

Accident Investigation



ACCIDENTS ARE INCIDENTS
That HAVE Harmed or Damaged People or Property

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Introduction:

Accident & Incident investigation is a practiced art, the investigator (s) should never conduct an investigation with existing prejudices, but with a clear mind set only on the objective to ascertain what happened, why did it happen and how can this be prevented from happening again.

As an investigator, you are not seeking to lay blame for the accident, to do so jeopardises the investigation outcomes, and as such, you should not be in a position to carry out the investigation. A good investigation can only be achieved, when the investigator (s) are neutral and solely focused on the structure of the accident itself. Like a detective conducting a criminal investigation, you are looking for factual evidence that will stand up in court, evidence that will lead to a decisive conclusion. The quality of an investigator is subject to their experience, just like a detective, one gets better the more one learns from each investigation.

Credits:

These should go to the men and women belonging to the various Australian State Safety Bodies, who have the unenviable task of investigating serious accidents and fatalities.

The point of a safe work place, is hopefully that you will never have to investigate a serious or fatal accident, achievement of a safe place of work is the ultimate goal so that you will not have to carry out the contents in this book.

In Queensland there is Government assistance available to all businesses to assist them in achieving a safe place of work, this is conducted through WHSQ and the IPaM department.

IPaM – (Injury Prevention and Management) The team will help businesses to reduce injuries and accidents in their workplaces. The team can be contacted through the WHSQ Web site.

Further Reading:

For further reading on achieving a safe workplace, the eBook *How to Achieve a Safe Work Place Rev.02*

Is available from the author by email, peter.ribbe@bigpond.com or available through the authors Linkedin page for download. au.linkedin.com/pub/peter-ribbe/76/96a/306/

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This is an example investigation designed to give an overview of how an accident investigation is conducted, what is required to be found and how you disseminate information from witness statements.

Accidents and Incidents

What is an accident and why should it be investigated?

- The term "accident" can be defined as an unplanned event that interrupts the completion of an activity, and that may (or may not) include injury or property damage.
- An incident usually refers to an unexpected event that did not cause injury or damage this time but had the potential. "Near miss or dangerous occurrence" are also terms for an event that could have caused harm but did not.
- Please note: The term incident is used in some situations and jurisdictions to cover both an "accident" and "incident". It is argued that the word "accident" implies that the event was related to fate or chance. When the root cause is determined, it is usually found that many events were predictable and could have been prevented if the right actions were taken -- making the event not one of fate or chance (thus, the word incident is used). For simplicity, we will use the term accident to mean all of the above events.
- The information that follows is intended to be a general guide for supervisors or joint occupational health and safety committee members. When accidents are investigated, the emphasis should be concentrated on finding the root cause of the accident rather than the investigation procedure itself so you can prevent it from happening again. The purpose is to find facts that can lead to actions, not to find fault. Always look for deeper causes. Do not simply record the steps of the event.

Accidents and Incidents

Reasons to investigate a workplace accident include:

Most importantly, to find out the cause of accidents and to prevent similar accidents in the future

- to fulfil any legal requirements
- to determine the cost of an accident
- to determine compliance with applicable safety regulations
- to process workers' compensation claims

Incidents that involve no injury or property damage should still be investigated to determine the hazards that should be corrected. The same principles apply to a quick inquiry of a minor incident and to the more formal investigation of a serious event.

Who should do the accident investigating?

Ideally, an investigation would be conducted by someone experienced in accident causation, experienced in investigative techniques, fully knowledgeable of the work processes, procedures, persons, and industrial relations environment of a particular situation.

Some jurisdictions provide guidance such as requiring that it must be conducted jointly, with both management and labour represented, or that the investigators must be knowledgeable about the work processes involved.

In most cases, the supervisor or manager should help investigate the event.

Other members of the team can include:

- employees with knowledge of the work
- safety officer
- health and safety committee
- employees with experience in investigations
- "outside" expert

- **Should the immediate supervisor / manager be on the team?**

The advantage is that these persons are likely to know most about the work and persons involved and the current conditions. Furthermore, the supervisor or manager can usually take immediate remedial action. The counter argument is that there may be an attempt to gloss over the supervisors or managers shortcomings in the accident. This situation should not arise if the accident is investigated by a team of people, and if the worker representative(s) and the members review all accident investigation reports thoroughly.

- **Why look for the root cause?**

An investigator who believes that accidents are caused by unsafe conditions will likely try to uncover conditions as causes. On the other hand, one who believes they are caused by unsafe acts will attempt to find the human errors that are causes. Therefore, it is necessary to examine some underlying factors in a chain of events that ends in an accident.

The important point is that even in the most seemingly straightforward accidents, seldom, if ever, is there only a single cause. For example, an "investigation" which concludes that an accident was due to worker carelessness, and goes no further, fails to seek answers to several important questions such as:

- Was the worker distracted? If yes, why was the worker distracted?
- Was a safe work procedure being followed? If not, why not?
- Were safety devices in order? If not, why not?
- Was the worker trained? If not, why not?

An inquiry that answers these and related questions will probably reveal conditions that are more open to correction than attempts to prevent "carelessness".

What are the steps involved in investigating an accident?

The accident investigation process involves the following steps:

- Report the accident occurrence to a designated person within the organization
- Provide first aid and medical care to injured person(s) and prevent further injuries or damage
- Investigate the accident
- Identify the causes
- Report the findings
- Develop a plan for corrective action
- Implement the plan
- Evaluate the effectiveness of the corrective action

- ## Investigation Kit



Voice Recorder/Batteries

Different colour marking paint
Numbers from 0 -9
Camera/Flash/Batteries

The items inside the kit have various uses to isolate and define the accident scene, and to describe and number items for description of evidence or occurrence.

Voice recorders for collecting interview witness statements while the information is fresh in witness's minds.

Chalk and paint, to define outlines/direction markers etc.

Numbers to define individual pieces of evidence

A 30cm ruler to give scale/size to an area

Camera using correct date and time stamp to record all aspects of the scene

Why Investigate?

- A well-ordered and thorough investigation is designed not to apportion blame, but to find root cause.
- Once root cause is established, what failed and why will be shown.
- This ensures that any failures in processes or systems are able to be rectified, and ensures that it does not happen again.
- That is why an investigator must remain neutral and not instil in themselves any pre conceptions about what happened.

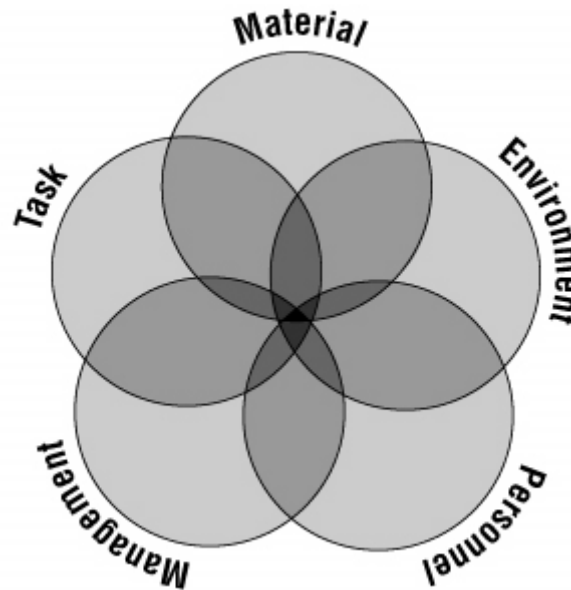
Accident Causation Models

Many models of accident causation have been proposed, ranging from Heinrich's domino theory to the sophisticated Management Oversight and Risk Tree (MORT).

The simple model shown in Figure 1 attempts to illustrate that the causes of any accident can be grouped into five categories - task, material, environment, personnel, and management. When this model is used, possible causes in each category should be investigated. Each category is examined more closely below. Remember that these are sample questions only: no attempt has been made to develop a comprehensive checklist

What should be looked at as the cause of an accident?

Figure 1: Accident Causation



Task

Here the actual work procedure being used at the time of the accident is explored.

Members of the accident investigation team will look for answers to questions such as:

- Was a safe work procedure used?
- Had conditions changed to make the normal procedure unsafe?
- Were the appropriate tools and materials available?
- Were they used?
- Were safety devices working properly?
- Was lockout used when necessary?

For most of these questions, an important follow-up question is "If not, why not?"

Material

To seek out possible causes resulting from the equipment and materials used, investigators might ask:

- Was there an equipment failure?
- What caused it to fail?
- Was the machinery poorly designed?
- Were hazardous substances involved?
- Were they clearly identified?
- Was a less hazardous alternative substance possible and available?
- Was the raw material substandard in some way?
- Should personal protective equipment (PPE) have been used?
- Was the PPE used?
- Were users of PPE properly trained?

Again, each time the answer reveals an unsafe condition, the investigator must ask why this situation was allowed to exist

Environment

The physical environment and especially sudden changes to that environment are factors that need to be identified. The situation at the time of the accident is what is important, not what the "usual" conditions were. For example, accident investigators may want to know:

- What were the weather conditions?
- Was poor housekeeping a problem?
- Was it too hot or too cold?
- Was noise a problem?
- Was there adequate light?
- Were toxic or hazardous gases, dusts, or fumes present?

Personnel

The physical and mental condition of those individuals directly involved in the event must be explored. The purpose for investigating the accident is not to establish blame against someone but the inquiry will not be complete unless personal characteristics are considered. Some factors will remain essentially constant while others may vary from day to day:

- Were workers experienced in the work being done?
- Had they been adequately trained?
- Can they physically do the work?
- What was the status of their health?
- Were they tired?
- Were they under stress (work or personal)?

Management

Management holds the legal responsibility for the safety of the workplace and therefore the role of supervisors and higher management and the role or presence of management systems must always be considered in an accident investigation. Failures of management systems are often found to be direct or indirect factors in accidents. Ask questions such as:

- Were safety rules communicated to and understood by all employees?
- Were written procedures and orientation available?
- Were they being enforced?
- Was there adequate supervision?
- Were workers trained to do the work?
- Had hazards been previously identified?
- Had procedures been developed to overcome them?
- Were unsafe conditions corrected?
- Was regular maintenance of equipment carried out?
- Were regular safety inspections carried out?

This model of accident investigations provides a guide for uncovering all possible causes and reduces the likelihood of looking at facts in isolation. Some investigators may prefer to place some of the sample questions in different categories; however, the categories are not important, as long as each pertinent question is asked. Obviously there is considerable overlap between categories; this reflects the situation in real life. Again it should be emphasized that the above sample questions do not make up a complete checklist, but are examples only.

How are the facts collected?

The steps in accident investigation are simple: the accident investigators gather information, analyse it, draw conclusions, and make recommendations. Although the procedures are straightforward, each step can have its pitfalls. As mentioned above, an open mind is necessary in accident investigation: preconceived notions may result in some wrong paths being followed while leaving some significant facts uncovered. All possible causes should be considered. Making notes of ideas as they occur is a good practice but conclusions should not be drawn until all the information is gathered.

Injured workers(s)

The most important immediate tasks--rescue operations, medical treatment of the injured, and prevention of further injuries--have priority and others must not interfere with these activities. When these matters are under control, the investigators can start their work.

Physical Evidence

Before attempting to gather information, examine the site for a quick overview, take steps to preserve evidence, and identify all witnesses. In some jurisdictions, an accident site must not be disturbed without prior approval from appropriate government officials such as the coroner, inspector, or police. Physical evidence is probably the most non-controversial information available. It is also subject to rapid change or obliteration; therefore, it should be the first to be recorded. Based on your knowledge of the work process, you may want to check items such as:

- positions of injured workers
- equipment being used
- materials or chemicals being used
- safety devices in use
- position of appropriate guards
- position of controls of machinery
- damage to equipment
- housekeeping of area
- weather conditions
- lighting levels
- noise levels
- time of day

Physical Evidence

You may want to take photographs before anything is moved, both of the general area and specific items. Later careful study of these may reveal conditions or observations missed previously. Sketches of the accident scene based on measurements taken may also help in subsequent analysis and will clarify any written reports. Broken equipment, debris, and samples of materials involved may be removed for further analysis by appropriate experts. Even if photographs are taken, written notes about the location of these items at the accident scene should be prepared.

Eyewitness Accounts

Although there may be occasions when you are unable to do so, every effort should be made to interview witnesses. In some situations witnesses may be your primary source of information because you may be called upon to investigate an accident without being able to examine the scene immediately after the event. Because witnesses may be under

severe emotional stress or afraid to be completely open for fear of recrimination, interviewing witnesses is probably the hardest task facing an investigator.

Witnesses should be kept apart and interviewed as soon as possible after the accident. If witnesses have an opportunity to discuss the event among themselves, individual perceptions may be lost in the normal process of accepting a consensus view where doubt exists about the facts.

Witnesses should be interviewed alone, rather than in a group. You may decide to interview a witness at the scene of the accident where it is easier to establish the positions of each person involved and to obtain a description of the events. On the other hand, it may be preferable to carry out interviews in a quiet office where there will be fewer distractions. The decision may depend in part on the nature of the accident and the mental state of the witnesses.

Interviewing

Interviewing is an art that cannot be given justice in a brief document such as this, but a few do's and don'ts can be mentioned. The purpose of the interview is to establish an understanding with the witness and to obtain his or her own words describing the event:

DO...

- put the witness, who is probably upset, at ease
- emphasize the real reason for the investigation, to determine what happened and why
- let the witness talk, listen
- confirm that you have the statement correct
- try to sense any underlying feelings of the witness
- make short notes or ask someone else on the team to take them during the interview
- ask if it is okay to record the interview, if you are doing so
- close on a positive note

DO NOT...

- intimidate the witness
- interrupt
- prompt
- ask leading questions
- show your own emotions
- jump to conclusions

Do Not

Ask open-ended questions that cannot be answered by simply "yes" or "no". The actual questions you ask the witness will naturally vary with each accident, but there are some general questions that should be asked each time:

- Where were you at the time of the accident?
- What were you doing at the time?
- What did you see, hear?
- What were the environmental conditions (weather, light, noise, etc.) at the time?
- What was (were) the injured worker(s) doing at the time?

- In your opinion, what caused the accident?
- How might similar accidents be prevented in the future?

If you were not at the scene at the time, asking questions is a straightforward approach to establishing what happened. Obviously, care must be taken to assess the credibility of any statements made in the interviews. Answers to a first few questions will generally show how well the witness could actually observe what happened.

Another technique sometimes used to determine the sequence of events is to re-enact or replay them as they happened. Obviously, great care must be taken so that further injury or damage does not occur. A witness (usually the injured worker) is asked to re enact in slow motion the actions that preceded the accident.

Background Information

A third, and often an overlooked source of information, can be found in documents such as technical data sheets, health and safety committee minutes, inspection reports, company policies, maintenance reports, past accident reports, formalized safe-work procedures, and training reports. Any pertinent information should be studied to see what might have happened, and what changes might be recommended to prevent recurrence of similar accidents.

What should I know when making the analysis and conclusions?

At this stage of the investigation most of the facts about what happened and how it happened should be known. This has taken considerable effort to accomplish but it represents only the first half of the objective. Now comes the key question--why did it happen? To prevent recurrences of similar accidents, the investigators must find all possible answers to this question.

You have kept an open mind to all possibilities and looked for all pertinent facts. There may still be gaps in your understanding of the sequence of events that resulted in the accident. You may need to reinterview some witnesses to fill these gaps in your knowledge.

When your analysis is complete, write down a step-by-step account of what happened (your conclusions) working back from the moment of the accident, listing all possible causes at each step. This is not extra work: it is a draft for part of the final report. Each conclusion should be checked to see if:

1. it is supported by evidence
2. the evidence is direct (physical or documentary) or based on eyewitness accounts, or
3. the evidence is based on assumption.

This list serves as a final check on discrepancies that should be explained or eliminated.

Why should recommendations be made?

The most important final step is to come up with a set of well-considered recommendations designed to prevent recurrences of similar accidents. Once you are knowledgeable about the work processes involved and the overall situation in your organization, it should not be too difficult to come up with realistic recommendations. Recommendations should:

- be specific
- be constructive

- get at root causes
- identify contributing factors

Resist the temptation to make only general recommendations to save time and effort.

For example, you have determined that a blind corner contributed to an accident.

Rather than just recommending "eliminate blind corners" it would be better to suggest:

1. install mirrors at the northwest corner of building X (specific to this accident)
2. install mirrors at blind corners where required throughout the worksite (general)

Never make recommendations about disciplining a person or persons who may have been at fault. This would not only be counter to the real purpose of the investigation, but it would jeopardize the chances for a free flow of information in future accident investigations.

In the unlikely event that you have not been able to determine the causes of an accident with any certainty, you probably still have uncovered safety weaknesses in the operation. It is appropriate that recommendations be made to correct these deficiencies.

The Written Report

If your organization has a standard form that must be used, you will have little choice in the form that your written report is to be presented. Nevertheless, you should be aware of, and try to overcome, shortcomings such as:

If a limited space is provided for an answer, the tendency will be to answer in that space despite recommendations to "use back of form if necessary."

If a checklist of causes is included, possible causes not listed may be overlooked.

Headings such as "unsafe condition" will usually elicit a single response even when more than one unsafe condition exists.

Differentiating between "primary cause" and "contributing factors" can be misleading. All accident causes are important and warrant consideration for possible corrective action.

Your previously prepared draft of the sequence of events can now be used to describe what happened. Remember that readers of your report do not have the intimate knowledge of the accident that you have so include all pertinent detail. Photographs and diagrams may save many words of description. Identify clearly where evidence is based on certain facts, eyewitness accounts, or your assumptions.

If doubt exists about any particular part, say so. The reasons for your conclusions should be stated and followed by your recommendations. Weed out extra material that is not required for a full understanding of the accident and its causes such as photographs that are not relevant and parts of the investigation that led you nowhere. The measure of a good accident report is quality, not quantity.

Always communicate your findings with workers, supervisors and management. Present your information 'in context' so everyone understands how the accident occurred and the actions in place to prevent it from happening again.

What should be done if the investigation reveals human error

A difficulty that has bothered many investigators is the idea that one does not want to lay blame. However, when a thorough worksite accident investigation reveals that some person or persons among management, supervisor, and the workers were apparently at fault, then this fact should be pointed out. The intention here is to remedy the situation, not to discipline an individual.

Failing to point out human failings that contributed to an accident will not only downgrade the quality of the investigation. Furthermore, it will also allow future accidents to happen from similar causes because they have not been addressed.

However never make recommendations about disciplining anyone who may be at fault. Any disciplinary steps should be done within the normal personnel procedures.

How should follow-up be handled?

Management is responsible for acting on the recommendations in the accident investigation report. The health and safety committee, if you have one, can monitor the progress of these actions.

Follow-up actions include:

- Respond to the recommendations in the report by explaining what can and cannot be done (and why or why not).
- Develop a timetable for corrective actions.
- Monitor that the scheduled actions have been completed.
- Check the condition of injured worker(s).
- Inform and train other workers at risk.
- Re-orient worker(s) on their return to work.

Conclusion

As can be seen from the previous pages, good investigation is worth spending the time on, the results of the investigation must be conclusive and never open ended, and must have at its end recommendations that ensure that the investigated accident/incident can not be repeated.

Accident Investigation

Trial Investigation

The Process:

The following process to an Accident / Incident Investigation must be carried out if the Accident or Incident is either a Notifiable event or a worker has received an injury requiring hospitalization/or damage caused exceeds the stated value of repair or replacement of \$1000.00

1. Secure the site of the accident.
2. Identify and keep separate any witnesses to the event.
3. Notify the relevant statutory body of the accident. (If required)
4. Call witnesses and interview, including mobile plant operator. (if required)
5. Ask witnesses for statements.
6. Return to accident site with information on occurrence.
7. Mark out incident area. (Photograph if possible)
8. Ascertain cause.
9. Ascertain worker/s involvement.
10. Ascertain environmental conditions that may have been contributing factors. (Photograph if possible)
11. Mark out impact points, document distances involved. (Photograph if possible)
12. Check and document if a safety breach has occurred, check if worker/s were trained in relevant SWP's Or Safety Procedures, through SWP/SOP training or induction, document findings.
13. Organise to visit injured worker (If required) take statements from workers.
14. Interview supervisor responsible for worker.
15. Collate and document findings.
16. Review findings and ascertain root cause.
17. Review findings and root cause and recommend ways to mitigate future accidents happening of the type being investigated.
18. Collate information and write report.
19. Pass investigation to senior manager for review.
20. On completion run Safety Alert and Toolbox Topic on the Accident/Incident

Standalone Accident Investigation Scenario

Worker was transferring Sodium Chlorite from one IBC to another.

The chemical has spilt and reacted to an unknown chemical residue present in the soil. This reaction has given off toxic gasses and the worker is overcome by these, he is laying prone near the IBC's.

You are to ensure;

The site is locked down, **(Make Believe)** proceed with first aid for injured worker and containment of chemical spill by PPE equipped rescue team.

Ensure normal evacuation procedures are followed for the injured worker, **(Make Believe)** notify ambulance and retain call ID Number (49786U)

(Make Believe) Notify WHS Queensland on 1300 369 915 of incident and retain report number (52176)

Follow:

21. Secure the site of the accident. (Allow no one to enter or leave)
22. Identify and keep separate any witnesses to the event.
23. Call witnesses and interview.
24. Ask witnesses for statements.
25. Return to accident site with information on occurrence.
26. Mark out accident scene (Mark out with paint) (Photograph if possible)
27. Ascertain workers actions from witness statements.
28. Ascertain type of PPE worker was wearing. (Was worker wearing correct PPE for chemical being transferred?)
29. Ascertain environmental conditions that may have contributed to the release of gas (Wear appropriate PPE) Take soil samples from area of spillage (Photograph if possible)
30. Find copy of SDS for Chemical being transferred, note any possible chemical reactions to types of other chemicals *(It was found due to the Investigation that a car battery had been damaged and the acid spilt on the ground a week previously)*
31. Mark out collapse point of worker, document distances involved from IBC's. (Photograph if possible)
32. Check and document if a safety breach has occurred, check if worker was trained in chemical handling, through SWP/SOP's, document findings.
33. Organise to visit injured worker, take statement from worker.
34. Interview supervisor responsible for worker.
35. Collate and document findings.
36. Review findings and ascertain root cause.
37. Review findings and root cause and recommend ways to mitigate future accidents happening of the type being investigated.
38. Collate information and write report.
39. Pass investigation to senior manager for review.

The SDS chemical details abbreviated for study purposes:

You will be able to find reactions, PPE etc for the trial investigation.

SODIUM CHLORITE 31% SOLUTION SDS

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- - DO NOT allow clothing wet with material to stay in contact with skin.
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.

SUITABLE CONTAINER

- - DO NOT use aluminium, galvanised or tin-plated containers.
- Lined metal can, lined metal pail/ can.
- Plastic pail.

For low viscosity materials

- Drums and jerricans must be of the non-removable head type.
- Where a can is to be used as an inner package, the can must have a screwed enclosure.

STORAGE INCOMPATIBILITY

- - Inorganic oxidising agents can react with reducing agents to generate heat and products that may be gaseous (causing pressurization of closed containers). The products may themselves be capable of further reactions (such as combustion in the air).
- Organic compounds in general have some reducing power and can in principle react with compounds in this class. Actual reactivity varies greatly with the identity of the organic compound.
- Inorganic reducing agents react with oxidizing agents to generate heat and products that may be flammable, combustible, or otherwise reactive.

Their reactions with oxidizing agents may be violent.

- Incidents involving interaction of active oxidants and reducing agents, either by design or accident, are usually very energetic and examples of so called redox reactions.
- Contact with acids produces toxic fumes.
- Avoid any contamination of this material as it is very reactive and any contamination is potentially hazardous.
- Avoid contact with copper, aluminium and their alloys.
- Chlorites are much less stable than corresponding chlorates and most will explode under shock or on heating to around 100 deg. C. These include
chlorites of copper (violent on impact), hydrazine (monochlorite, inflames when dry), nickel (explodes at 100 deg. C but not on impact), silver
(at 105 deg. C or on impact), sodium, tetramethylammonium and thallium (which show detonator properties). Several other chlorites not isolated and
unstable in solution include ammonium chlorite and its mono-, di-, and tri-methyl derivatives.
- Metal salts of chlorites are powerful oxidants.
- Avoid storage with reducing agents.

STORAGE REQUIREMENTS

- - Store in an upright position.
- Store in original containers.
- Keep containers securely sealed.
- DO NOT store near acids, or oxidising agents.
- No smoking, naked lights, heat or ignition sources.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

The following materials had no OELs on our records

- sodium chlorite: CAS:7758- 19- 2 CAS:66554- 51- 6

PERSONAL PROTECTION

EYES

■ - Safety glasses with unperforated side shields may be used where continuous eye protection is desirable, as in laboratories; spectacles are not

sufficient where complete eye protection is needed such as when handling bulk-quantities, where there is a danger of splashing, or if the material

may be under pressure

- Chemical goggles. whenever there is a danger of the material coming in contact with the eyes; goggles must be properly fitted.

HANDS/FEET

■ - **Elbow length PVC gloves.**

- When handling corrosive liquids, wear trousers or overalls outside of boots, to avoid spills entering boots.

Suitability and durability of glove type is dependent on usage. Factors such as:

- frequency and duration of contact,
- chemical resistance of glove material,.
- Do NOT wear natural rubber (latex gloves).
- Neoprene rubber gloves.

OTHER

■ - **Overalls.**

- PVC Apron.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required. For further

information consult site specific CHEMWATCH data (if available), or your Occupational Health and Safety Advisor.

ENGINEERING CONTROLS

■ Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator.

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS CHRONIC HEALTH EFFECTS

- Harmful if swallowed. ■ Danger of cumulative effects.
- Toxic in contact with skin.
- Causes burns.
- Risk of serious damage to eyes.

TOXICITY AND IRRITATION

- unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY IRRITATION

Oral (Guinea pig) LD50: 300 mg/kg

Oral (Mouse) LD50: 300 mg/kg

Oral (Rat) LD50: 350 mg/kg

- Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound.

The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling epidermis.

Oral (rat) LD50: 200-2000 mg/kg No data [Hoechst]

SODIUM CHLORITE:

- unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.



Secure the site, wear the correct PPE as required, do not place yourself into danger, either with securing the accident site, or evacuating the injured worker.

Assess the injured worker for injuries etc.



Evacuate injured worker.





Mark out and measure out all relevant evidence, document everything you find.



Evidence photos, a crucial part of finding the why's, and why not's.



Evidence photo of container label, the investigator is able to follow up with the confirmation of the contents from the SDS. (Safety Data Sheet)



Photo of the open IBC tap, and the spilled chemical on the ground where the reaction took place.

Witness Statements:

Standalone Investigation Training

Witness Statement 1.

Statement to occurrence of chemical spill:

Statement given by; George Longjohns.

16th May 2013

On Thursday morning about 7:45am, I saw Cecil Meathead working on two IBC's (Intermediate Bulk Containers) just to the side of the company car, car port. I was loading a truck at the time, so did not pay too much attention to what was going on. When I came back for another pallet, I noticed Cecil was lying next to one of the IBC's, I stopped my Fork Lift, and ran over to where Cecil was lying.

As I got near, a strong odour of chlorine was smelt by me, so I stopped and ran to the office to raise the alarm. Terry Smith my supervisor was there and ran out to see what was going on, he came back choking and found it hard to breathe. He then raised the evacuation alarm and called the Emergency Rescue & Response Team. They went in and removed Cecil on a stretcher, gave him mouth to mouth and CPR, the office called an ambo, and Cecil was taken to hospital.

That was all I saw, I went back to work loading the truck when Cecil was taken away.

George Longjohns.

Standalone Investigation Training

Witness Statement 2.

Statement to occurrence of chemical spill:

Statement given by; Terry Smith.

16th May 2013

I was in the office getting some gloves around 7:45am when George Longjohns came running in to say that Cecil Meathead had collapsed, I ran out to see what was going on, when I saw Cecil laying there, I was overcome with a strong chlorine smell that made me gag, and my eyes water. I started to feel like I was going to be sick and pass out, so I went back into the office and raise the alarm, I notified the office staff to call an ambo and the Fire Brigade, and hit the evacuation alarm and had the receptionist call the ERRT, the factory evacuated, the factory manager Bill Littlebottom took some photos, and the ERRT came all suited up and took George to a clearing on a stretcher, they did CPR on him, then the ambo came and took George away. The Fire Brigade had the Hazmat Team. Then the factory manager Bill Littlebottom taped up the area and went round to ask what everyone saw. Bill Littlebottom then investigated what happened with the Fire Brigade.

Terry Smith.

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Witness Statement 3.

Statement to occurrence of chemical spill:

Statement given by; Supervisor John Nobrains.

16th May 2013

On the morning of 16th May 2013, I instructed Cecil Meathead to transfer sodium chlorite from the leaking IBC into another good empty one. I told him to grab a forklift, mask, goggles and a transfer hose and go and do the job.

It's not my fault he got sick from the chemical; I was not to know that he would get sick and pass out. I am too busy running the other men to worry about chasing one person that should know his job. No blame can be attributed to me as I was not there. I did everything I could and told him what he needed to take with him for PPE. He has done it many times before, so I could not see a problem in him doing it again. There was a case the week before when the maintenance men were fixing the truck and smashed one of the batteries, and the acid leaked on the ground, but that's not my problem, the maintenance supervisor should have checked to make sure that it was cleaned up.

John Nobrains

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Witness Statement 4.

Statement to occurrence of chemical spill:

Statement given by; Injured Worker, Cecil Meathead

17th May 2013

On the morning of 16th May 2013, I Cecil Meathead was instructed to transfer sodium chlorite from the leaking IBC into another good empty one by John Nobrains the plant supervisor. I went and got a forklift, mask, goggles and a transfer hose and went do the job, (I have driven a forklift many times, but never got a license)

When I placed the damaged IBC on the ground, I went to get an empty one; I positioned that and put the transfer hose into the damaged top of the IBC and the empty one, and started to transfer the Sodium Chlorite. After about ten minutes I could smell a strange smell coming from the IBC that the chemical was being transferred into, I did not take much notice at first, but then started to get dizzy and then I must have blacked out, that's all I remember, then I woke up in hospital.

Cecil Meathead

The following is an investigation report template.

You are to look at the scenario, study the photos and SDS, study the witness reports, and write everything down into the areas of the investigation report as you find and evaluate the evidence.

Who uses this form?

Any person that is conducting an investigation into an Accident or Incident.

Purpose:

When an Accident or Incident occurs where workers are injured or property is damaged, the details must be investigated and recorded to ascertain a root cause and prevent future accidents or incidents from occurring.

Part A – To be completed by investigator

Name Of Investigator: Date:

Time of Accident/Incident: Am: ☐ Pm: ☐

Name of Supervisor responsible in area of occurrence:

Work Area:

Notifiable Incident? Y ☐ N ☐ If Yes Insert Notification Number:

Internal Incident Register Number:

Part B – Attachments

Witness Statements: Y ☐ N ☐

Injured Worker/s Statements: Y ☐ N ☐

Evidence Photos: Y ☐ N ☐ (Photos must include Date & Time stamp)

Root Cause Analysis: Y ☐ N ☐

Recommendations: Y ☐ N ☐

Occurrence Report: Y ☐ N ☐

Internal Incident Report Attached: Y ☐ N ☐

Copy of external investigation outcomes and findings (State Safety Body): Y ☐ N ☐

Part C - Type of investigation

Injury: Y ☐ N ☐

Damage to Property or Plant: Y ☐ N ☐

Fatality: Y ☐ N ☐

Root Cause Findings:

Below are some of the items that should be present.

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Findings that should be present in investigation of root cause

- 1. Supervisor ignorant of the type of PPE required for chemical transfer.**
- 2. Worker ignorant of the type of PPE required for chemical transfer.**
- 3. Lack of concern from supervisor towards injured worker.**
- 4. Worker was not trained in chemical handling.**
- 5. The spill of the battery acid was not reported or documented.**
- 6. Worker was not licensed to operate a forklift.**
- 7. Worker did not close the tap or check empty IBC prior to chemical transfer taking place**
- 8. Supervisor and worker had not checked and had no knowledge of contents of SDS for Sodium Chlorite.**
- 9. Supervisor knowing an acid spill occurred in the area of transfer did not check SDS for possible reaction with Sodium Chlorite in the area.**
- 10. Maintenance Supervisor did not follow up to ensure site was de contaminated after acid spill.**

You then take all the gathered information, and in your report make recommendations that will ensure that this type of accident does not happen again.