IPLOCA
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INCIDENT INVESTIGATION PROCESS

Incident / Accident / Ill-Health investigations comprise of 3 basic steps:

1- Description of the Incident
   a. Document the type / severity of the event
   b. Cover the who/ what/ when/ where/ how

2- Analyse the information
   a. Possible immediate causes
   b. Possible system (root) causes

3- Corrective Phase
   a. Proposals for corrective actions

1. DESCRIPTION OF THE INCIDENT

The processes used to investigate an incident always follow the same principles. However, the make up of the Investigation Team, and the investigation process followed, is determined by the potential severity of the incident.

The first stage of the process is therefore to make an estimate of the most serious probable outcome of the incident in order to determine the process to be followed.

Note: Potential Incident severity is based upon the most serious probable outcome.

For example:

> If a man cuts his finger with a knife, the most likely outcome of the incident is a cut finger and the potential severity of the incident should be judged on that basis but...
>
> If a man cuts his finger on a power saw, the most serious probable outcome could easily have been an amputation and the potential severity of the incident is therefore judged to be much greater.

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1.1. Major Incident (Definition)

A Major Incident is an incident, including a security incident, involving any one of the following:

- a fatality
- multiple serious injures
- significant adverse reaction from authorities, media, NGO's or the general public
- cost of accidental damage exceeding US$ 500,000
- oil spill of more than 100 barrels, or less if it at a sensitive location (1 barrel=159 litres=42 US gallons)
- release of more than ten tonnes of a classified chemical.

Note: An incident must always be treated as a Major Incident for investigation purposes if personal injury resulting in a day away from work case or an oil or chemical release beyond company premises has occurred.

1.2. Team Selection

Incident investigation teams are determined according to the type of incident. Generally, the team will consist of the following:

- a member designated as the Investigation Team Leader
- at least one person knowledgeable in the process involved
- a contract employee, contractor management representative, and / or HSE representative if the incident involved the work of a contractor
- a person knowledgeable in incident investigation techniques and system cause analysis
- other persons, as needed, with appropriate knowledge and experience to thoroughly investigate and analyze the incident, i.e., may include persons from other assets or within the industry as a third party representative in major investigations.

1.3. Fact Finding

Information on the incident can be obtained by collecting information from people, positions, parts and papers.

Interviews with witnesses shall be carried out as soon as possible after the incident; while the incident is fresh in their minds and before too much discussion has taken place with their colleagues.

Witnesses should be interviewed individually, so that they are not interrupted or questioned by others involved. One member of the team shall interview the witness and a second record the interview. The interviewee must sign interview transcripts.

To ensure that all facts are uncovered, ask the broad "who, what, where, when, why and how" open-ended questions.

1.4. Establish the Sequence of Events

As the investigation progresses, the investigators should begin to identify the sequence of events and concentrate efforts on increasing their knowledge in areas of uncertainty.

As the extent of physical factors involved in an incident becomes clear, the investigators should shift the emphasis of their investigation and questioning to the system causes and the reasons for people's actions.

Establish a chronology of events by date, time and place. The construction of a diagram showing the connections between the various events and conditions leading up to the incident, called Sequence of Events, is a useful technique in the investigation process, especially for more complex incidents.

1.5. Establish Findings

The findings of the investigation should establish the system causes of the incident so that corrective measures can be taken to prevent future incidents.

2.0. ANALYSE THE INFORMATION

2.1. Identify Critical Factors and Causes and Make Recommendations

The investigation process shall identify actions to prevent recurrence. This is achieved by addressing the substandard acts and conditions and by identifying and correcting the latent failures.

Not all causes can be completely eliminated and some may be eliminated only at prohibitive cost. Some recommendations will, therefore, be focused on reducing the risk to a tolerable level, while others will be focused on improving protective systems (the defenses) to limit the consequences.

At least one recommendation should be made for each finding.

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2.2. System Cause Analysis

All incident findings should be reviewed to determine the critical factors, immediate causes and system causes of the incident.

Identification of system causes of an incident may often reveal underlying management system failures that resulted in the incident occurring.

System Cause Analysis is a:

- process for analyzing incidents
- means to provide consistent and repeatable results
- means of providing objective and not punitive results
- means of providing final results from which system causes can be identified. Once identified, actions can be taken to correct the cause and prevent a similar type incident

After examining all the critical factors involved in an incident and arriving at the system causes, a good check to use is to ask, “If these system causes were corrected, would this prevent the incident from happening again?” If the answer is no, further evaluation is needed.

System Cause Analysis - Example

It is very easy to mistake an immediate cause for a system cause of an incident. As stated above, the system causes of an incident will often be a management system failure. The following example illustrates this point:

> A spill occurred when an employee overflowed a fuel truck while loading it at the bulk fuel loading facility.
>
> The initial investigation revealed that the operator of the truck overestimated the amount of fuel required to fill the truck. By the time he realized he was running out of tank capacity, he couldn’t reach the shutoff switch before the truck overflowed.
>
> The initial finding was that the operator of the fuel truck was inattentive. However further questioning of the driver and a survey of the scene revealed that the truck was being loaded from the top and the emergency shutoff switch for top loading was not functioning properly. This required the operator to climb down off of the truck and to enter the pump room to shut off the flow of fuel. The malfunctioning switch had been reported several weeks prior to the incident but had not yet been repaired.

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Note: One system cause of the incident was subsequently found to be a management system that allowed a critical component of an emergency shutdown system to remain in service while not functioning properly.

After arriving at one of the most obvious causes of the incident, it is important to ask, "Why?" In the case above, asking why the employee overflowed the tank resulted in the identification of the malfunctioning switch, and the need for a system to prioritize work requests so critical safety components are repaired as soon as possible.

The Comprehensive List of Causes Charts shall be used to determine system causes for all incident investigations.

Immediate Causes: These are "symptoms" of the system causes

1	Did Not Follow Existing Procedures	1-1 Violation by individual; 1-2 Violation by group; 1-3 Violation by Supervisor; 1-4 Procedure not available; 1-5 Procedure was not understood; 1-6 other
2	Use of Tools, Plant/Equipment or Vehicle	2-1 Plant/Equipment or Vehicle used in the wrong way ; 2-2 Tools used in the wrong way; 2-3 Use of Plant/Equipment or Vehicle with known defect; 2-4 Use of tools with a known defect; 2-5 Incorrect placement of tools, equipment or materials; 2-6 Operation of Plant/Equipment or Vehicle at improper speed; 2-7 Other
3	Use of Protective Equipment or Methods	3-1 Need of protective equipment or methods not recognized; 3-2 Personal protective equipment or methods not used; 3-3 Incorrect use of personal protective equipment or methods; 3-4 Personal protective equipment or methods not available; 3-5 Disabled guards, warning systems or safety devices; 3-6 Removal of guards, warning systems or safety devices; 3-7 Others
4	Lack of Focus or Inattention	4-1 Distracted by other concerns; 4-2 Inattention to surroundings; 4-3 Inappropriate workplace behavior; 4-4 No warning provided; 4-5 Unintentional human error; 4-6 Routine activity without thought; 4-7 Other
5	Protective Systems	5-1 Guards or protective devices not effective; 5-2 Defective guards or protective devices were needed; 5-3 incorrect personal protective equipment; 5-4 Defective personal protective equipment; 5-5 Warning systems not effective; 5-6 Defective warning systems; 5-7 Safety devices were not effective; 5-8 Defective safety devices; 5-9 Other
6	Tools, Plant/Equipment	6-1 Plant/ Equipment malfunction; 6-2 Preparation of Plant/Equipment; 6-3 Tool malfunction; 6-4 Preparation of tools; 6-5 Vehicle malfunction; 6-6 Preparation of vehicle; 6-7 Other
7	Unanticipated Exposure to	7-1 Fire or explosion; 7-2 Noise; 7-3 Energized Electrical Systems; 7-4 Energized source other than electrical; 7-5 Temperature extremes; 7-6 Hazardous chemicals; 7-7 Mechanical hazards; 7-8 Storms or acts of nature; 7-9 Other
8	Work Place Layout	8-1 Congestion; 8-2 Illumination; 8-3 Ventilation; 8-4 Unprotected height; 8-5 Work place displays; 8-6 Other

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System (Root) Causes

9	Physical Capability	9-1 Vision deficiency; 9-2 Hearing deficiency; 9-3 Other sensory deficiency; 9-4 Other permanent physical disabilities; 9-5 Substance sensitivities or allergies; 9-6 Size or strength limitations; 9-7 Other
10	Physical Condition	10-1 Previous injury or illness; 10-2 Fatigue; 10-3 Diminished performance; 10-4 Impairment due to drug, alcohol or medication; 10-5 Other
11	Mental Capability	11-1 Memory failure; 11-2 Poor coordination or reaction time; 11-3 Emotional status; 11-4 Fears or phobias; 11-5 Low mechanical aptitude; 11-6 Low learning aptitude; 11-7 Incorrect judgment; 11-8 Other
12	Mental Stress	12-1 Preoccupation with problems; 12-2 Frustration; 12-3 Confusing directions/demands; 12-4 Conflicting directions/demands; 12-5 Extreme decision demands; 12-6 Unusual concentration or perception demands; 12-7 Other emotional overload; 12-8 Other
13	Behaviour	13-1 Antecedent not present; 13-2 Antecedent not effective; 13-3 Incorrect behaviour not reinforced; 13-4 Incorrect behaviour not confronted; 13-5 Proper behaviour not rewarded: 13-6 Behavioural analysis process not effective; 13-7 Other
14	Skill Level/ Competency	14-1 Assessment of required skills or competency not effective; 14-2-Practice of skills not effective; 14-3 No coaching on skill; 14-4 Infrequent performance of skill; 14-5 Other
15	Training/Knowledge Transfer	15-1 No training provided; 15-2 Training effort not effective; 15-3 Knowledge transfer not effective ; 15-4 Training materials not recalled; 15-5 Other
16	Management/ Supervision/ Employee leadership	16-1 Behaviours not reinforced; 16-2 Participation in safety efforts not effective; 16-3 Consideration of safety in staffing not effective; 16-4 Resourcing for safety not effective; 16-5 Support of people not effective; 16-6 Monitoring/ auditing of safety process not effective; 16-7 Lessons learned not embedded; 16-8 Leadership or accountability; 16-9 Employee involvement not effective; 16-10 Risk analysis or tolerance not effective; 16-11 Other
17	Contractor Selection & Oversight	17-1 No contractor pre-qualifications process; 17-2 Contractor pre-qualifications process not effective; 17-3 Use of a non-approved contractor; 17-4 Contractor selection not effective; 17-5 No job oversight process; 17-6 Job oversight not effective; 17-7 Other
18	Engineering/Design	18-1 Technical design not correct; 18-2 Design standards, specifications or criteria not correct; 18-3 Incorrect ergonomic or human factor design; 18-4 Monitoring of construction not effective; 18-5 Assessment of operational readiness not effective; 18-6 Monitoring of initial operation not effective; 18-7 Technical analysis for risk not effective; 18-8 Other
19	Control of Work	19-1 No work planning or risk assessment performed; 19-2 Risk assessment not effective; 19-3 Required permit not obtained; 19-4 Specified controls not followed; 19-5 Change in job scope; 19-6 Work site not left safe; 19-7 Other
20	Purchasing, Material & Material Handling Control	20-1 Incorrect item ordered; 20-2 Incorrect item received; 20-3 Handling or shipping not effective; 20-4 Storage of materials not effective; 20-5 Labelling of material not effective; 20-6 Other
21	Tools & Plant/Equipment	13-1 Wrong tools or plant/equipment provided; 13-2 Correct tools or plant/equipment not available; 13-3 No inspection; 13-4 Incorrect adjustment/repair/maintenance; 13-6 Removal or replacement of unsuitable items not effective; 13-8 No preventative maintenance program; 13-9 Testing of plant, tools or equipment not performed; 13-10 Other
22	Standards/ Practices/Procedures (SPP)	22-1 Lack of SPP for the task; 22-2 Development of SPP not effective; 22-3 Communication of SPP not effective; 22-4 Implementation of SPP not effective; 22-5 Enforcement of SPP not effective; 22-5 Other
23	Communication	23-1 Horizontal communication between peers not effective; 23-2 Vertical communication between supervisor and person not effective; 23-3 Communication between different organizations not effective; 23-4 Communication between work groups not effective; 23-5 Communication between shifts not effective; 23-6 Communication not received; 23-7 Incorrect information; 23-8 Information not understood; 23-9 Other

3. CORRECTIVE PHASE

Review each of the immediate and system causes and develop recommended actions to address all identified risks.