

Title	Contract Research Report 348: Assessing the safety of staffing arrangements for process operations in the chemical and allied industries
Publisher/Author	HSE
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Executive Summary	<p>INTRODUCTION</p> <p>This study has been completed on behalf of the Hazardous Installations Directorate (HID) of the Health and Safety Executive who have observed that a number of chemical sites are taking steps to reduce staffing levels in their operating teams. There is a concern that such reductions could impact the ability of a site to control abnormal and emergency conditions and may also have a negative effect on staff performance through an impact on workload, fatigue, etc.</p> <p>HID identified the need for a practical method that organisations could use to assess their required staffing levels and the impact on safety of any reduction in operations staff. The method is to help companies in the chemical and allied industries justify appropriate levels of operations staff by a suitable and sufficient assessment, and enable HID inspectors to apply consistent standards on staffing levels.</p> <p>Method</p> <p>The method concentrates on the staffing requirements for responding to hazardous incidents. Specifically, it is concerned with how staffing arrangements affect the reliability and timeliness of detecting incidents, diagnosing them, and recovering to a safe state.</p> <p>The method is designed to flag when too few staff are being used to control a process. It is not designed to calculate a minimum or optimum number of staff. If a site finds that its staffing arrangements ‘fail’ the assessment, it is not necessarily the case that that staff numbers must be increased. Other options may be available.</p> <p>The method is in two parts. The first is a physical assessment, the second is a ladder assessment.</p> <p>Physical assessment</p> <p>The physical assessment tests the staffing arrangements against six ‘principles’:</p> <ol style="list-style-type: none"> i) There should be continuous supervision of the process by skilled operators, i.e. operators should be able to gather information and intervene when required; ii) Distractions such as answering phones, talking to people in the control room, administration tasks and nuisance alarms should be minimised to reduce the possibility of missing alarms; iii) Additional information required for diagnosis and recovery should be accessible, correct and intelligible; iv) Communication links between the control room and field should be reliable. For example, back-up communication hardware that is non-vulnerable to common cause failure, should be provided where necessary. Preventive maintenance routines and regular operation of back-up equipment are examples of arrangements to assure reliability; v) Staff required to assist in diagnosis and recovery should be available with sufficient time to attend when required; vi) Operating staff should be allowed to concentrate on recovering the plant to a safe state. Therefore distractions should be avoided and necessary but time consuming tasks, such as summoning emergency services or communicating with site security, should be allocated to others.

The assessment is in the form of specific questions, each requiring a yes/no answer. The questions are arranged in eight trees (an example is shown in Figure I). The choice of scenarios for assessment is critical and must consider the worst cases both in terms of consequence and of operator workload.

Ladder assessment

Organisational factors are assessed using ladders (see the example in Table I - note: the dotted line represents the boundary between acceptable and unacceptable). There are twelve ladders in total.

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