

## FACTSHEET

# Human and organisational factors

Human and organisational factors are the environmental, organisational and job-related, and human characteristics that influence our behaviour at work. These factors can affect health and safety in the workplace.

What people are being asked to do (the task and its characteristics), who is doing it (the individual and their competence) and where they are working (the organisation and its attributes) all have an influence on the safety of the workplace.

This factsheet outlines ten human and organisational factors that will, if optimised, reduce the likelihood of all types of human failure.

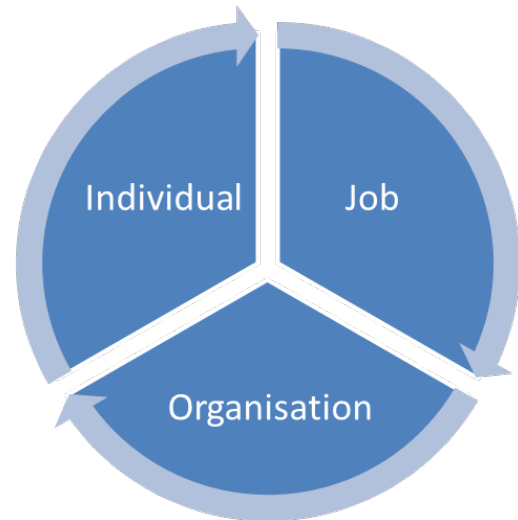


Figure 1: Considerations for human and organisational factors.

## Ten human and organisational factors to consider

### 1. Human failures

Human failures are not random. They can be attributed to two main types of human failure: errors and violations.

#### Errors

**Slips or lapses** are actions that are not planned or intended. These types of errors are commonly made by highly trained people carrying out procedures where familiarity means the person does not need to concentrate closely on what they are doing. Slips and lapses cannot be eliminated by training, but improving design can reduce their likelihood and create a more error-tolerant system.

**Errors of judgement or decision-making** are where the intended actions are wrong. These also occur when we do the wrong thing, believing it to be the right thing. These errors tend to occur in situations where a person does not know the precise method of carrying out a task, either because it is new and/or unexpected, or because they have not been properly trained. Often in such circumstances people fall back on rules remembered from similar situations, and these rules may be incorrect or inappropriate in the new situation. Training based on good procedures is the key to avoiding mistakes like these.

## Violations

Violations—non-compliance, circumventions, and shortcuts—differ from errors in that they are intentional, but usually well-meaning, failures. Typically, a person will deliberately carry out a procedure incorrectly for some perceived and/or expected gain (time, praise, ease, etc.).

These failures are rarely malicious and usually result from an intention to get the job done as efficiently, from the workers perspective, as possible. They often occur when the equipment or task has been poorly designed and/or maintained, or not entirely fit-for-purpose. Mistakes resulting from poor training are often mistaken for violations.

It is crucial to understand how and why violations are occurring before you can introduce effective methods for avoiding them. Peer-pressure, unworkable rules and incomplete understanding can all give rise to violations.

There are several ways to manage violations including:

- designing them out of the system, process of plant
- taking steps to increase their detection
- ensuring key rules and procedures are relevant, practical and the rationale behind them is explained.

The development of key rules or procedures must involve workforce consultation and participation.

## 2. Procedures

Procedures include method statements, work instructions and permits to work, which are recognised and an agreed safe way of doing things. Procedures may include step-by-step instructions, checklists, decision aids, diagrams and flow charts.

Problems with procedures are cited in numerous incidents and frequently identified as one of the causes of major accidents.

The main shortcomings are usually an over-reliance on procedures to control risk, a failure to correctly follow safe working procedures, or use of sequentially or factually inadequate procedures. Operating procedures are vital links in the control schema, but may not be the best method of controlling hazards, and certainly should not be used as the sole defence against human error.

Key principles in procedural design are:

- all procedures should address, and therefore be based on, risks identified during an assessment process
- risk assessments should clearly establish if procedures are an appropriate control measure
- consider the links between procedures and competency. Procedures cannot, and must not, substitute for actual competency.
- have a system for managing procedures that includes:
  - which tasks need procedures (not all do)
  - how procedures are developed (and who is involved)
  - how people comply and how procedures are reviewed and updated ('buy in' and reflective of current 'good practice')
  - the use of task analysis methods to inform the content development of key procedures (walking and talking through the tasks with users).
- use a format, style and level of detail appropriate to the user, task and consequence of failure. Ensure they are fit-for-purpose and seek feedback before retraining everyone on new procedures.

### 3. Training and competence

Competence can be defined as the ability to undertake responsibilities and perform activities to a recognised standard on a regular basis. It is a combination of skills, experience and knowledge.

Key principles for the assurance of competence are:

- link competence assurance to key responsibilities, activities and tasks identified in risk assessments
- ensure competency assurance systems aim to establish and maintain competency for all those involved in safety-related work, including managers
- training is an important component of establishing competency but is not sufficient on its own. Consolidation of knowledge and skills through practice is a key part of developing competency.
- make sure competence assurance systems take into account foreseeable work and operating conditions, including infrequent and complex activities, emergency situations and upsets, and maintenance
- make sure training and competence assessment methods are appropriate to the hazard profile of the tasks being undertaken. Make competency assurance systems for safety-critical tasks more robust.
- structure on-the-job training and link it to risk assessments and associated control measures, including procedures. In safety-critical environments, support on-the-job training with other forms of training.
- validate, evaluate and record all training
- schedule refresher training for infrequent, complex or safety-critical tasks. This may include appropriate reassessment.
- include site specific aspects in vocational qualifications and link them appropriately to the hazards and risks in your workplace
- aim to achieve a suitable balance between competence and supervision.

### 4. Staffing and workload

Appropriate staffing is not just a matter of having enough staff, but also ensuring staff have suitable knowledge, skills and experience to operate safely. A safe balance comes down to having the right numbers of the right people, in the right place at the right time.

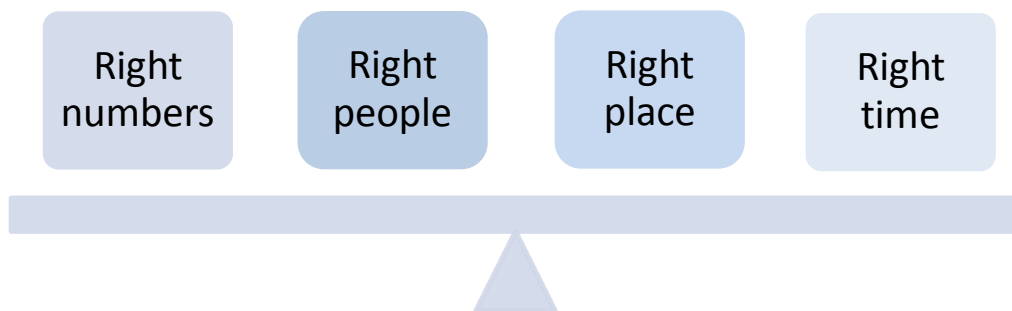


Figure 2: Balance of staffing and workload

Potential problems when reducing staffing levels include:

- health and safety considerations are not included or are overlooked when devising commercially driven reorganisation plans
- central or corporate pressure pushes local management to reduce staffing levels beyond local managers' judgement of the risk environment
- remaining staff take on all the tasks of staff that have left, leading to increasing workload and job scope
- key safety competencies are lost
- work processes are not reorganised to reduce workload
- insufficient allowance is made for emergency work, illness, absence and peak workloads (high product demand).

Signs staffing levels might be not be adequate are:

- safety-critical tasks are not completed or completed later than they should have been
- a backlog of maintenance
- more overtime on offer
- more complaints and absences due to stress, fatigue and other ill-health
- increased staff turnover due to high workload, stress and fatigue
- bottlenecks in communication
- increased customer complaints and delivery times.

## Workload

People have finite capacity for processing information, holding items in working memory, making decisions and performing tasks. Excess workload can result in:

- human performance issues such as slower or compromised task performance
- increases in errors such as slips, lapses or mistakes.

Note that underload (as opposed to overload) can also lead to human performance issues such as boredom, loss of situational awareness and reduced alertness. Workload balance affects competence, and is linked to working hours and patterns, organisational change and staffing levels.

Points to remember when considering workload are:

- performance can be affected by the workload being too high or too low
- workload can shift over time as activities are added gradually
- workload is directly related to staffing and work scheduling
- competency is indirectly affected by staffing and work loading
- crucial health and safety information is compromised during extreme workload (low or high).

## 5. Organisational change

As industry faces increasing demand challenges pressure will build for organisational change and staff reductions.

Organisational changes such as reduction in staffing levels, increased use of contractors and outsourcing, combining departments and restructuring roles and responsibilities are not usually as well analysed or controlled as changes to plant or process. If these changes are not managed properly, they can have significant impact on safety management.

Consider the following points when managing organisational change:

- examine and assess all direct and indirect effects of a proposed change on the control of hazards
- poorly managed organisational change can increase workforce stress
- major accident hazard sites should aim for higher reliability in their planning and decision-making during period of change due to greater potential for an accident
- plan organisational change in a thorough, systematic and realistic way, similar to the processes for managing plant change
- phase in change wherever possible, as too many simultaneous changes may result in inadequate attention to some or all risks
- two aspects of the change need risk assessment: risk and opportunities resulting from the change and risks arising from the process of change
- consult with staff (including contractors) before, throughout and after the change
- ensure all key tasks and responsibilities are identified and successfully transferred to the new structure
- provide training and experienced support and supervision for staff with new or changed roles
- consider a review of plans and assessment by internal and external experts
- remember that change can also happen in static organisations, for example as the result of an aging workforce.

## 6. Safety-critical communication

Spoken and written communication can be critical in maintaining safety. Things to consider include:

- general communication in the form of safety information
- communication between team members or between different teams during operation or maintenance work
- emergency communication.

Make sure all key personnel, including employees, contractors, and visitors, have access to key information to help them safely negotiate hazards in the workplace. This can include key findings in risk assessment, induction to site, evacuation drills, emergency instruction, safety warnings and so on.

- a key area of communication, particularly for major hazards, is shift communication, including shift handover
- a permit to work is effectively a means of communication between site management, plant shift supervisors and operators and those who carry out the work.

Safety-critical communication points to remember:

- identify who needs to communicate and what their communication needs are
- consider the mode of communication most appropriate for the situation, e.g. face-to-face, written, visual or verbal
- consider the timing of key safety communications, e.g. are the hazards given attention before the task?
- use language appropriate to the workforce, taking into account literacy and languages
- highlight safety-critical steps in procedure and draw attention to them in training. When trying to get an important message across, consider using two or more methods of communication.
- putting up signs can be part of an effective safety communication, but they are not enough on their own.

## 7. Human factors in design

The design of control rooms, plant and equipment can have a large impact on human performance. Designing tasks, equipment and workstations to suit the user can reduce human error, accidents and ill-health.

The earlier consideration is given to human factors and ergonomics in the design process, the better the results are likely to be. It is important to use human factors and ergonomics expertise appropriately by involving people with knowledge of the working processes and the end user.

Poor design contributes to work-related ill health and has been found to be a root cause of several major accidents. Involving the end user is key to designing operable and maintainable plant and systems.

Design points to remember:

- design control rooms and equipment in accordance with key ergonomic standards
- involve users in the design process. Include different types of users such as operators, maintenance and systems support personnel.
- give consideration to operator characteristics including body, size and strength and mental capability.
- design plant and processes for operability and maintainability. Do not neglect other elements of the lifecycle, for example decommissioning.
- give consideration to all reasonably foreseeable operating conditions, including emergencies
- consider the interface between the end users and the system.

## 8. Fatigue and shift work

Fatigue arises from excessive working time or poorly designed shift patterns. It is generally considered to be a decline in the mental and or physical performance that results from prolonged exertion, sleep loss and disruption of the internal clock. It is also related to workload. Workers are more easily fatigued if their work is machine paced, complex or monotonous.

Fatigue results in slower reactions, reduced ability to process information, memory lapses, absent mindedness, decreased awareness, lack of attention, underestimation of risk and reduced coordination. Fatigue can lead to errors and accidents, ill-health and injury, and reduced productivity.

Points about fatigue to remember:

- risks associated with both developing fatigue and being fatigued need to be assessed and controlled via consultation
- being fatigued can have acute consequences (safety risks) and chronic consequences (health risks)
- working hours and scheduling make up a great proportion of the causal factors in the development of fatigue in workers and they need to be risk-assessed prior, during and after any proposed changes
- survey employees on the impacts of their working hours and shift patterns as part of a monitoring program
- develop a policy that addresses and sets limits on working hours, overtime and shift swapping, and on-call working
- increasing or regular shift swapping may indicate problems with inadequate resource allocation
- a planned and systematic approach to assessing and managing the risk of shifts can improve the health and safety of workers

- a no-blame reporting system can effectively assist in identifying potential fatigue issues as they emerge
- sleep disturbance (often unreported or detected) can lead to sleep debt and fatigue.

## 9. Organisational culture

Organisational culture is often understood as ‘the way we do things around here’. Culture forms the context in which people judge the appropriateness of their behaviour. An organisation’s culture will influence human behaviour and human performance at work.

An organisation’s safety culture can influence safety outcomes and impact on the effectiveness of the safety management system. It is a subset of the overall organisational or company culture. Management style is a significant factor with regard to safety culture.

Safety culture points to remember:

- management commitment and style is a key driver
- employee involvement is crucial
- training and competence play key roles in the satisfaction of workers
- good communication is essential
- compliance with procedures needs to be balanced with autonomously functioning work teams
- investigation of incidents should focus on the whole system not just the operator
- organisational learnings must be shared.

## 10. Maintenance, inspection and testing

Maintenance, inspection and testing (MIT) are key activities for many industries. These activities can be assessed through two means: a review of the outputs and assessment of the process.

Questions to ask about your company are:

- Have adequate resources and staff been made available to undertake the necessary maintenance, inspection and testing in your organisation?
- Do senior managers and directors fully understand the consequences of failing to provide these resources?

Key considerations in maintenance, inspection and testing include:

- allocation of roles and responsibilities for managing MIT activities
- a system for identifying relevant plant and equipment, including an MIT system
- ensuring people determining MIT regimes and intervals are competent to do so
- a system for assuring the competence and supervision of those personnel undertaking the activities
- providing appropriate instructions and procedures for MIT staff
- ensuring effective communication between all personnel in the MIT system.
- providing an effective system to record, track and trend MIT information
- managing MIT with consideration to priority
- lag and lead indicators that reflect the risk profile of the plant and equipment
- ensuring procedures for examination inspection and proof testing have clear pass fail criteria
- conducting an independent review of MIT systems to see if they are fit for purpose.

## More information

A good general source of information is [Human factors and ergonomics \(Health & Safety Executive UK\)](#).