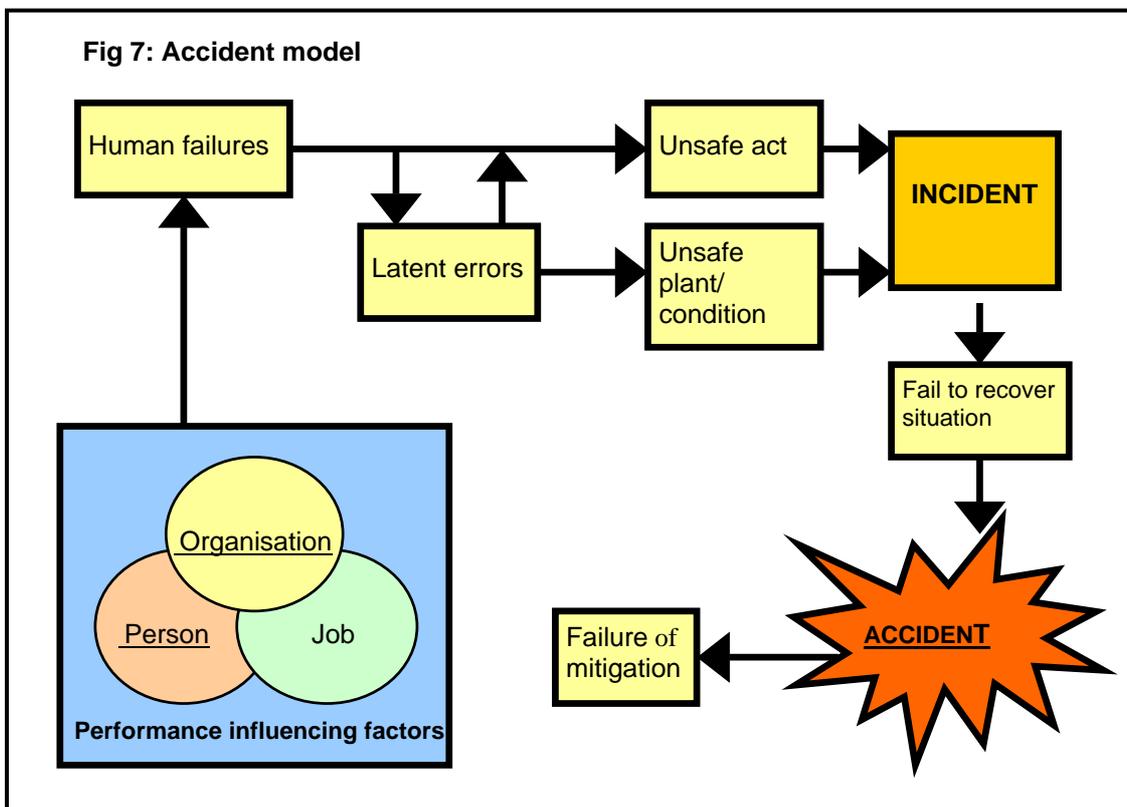


**Human Factors view of accident causation**

Accidents are caused by active failures or latent conditions which can lead to human error or violations. Active failures are the acts or conditions precipitating the incident situation. They usually involve the front-line staff, the consequences are immediate and can often be prevented by design, training or operating systems.

Latent conditions are the managerial influences and social pressures that make up the culture ('the way we do things around here'), influence the design of equipment or systems, and define supervisory inadequacies. They tend to be hidden until triggered by an event. Latent conditions can lead to latent failures: human error or violations. Latent failures may occur when several latent conditions combine in an unforeseen way. We all make errors irrespective of how much training and experience we possess or how motivated we are to do it right.

**The human contribution to accidents**



People can cause or contribute to accidents (or mitigate the consequences) in a number of ways:

- Through a failure a person can directly cause an accident. However, people tend not to make errors deliberately. We are often 'set up to fail' by the way our brain processes information, by our training, through the design of equipment and procedures and even through the culture of the organisation we work for.
- People can make disastrous decisions even when they are aware of the risks. We can also misinterpret a situation and act inappropriately as a result. Both of these can lead to the escalation of an incident.
- On the other hand we can intervene to stop potential accidents. Many companies have their own anecdotes about recovery from a potential incident through the timely actions of individuals. Mitigation of the possible effects of an incident can result from human resourcefulness and ingenuity.

- The degree of loss of life can be reduced by the emergency response of operators and crew. Emergency planning and response including appropriate training can significantly improve rescue situations.

The consequences of human failures can be immediate or delayed.

**Active failures** have an immediate consequence and are usually made by front-line people such as drivers, control room staff or machine operators. In a situation where there is no room for error these active failures have an immediate impact on health and safety.

**Latent failures** are made by people whose tasks are removed in time and space from operational activities, e.g. designers, decision makers and managers. Latent failures are typically failures in health and safety management systems (design, implementation or monitoring). Examples of latent failures are:

- Poor design of plant and equipment;
- Ineffective training;
- Inadequate supervision;
- Ineffective communications;
- Inadequate resources (e.g. people and equipment); and
- Uncertainties in roles and responsibilities.

Latent failures provide as great, if not a greater, potential danger to health and safety as active failures. Latent failures are usually hidden within an organisation until they are triggered by an event likely to have serious consequences.

### **Investigating the causes of accidents**

After an accident involving human failure the investigation into the causes and contributing factors often makes little attempt to understand **why** the human failures occurred. Finding out both the immediate and the underlying causes of an accident is the key to preventing similar accidents through the design of effective control measures. Typical examples of immediate causes and contributing factors for human failures are given below:

- Job factors;
  - illogical design of equipment and instruments;
  - constant disturbances and interruptions;
  - missing or unclear instructions;
  - poorly maintained equipment;
  - high workload;
  - noisy and unpleasant working conditions.
- Individual factors
  - low skill and competence levels;
  - tired staff;

- bored or disheartened staff;
- individual medical problems
- Organisation and management factors
  - poor work planning, leading to high work pressure;
  - lack of safety systems and barriers;
  - inadequate responses to previous incidents;
  - management based on one-way communications;
  - deficient co-ordination and responsibilities;
  - poor management of health and safety;
  - poor health and safety culture.

### **Specific documents**

In addition to the general documents that should be requested prior to the visit (see chapter 'aim of the guidance') it is recommended that the following documents, which are specific to this topic, should also be requested:

- copy of company accident report into recent near miss, MAH, or accident with MAH potential.

### **Guidance**

- **Reducing error and influencing behaviour**, HSG48
- **Successful health and safety management** HSG65

### Question set: HF in accident investigation

	Question	Site response	Inspectors view	Improvements needed
1	Are investigations carried out by multi-functional teams, including operators where appropriate?			
2	Do investigations recognise that accidents normally have more than one cause?			
3	Do investigations identify underlying causes and system failures, not only immediate causes?			
4	Do investigations recognise that there are different types of human failure, and take appropriate remedial action (i.e. avoiding pat answers to 'human error')?			
5	Do investigations of human failures look for root causes (performance influencing factors)?			
6	Are employees blamed only where fair?			
7	Is the quality of investigations controlled, i.e. through management arrangements such as training, guidance and quality assurance?			
8	Is there an effective mechanism for action tracking?			