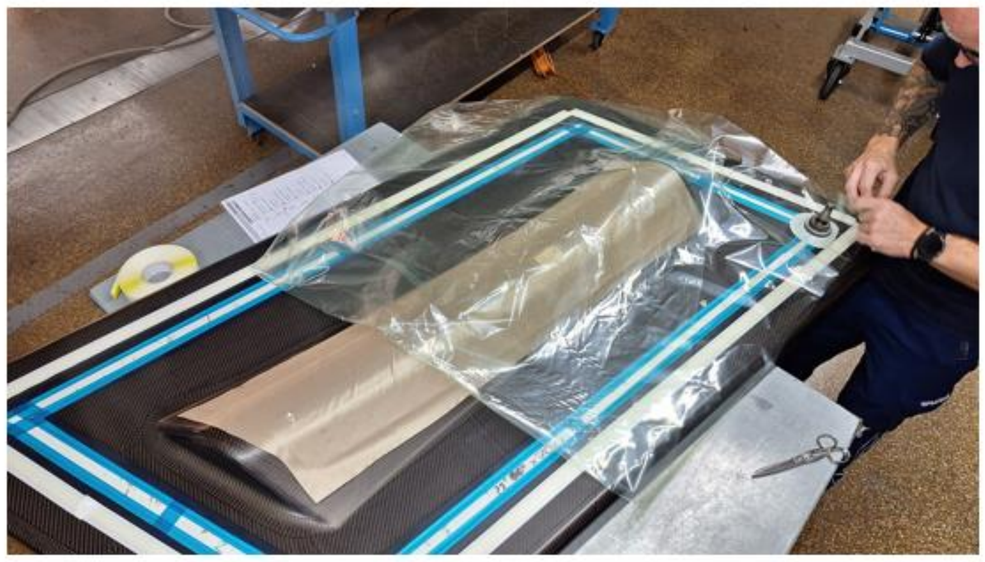
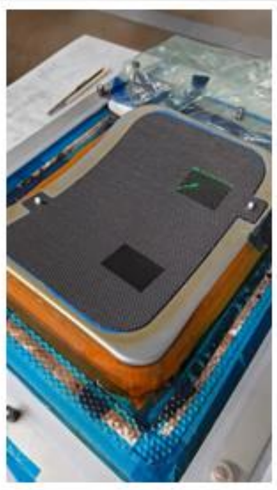
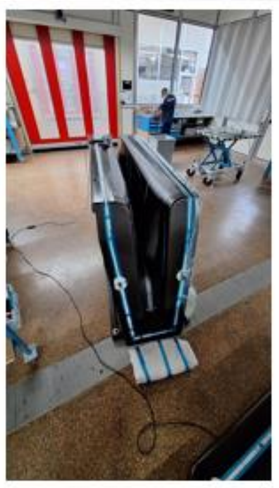
HSLU Hochschule Luzern

Technik & Architektur
Master of Science In Engineering – Business Engineering

Implementing Lean Production in Greenfield Composite Manufacturing







Problem Statement
Pilatus Aircraft's current composite manufacturing operations exhibit three critical inefficiencies that significantly impact competitive positioning. Extended lead times fail to meet modern market expectations, with current production processes showing prolonged cycle times that cascade through the entire value chain. Excessive work-in-progress inventory ties up substantial capital resources while creating operational complexity throughout the manufacturing system. Significant workload volatility creates uneven resource utilization patterns, leading to periods of both overcapacity and severe bottlenecks that undermine production planning effectiveness. These challenges are particularly acute in the autoclave manufacturing value stream, where high-temperature, high-pressure curing processes require precise coordination of materials, equipment, and personnel, while current brownfield constraints limit implementation of modern lean manufacturing principles.

Methodology
Development of comprehensive lean manufacturing framework for Pilatus Aircraft's Schwarzhorn facility. Framework incorporates Theory of Constraints, Just-in-Time systems, and Siemens Tecnomatix simulation for bottleneck identification. Methodology includes Value Stream Mapping, SMED techniques, and visual management systems for July 2026 transition.

Results
Three strategic optimization scenarios developed: minimal work-in-progress configuration strategy utilizing just-in-time principles and kanban methodology; optimal lead time performance strategy focusing on workflow optimization and bottleneck elimination; balanced approach combining inventory optimization with lead time improvements while maintaining operational flexibility for market volatility adaptation.

Results indicate measurable production efficiency improvements, reduced manufacturing cycle times, optimized resource utilization, enhanced competitive positioning, that could be applied to both the current value stream and the modernized Schwarzhorn composite production stream.

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