

Smart Production Planning: The Case of Aluminium Foundry

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Abstract : In the context of the circular economy, production planning aims to eliminate waste and emissions and maximize resource efficiency. Historically production planning is challenged through arrays of uncertainty and complexity arising from the interdependence and variability of products, processes, and systems. Manufacturers worldwide are facing new challenges in tackling various environmental issues such as climate change, resource depletion, and land degradation. In managing the inherited complexity and uncertainty and yet maintaining profitability, the manufacturing sector is in need of a holistic framework that supports energy efficiency and carbon emission reduction schemes. The proposed framework addresses the current challenges and integrates simulation modeling with optimization for finding optimal machine-job allocation to maximize throughput and total energy consumption while minimizing lead time. The aluminium refinery facility in western Sydney, Australia, is used as an exemplar to validate the proposed framework.

Keywords : smart production planning, simulation-optimisation, energy aware capacity planning, energy intensive industries

Conference Title : ICIMSE 2024 : International Conference on Industrial and Manufacturing Systems Engineering

Conference Location : Rome, Italy

Conference Dates : June 03-04, 2024