

# **Ergonomic requirements for job aids — Work documents for operators in chemical process control systems**

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## **Abstract**

In an exploratory field study in the chemical process industry, job aids such as documentation materials and instructions were examined to identify ergonomic benefits and drawbacks of the design of work documents for given tasks. An analysis of the literature resulted in only a small amount of evidence with regard to an ergonomic design of work documents and the available recommendations concerned rather formal criteria. In six control rooms analyses of jobs, tasks, qualifications and documents have been conducted using observational and interview techniques. Factors influencing the quantity and quality of the design have been identified and recommendations for an ergonomic design of usable work documents developed. The (software) ergonomic dialogue design principles transparency, consistency, and compatibility have been demonstrated to be suitable and useful for both the evaluation and the design (or redesign) of existing or new work documents. However, these dialogue principles have to be broken down in a systematic and appropriate way, appropriate to this field of application, in order to be usable for practical purposes. Although in the chemical industry in most control rooms instruction material is available to the operator, its contribution to safety and health, system reliability and productivity appears to be suboptimal. Thus, an ergonomic design of work documents is not merely badly required but also of increasing importance due to ongoing developments towards increasing complexity in process control.

## **Introduction**

Legal requirements in health and safety regulations within the EU call for usable instructions in the use of process control systems, and in the event of changes in the system, for instructions specific to the operators' job under such conditions (e.g., Seveso II Directive, Safety and Health Directive, Work Equipment Directive). This, of course, applies to the work of control room operators in the chemical industry.

However, since chemical plants with an increased risk of hazards have been addressed by the *Seveso II Directive*, requirements regarding the design of work