People can cause or contribute to accidents – human failures.

THERE ARE 2 CAUSES OF HUMAN FAILURES

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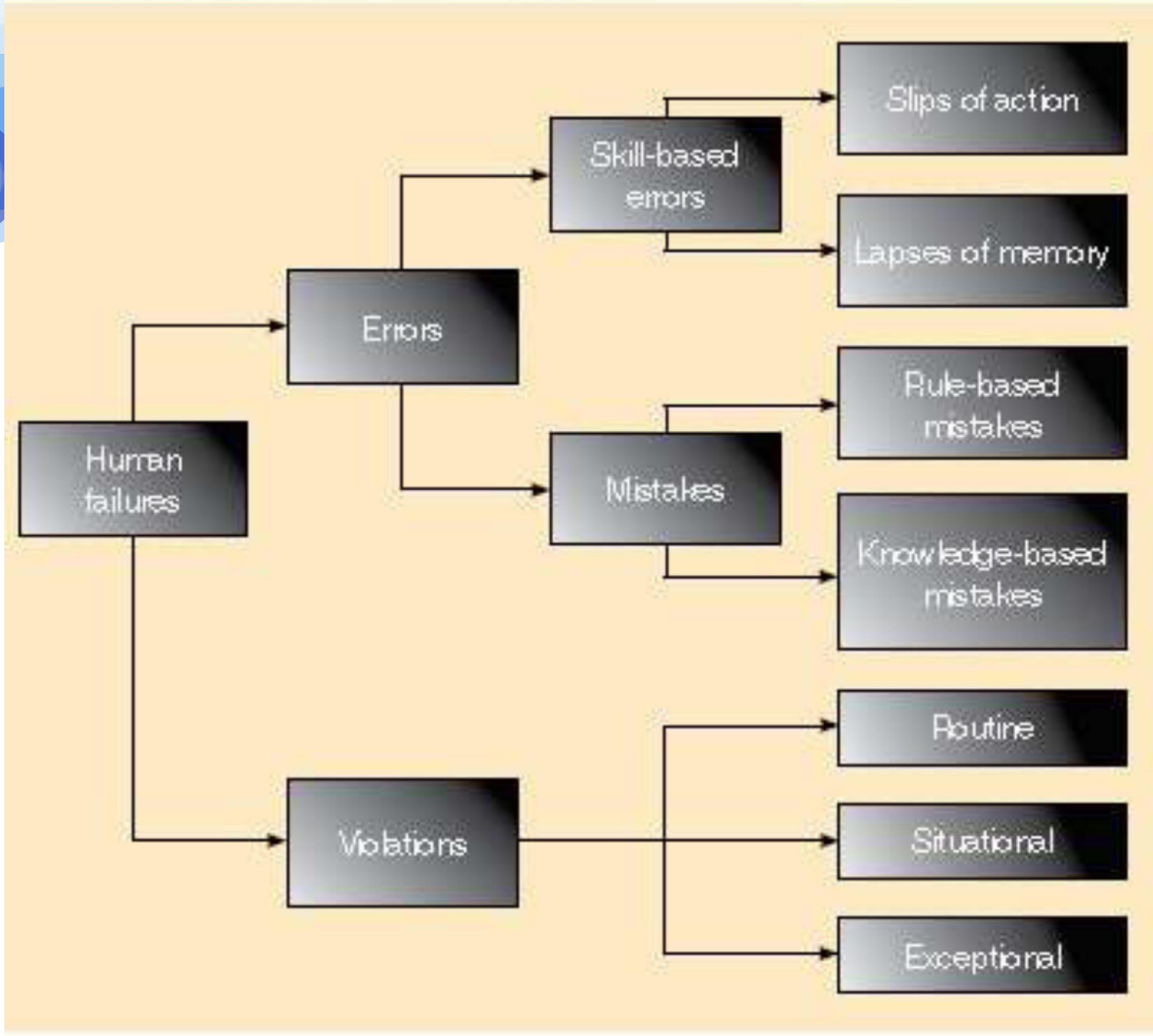
VIOLATIONS + ERRORS = INJURY, DEATH & DAMAGE


Human failures
Errors
Skill-based errors
Slips of action
Lapses of memory
Mistakes
Rule-based mistakes
Knowledge-based mistakes
Violations
Routine
Situational
Exceptional

HUMAN ERROR IS THE FAILURE OF PLANNED ACTIONS TO ACHIEVED THEIR DESIRED NEEDS

It is suggest that human error is a primary cause of 60-90% major accidents.

There are 2 basic types of human error:

1. Skill-based error
2. Mistakes

HUMAN ERRORS

Skill-based error

- Involve routine tasks in familiar situations.
- May cause by inattention or over attention.
- Two categories – slips and lapses

Slips

- Failure of execution of planned tasks i.e. ‘action-not as-planned’.
- May be due to distraction from task or preoccupation with other things.

SKILL-BASED ERROR

Slips – examples

- Picking up the wrong component from a mixed box.
- Omitting a step or series of steps from a task.
- Performing the action in the wrong direction (e.g. turning a control knob to the right rather than the left.

SKILL-BASED ERROR

Lapses

- Failures to carry out an action due to forgetfulness (memory failures).
- Can be reduced by minimising distractions and interruptions to tasks and by providing effective reminders.

SKILL-BASED ERROR

Lapses – example

An experienced road tanker driver had virtually completed the filling of his vehicle from a bulk tank of flammable liquid when a nearby telephone rang. After ignoring it for some five minutes he closed the various valves on the installation and went to answer it. On returning to the vehicle he drove away having forgotten that he had not disconnected the tanker hose from the installation. Fixed pipework from the installation fractured and approximately one tonne of material was lost. The installation was not fitted with a drive-away protection device.

SKILL-BASED ERROR

Mistakes

- Do the wrong thing believing it to be right.
- Two types of mistakes – rule-based and knowledge-based.

Rule-based mistakes

- Occur when our behaviour is based on remembered rules or familiar procedures.
- It is called rule-based because we apply rules of the kind*: if (this situation) then do (these actions).*

Rule-based mistakes - example

An operator was very familiar with the task of filling a tank. He expected the filling procedure to take about 30 minutes. However, on this occasion the diameter of the pipe entering the tank had been enlarged and the tank was filling much more rapidly than he anticipated. He ignored the high level alarms on the grounds that the tank could not be full so quickly. The tank overflowed. Improved communications would have alerted the operator to the changes that had been made to the pipe.

Knowledge-based mistakes

- May occur when we have to think our way through a novel situation for which we do not have a procedure or “rule”.
- Make wrong judgement due to insufficient knowledge or experience (lack of expertise).

Knowledge-based mistakes - example

A man was killed while removing the lid of a 45 gallon drum using a burning torch. He had not been told that the drum contained flammable residues. The drum exploded when heat was applied.

VIOLATIONS ARE ANY DELIBERATE DEVIATIONS FROM RULES, PROCEDURES, INSTRUCTIONS & REGULATIONS

There are 3 categories of violations:

1. Routine
2. Situational
3. Exceptional

HUMAN ERRORS

Routine

- Breaking the rule or procedure has become a normal way of working within the work group.

VIOLATIONS

Routine - example

The inquiry into the Clapham Rail Crash found that maintenance working practices had degraded to the point where it had become routine not to use the prescribed method for certain tasks. Poor supervision and problems with training and testing meant that this situation was allowed to persist.

In a study of Dutch railways, 80% of the workforce considered that the rules were mainly concerned with pinning blame, while 95% thought that work could not be finished on time if all the rules were followed.

VIOLATIONS

Situational

- Breaking the rule is due to pressures from the job such as being under time pressure, the right equipment not being available, or even extreme weather conditions.

Situational – design features which increase violation

- Awkward, uncomfortable or painful working posture
- Excessively awkward, tiring or slow controls or equipment
- Difficulty in getting in or out of operating or maintenance position
- Equipment or software which seems unduly slow to respond
- High noise levels which prevent clear communication
- Frequent false alarms from instrumentation
- Instrumentation perceived to be unreliable
- Procedures which are hard to read or out of date
- Difficult-to-use or uncomfortable personal protective equipment
- Unpleasant environments, eg dust, fumes, extreme heat or cold

VIOLATIONS

Situational - example

A steel erector was killed when he fell 20 m from a structure under erection. Although harnesses were provided there was no provision for fixing them and there were no other safeguards available.

VIOLATIONS

Exceptional

- Rarely happen and only then when something has gone wrong.

Exceptional - example

Before the accident at the Chernobyl nuclear power plant a series of tests were being undertaken. When an operator failure led to dangerously low power levels the test should have been abandoned. Operators and engineers continued to improvise in an unfamiliar and increasingly unstable regime to protect the test plan.

VIOLATIONS