

Introduction

The term **human factors integration** is often used to describe a risk-based approach to considering the human role in complex systems. This approach looks at the critical tasks that people carry out at work, and ensures that these are supported by the design of the equipment and systems they operate, the training they receive and the working practices they use.

By integrating human factors into the workplace, organisations create the conditions for successful, reliable operations which ultimately reduce human errors, accidents and costs. Across all industries, it is estimated that 80-90% of accidents can be attributed to human and organisational failures. Studies also indicate that human factors integration in design can reduce capital expenditure by up to 5% and operational and maintenance costs by 3-6% over the life of a facility (*Source: FABIG Technical Note 9*).

The consultants at HF Integration Pty Ltd are skilled in the application of human factors and ergonomics in hazardous industries. Some examples of in-house capabilities are provided below.

Human Factors Engineering (HFE)

Common in the design of oil and gas facilities, this work applies task analysis and ergonomics standards to the layout and design of equipment and workspaces. This helps to ensure that operators' requirements for controlling, inspecting and maintaining process equipment are considered throughout the project, improving the safety and efficiency of the facility. Specific activities include:

- Valve criticality analysis
- Manual handling studies
- Operation and maintenance access review
- Reducing maintenance duration



Control system ergonomics

As technological advances have allowed more and more process information to be displayed in the control room, so the role of the operator in monitoring and managing this information has become more complex. Detailed ergonomics input to the design of human-machine interfaces (HMI), alarm systems and workstations is required to support safe and efficient process control.



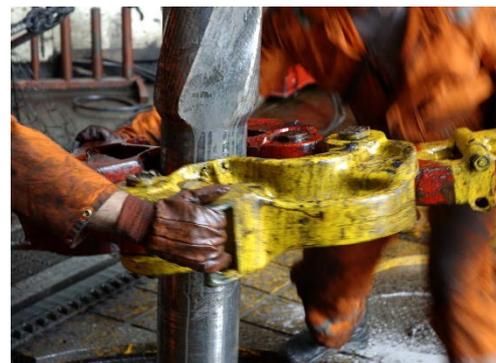
Typical aspects include:

- Ergonomic design of control consoles and display screens
- Human reliability analysis
- HMI and process control graphics design
- Human factors in automation
- Workload analysis

Workplace risk assessment and expert witness testimony

HF Integration is registered with UniSearch Expert Opinion Services, and provides expert witness testimony across all industries. Ergonomics input to the design of workplaces ensures not only that people have a safe and healthy working environment, but also that the critical parts of their job are supported. Typical studies include:

- Workplace risk assessment in hazardous industries
- Application of relevant design standards and best practice to workplace design
- Ergonomic assessment of workplaces and equipment





Human Reliability

Safety critical systems require careful consideration of human capabilities in order to achieve high reliability. HF Integration helps organisations to understand the human contribution to major accident risk, and undertakes the following studies:

- Predictive human error analysis
- Qualitative risk assessment, identifying the factors which influence human performance
- Safety Critical Task Analysis
- Quantitative human reliability assessments for support in risk modelling
- Reliability through design and allocation of function

Safety Management Systems

A company's Safety Management System defines how that organisation manages risk on site, and ensures that its workforce have the necessary tools and competencies to work safely and effectively. HF Integration supports these systems by ensuring that human capabilities and limitations are considered through:

- The design of usable and reliable procedures
- Support to management of change
- Consideration of human factors in risk assessments
- Risk based training needs analysis
- Communications analysis
- Safety Culture Assessment



Crew Resource Management (CRM)

CRM refers to the non-technical skills that operators need to work effectively in dynamic, hazardous industries. These include skills in:

- Situation Awareness
- Decision making
- Effective communication
- Teamwork and leadership
- Management of stress and fatigue

HF Integration helps organisations to recognise the importance of CRM, and develop the skills needed by frontline personnel.

About the Director

Andrew Sutherland has 15 years' experience in providing practical human factors, ergonomics and workplace risk assessment services to clients in a range of hazardous industries, including oil and gas, mining, rail and defence. He holds Masters qualifications in Psychology and Ergonomics, and in 2015 was elected as a Fellow of the Chartered Institute of Ergonomics and Human Factors, which acknowledges a significant contribution to the discipline for over 10 years.

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