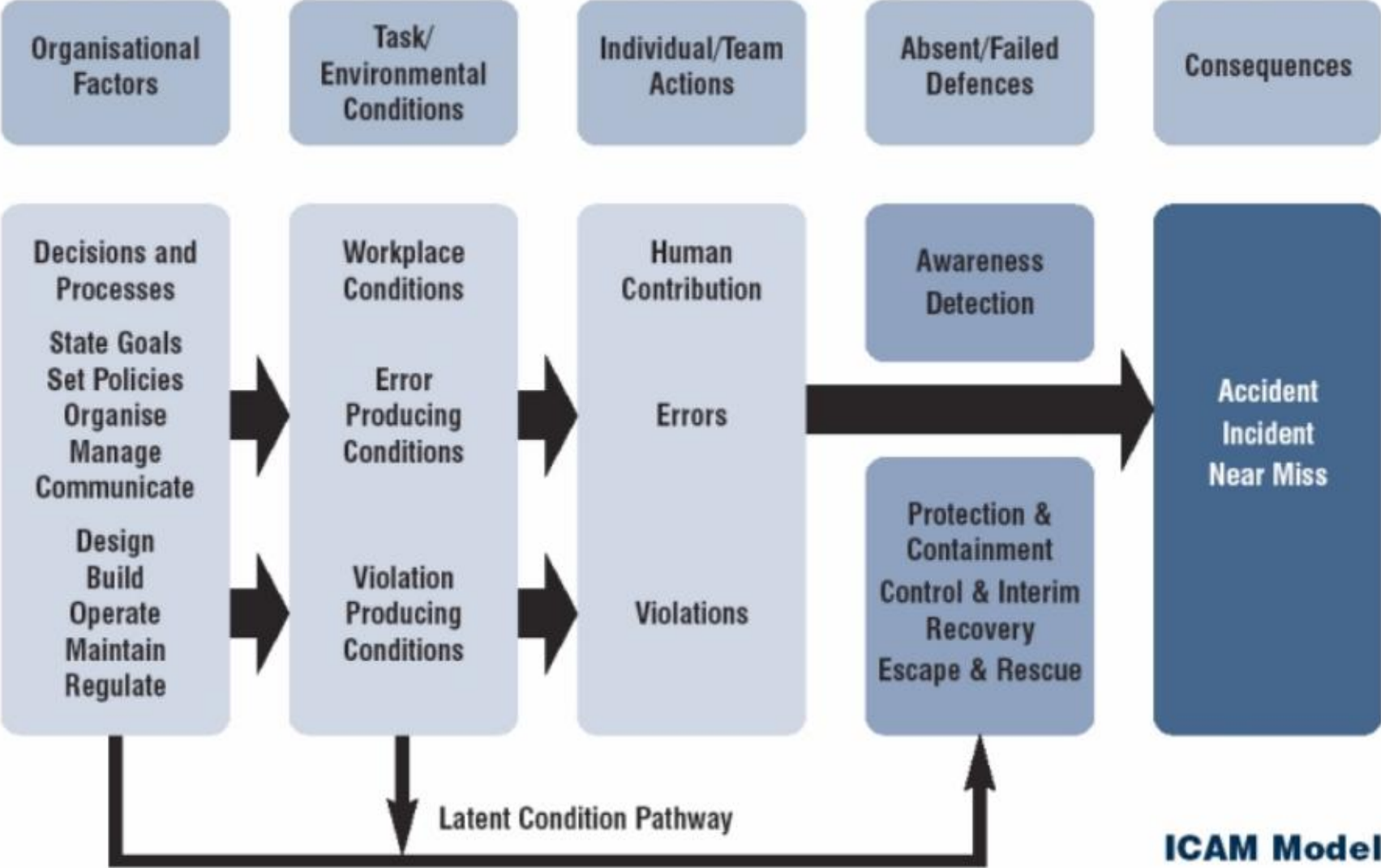# ICAM Model of Incident Causation
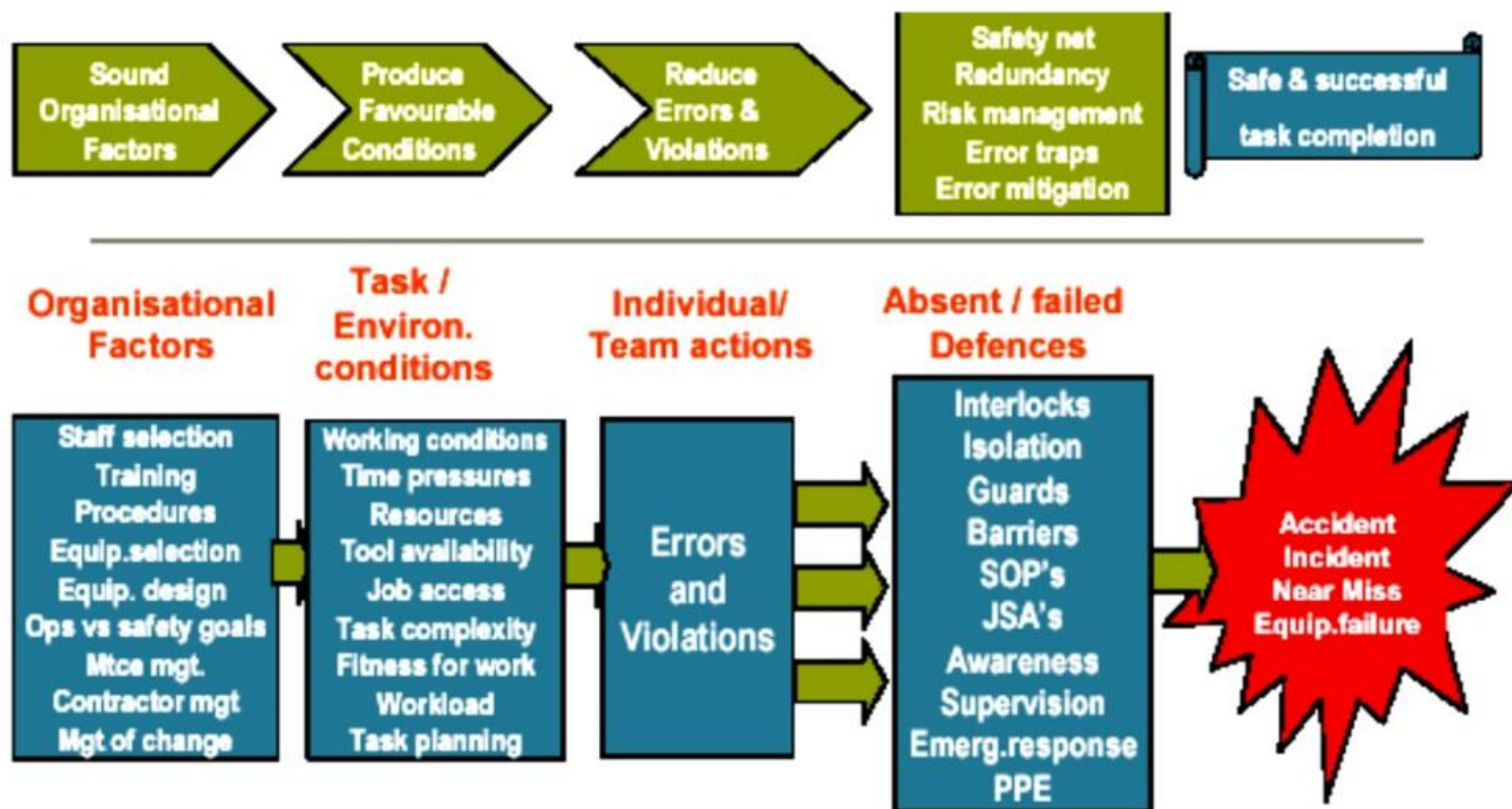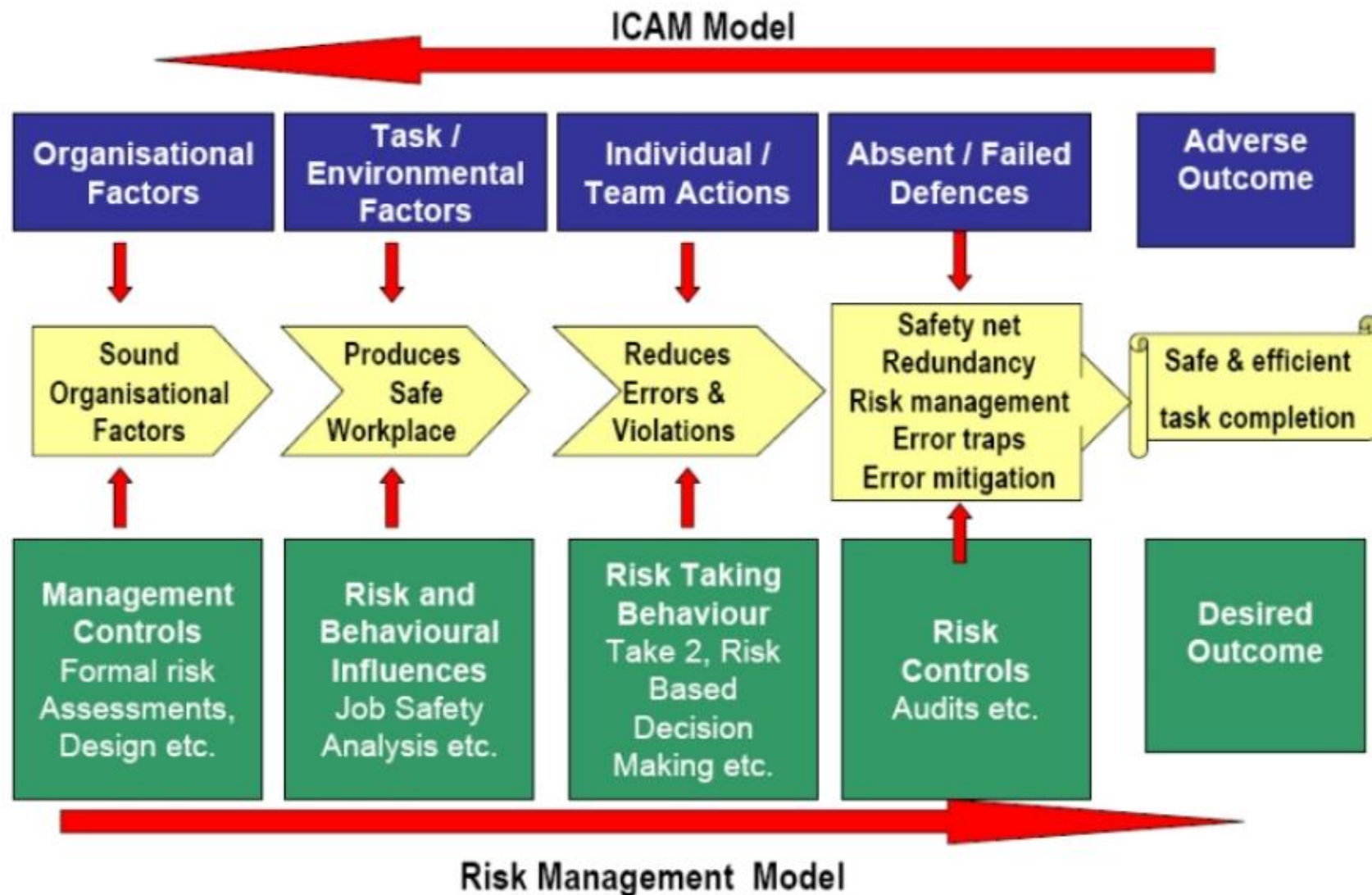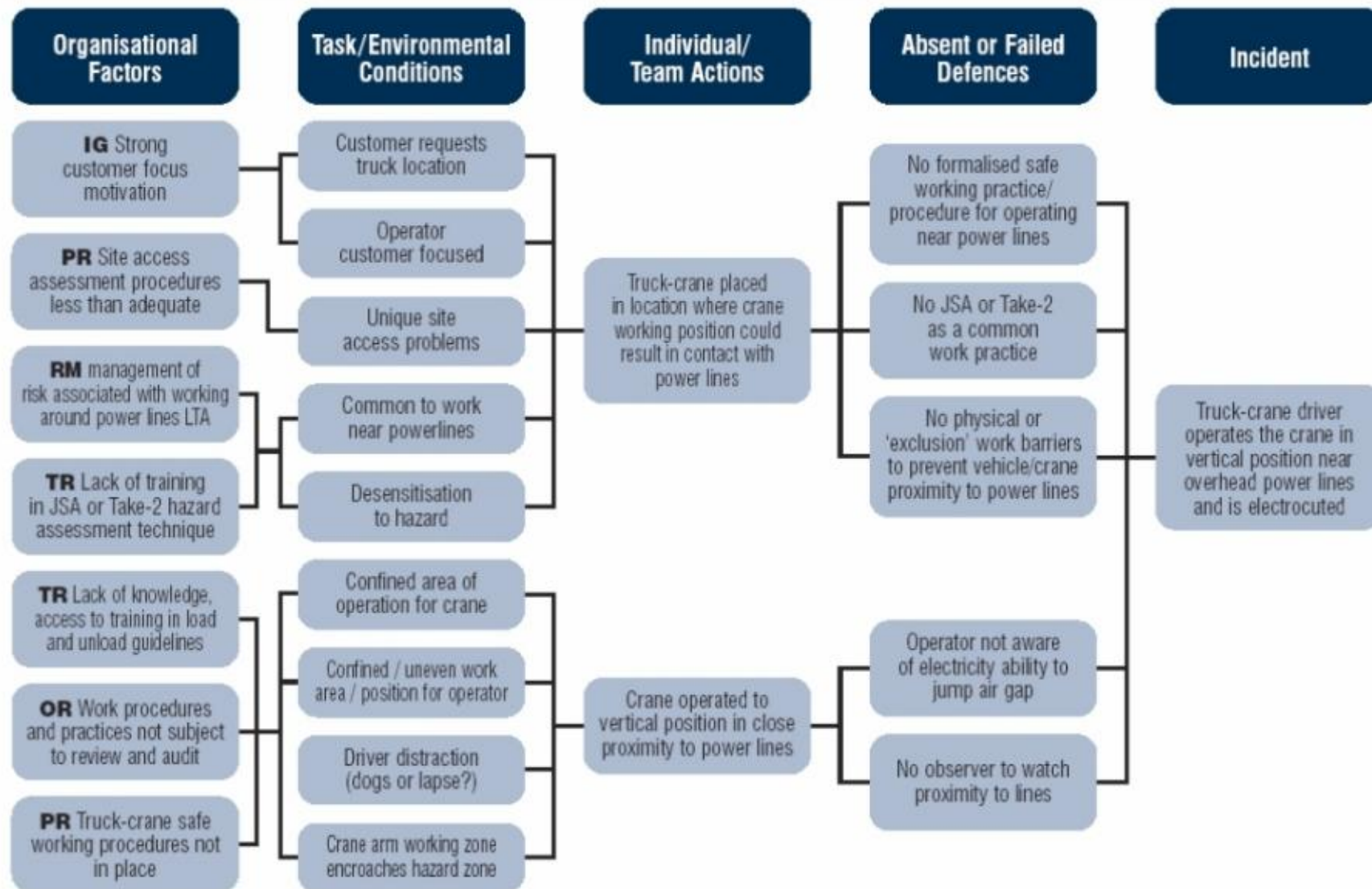
ICAM Model of Incident Causation

Reactive and Proactive Use of the ICAM Model

ICAM Chart Example

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

IG Strong customer focus motivation

Customer requests truck location

PR Site access assessment procedures less than adequate

Operator customer focused

Unique site access problems

RM management of risk associated with working around power lines LTA

Common to work near powerlines

TR Lack of training in JSA or Take-2 hazard assessment technique

Desensitisation to hazard

Truck-crane placed in location where crane working position could result in contact with power lines

No formalised safe working practice/ procedure for operating near power lines

No JSA or Take-2 as a common work practice

No physical or 'exclusion' work barriers to prevent vehicle/crane proximity to power lines

Truck-crane driver operates the crane in vertical position near overhead power lines and is electrocuted

TR Lack of knowledge, access to training in load and unload guidelines

Confined area of operation for crane

Confined / uneven work area / position for operator

OR Work procedures and practices not subject to review and audit

Driver distraction (dogs or lapse?)

PR Truck-crane safe working procedures not in place

Crane arm working zone encroaches hazard zone

Crane operated to vertical position in close proximity to power lines

Operator not aware of electricity ability to jump air gap

No observer to watch proximity to lines

ICAM chart for crane incident (Source: (BHP Billiton, 2001).

Types of ICAM Causal Factors

Organizational Factors

HW	Hardware
TR	Training
OR	Organisation
CO	Communication
IG	Incompatible Goals
PR	Procedures
MM	Maintenance Management
DE	Design
RM	Risk Management
MC	Management of Change
CM	Contractor Management
OC	Organisational Culture
RI	Regulatory Influence
OL	Organisational Learning

Human factors (Source: BHP Billiton, 2001).

Human Factors		
Error Factors	**Common Factors**	**Violation Factors**
Preoccupation, distraction	Insufficient ability	Age and gender
Memory failures	Inadequate skill	High risk target
Strong motor programmes	Skill overcomes danger	Behavioural beliefs (gains > risks)
Perceptual set	Unfamiliarity with task	Subjective norms condoning violations
False sensations	Poor judgement: illusion of control or least effort	Personality: unstable extrovert, non-compliant
False perceptions	Overconfidence	Perceived behavioural control
Confirmation bias	Performance anxiety	Low morale
Situational awareness	Time pressure	Bad mood
Incomplete knowledge	Arousal state: monotony and boredom, emotional status	Job dissatisfaction
Inaccurate knowledge		Attitude to the system
Inference and reasoning		Misperception of hazards
Stress and fatigue		Low self-esteem
Disturbed sleep patterns		Learned helplessness
Error proneness		

Workplace factors (Source: BHP Billiton, 2001).

Workplace Factors		
Error Factors	**Common Factors**	**Violation Factors**
Change of routine	Time shortage	Violations tolerated
Negative transfer	Inadequate tools and equipment	Compliance goes unrewarded
Poor signal/noise ratio	Poor procedures and instructions	Procedures protect the system not the individual
Poor man/system interface	Poor tasking	Little or no autonomy
Designer/user mismatch	Inadequate training	Macho culture
Educational mismatch	Hazards not identified	Perceived licence to bend rules
Hostile environment	Undermanning	Adversarial industrial climate
Domestic problems	Inadequate supervision	Low operator pay
Poor communications	Poor access to job	Low operator status
Poor mix of hands-on work and written instruction (reliance on undocumented knowledge)	Poor housekeeping	Unfair management sanctions
Poor shift patterns/overtime working	Poor supervisor/worker ratio	Blame culture
	Poor working conditions	Poor supervisory example
	Inadequate mix of experience/inexperienced workers	Task allows for easy short-cuts