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Simulating operator learning during production ramp-up in parallel vs. serial flow production

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Abstract

The aim of this research is to demonstrate how human learning models can be integrated into discrete event simulation to examine ramp-up time differences between serial and parallel flow production strategies. The experimental model examined three levels of learning rate and minimum cycle times. Results show that while the parallel flow system had longer ramp-up times than serial flow systems, they also had higher maximum throughput capacity. As a result, the parallel flow system frequently outperformed lines within the first weeks of operation. There is a critical lack of empirical evidence or methods that would allow designers to accurately determine what the critical learning paramters might be in their specific operations, and further research is needed to create predictive tools in this important area.

Keywords:

production ergonomics | time-to-volume | production launch | human factors | discrete event simulation

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