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The control room operator: The forgotten element in mineral process control

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Abstract

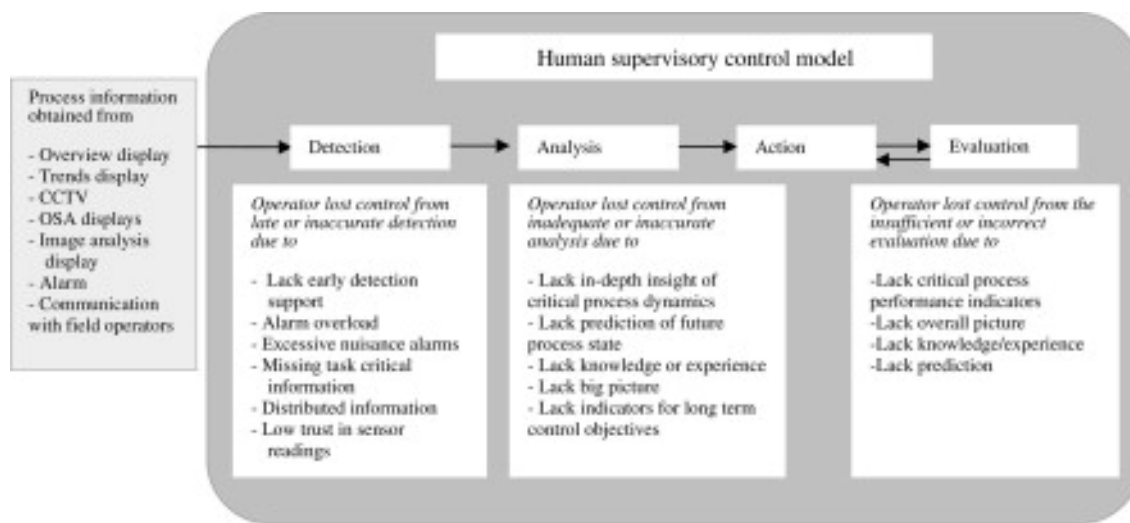
The value of process control has become widely recognized in the mineral processing industry. In the last 40 years, the industry has strived to maximize the capacities of such process control systems. Despite this sustained effort, advancement has not always resulted in the plant performance expected. The poor performance of human operators in the control room is now being seen as one of the key reasons why such process control systems fail to deliver their full potential.

Focusing on this largely forgotten element in mineral processing, this paper presents a field study from a human factors perspective to investigate the current status of control room operators and to explore the underlying “barriers” in their work environment. This study involved operators working at two different types of Australian mineral processing plants. Multiple data collection methods including control room observations, interviews, surveys and reviews of documentation were used

The findings revealed several serious shortcomings in the integration of people and technology in the current control room environment. Operator control of the systems was typically passive, alarms were mistrusted or ignored, and much technology was distrusted, rejected or not fully understood. The main reasons for this were that the current information representation in the control room did not support the needs of human supervisory control and that various organizational issues such as insufficient operator training, poor shift handover and inappropriate task allocations significantly worsened the situation. Overall it is stressed that enhancing operator capacity is a promising new area for the mineral processing industry. Developing effective Human machine interfaces (HMI) and alarms, improving operator training, and optimising organisational factors are all recommended as key items to help achieve a better integration of operators and technologies.

Graphical abstract

HMI/Alarm limitations contribute to human supervisory control failures.



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Highlights

â–° This work investigated human operation at two different types of Australian mineral processing plants. â–° It revealed several serious shortcomings in the integration of people and technology in the current control room environment. â–° The findings include the limitations of the control room interface and various organizational inadequacies. â–° Overall it is stressed that enhancing operator capacity is a promising new area for the mineral processing industry.



Keywords

Mineral process control; Human supervisory control; Human factors; Human machine interface(HMI); Alarm; Human technology integration

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