

Production Flow in Laboratory Operations

Böhler 2 - Probenlogistik

Böhler - Grobtrennen



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MOTIVATION & GOALS

- **Process Optimisation** – Optimising the material sample delivery process by reducing lead times, increasing customer satisfaction, and creating a more balanced and predictable workload for improved resource utilisation.
- **Standardisation and Quality Improvement** – Establishing a standardised sample cutting layout generation process that reduces cutting effort and tool wear while ensuring consistent layout quality.
- **Automation and System Integration** – Enabling a fully automated sample extraction workflow through automated marking of extraction layouts and direct integration with cutting machines.

Project FactBox

Project Name Böhler 2 & Böhler

Project ID Direct Contract

Duration 18 Months

Area 4.2

Cognitive Production Systems

Project Lead

DI Dr. Philipp Eisele

APPROACH

- **Simulation-Based Optimisation (SBO)** – Creation of an SBO model for production supply chain networks.
- **Combinatorial Optimisation** – Implementation of the Travelling-Salesman Problem and Knapsack Problem
- **Knowledge Transfer** – Translating manual logic processes to a rules-based system
- **Software demonstrator** – Designing a software demonstrator for validation, feedback, and rule refinement

CONTRIBUTION

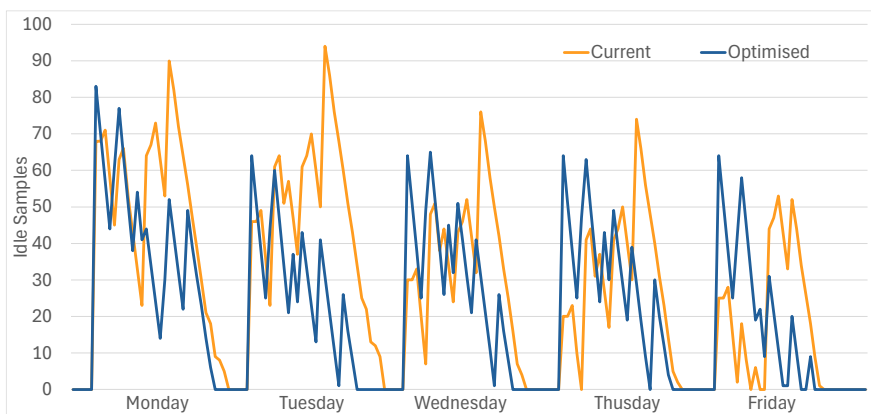
Scientific contribution

- **Integrated multi-route Travelling-Salesman-Knapsack Problem** – Solving routing and load sample selection simultaneously
- **Translation of knowledge to defined rules** – Enabling knowledge transfer and standardised procedures

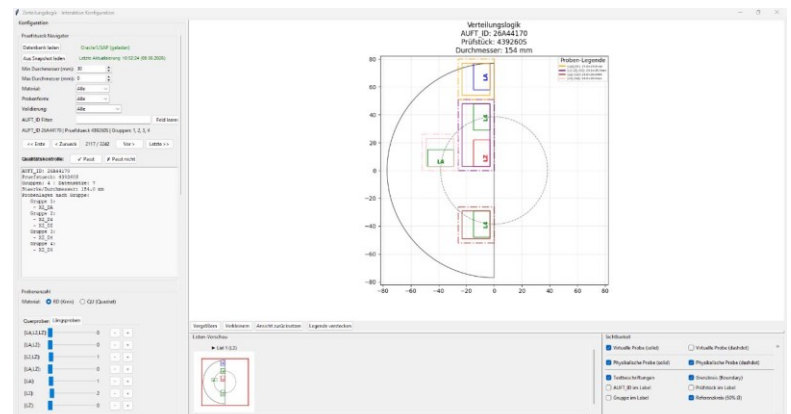
Economic contribution

- **Practical implementation of SBO** – Simulation-Based Optimisation enhancing efficiency and throughput in logistics
- **Software program** – Providing a software tool for automated layout generation
- **Automation and System Integration** – Implementation of automated sample layout marking

SYSTEM OUTCOME



Comparison of the timeline of idle samples in the laboratory



Software demonstrator for sample layout generation

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ONE STEP AHEAD.