection to different IT systems. CoPro developed **model libraries** for the efficient development of advanced optimisation-based solutions and techniques and software for **hybrid modelling** and **model management**.

The developments of CoPro were motivated by and applied to challenging use cases from different sectors of the process industries:

- (Petro-)chemical production;
- Cellulose fiber production;
- Production, formulation and packaging of consumer goods;
- Sterilisation and packaging of food.

CoPro demonstrated that significant savings of energy and resources are possible by using advanced technologies for monitoring, decision support, optimisation, and planning and scheduling.

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Sector:

Chemicals

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Engineering

Summary:

Thermal processing often constitutes the main bottleneck of the plant, consuming 70% of the total production time and 60% of the energy of a standard canning factory. Innovative solutions are needed to:

- Minimise health risks derived from potential contamination by microorganisms.
- Reduce product quality losses.
- Increase efficiency by minimising production times and energy consumption.
- Comply with environmental constraints

In attaining these objectives, thermal models are the essential elements upon which one can build software sensors and model predictive controllers to guarantee product safety and quality, or plant-wide scheduling solutions. Presently, we have at hand a library of thermal models to predict/infer:

- Temperature and pressure evolution in the retort.
- Temperature distribution within the product.
- Lethality, nutrient or colour degradation in the product.

Theme:
Plant-wide monitoring - SPIRE02-2016
Keywords:
Canning industry, thermal models, food safety, quality optimization, minimum sterilization time, model predictive control
Type:
Software
Document
Poster

Resources

Link:
Technology Short Description: Thermal models for process optimisation in the canning industry

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Complementary Material:

Poster: Thermal models for process optimisation in the canning industry

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