

# **Simulation of industrial decision making: lessons learnt from field studies in process control and railway signalling environments**

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## **Abstract**

Previous work has stated that the simulation approach is appropriate for investigating complex decision making processes undertaken by operators in industrial settings. This paper discusses whether results obtained from such simulation studies can be effectively applied to real world environments, or whether other factors affect the application of simulation study results. Two studies from different industrial sectors are presented – process control in the steel industry and railway signalling. The studies investigated human operators as complex decision makers from a number of investigatory perspectives including mental workload, situation awareness and communication networks. Three aspects of a human operator's work are evident: interaction and communication, including human-system interaction and human-human interaction; naturalistic decision making, including mental workload, situation awareness and problem solving; and organisational factors, including teamwork, supervision, operator visibility, and task and job distinction. The paper concludes with a summary of what aspects to consider in future simulation research to provide effective real world solutions that support industrial decision makers.

## **Introduction**

Simulation is frequently proposed as a suitable tool for empirical research into complex decision making processes. Indeed, some methods (e.g. secondary task measures of workload - Hancock & Meshkati, 1988) or task interruption situation awareness measurement such as SAGAT (Endsley, 1987) are only generally applied in simulated environments. However, in applied human factors research, it is not always the case that results obtained from simulation studies can be effectively transferred to real world environments.

In D. de Waard, K.A. Brookhuis, J. Moraal, and A. Toffetti (2002), *Human Factors in Transportation, Communication, Health, and the Workplace* (pp. 455 - 470). Maastricht, the Netherlands: Shaker.