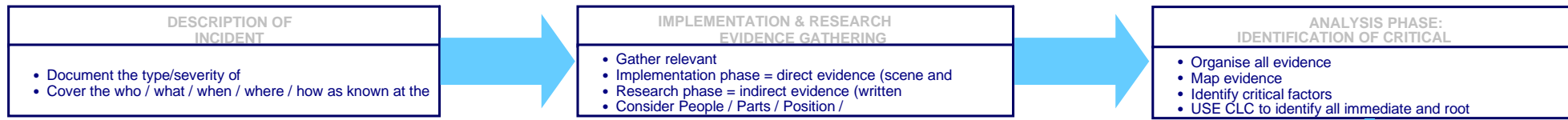


Comprehensive List of Causes

A TOOL FOR ROOT CAUSE ANALYSIS



ACTIONS		POSSIBLE SYSTEM CAUSES		CONDITIONS			
1. Following Procedures 1-1 Violation by individual 1-2 Violation by group 1-3 Violation by supervisor 1-4 Operation of equipment without authority 1-5 Improper position or posture for the task 1-6 Overexertion of physical capability 1-7 Work or motion at improper speed 1-8 Improper lifting 1-9 Improper loading 1-10 Shortcuts 1-11 Other	2. Use of Tools or Equipment 2-1 Improper use of equipment 2-2 Improper use of tools 2-3 Use of defective equipment (aware) 2-4 Use of defective tools (aware) 2-5 Improper placement of tools, equipment or materials 2-6 Operation of equipment at improper speed 2-7 Servicing of equipment in operation 2-8 Other	3. Use of Protective Methods 3-1 Lack of knowledge of hazards present 3-2 Personal protective equipment not used 3-3 Improper use of proper personal protective equipment 3-4 Servicing of energised equipment 3-5 Equipment of materials not secured 3-6 Disabled guards, warning systems or safety devices 3-7 Removal of guards, warning systems or safety devices 3-8 Personal protective equipment not available 3-9 Other	4. Inattention / Lack of Awareness 4-1 Improper decision making or lack of judgement 4-2 Distracted by other concerns 4-3 Inattention to footing and surroundings 4-4 Horseplay 4-5 Acts of violence 4-6 Failure to warn 4-7 Use of drugs or alcohol 4-8 Routine activity without thought 4-9 Other	5. Protective Systems 5-1 Inadequate guards or protective devices 5-2 Defective guards or proactive devices 5-3 Inadequate personal protective equipment 5-4 Defective personal protective equipment 5-5 Inadequate warning systems 5-6 Defective warning systems 5-7 Inadequate isolation of process or equipment 5-8 Inadequate safety devices 5-9 Defective safety devices 5-10 Other	6. Tools, Equipment and Vehicles 6-1 Defective equipment 6-2 Inadequate equipment 6-3 Improperly prepared equipment 6-4 Defective tools 6-5 Inadequate tools 6-6 Improperly prepared tools 6-7 Defective vehicle 6-8 Inadequate vehicle for the purpose 6-9 Improperly prepared vehicle 6-10 Other	7. Work Exposures to 7-1 Fire or explosion 7-2 Noise 7-3 Energised electrical systems 7-4 Energised systems, other than electrical 7-5 Radiation 7-6 Temperature extremes 7-7 Hazardous chemicals 7-8 Mechanical hazards 7-9 Clutter or debris 7-10 Storms or acts of nature 7-11 Slippery floors or walkways 7-12 Other	8. Workplace Environment / Layout 8-1 Congestion or restricted motion 8-2 Inadequate or excessive illumination 8-3 Inadequate ventilation 8-4 Unprotected height 8-5 Inadequate workplace layout controls less than adequate • displays less than adequate • labels less than adequate • locations out of reach or sight • conflicting information is presented 8-6 Other

PERSONAL FACTORS		POSSIBLE SYSTEM CAUSES		JOB FACTORS										
1. Physical Capability 1-1 Vision deficiency 1-2 Hearing deficiency 1-3 Other sensory deficiency 1-4 Reduced respiratory capacity 1-5 Other permanent physical disabilities 1-6 Temporary disabilities 1-7 Inability to sustain body positions 1-8 Restricted range of body movement 1-9 Substance sensitivities or allergies 1-10 Inadequate size or strength 1-11 Diminished capacity due to medication 1-12 Other <input type="checkbox"/> Not applicable	2. Physical Condition 2-1 Previous injury or illness Fatigue • due to workload • due to lack of rest • due to sensory overload 2-2 Diminished performance • due to temperature extremes • due to oxygen deficiency • due to atmospheric pressure variation 2-3 Blood sugar insufficiency 2-4 Impairment due to drug or alcohol use <input type="checkbox"/> Not applicable	3. Mental State 3-1 Poor judgement 3-2 Memory failure 3-3 Poor co-ordination or reaction time 3-4 Emotional disturbance 3-5 Fears or phobias 3-6 Low mechanical aptitude 3-7 Low learning aptitude 3-8 Influenced by medication 3-9 Other <input type="checkbox"/> Not applicable	4. Mental Stress 4-1 Preoccupation with problems 4-2 Frustration 4-3 Confusing directions/demands 4-4 Conflicting directions/demands 4-5 Meaningless or degrading activities 4-6 Emotional overload 4-7 Extreme judgement decisions/demands 4-8 Extreme concentration/perception demands 4-9 Extreme boredom 4-10 Other <input type="checkbox"/> Not applicable	5. Behaviour 5-1 Improper performance is rewarded • saves time or effort • avoids discomfort • gains attention 5-2 Improper supervisory example 5-3 Inadequate identification of critical safe behaviours 5-4 Inadequate reinforcement of critical safe behaviours • proper performance is criticised • inappropriate peer pressure • inadequate performance feedback • inadequate disciplinary process 5-5 Inappropriate aggression 5-6 Improper use or production incentives 5-7 Supervisor implied haste 5-8 Employee perceived haste 5-9 Other <input type="checkbox"/> Not applicable	6. Skill Level 6-1 Inadequate assessment of required skills 6-2 Inadequate practice of skill 6-3 Infrequent performance of skill 6-4 Lack of coaching on skill 6-5 Insufficient review of instruction to establish skill 6-6 Other <input type="checkbox"/> Not applicable	7. Training / Knowledge Transfer 7-1 Inadequate knowledge transfer • inability to comprehend • inadequate instruction qualifications • inadequate training equipment • misunderstood instructions 7-2 Inadequate recall of training material • training not reinforced on the job • inadequate refresher training frequency 7-3 Inadequate training effort • inadequate training program design • inadequate training goals / objectives • inadequate new employee orientation • inadequate initial training • inadequate means to determine if qualified for job 7-4 No training provided • need for training not identified • training records incorrect or out of date • new work methods introduced without training • decision made not to train 7-5 Other <input type="checkbox"/> Not applicable	8. Management / Supervision Employee Leadership 8-1 Conflicting roles / responsibilities • unclear reporting relationships • conflicting reporting relationships • unclear assignment of responsibility • conflicting assignment of responsibility • improper or insufficient delegation of authority 8-2 Inadequate leadership • standards of performance missing or not enforced • inadequate accountability • inadequate or incorrect performance feedback • inadequate work site walk-through 8-3 Inadequate safety promotion 8-4 Inadequate correction of prior hazard / incident 8-5 Inadequate identification of worksite / job hazards 8-6 Inadequate management of change system 8-7 Inadequate incident reporting / investigation system 8-8 Inadequate or lack of safety meetings 8-9 Inadequate performance measurement and assessment 8-10 Other <input type="checkbox"/> Not applicable	9. Contractor Selection and Oversight 9-1 Lack of contractor pre-qualifications 9-2 Inadequate contractor pre-qualifications 9-3 Inadequate contractor selection 9-4 Use of non-approved contractor 9-5 Lack of job oversight 9-6 Inadequate oversight 9-7 Other <input type="checkbox"/> Not applicable	10. Engineering / Design 10-1 Inadequate technical design • design input obsolete • design input not correct • design input not available • design output inadequate • design input feasible • design output unclear • design output not correct • design output inconsistent • no independent design review 10-2 Inadequate standards, specifications, and/or design criteria 10-3 Inadequate assessment of potential failure 10-4 Inadequate ergonomic design 10-5 Inadequate monitoring of construction 10-6 Inadequate assessment of operational readiness 10-7 Inadequate monitoring of initial operation 10-8 Inadequate evaluation and/or documentation of change 10-9 Other <input type="checkbox"/> Not applicable	11. Work Planning 11-1 Inadequate work planning 11-2 Inadequate preventative maintenance • assessment of needs • lubrication / servicing • adjustment / assembly • clearing / resurfacing 11-3 Inadequate repair • communication of needed repair • scheduling of work • examination of parts • parts substitution 11-4 Excessive wear and tear • inadequate planning for use • extension of service life • improper loading • use by untrained people • use for wrong purpose 11-5 Inadequate reference materials or publications 11-6 Inadequate audit / inspection / monitoring • no documentation • no correction responsibility assigned • no accountability for corrective action 11-7 Inadequate job placement • appropriate personnel not identified • appropriate personnel not available • appropriate personnel not provided 11-8 Other <input type="checkbox"/> Not applicable	12. Purchasing, Material Handling and Material Control 12-1 Incorrect item received • inadequate specifications to vendor • inadequate specifications on requisition • inadequate control on changes to orders • unauthorised substitution • inadequate product acceptance requirements • no acceptance verification performed 12-2 Inadequate research on materials / equipment 12-3 Inadequate mode or route of shipment 12-4 Improper handling of materials 12-5 Improper storage of materials or spare parts 12-6 Inadequate material packaging 12-7 Material shelf life exceeded 12-8 Improper identification of hazardous materials 12-9 Improper salvage and/or waste disposal 12-10 Inadequate use of safety and health data 12-11 Other <input type="checkbox"/> Not applicable	13. Tools and Equipment 13-1 Inadequate assessment of needs and risks 13-2 Inadequate human factors / ergonomics considerations 13-3 Inadequate standards or specifications 13-4 Inadequate availability 13-5 Inadequate adjustment / repair / maintenance 13-6 Inadequate salvage and reclamation 13-7 Inadequate removal / replacement of unsuitable items 13-8 No equipment record history 13-9 Inadequate equipment record history 13-10 Other <input type="checkbox"/> Not applicable	14. Work Rules / Policies / Standards / Procedures (PSP) 14-1 Lack of PSP for the task • lack of defined responsibility for PSP • lack of job safety analysis • inadequate job safety analysis 14-2 Inadequate development of PSP • inadequate co-ordination with process / equipment design • inadequate employee involvement in the development • inadequate definition of correction actions • inadequate format for easy use 14-3 Inadequate implementation of PSP, due to deficiencies • contradictory requirements • confusing format • more than one action per step • no check-off spaces provided • inaccurate sequence of steps • confusing instructions • technical error / missing steps • excessive references • potential situations not covered 14-4 Inadequate enforcement of PSP • inadequate monitoring of work • inadequate supervisory knowledge • inadequate reinforcement • non-compliant not corrected inadequate communication of PSP • incomplete distribution to work groups • inadequate translation to appropriate languages • incomplete integration with training • out of date revisions still in use 14-5 Other <input type="checkbox"/> Not applicable	15. Communication Inadequate horizontal communication between peers Inadequate vertical communication between supervisor and person Inadequate communication between different organisations Inadequate communication between work groups Inadequate communication between shifts Inadequate communication methods No communication method available Incorrect instructions Inadequate communication due to job turnover Inadequate communication of safety and health data, regulations or guidelines Standard terminology not used 15-12 Verification / repeat back techniques not used 15-13 Messages too long 15-14 Speech interference 15-15 Other <input type="checkbox"/> Not applicable

For each identified critical factor, consider if any of the listed root cause categories apply. If "yes", circle the specific root cause. If none of the root causes in the category apply, then check the "not applicable" box at the bottom of the column.

CORRECTIVE PHASE: PROPOSALS FOR CORRECTIVE ACTION

- Align with AMEC Performance Standards elements

ELEMENTS OF PERFORMANCE STANDARDS

