What Went Wrong?

A case study in a damaging incident.

If we are to prevent future incidents happening, we must be able to identify and correct those 'contributing factors' proved to be a 'Root Cause' of the incident.

Prepared by Neville J. Betts, CFSIA.RSP (Australia)

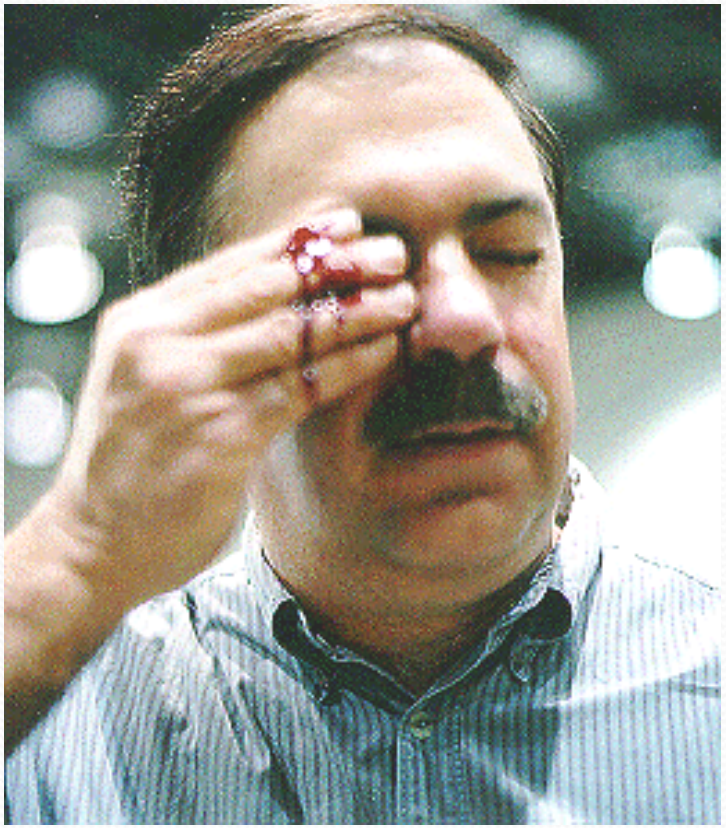
There is no such thing as an accident. What we call by that name is the effect of some cause which we do not see.

Voltaire, Author and Philosopher, 1694-1778


CAT

Considerations

- Effective investigation of incidents is of paramount importance to ensure prevention of reoccurrence.
- Human error is to be expected, anticipated and provided for. No-one is immune from making errors



HUMAN ERROR IS A CONSEQUENCE, NOT A CAUSE.

Examples of Human Error

- Inexperience or incompetence;
- Habit, Carelessness;
- Ill health or poor fitness;
- Psychological or cultural differences;
- Reliance on memory and discretionary decision making and;
- Rushing to complete the task.

Examples of Human Error

- Impact of workload (i.e. fatigue, stress and other human limitations);
- Poor, inadequate or incorrect communications;
- Poor, inadequate or incorrect formulation, transgression and execution of instructions or authorities;

Considerations

Incident Investigators should be able to;

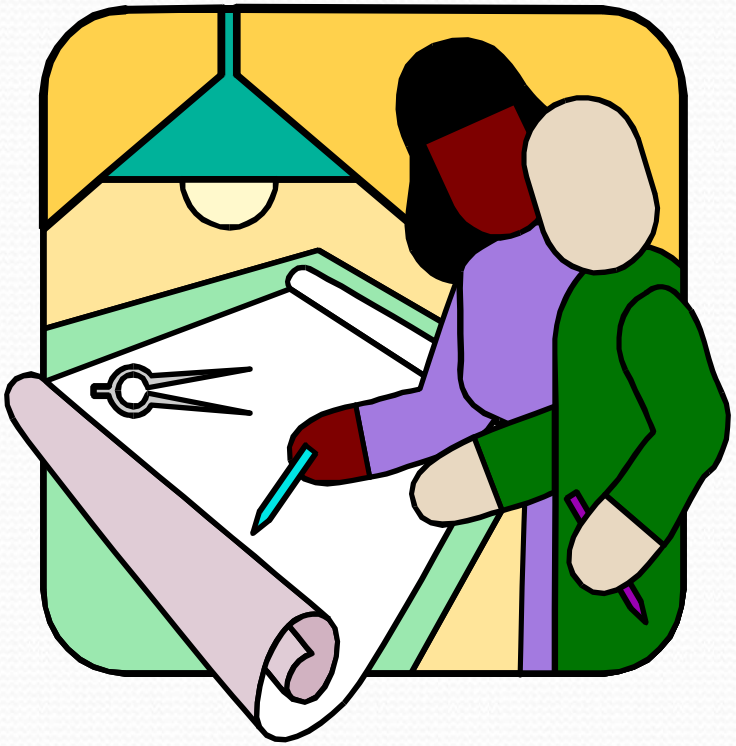
- Recognise the implications of an incident
- Plan an incident investigation
- Carry out an investigation
- Collect and analyse information
- Make appropriate recommendations
- Prepare an incident report.

Considerations

Incident Investigators should be able to;

- Locate, interpret and apply relevant information
- Work effectively with others
- Maintain required records
- Select and use appropriate workplace colloquial and technical language and communication.

TYPES OF INVESTIGATION



- Coronial Investigation.
- Police enquiry.
- WorkCover Authority.
- Company Investigation.
- Insurance Investigation.
- Other regulatory enquiries.

The role of investigators

- As investigators, you will be required to find out the systemic reasons for the incident occurrence
- The external investigator is collecting, examining and analysing evidence to find out whether any legal action will be taken, and if so, against whom.

Normally, Investigators are appointed to find out;

- What are the gaps in the management and operation of the business that allowed this incident to happen?
- You need to establish the contributing factors and then determine the root cause (s).

City Rail Train collided with the larger Indian Pacific
2nd December 1999

Failure to 'Risk Assess' the communications technology

Commissioner McInerney was incredulous at the antiquated nature of the communication systems in use. He said;

Perhaps he (the driver of the Indian Pacific) could send up a smoke signal. Really, in the 21st Century, a technology that was early 20th century is still being used to communicate. I find that very difficult to understand.

Contributing Factors and Root Cause (s)

- A contributing factor is any action, inaction or condition that is directly linked to the occurrence and if removed, may prevent or reduce the severity of an occurrence
- The root cause may include any element that, if removed, would have prevented the occurrence or reduced its consequences.

CONTRIBUTING FACTORS

SYSTEMS OF WORK

- Lack of systems & procedures
- Inappropriate systems & procedures
- Poor training in procedures
- Housekeeping

What is Root Cause?

The root cause may include any element that, if removed, **would** have prevented the occurrence or reduced its consequences.

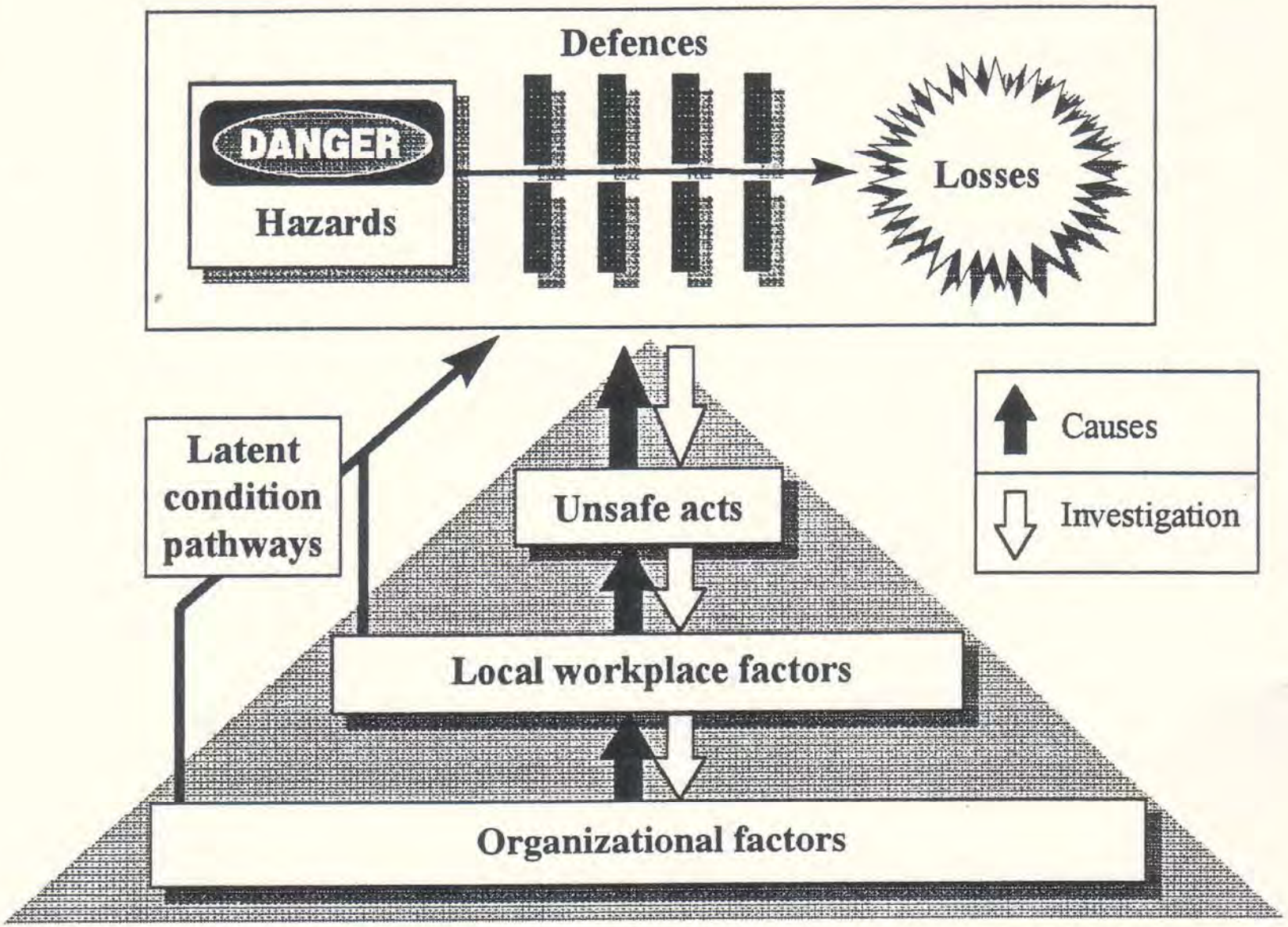
Importantly

It is essential to find out the contributing factors to technical failures, these could be: design, quality or availability or hardware, maintenance and/or housekeeping (***Latent Conditions***).

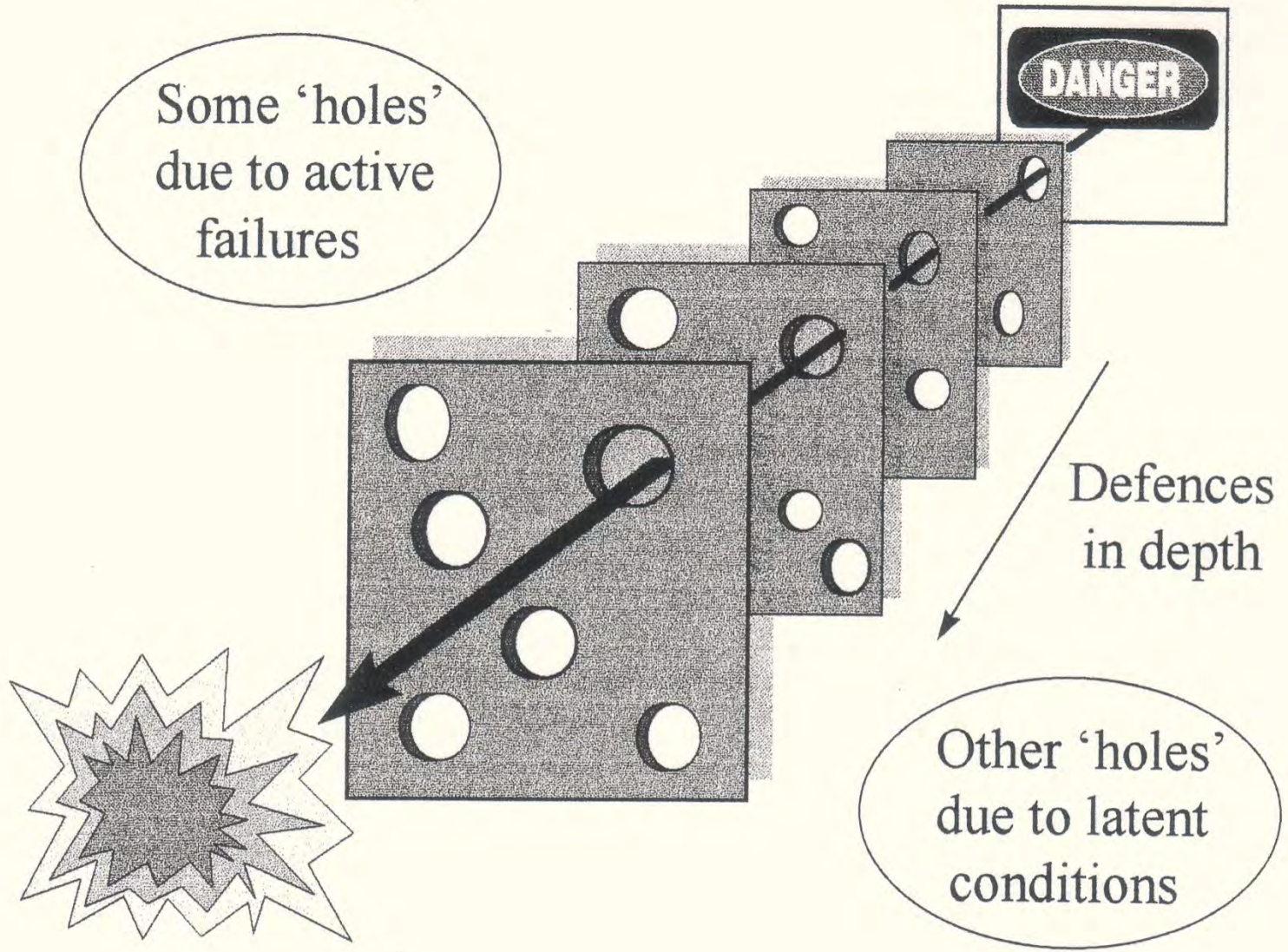
It is also essential to find out the human failures committed by individuals or teams

(***Active Failures***).

J. Reason, (2000) Managing the Risks of Organisational Accidents, Ashgate, Sydney, pp 10-11



Stages in the development and investigation of an organizational accident



An accident trajectory passing through corresponding holes in the layers of defences, barriers and safeguards.
The holes can be created by active and latent failures.

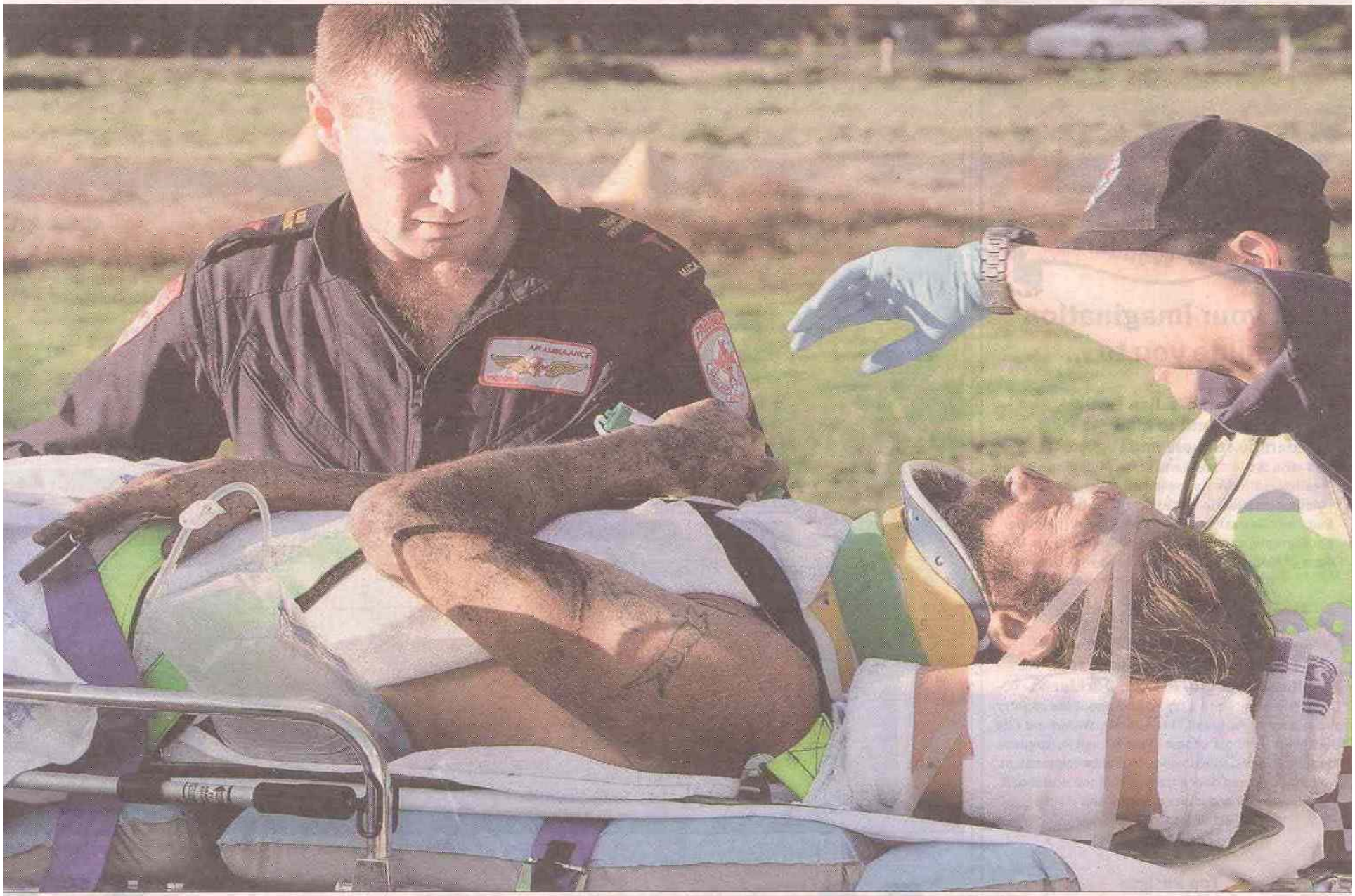
Kerang Rail Crossing Collision

On Tuesday 5th June 2007, at 13:34 hrs, the Melbourne bound N-Class Locomotive with 3 H-Class carriages collided with a B-Double Semi Trailer causing multiple fatalities.

The train had departed from Swan Hill at 13:00 hrs and was due to arrive at 17:09. In all, 3 V/Line staff and 34 passengers with reservations were on the train and two or more other passengers without reservations.

The incident occurred on the Murray Valley Highway approximately 3 kms north west of Kerang at an actively protected level crossing, which has flashing lights, bells and signage, but no booms.

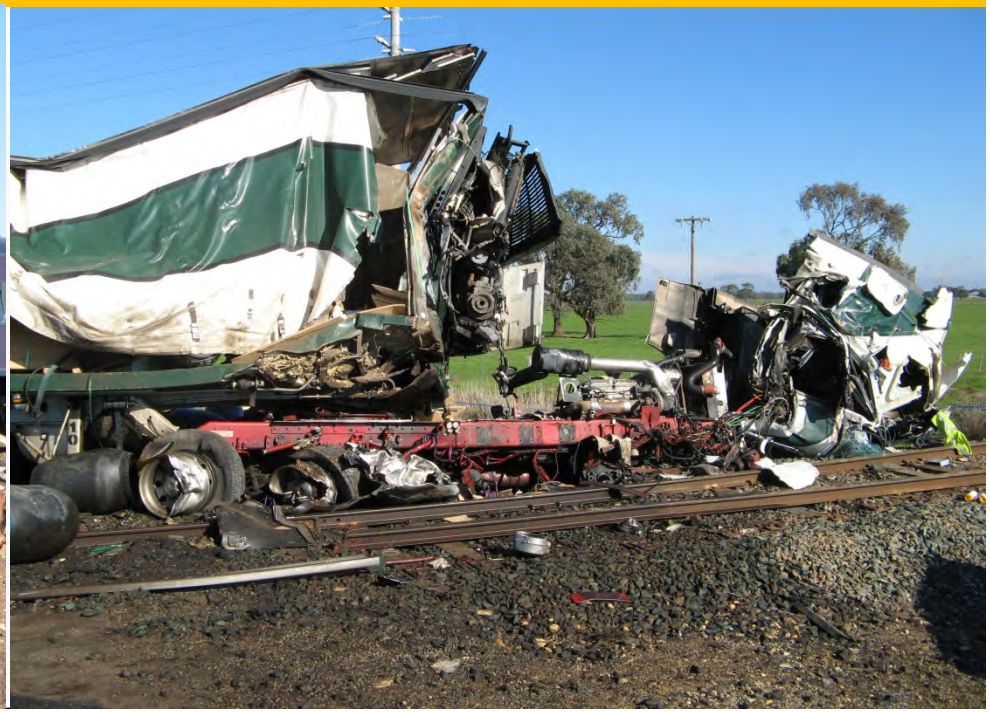

CROSSING



Pain: medics tend to an injured man before he is flown to Melbourne from Kerang. Picture: ANDREW TAUBER

Consider;
What were the Latent Conditions ?
What were the Active Failures ?

Eleven (11) persons died and many more were injured and traumatised by this Incident



Ladbroke Grove Rail Crash (UK)

Ladbroke Grove Rail Crash (UK)

October 1999

Passenger train passed a red signal and collided with a high speed passenger train.

- 31 people died
- 400 injured

Ladbroke Grove Rail Crash (UK)

The enquiry, when faced with a massive failure of 'risk awareness' used the following terms;

- ***A culture of apathy***
- ***Inadequate management***
- ***An endemic culture of complacency***
- ***An unresponsive and slow moving culture***.

Developing a Safety Culture

The bad news is that creating a healthy safe culture and keeping it alive requires effort.

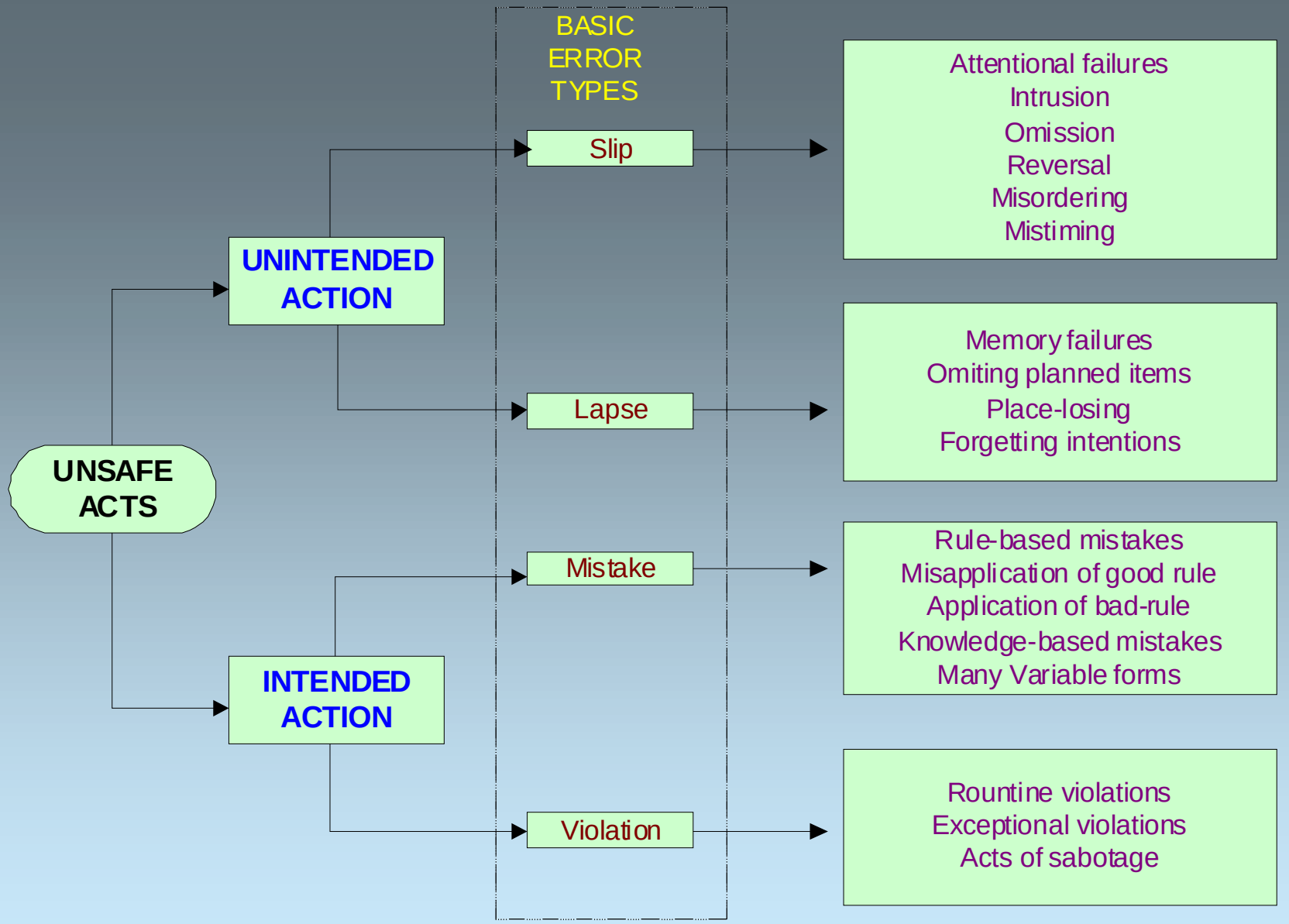
Comment by Professor Patrick Hudson, Safety Culture: The ultimate goal, Flight Safety Australia, Sep-Oct 2001

The good news is that developing a safety culture is worthwhile, both in terms of lives and disabling injuries and profits.

A Culture of Safety

Culture is the invisible force behind the tangibles and observables in an organisation. It is the social energy that moves people to act in certain ways.

Culture is to an organisation what personality is to the individual- a hidden, yet unifying theme that provides meaning, direction and mobilization for both the employer and the employees.



Psychological varieties of unsafe acts, James Reason, *Managing the Risks of Organisational Accidents*, Ashgate, 2000)

What is meant by ‘Human Factors’?

The discipline of optimising human performance in the workplace:

- Considers the working environment from a human-centered viewpoint looking at the whole system and its influence on the way people behave.
- Applies information about human characteristics, capacities and limitations to the design of human tasks, machines, machine systems and environments.

What is meant by ‘Human Factors’?

Considers the potential for human error, incidents and safety risks that may result from human error.

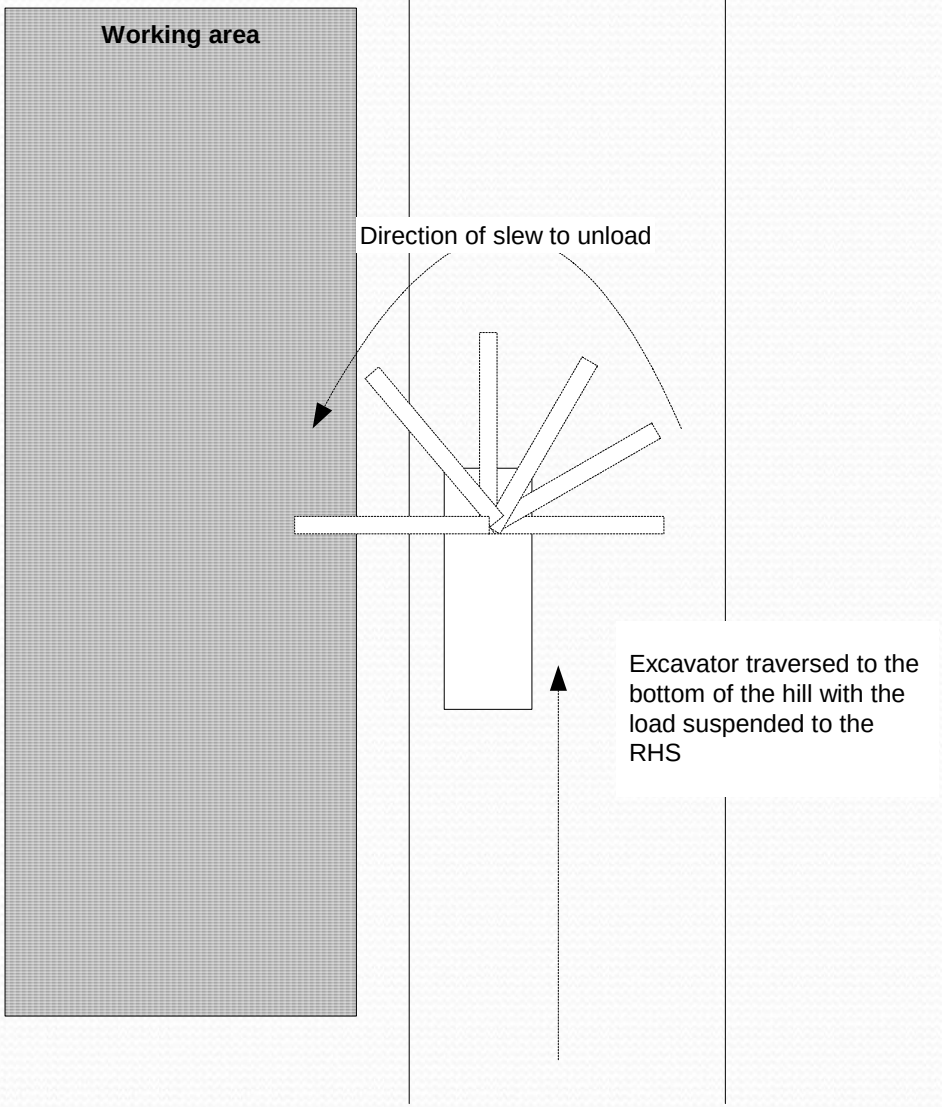
For example ,from the failure of risk controls dependent on human involvement.

Beresfield NSW Rail Crash, 23 October 1997.

Finding of the Beresfield Rail Investigation

- The investigation found the circumstances of the incident were consistent with the crew failing to comply with caution and stop signal indications protecting the stationary train.
- Reduced driver alertness, associated with work related fatigue, was found to be a significant factor in the events leading to the collision, together with a system intolerant to human error, and inadequate safety defenses.
- Vigilance Controls that led to Mindless Repetition.

CASE STUDY


Working area
Direction of slew to unload
Excavator traversed to the bottom of the hill with the load suspended to the RHS
Top of Hill

Activity- **Analyse the Findings**

Case Study

- **Consider all the information from your case study, identify the contributing factors and build a sequence of events.**
- **Make notes on the contributing factors, and a rough sketch of the sequence of events, below.**
  - a) Contributing factors and determine the possible root causes
  - b) Sequence of events (diagram)
- **Nominate the Root Causes**.

Activity

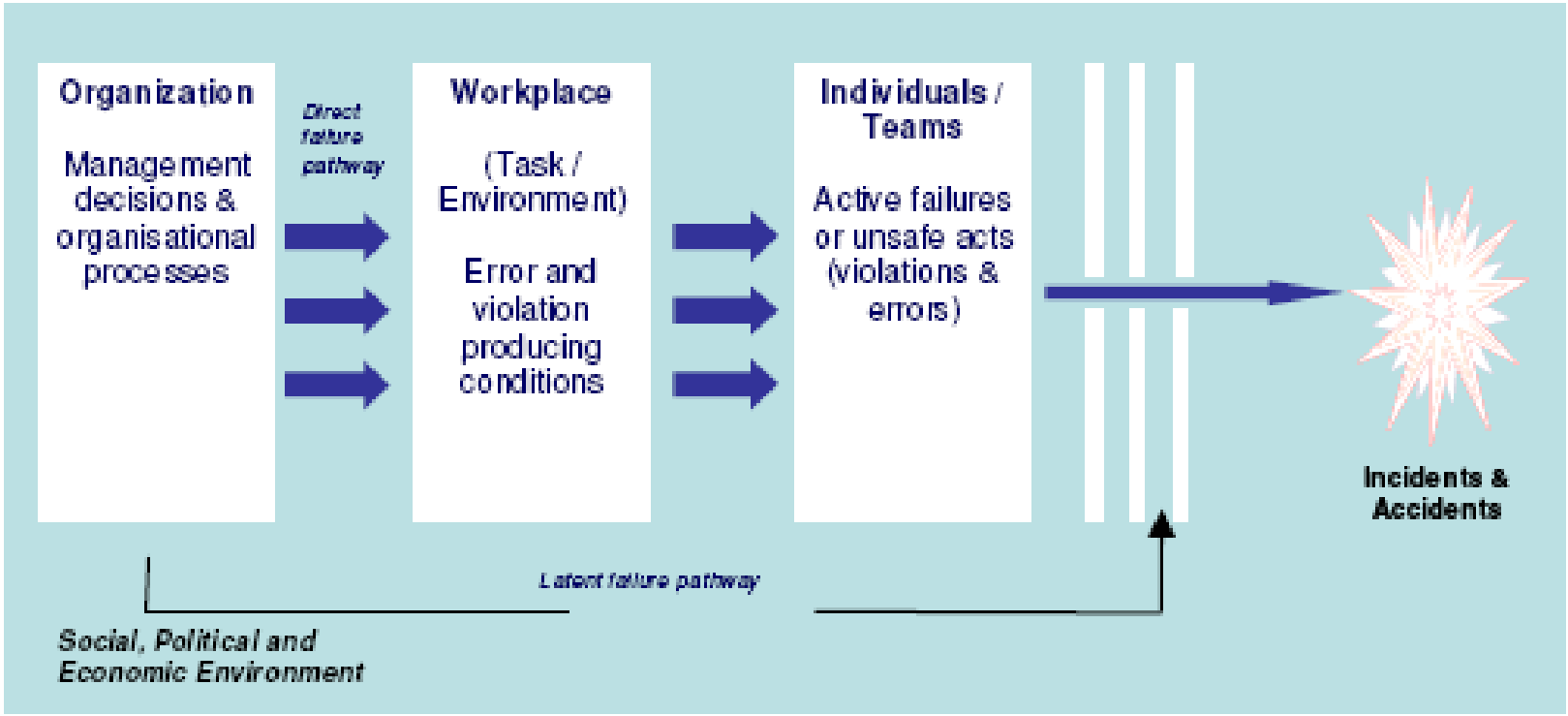
- List some examples of evidence that could be damaged at the site of an incident - and the best way to preserve that evidence:

The James Reason Model

- The intention of the model is to discover every factor which contributed to the incident. Some of these factors are 'latent' - that is 'lying in wait' and not directly connected to the incident.
- This includes system failures made by designers, managers and maintenance staff.
- The Reason model produces a long chain of events, starting with senior management decisions and culminating in errors and failures at the operational level.

Reason J, (2000) Managing the Risks of Organisational Accidents, Ashgate, Sydney

Reason Model



The causal chain for Organisational Errors

Longford explosion and fire: August 1998