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INVESTIGATION TECHNIQUES

ICAM – POCKET GUIDE

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This pocket booklet is designed to provide you with an easy reference point for key issues that you may need to refer to when out in the field conducting an investigation.

CONTENTS

IMMEDIATE ACTIONS

We start with the immediate actions which need to be taken prior to the investigation commencing. It is expected that these will already have happened by the time you need to use this booklet but they are produced here as a reminder of what should have already happened by the time the investigation starts.

Immediate response—ensure safe to intervene

Provide first aid

Notify the emergency services

Evacuate the area if necessary and initiate emergency response and mitigation measures.

Notify next of kin and support victim

Notify authorities (WorkSafe NZ, Police etc.)

Notify legal advisor/insurer

Secure the accident scene

Commence investigation

PLANNING THE INVESTIGATION

INITIAL PLANNING

Once a decision has been made to commence the investigation you will need to convene an initial planning meeting to consider such issues as:

INVESTIGATION RESOURCES

- Office or meeting room capable of being locked or secured
- Access to resources such as computers, phones etc
- Administration assistance if required
- Equipment or other items required to carry out the investigation (a suggested list is given at the bottom of this section)

ACCESS REQUIREMENTS

- Personnel, witnesses
- Documentation such as maintenance records, time sheets, training records etc
- Premises and equipment

INVESTIGATORS TOOL KIT

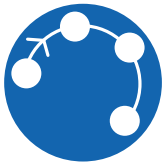
- First aid kit
- Mobile phone
- Disposable gloves
- Camera
- Torch and batteries
- Zip lock plastic bags and labels
- Emergency phone numbers
- Chalk and/or spray paint
- Clip board, notebook, pen, pencil and dictaphone recorder
- Tape measure
- Caution tape
- Breathing apparatus (if needed)
- Protective clothing (as required)
- Air contaminant testing equipment (if needed)

SIX STEPS TO ACCIDENT INVESTIGATION

Once the initial planning stage is complete we now need to consider the stages of the accident investigation itself. There are six steps:

1 Decide the level of investigation

2 Gather information



3 Establish the sequence of events

4 Analyse the information

5 Complete the investigation report

6 Follow up and close out

GATHERING INFORMATION

PEEPO

This stands for People, Environment, Equipment, Procedures and Organisation.

For each of these categories the accident investigation team will need to consider all actions, conditions and deficiencies which require further examination in order to determine if any of these were a contributing factor. This list is not exhaustive but is produced to serve as a reminder of the sort of information that may be of interest:

PEOPLE

- Witnesses
- Others who may be able to assist

How do we do this?

- Interviews
- Statements
- Observations

EQUIPMENT

- Plant and Equipment
- Tools
- Buildings and infrastructure
- Vehicles

How do we do this?

- Operating instructions
- Manufacturer's instructions
- Testing and certification
- Actual operation

ENVIRONMENT

- Weather conditions
- The general working environment
- The actual scene of the accident

How do we do this?

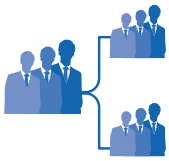
- Physical inspections
- Photographs
- Diagrams/maps
- General observations
- Event reconstructions

PROCEDURES

- SOP's
- JSA'a
- Written/Verbal Instructions
- Documents and reports

How do we do this?

- Review
- Compare and contrast



ORGANISATION

- Training
- Supervision
- Time management
- Hours of work
- Resourcing

How do we do this?

- Review
- Compare and contrast

DATA COLLECTION CHECKLIST—PEOPLE

Records	Personnel, medical, training and incident history records.
Roster	Time sheets, shift rosters and work cycles.
History	Previous 72 hour history of key personnel involved.
Psychology	Assessment of personality, safety attitude, motivation, conflict, stress, external influences, i.e. social and domestic pressures.
Physiology	Assessment of physical and mental state prior to the incident including fatigue, substance abuse, physical stress, illness or impairment, environmental discomfort, age and physical condition.

Ability	Assessment of training, experience and competence for the task.
Supervision	Levels and quality of supervision.
Alertness	Assessment of situation and hazard awareness.
Communication	Assessment of communication adequacy and effectiveness.
Teamwork	Assessment of teamwork, workload sharing and coordination of effort.

DATA COLLECTION CHECKLIST—EQUIPMENT

Design	The design of the equipment should be adequate to meet the requirements and operational conditions under which they were being used.
Construction	The equipment should be constructed to specifications within the design standard.
Testing	The equipment should be tested to ensure it meets the design standard and construction specifications.

Inspection	There should be an inspection procedure for monitoring the status of the equipment: › On initial delivery › Periodically throughout its life › At critical times before, during and after operation.
Maintenance	The equipment should be maintained to the manufacturer's recommendations to maintain the original design performance safety and reliability standards.

Modification	Equipment modification should be carried out by controlled procedure to ensure performance, safety and reliability are not adversely affected. Modifications should also account for changes to: › Maintenance procedures › Inspection procedures › Operating procedures › Ergonomics › Man-machine interface.

DATA COLLECTION CHECKLIST—ENVIRONMENT

Illumination	Too much or too little light that was a negative influence on vision.
Precipitation	Climatic precipitation that has a negative influence on human or equipment performance. This includes condensation, fog, frost, hail, ice, mist, rain, sleet or snow.
Contaminants	Natural or man-made elements that render material or the environment unsatisfactory for human or equipment use and have a negative influence on performance. These include carbon dioxide, carbon monoxide, chemicals, dust, foreign objects, debris, fumes, gases, impurities, mists, smog, smoke, toxic materials or vapours.

Noise	Unwanted sounds that produces hearing loss, disturb/ distract attention from the task at hand or interfere with communication.
Temperature / humidity	Extremes of heat, cold and humidity that have a negative influence on human or equipment performance.
Wind / turbulence	Natural or man made air movement that has a negative influence on human or equipment performance.
Vibration	Repeated/periodic motions that have a negative influence on human or equipment performance.
Acceleration or deceleration	Forces experienced by personnel / equipment due to rate of change of velocity.

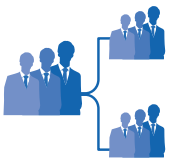
Radiation	Radiant energy emitted in waves or particles that have a negative influence on human or equipment performance. This includes ionising radiation such as x-rays, as well as non-ionising radiation such as microwaves, lasers, radio waves, sonar and radar, ultraviolet, visible (sunlight) and infra-red.
Work surface / space	Conditions (excluding precipitation) of natural or man-made work surfaces on which personnel and equipment operate that have a negative influence on performance. This includes holes, inclines, rocky, rough, rutted, slippery, steep or uneven wave action.

Electricity	Natural or man-made electrical current that has a negative influence on human or equipment performance. This includes burn out, electrocution, discharge, earth faults, lightning, shock, short or static.
Air pressure	Sudden or gradual changes in air pressure that have a negative influence on human or equipment performance. This includes altitude, bends, blasts, chokes, decompression, explosion or hypoxia.
Wildlife	The actions or presence of animals that injure personnel, cause personnel to make errors, damage equipment or cause equipment to malfunction.

DATA COLLECTION CHECKLIST—PROCEDURES

Utilisation	The documented procedures should be used for conducting the operation in a correct, safe and efficient manner. In other words, is it used, and is it useful?
Content	The documented procedures should be adequate for the scope of the work to be conducted. The procedure should: cover all tasks, be technically correct, contain emergency provisions, contain work-around provisions, cover exemptions where the entire procedure does not apply.

Usability	The procedures should contain the necessary information in a user friendly language and layout. The format should successfully link people and equipment to provide for risk minimised operation.
Validation	The procedures should be reviewed, checked and tested by qualified people to ensure that the personnel that use the procedure can carry out the operation correctly, safely and efficiently.
Control	The procedure should have a method of revision control to ensure only current procedures are in use.



DATA COLLECTION CHECKLIST—ORGANISATION

Organisational culture	The organisation should have a systematic approach to safety. There should be evidence of management, leadership and commitment to setting high standards of safety, quality and productivity performance. Measurable factors include: › Organisational structure › People management › Provision and quality of tools and equipment › Commercial and operational pressures › Planning › Maintenance of facilities and equipment › Communication.

Training program	The organisation should have a structured training program for the provision and consolidation of technical skills, safety awareness and safety knowledge. The effectiveness of training should be measurable.
Visible support	The organisation should demonstrate support for the worksite operational staff including provision of adequate manning levels, suitable equipment and materials and adequate facilities and services.
Operational feedback processes	The organisation should have a formal and effective operational feedback system for system monitoring and improvement.

Organisation

Procedures

Environment

Equipment

People

INTERVIEWING WITNESSES

Good questioning technique is important for interviewing. The idea is to encourage sharing of detailed information through short, simple questions built around the words what, where, when, how, who, and why.

Be tactful when asking 'why' questions, as these can easily be misinterpreted as 'blaming questions' e.g. – "Why did you do that?" Why didn't you do that?" An indicator of good questioning technique is if the interviewee is doing most of the talking. In some cases, closed questions can also be appropriate. These are questions directed at a subject or object and can be used to encourage the witness to elaborate on something they have mentioned.

QUESTIONS/TECHNIQUES

FREE RECALL / NARRATIVE

A broad invitation to the witness to mentally recreate the incident and say whatever they want. This is the best way to start the interview.

> Could you tell me in your own words whatever you can remember about the incident?

OPEN-ENDED QUESTIONS

Allow for an unlimited and general response from the witness in their own words.

> What happened after the traffic lights changed?

ACTIVE LISTENING

Active listening includes both verbal and non-verbal indications which encourages the witness to continue talking.

- Eye contact
- Leaning forward
- Nodding head
- Verbal feedback

I see

Okay

PARAPHRASING

This is a technique where the interviewer considers what has been stated by the witness and restates it in their own words.

So what you're saying is that the car turned into the intersection from your left prior to the incident? Is that right?

CLOSED QUESTIONS

These questions can usually be answered with a single word or short answer.

> You say you did explain the Permit to Work?

LEADING QUESTIONS

Leading questions anticipate the answer that may be provided.

> Would you agree that the procedure is inadequate for this task?

LOADED QUESTIONS

These are the questions which use loaded words which may result in emotional reaction or response.

> So how careless do you think the other driver was?

WITNESS INTERVIEWING TECHNIQUES

Timeliness	Interview witnesses as soon as possible.
Preparation	Review known information, visit the scene, have material on hand to use at interview.
Witness Assessment	Prioritise interview order, assess expertise (familiarity) and credibility (motivation)
Location	Private, lack of distractions, revisit site for environmental cues to aid recall.
Record of Interview	Ensure information is interpreted and recorded correctly.
Interview Process	Introduce yourself, explain purpose of the interview, establish rapport, emphasise focus of the investigation (prevention / risk reduction)

Active Listening	Be attentive, be conscious of body language.
Communication	Use everyday language, try to avoid technical terms, jargon and acronyms.
Understanding	If the witness is distressed, take a break.
Recommendations	Ask those interviewed how best to prevent recurrence.
Closing	Thank the witness - pass on contact details.
Follow-Up	Re-contact the witness a few days later to ask if additional information was recalled.

LEARNING TEAMS

WHEN TO USE A LEARNING TEAM

A Learning Team can be used proactively (before we have had a failure) or reactively (after an event has occurred).

HOW TO FACILITATE A LEARNING TEAM

PREPARATION

- Hold the Learning Team as soon as possible after the incident, event or activity
- Use a good facilitator
- Have a note taker, and use a whiteboard
- Get the right people in the room - everyone involved in the event, including contractors, and technical experts if needed.
- Get the right room for the right time
- Plan for breaks

SET THE SCENE

Explain what a Learning Team is and its purpose. Discuss ground rules and invite the group to agree to ground rules that best resonate with them.

Some examples of ground rules:

- Have a positive and curious attitude
- Leave hierarchy at the door
- Actively participate – don't wait to be asked
- Be concise - make sure everyone gets time to talk
- Respect and value diversity of views
- Put mobiles on silent – take calls in breaks
- Don't use 'counter-factual' or blaming language - "should have... , could have... I would have..."

EXPLORE THE WORK

Let people tell their story, perhaps with the help of a timeline. Then try the following questions:

- What happened the way you thought it would?
- What surprised you during the work?
- What hazards did you identify, and which ones did you miss?
- Where did you have to 'make do', or adapt? Why?
- What made the work different to other work?
- What task and environmental conditions were in play at the time and which ones felt the most important. Why?

WRAP UP THE SESSION

Ask a few questions to summarise the session and pave the way for next steps:

- What are the most important things we have learnt?
- Who else needs to know about this, and how can we share the learning?
- What does good look like and what could be different as a result of these findings?
- Who is going to do what, by when, and how can we get feedback?

ANALYSING INFORMATION

ESTABLISHING THE SEQUENCE OF EVENTS

TIMELINES

Time is a powerful way to organise the data collected during an investigation. Workplaces can be described as event-driven; activity ebbs and flows as the work tasks and processes change and progress through time. Work demands and pressures also vary through time.

Developing a timeline simply involves identifying events (happenings, what was said or done) in chronological order. Timelines should contain enough detail for you to build a picture of what happened, when and how, so that you can start to reveal the underlying factors which may have contributed to the incident in question.

The timeline should also show you the gaps in your data - where you don't know what happened next, or led to an event, and where there are lapses in time where you don't have any data. Often this will mean you have to go back and search for more data.

EVENT AND CONDITION CHARTS

This is a good method for setting out the facts you have gathered so far so that you can begin to see relationships between the timings of the events and conditions at the time. It is a good way of attempting to find out what it was like for the people involved as they made sense of the unfolding situation. It allows the investigation team to reconstruct a story of what happened. Information and insights about the conditions of work from the PEEPO chart can be added to the timeline so that it shows not only what happened, but what it was like at the time for those involved. It also combats hindsight bias in the investigation team as the method tries to build a picture of what it was like inside the 'tunnel' of perception of those involved in the incident.

EVENTS

An event is something that happened during the incident sequence. For example, a decision made to act in a certain way, a failure of equipment or movement of machinery. Events should be able to be traced to a single point in time; i.e. 'time-stamped'.

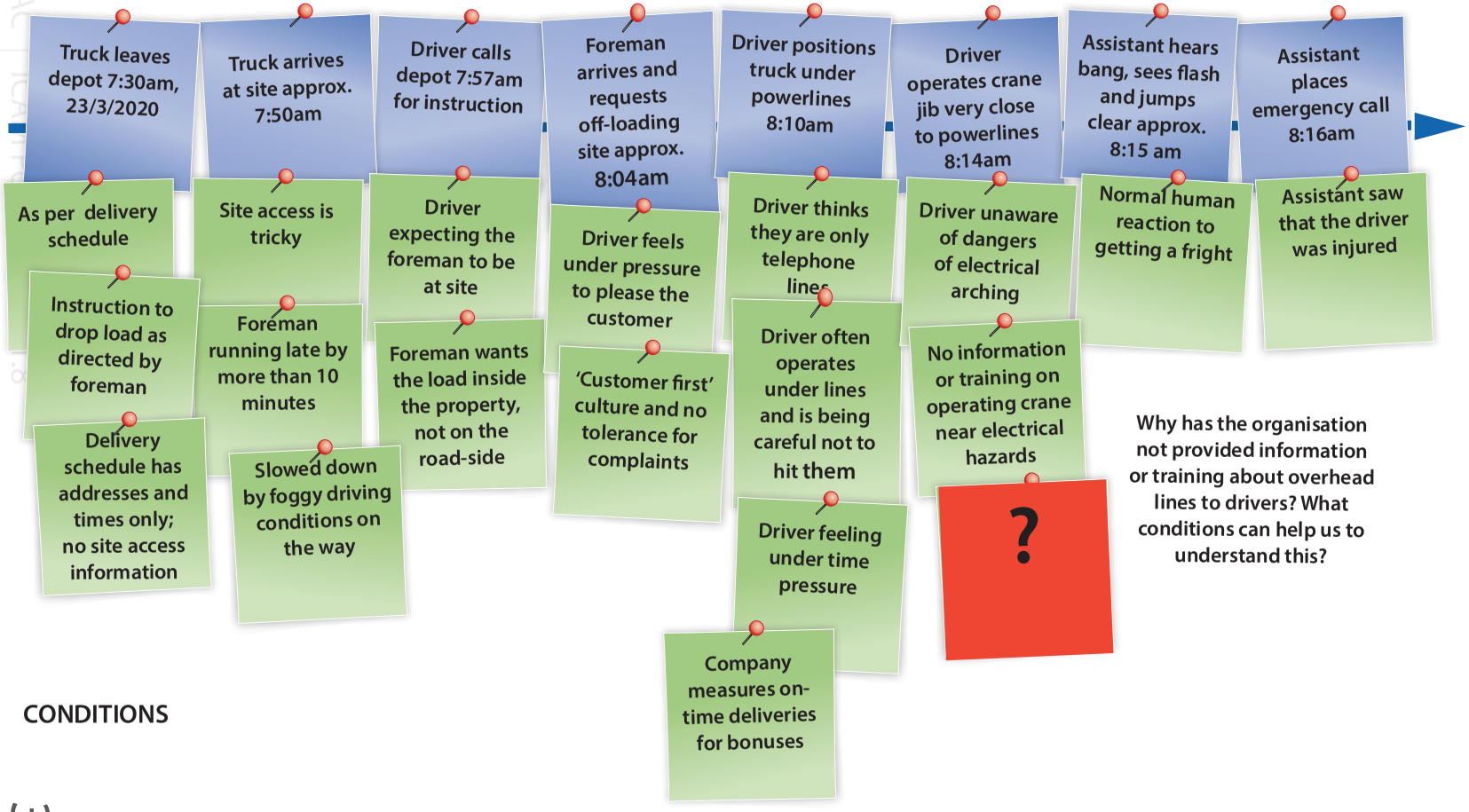
CONDITIONS

Conditions are a state of being during the incident sequence, for example, a toxic atmosphere, high winds, poor lighting, a live electrical circuit or a wet slippy floor. Conditions can also be the result of an event. Some conditions may exist for the entire duration of the incident; others may arise and then cease at various points during the incident sequence.

METHODOLOGY

Write down all the events that happened on Post-it notes of one colour and conditions on a second colour Post-it note. The example below has used blue and green. (Blue=events, green = conditions). Build the sequence of events using the event Post-it notes, in sequential order from left to right. Then, using the perspectives of the people involved at the time, build up a picture of the conditions, and how they changed as the sequence of events progressed.

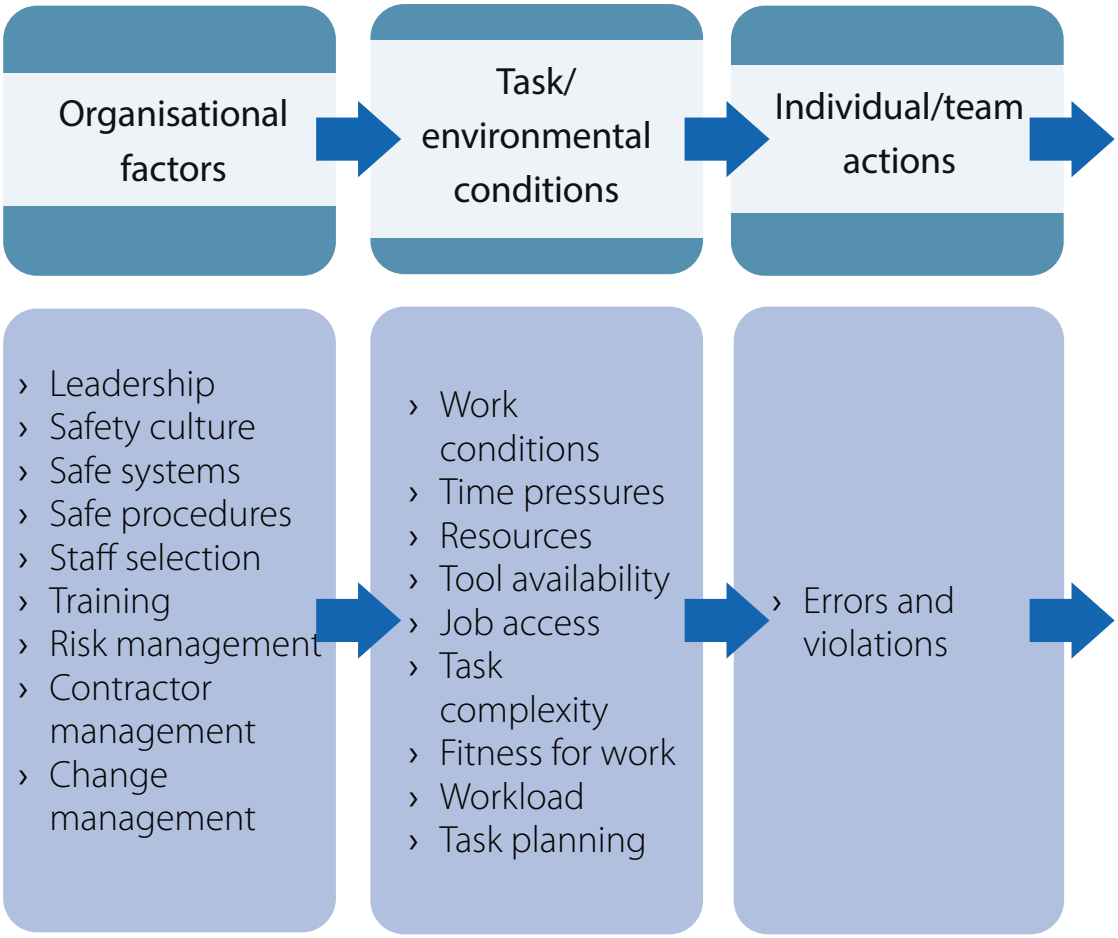
EVENTS



Why has the organisation not provided information or training about overhead lines to drivers? What conditions can help us to understand this?

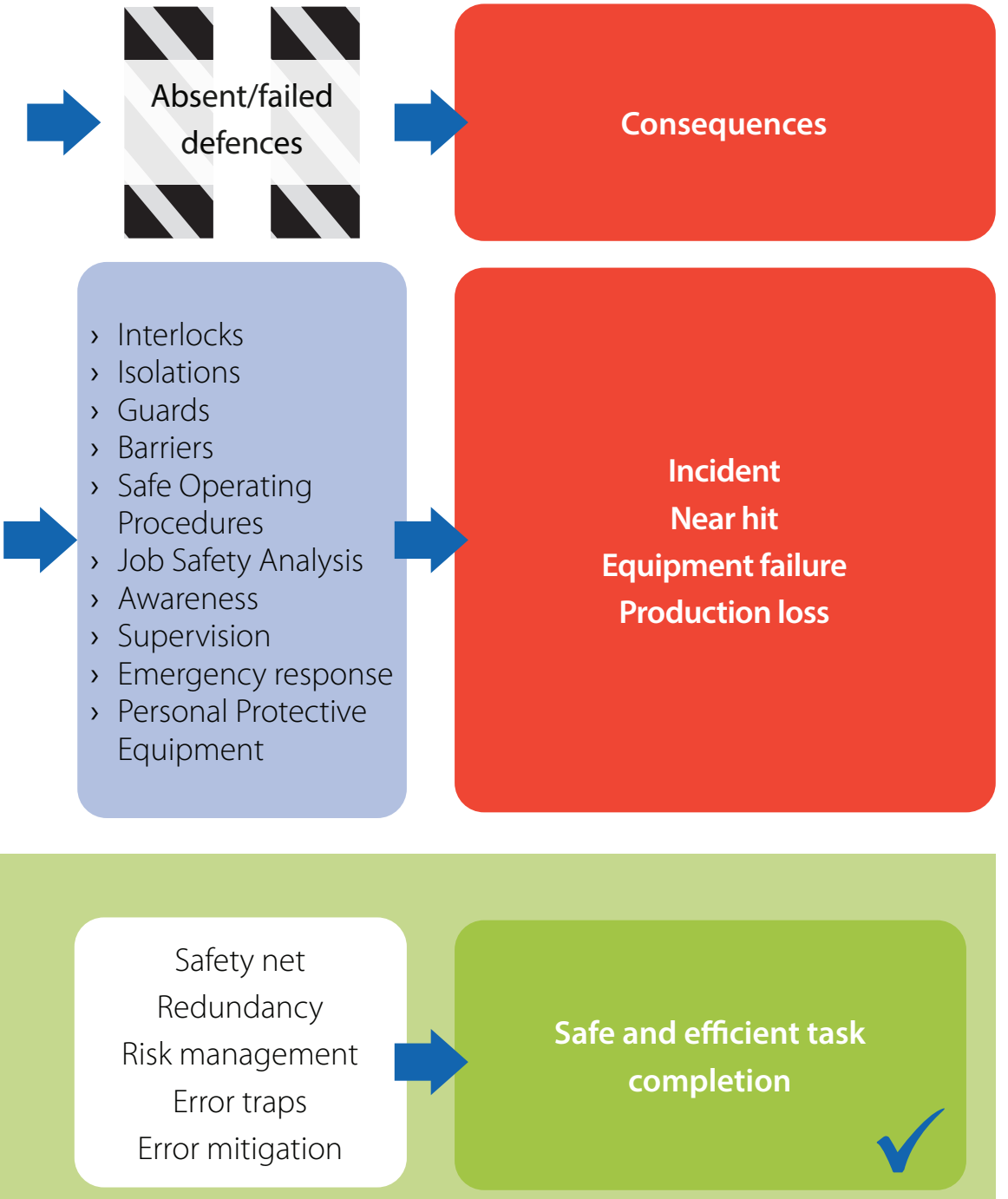
CONDITIONS

APPLY THE ICAM INCIDENT CAUSATION MODEL



Adverse outcome prevention

Good organisational factors	Produces a safe workplace	To reduce errors and violations


Absent/failed defences
Consequences
› Interlocks
› Isolations
› Guards
› Barriers
› Safe Operating Procedures
› Job Safety Analysis
› Awareness
› Supervision
› Emergency response
› Personal Protective Equipment
Incident
Near hit
Equipment failure
Production loss
Safety net
Redundancy
Risk management
Error traps
Error mitigation
Safe and efficient task completion

ABSENT OR FAILED DEFENCES

Defence	Explanation and sub-categories
Awareness	Appreciation/understanding of the nature and severity of hazards and hazardous conditions. Defences include: › Training and/or supervision › Communication of hazards and risk information › Hazard identification and risk assessment
Detection	Warning of presence and nature of potentially hazardous situation: › Automatic warning mechanism (visual, audible, other) › Signage (temporary/permanent) › Atmospheric hazard detection › Outside safe parameter detection and alarm › Fire detection and alarm

Defence	Explanation and sub-categories
Control and Interim Recovery	To restore people or equipment to a safe state with minimal injury or damage: › Guarding and barriers › Bypass or pressure relief › Emergency shut down › Circuit breakers and residual current devices › Trip and interlock devices
Protection and Contain-ment	Measures to contain hazards (collective) and protect from hazards (individual): › Personal Protective Equipment › Bunding and spill response › Fire fighting media › First aid
Escape and Rescue	Evacuate away from hazards and provide immediate response to harm: › Emergency exits and routes › Communication and planning › Rescue team and equipment

IDENTIFY THE INDIVIDUAL/TEAM ACTIONS

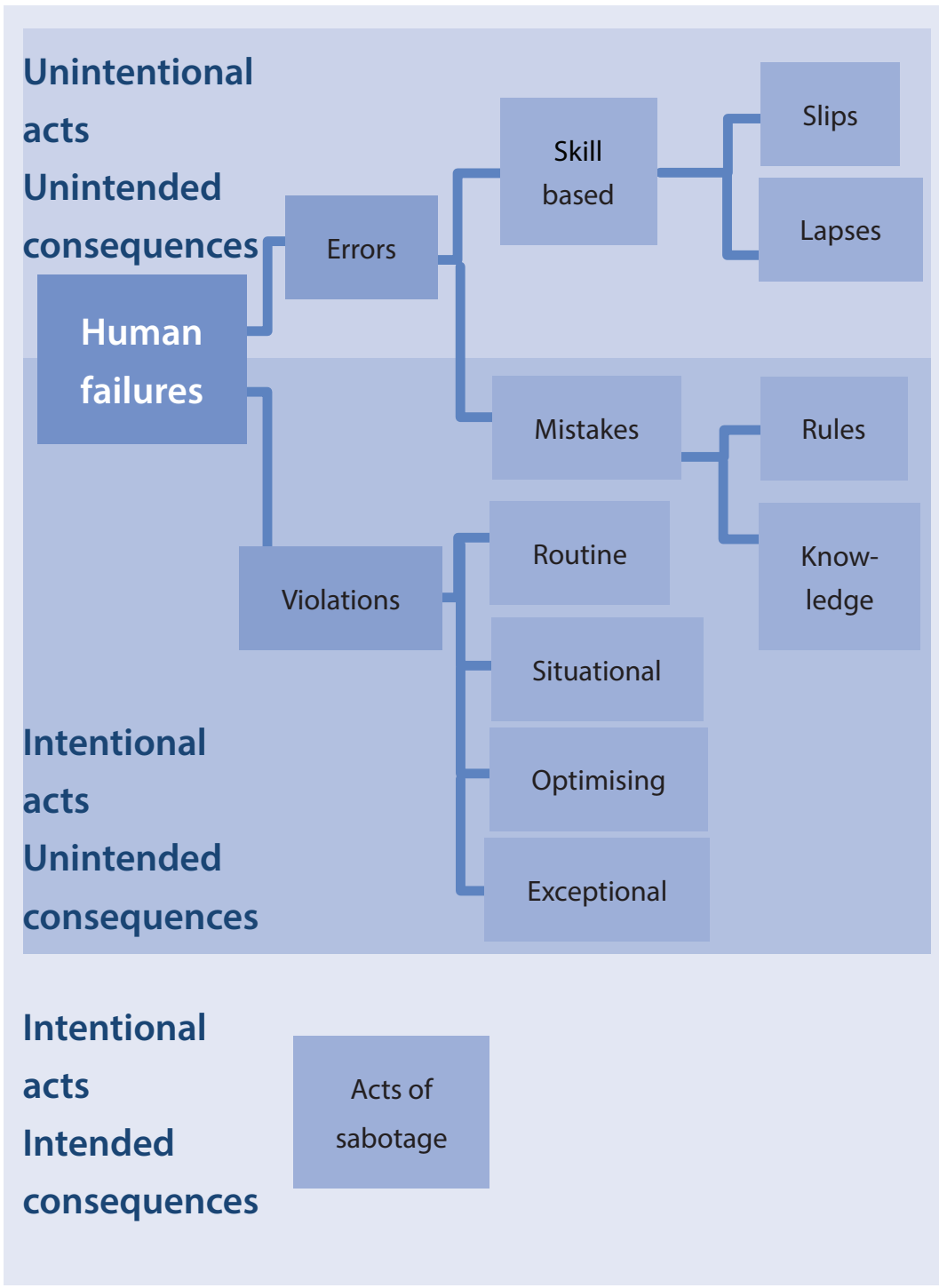
Sometimes referred to as 'Active Failures' these are the errors or violations, the 'unsafe acts or omissions' of individuals that lead directly to an accident. When these 'unsafe acts or omissions' are committed in the presence of an uncontrolled hazard they can lead to injury and/or damage to plant and equipment.

At all times we are endeavouring to understand why the individual did what they did and what were the circumstances that triggered their behaviour.

There are two different types of human failures:

Error—an action or decision which is not intended, involving a deviation from an accepted standard, and which leads to an undesirable outcome.

Violation—a deliberate deviation from a rule or procedure, essentially 'breaking the rules'


Unintentional acts Unintended consequences
Human failures
Errors
Skill based
Slips
Lapses
Mistakes
Rules
Know-ledge
Violations
Routine
Situational
Optimising
Exceptional
Intentional acts Unintended consequences
Intentional acts Intended consequences
Acts of sabotage

ERRORS

Errors fall into three further categories: **slips, lapses and mistakes.**

SLIPS

Slips are failures to do with the actions of a task – unintended deviations from the required way of doing something.

Typical slips include:

- Performing an action too soon in a procedure or leaving it too late
- Leaving out a step or series of steps from a task
- Carrying out an action with too much or too little strength (e.g. over-torquing a bolt)
- Performing the action in the wrong direction (e.g. turning a control knob to the right rather than the left, or moving a switch up rather than down)
- Doing the right thing but on the wrong object (e.g. switching the wrong switch); and
- Carrying out the wrong check but on the right item (e.g. checking a dial but for the wrong value).

LAPSES

Lapses are when we forget to carry out an action, lose our place in a task or even forget what we were doing. Tasks which take some time to complete or involve periods of waiting are especially prone to lapses. Lapses can be reduced by minimising distractions and interruptions, and by using reminders such as checklists. Task and equipment design can also help.

MISTAKES

Mistakes are a more complex type of human error where we do the wrong thing believing it to be right.

Rule-based mistakes occur when our behaviour is based on remembered rules or familiar procedures. We have a strong tendency to use familiar rules or solutions even when these are not the most convenient or efficient.

Knowledge-based mistakes involve incorrect assessments, diagnoses or miscalculations when we are faced with unfamiliar circumstances. In these situations we have to consciously make new goals, plans or procedures, based on principles or similar experiences.

VIOLATIONS

Violations are deliberate deviations from rules, procedures, instructions and regulations.

Research has shown that violations are usually motivated by a desire to complete a task which is constrained in some way. Very rarely are they wilful acts of sabotage or vandalism.

ROUTINE VIOLATIONS

Routine violations describe situations where breaking the rule or procedure has become a normal way of working within a group. This can be due to:

- Rules which are not understood or perceived as too restrictive
- Cutting corners to save time and energy
- The belief that the rules do not apply
- Lack of enforcement of rules; and
- New workers being led or pressured into following group norms.

ACTS OF SABOTAGE

Deliberate acts where the intention is malicious and the outcome is intended.

SITUATIONAL VIOLATIONS

Situational violations are when rules are broken due to pressures from the job. Common examples are:

- Time pressure
- Lack of resources or personnel
- Lack of the right equipment for the job; or
- Extreme weather conditions

OPTIMISING VIOLATIONS

These are deliberate actions taken because the individual or team thought there would be some benefit - either to the organisation or themselves personally. These violations may be encouraged by incentives, and can be an indicator of incompatible goals and possible improvements.

EXCEPTIONAL VIOLATIONS

Rare, and usually occur when something has gone wrong unexpectedly, or in emergency situations. To solve a new problem or deal with a situation, workers may decide to break a rule even though they are aware that there is risk involved. There is usually a belief that the benefits of breaking the rule outweigh the risks.

IDENTIFY THE TASK/ENVIRONMENTAL CONDITIONS

These are the conditions in existence immediately prior too or at the time of the incident that directly influences human and equipment performance in the workplace. These are the circumstances under which the errors and violations took place and can be embedded in task demands, the work environment, individual capabilities and human factors.

The Task / Environmental Conditions can be categorised in two groups: Workplace Factors and Human Factors. Within the two groups are factors that can promote the commission of errors or violations. The common factors may promote errors and / or violations.

The tables below detail task and environmental conditions that promote human error.

WORKPLACE FACTORS

	Error Factors
☑	Change in routine
☑	Negative transfer
☑	Poor signal/noise ratio
☑	Poor man/system interface
☑	Designer/user mismatch
☑	Educational mismatch
☑	Hostile environment
☑	Domestic problems
☑	Poor communications
☑	Reliance on undocumented knowledge
☑	Poor shift patterns and overtime working

Common Factors	
☑	Time shortage
☑	Inadequate tools and equipment
☑	Poor procedures and instructions
☑	Poor tasking
☑	Inadequate training
☑	Hazards not identified
☑	Undermanning
☑	Inadequate supervision
☑	Poor access to job
☑	Poor housekeeping
☑	Poor supervisor/worker ratio
☑	Poor working conditions
☑	Inadequate mix of experienced and inexperienced workers

Violation Factors	
☑	Violations tolerated
☑	Compliance goes unrewarded
☑	Procedures protect the system not the individual
☑	Little or no autonomy
☑	Macho culture
☑	Perceived licence to bend the rules
☑	Adversarial industrial climate
☑	Low operator pay
☑	Low operator status
☑	Unfair management sanctions
☑	Blame culture
☑	Poor leadership example
☑	Task allows for easy shortcuts

HUMAN FACTORS

Error Factors	
☑	Attention capture
☑	Memory failures
☑	Strong motor programmes
☑	Perceptual set
☑	False sensations
☑	False perceptions
☑	Confirmation bias
☑	Situational bias
☑	Incomplete knowledge
☑	Inference and reasoning
☑	Stress and fatigue
☑	Disturbed sleep patterns
☑	Error proneness

Common Factors	
✓	Lack of ability
✓	Lack of skill
✓	Skill overcomes danger
✓	Unfamiliarity with task
✓	Poor judgement
✓	Overconfidence
✓	Performance anxiety
✓	Time pressures
✓	Monotony/Boredom

Violation Factors	
☑	Age and Gender
☑	High risk target
☑	Risk and reward
☑	Violations normalised
☑	Personality
☑	Perceived behavioural control
☑	Low morale
☑	Bad mood
☑	Job dissatisfaction
☑	Attitude to the system
☑	Misperception of the hazard
☑	Low self-esteem
☑	Learned helplessness

Organisational Factors are deficiencies or anomalies that create the **Task/Environmental Conditions** that result in **Individual/Team Actions**. A defining characteristic of Organisational Factors is that they were present before the onset of an incident sequence. **Organisational Factors** may lie dormant for a long time only becoming evident when they combine with Task/Environmental and I**ndividual/ Team Actions**.

There are 16 organisational factors:

1. Hardware (HW)
2. Training (TR)
3. Organisation (OR)
4. Communication (CO)
5. Incompatible Goals (IG)
6. Mgt of Change (MC)
7. Procedures (PR)
8. Maintenance Mgt (MM)
9. Risk Mgt (RM)
10. Design (DE)
11. Contractor Mgt (CM)
12. Org. Culture (OC)
13. Regulatory Influence (RI)
14. Org. Learning (OL)
15. Critical Risk Mgt (CRM)
16. Management Systems (MS)

1 HARDWARE (HW)

Failures of facilities, equipment or tools due to inadequate quality of materials or construction, non-availability, and failures due to ageing (position in the life-cycle). Does not include problems with poorly designed equipment or failures caused by inadequate maintenance.

Inadequate hardware can be caused by:

- Poor storage or cleaning processes
- Financial constraints or time pressures
- Ineffective supply/stock ordering systems
- No regular evaluation and updating of hardware specifications
- Theft
- Tools and equipment not fit for purpose
- Poor selection of tools

May result in...

Inadequate hardware may result in:

- Inadequate use of tools and equipment including improvisation
- Tools, equipment and materials not available
- Tools, equipment and materials of poor quality

2 TRAINING (TR)

Deficiencies in the system for providing the necessary awareness, knowledge or skill to an individual or individuals in the organisation.
In this context, training includes on the job coaching by mentors and supervisors as well as formal courses.

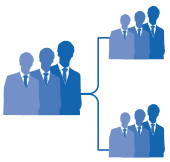
Inadequate training can be caused by:

- Inadequate management of training
- Poor employee selection processes (matching right person to the job)
- Poor training needs assessment
- Training not given or ineffective
- Right training given to wrong person
- No or ineffective evaluation of training outcomes
- Training not focused at skills/competency

May result in...

Inadequate training may result in:

- High supervision time requirements
- Poorly performed tasks
- Employees unable to perform their tasks
- Activities taking longer and of poorer quality
- Excessive time spent training
- Mis-match of abilities



3 ORGANISATION (OR)

Deficiencies in either the structure of the organisation or the way it conducts its business that allows safety responsibilities and accountabilities to become ill-defined and warning signs to be overlooked.

Inadequate organisation can be caused by:

- Poorly defined departments or sections
- Unclear accountability, responsibility or delegation
- Poorly defined objectives and planning processes
- Poorly defined organisational structure in terms of policy making, managerial, supervisory, and operational levels
- Too much bureaucracy
- Many reorganisations and restructures

May result in...

Inadequate organisation may result in:

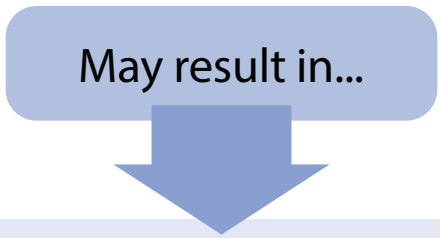
- Big hierarchy which is slow to respond to changes
- Deferred decisions
- No one or wrong person held accountable (only held responsible)
- Rules and procedures not enforced
- Poor control or management of events

4 COMMUNICATION (CO)

Failure in transmitting information necessary for the safe and effective functioning of the organisation to the appropriate recipients in a clear, unambiguous or intelligible form.

Inadequate communication can be caused by:

- Lack of clear communication structure
- Language or cultural problems
- Inadequate feedback/confirmation from the receiver
- Inability to communicate with the correct person
- Unreceptive receiver



Inadequate communication may result in:

- Misunderstanding or incorrect interpretation
- People not knowing what to report or to whom
- Right information not being communicated to right people in whole or in part
- Failure to find information

5 INCOMPATIBLE GOALS (IG)

Failure to manage conflict; between organisational goals, such as safety and production; between formal rules such as company written procedures and the rules generated informally by a work group; between the task requirements of individuals and their personal preoccupations or goals.

Inadequate goals can be caused by:

- Conflict between safety and production
- Conflict between formal and informal processes
- Imbalance between safety requirements and financial constraints
- Conflict between work and personal priorities
- Management being unclear on importance of safety

May result in...

Inadequate goals may result in:

- Overruling, or short-cutting procedures
- Putting people under pressure
- Operating close to or outside of normal control limits
- Failure to communicate information about hazards

6 MANAGEMENT OF CHANGE (MC)

The absence or failure of systematic assessment and implementation of change; to operations, processes, personnel, plant and equipment, products and services, premises etc. Change should be assessed for risk and appropriate planned action should be taken to ensure existing performance levels are not conceded.

Inadequate management of change can be caused by:

- Change process poorly conducted
- Objectives and scope unclear
- Inadequate CBA of the impact of change
- Poor change implementation planning
- Poor communication of change
- Speed of change implementation - too fast/slow
- Approval of proposed change absent or inappropriate
- Inadequate monitoring of the effects of change to existing performance levels

May result in...

Inadequate management of change may result in:

- Adverse impact on production and safety performance
- Risk levels above ALARP, regulatory breaches
- Unexpected near-misses, incidents and accidents
- Gaps in organisational structures and responsibilities
- Mismatch between equipment, procedures and training
- Insufficient staffing levels, confusion and low morale
- Increase in equipment breakdown or damage
- Mismatch between policy, procedures and practice

7 PROCEDURES (PR)

Unclear, unavailable, incorrect or otherwise unusable standardised task information that has been established to achieve a desired result.

Inadequate procedures can be caused by:

- Inadequate knowledge of the writer
- Little or no feedback on practical usefulness of procedures
- No structure in the way procedures are written, tested, documented and implemented
- Difficulty in finding procedures
- Gaps in what procedures are required
- Procedures written for political rather than operational reasons
- Unclear scope of procedures

May result in...

Inadequate procedures may result in:

- Procedures not in place for safety critical activities
- Overlapping or conflicting procedures
- Procedures not being able to be accessed by users
- Failure to communicate new or existing procedures
- Toleration for violations
- Ambiguous, incorrect, or out-of-date procedures in place

8 MAINTENANCE MANAGEMENT (MM)

Failures in the systems for ensuring technical integrity of facilities, plant, equipment and tools, e.g. maintenance systems, condition surveys, corrosion controls and function testing of safety and emergency equipment.

This does not include issues relating to the execution of maintenance activities.

Inadequate maintenance management can be caused by:

- Inadequate planning, control, application and recording of activities
- Financial constraints or time pressures
- Ineffective communication of state of equipment to relevant person
- Lack of specialised maintenance personnel
- Lack of maintenance protocols/manuals and other relevant documentation
- Wrong maintenance strategy applied

May result in...

Inadequate maintenance management may result in:

- Defective or malfunctioning plant or equipment
- Makeshift or reactive (unplanned) maintenance
- Plant and equipment not operable in intended manner

9 RISK MANAGEMENT (RM)

Deficiencies in the process of identifying, assessing and prioritising risks, followed by a co-ordinated application of resources to minimise risks to ALARP, as well as the ongoing monitoring of risk levels.

Inadequate risk management can be caused by:

- Inadequate or poorly conducted risk management process
- Goals, objectives, scope and boundaries of risk management activity not clearly determined
- Level of risk analysis inappropriate for the degree of risk or phase of life-cycle
- Hazard id. not systematic or thorough
- Lack of appropriate competencies and experience
- Inappropriate selection or poor implementation of risk control measures
- Inadequate monitoring of risk control effectiveness

May result in...

Inadequate risk management may result in:

- Risk levels above ALARP
- Uncontrolled hazards and consequences
- Unexpected incident and accident rate
- Inappropriate risk ranking and allocation of risk control resources
- Incomplete, inadequate or out-of-date Risk Register
- Breach of local regulatory requirements

10 DESIGN (DE)

Deficiencies in layout or design of facilities, plant, equipment or tools that lead to misuse or unsafe acts, (often increasing the chance of particular types of errors and violations). Many design failures result from the physical and professional separation of the designer and end user.

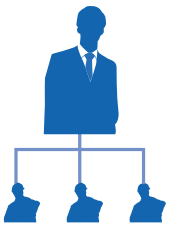
Inadequate design can be caused by:

- No standardisation of equipment or use of it
- Not assessing or adapting to the needs of the end user
- Financial constraints or time pressures
- Procurement design standards not set or monitored

May result in...

Inadequate design may result in:

- Improvised usage
- Exposure to hazards
- Poor access/layout
- Complex training requirements
- Equipment/process not being able to be used properly
- Additional effort needed to complete the job



11 CONTRACTOR MANAGEMENT (CM)

Deficiencies in the evaluation, selection, control and monitoring of contractor activities including personnel, equipment and materials. The lack of review of contractor activities post-contract.

Inadequate contractor management can be caused by:

- Poor or no contractor management processes
- Lack of communication
- Contract work poorly specified
- Inadequate time and resources to complete contract work
- Unclear roles and responsibilities
- Mis-match of company and contractor safety standards
- Poor monitoring and compliance processes
- Poor contractor selection processes

May result in...

Inadequate contractor management may result in:

- Incompatible goals where production is given a disproportionate priority over safety
- Misunderstanding of safety rules
- Contractors under resourcing for safety
- Poor safety performance standards
- Poor competency and manning levels for job completion
- Under-reporting of incidents

12 ORGANISATIONAL CULTURE (OC)

Organisational culture or sub-cultures may not be supportive toward health and safety, or may even be adversarial. Culture is the psychologically safest way to operate, shaped by the shared beliefs, values, norms and fundamental assumptions of a group.

Inadequate organisational culture can be caused by:

- Competing or obscure company policy
- Ineffective management decisions about policy
- Diverse and conflicting values and beliefs
- Poor relationships, low levels of trust, goodwill
- Factions and politics
- Unaddressed employee fears and anxieties
- Unnecessary risk taking passively allowed
- Poor, weak or authoritarian leadership
- Inconsistency between values and actions
- Lack of compliance, monitoring and review

May result in...

Inadequate organisational culture may result in:

- Poor communication between divisions
- Failure to complete tasks and rule-breaking normalised
- Poor commitment to safety, environment and community
- Reluctance for voluntary resolution of identified hazards
- Low incident occurrence reporting
- Low staff morale and motivation
- Miscalculation of the level of acceptable risk
- Ambiguous expectations of behaviour requirements

13 REGULATORY INFLUENCE (RI)

The potential negative influence on safety culture of regulation. This can include defining and controlling the health and safety management framework within which the organisation is required to operate.

Inadequate regulatory influence can be caused by:

- Ambiguous regulations
- Duplicated safety practices
- Multiple overlapping requirements for documentary evidence
- Conflicting regulatory requirements from different sources
- Lack of knowledge regarding regulatory requirements
- Regulators with a poor knowledge and understanding of industry requirements

May result in...

Inadequate regulatory influence may result in:

- Delays in meeting regulatory requirements
- Additional resources to meet regulatory requirements
- Prescriptive regulatory requirements
- Restrictive work practices
- Difficulties in interpreting regulations
- Under-reporting of incidents due to fear of enforcement action
- Inability to demonstrate compliance or satisfy other legal requirements
- Loss of operating licence or other regulatory sanctions

14 ORGANISATIONAL LEARNING (OL)

The failings in the strategies applied by organisations to ensure that lessons are learnt and remembered for the future. They can include investigation reports, corrective action implementation, audit findings, risk management processes, and reviews.

Inadequate organisational learning can be caused by:

- No systematic reporting and investigating
- Failure to communicate lessons to all parties
- Poor evaluation of effectiveness of corrective actions
- Lack of awareness of organisational risk exposure
- Audit recommendations being ignored or down-played
- Lack of leadership/commitment to learning
- Lack of resources to take action
- Inadequate safety records/data systems and analysis

May result in...

Inadequate organisational learning may result in:

- Poor communication about the causes of failure
- Failure to complete tasks and corrective actions
- Poor commitment to safety, well-being and environment
- Lack of clear management structures/processes
- Low staff morale and motivation
- Miscalculation of the level of acceptable risk
- Ambiguous expectations of behaviour requirements
- Slow acceptance of change, restricting continual improvement process
- Unsafe work conditions not addressed

15 CRITICAL RISK MANAGEMENT (CRM)

Weaknesses in the system for identifying and managing low probability, high consequence events.

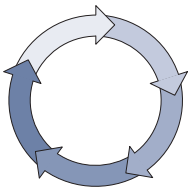
Inadequate critical risk management can be caused by:

- Absence of specific critical risk registers
- Lack of formalised critical risk management standards
- Performance measures relating to high probability low consequence events used as a measure for all risks

May result in...

Inadequate critical risk management may result in:

- Over-optimism about the capability of the organisation to manage critical risks
- Lack of awareness of critical risks
- No consistent or clear approach or resources available to manage a critical risk



16 MANAGEMENT SYSTEMS (MS)

Management systems are the integrated framework of processes and procedures used to ensure that an organisation can fulfil all tasks required to achieve its objectives.

Inadequate management systems can be caused by:

- No alignment with a recognised standard such as ISO 18001
- Lack of clear, systematic and comprehensive hazard and risk management processes (both LTI and catastrophic hazard)
- Lack of goal setting, planning, documentation and measuring performance against goals
- Lack of visible commitment from management
- Inadequate resources to manage safety
- Lack of systems to encourage open communication
- Action not being taken or not subject to evaluation

May result in...

Inadequate management systems may result in:

- Erosion of operational safety margins
- Increase in errors/incidents
- Identified hazards not being managed
- Lack of reporting of hazards and near misses
- Decrease in morale and productivity
- Poor communication between management and other areas
- Poor safety culture and standards
- Inadequate monitoring and review of safety actions
- Increased economic consequences due to costs
- Legal noncompliance

Describe Incident:

Organisational Factors	Task/ Environmental Conditions	Individual/Team Actions	Absent or Failed Defences

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