

Accident/Incident Investigation

Jim Howe CSP, Steve Sallman

Accident - Incident Investigation

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Session Objectives:

Upon completing this session participants will be able to:
Recall the elements of the incident investigation process including;

Given an incident scenario; demonstrate effective witness interview techniques, develop a sequence of events chart and create a cause and effect chart, identify system deficiencies and potential process improvements based on a cause and effect chart, identify appropriate corrective and preventive actions

Assess their current incident investigation processes and develop improvements where needed

Response cards (clickers)



No on/off, just push the number key corresponding to your choice, special instructions.
You can change your mind during polling and change your entry.
The system will count your last selection prior to polling ending.
To choose "10" click "0".

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**Incident Investigation
(Beyond the Basics)**

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- Why do we do accident investigation?
- What are we trying to accomplish?
- Do the objectives of all investigators coincide with mine?
- How will we know if we are successful?
- What is the scope of the investigation?
- When should the report start and stop?
- What method do you use to conduct accident investigation?

BE PREPARED AHEAD OF TIME

Fact Finding not Fault Finding

- Accident investigators should remain neutral and independent and present the results from the investigations in an unbiased way

Basic Skills of an Investigator

- Observe - see objects, people, actions objectively, unbiased by experience.
- Listen - hear what people are communicating, not just what they say.
- Empathize - put self in other person's shoes to understand what they are communicating.
- Sequence - put a lot of disjointed data into its logical sequential order.
- Reason - putting data together to reach logical descriptions, and recommendations.
- Question - define questions that when answered, provide understanding.

Ludwig Benner

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Mentally Preparing for an Accident Investigation

A skilled investigator has the ability to:

- 1) transform the chaos into an orderly effective investigation
- 2) Maintain an open mind, control his/her biases and not jump to conclusions.

Remember there will be plenty of time after the initial investigation to determine the cause(s) and develop recommendations.

Basic Elements of an Effective Accident Investigation

1. Preparation
2. Initial Notification
3. On-site Investigation
4. Development of a Report
5. Implementation and Follow-up

Guidelines

- Step 1 — Evaluate and Analyze
- Step 2 — Gather information
- Step 3 — Release Incident Scene
- Step 4 — Create Cause Map
- Step 5 — Compile Report
- Step 6 — Communicate Findings and Recommendations

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When a serious incident occurs focus only on the following three tasks.

1. Provide medical treatment for victim(s)
2. Notify family members if appropriate
3. Secure and preserve the accident site

After the above tasks have been completed investigators can begin the investigation.

Beyond Physical Injuries

Accidents affect the emotional condition of co-workers, first responders, supervisors and friends.

Critical Incident Response

Pay attention to those that were not physically injured but were emotionally injured.

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Family Support

1. Initial communication
2. Support at the hospital
3. Assistance with travel and housing for out-of-town family members
4. Counseling assistance
5. Medical treatment support
6. One union representative and one management representative available to the family 24 hours a day
7. Arrange for family members to visit the accident site when requested. This should be done when the plant is not operating.
8. On-going support and benefit assistance

Being Prepared takes:

1. Training and Communication
2. Notification System
3. Critical Incident Response
4. Materials and Equipment

Training

- | | |
|---|---|
| a) Accident Investigators <ul style="list-style-type: none">- methods and techniques- interview methods- photographing and documenting an accident site- report writing and development | c) Plant Security Personnel <ul style="list-style-type: none">- securing an accident site- basic skills required of an investigator- emergency first aid- hazardous material training |
| b) Emergency Responders <ul style="list-style-type: none">- minimizing disturbance of the accident site- emergency first aid- knowledge of hazardous materials and processes- plant layout—emergency routes | d) Local Union and Management Representatives <ul style="list-style-type: none">- familiarized with the incident investigation system- importance of securing the accident site- importance of investigations being conducted by qualified personnel |

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Communication

- **In-Plant Notification System**
 - A communication system must be developed to insure the prompt notification of appropriate union and management personnel in the event of an accident.
- **External Notification**
 - Contact must be made with the UAW-GM notification hotline as soon as possible
 - OSHA must be made aware of major incidents

Prompt notification is critical to effective accident investigation.

Communication of Accident Information to the Plant Workforce

As soon as possible and no later than the day following a serious accident, a written communication should be posted and/or handed out. Joint Union/Management communications have the greatest credibility. The communication should be limited to a brief summary of the facts of the incident.

This communication should include:

- 1) Date and time of the incident
- 2) Name, department and job classification of the victim(s)
- 3) Brief (a few paragraphs) summary of incident
- 4) Medical condition of the victim(s)
- 5) Status of the accident investigation process
 - who is involved (International Union, Local Union, corporation, group, division, etc.)
- 6) Name of the medical facility where the victim(s) is being treated

Equipment and Materials

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Investigation Kit

1. Maintained at designated location(s)
2. Used only for investigations or training
3. Inspected regularly

Photographic Equipment and Supplies

- 35mm or Digital Camera
- External Flash Unit
- Tripod
- Battery charger
- Extra batteries, memory cards, film
- Video Camera
- Extra batteries, memory cards, tape
- Power supply
- (add additional items as needed)

Forms, Checklists and Documents

- Investigation form
- Interview form
- Note pad
- Document checklist
- Phone listing
- Photo log
- Critical incident form
- Relevant standards and regulations
- Accident investigation manual
- Graph paper for sketches
- Post-It pads
- (add additional items)

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CRITICAL INCIDENT PERSONNEL REPORT

Date _____ Workplace _____ LOCAL UNION _____
 Incident _____

The Health and Safety Investigation Team should complete the Name, Job Title, Shift and Involvement in Incident columns.

NAME	JOB TITLE	SHIFT	INVOLVEMENT IN INCIDENT	DESIRET
1) _____	_____	_____	_____	YES NO
2) _____	_____	_____	_____	YES NO
3) _____	_____	_____	_____	YES NO
4) _____	_____	_____	_____	YES NO
5) _____	_____	_____	_____	YES NO
6) _____	_____	_____	_____	YES NO
7) _____	_____	_____	_____	YES NO
8) _____	_____	_____	_____	YES NO
9) _____	_____	_____	_____	YES NO
10) _____	_____	_____	_____	YES NO
11) _____	_____	_____	_____	YES NO
12) _____	_____	_____	_____	YES NO

Personal Protective Equipment

- Safety glasses
- Safety shoes
- Gloves (cloth and latex)
- Safety lock(s)
- Hearing protection
- Hard hat
- (add additional items as needed)

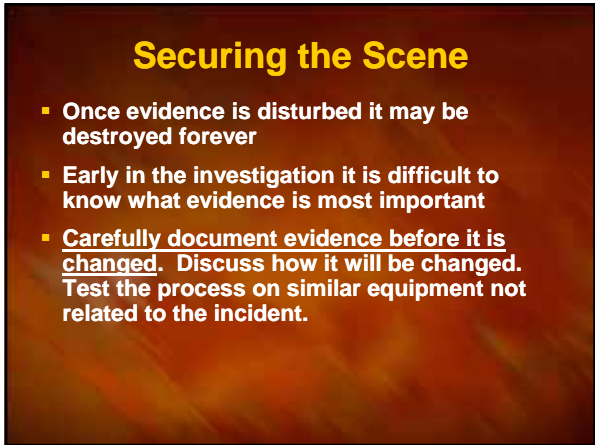
Miscellaneous Materials and Supplies

- Flashlight
- Masking tape
- Chalk for marking areas
- Plastic bags to store physical evidence
- Permanent marking pens
- Tape measure (25 foot)
- Tags
- Caution tape
- Sound Level Meter
- Air monitoring equipment
- (add additional items)

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Securing the Scene

- Protect scene (e.g., utilize yellow caution tape to establish a barrier to the incident scene).
- Station designated personnel around perimeter to maintain crowd control.
- Provide entry points to control people going in and out.
- Mark off blood or body fluid spill areas to prevent contacting contaminated surfaces and equipment.
- Prevent use of equipment - lockout equipment involved.

Securing the Scene

- Ensure scene is safe
 - Stabilize, secure or, if necessary, dismantle equipment
 - Remove fallen objects which pose a hazard
 - Stop leaks; prevent exposure to hazardous materials
 - Stabilize material

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Step 2 — Gather information

On Site Investigation

- conduct interviews
- photograph/video scene
- collect documents



Initial goal is to document the accident scene and interview those who were immediately involved.

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Information and Documents to be Collected

- 1) Photographs
- 2) Witness Statements
- 3) Personnel, work history and demographics
- 4) Blueprints of equipment and plant layouts
- 5) Equipment operating manuals
- 6) Maintenance records
- 7) Results of past inspections
- 8) Results of inspections after accident
- 9) Results of Industrial Hygiene Sampling
- 10) Training records: technical and health & safety
- 11) Records of past injuries and illnesses of the victim

Information and Documents (continued)

- 12) Records of past injuries/illnesses of other workers who perform similar tasks to those performed by the victim
- 13) Medical status; Death Certificate
- 14) Analysis of physical evidence: fingerprints, chemical analysis, metallurgical tests, weld integrity, etc.
- 15) Autopsy Results
- 16) Contractor Contracts & Pre-bid Documents
- 17) Plant Security & First Responder Reports
- 18) Sketch of accident scene (before and after)
- 19) Lockout energy control procedures; MSDS(s)
- 20) Surveillance video; machine or equipment status information; or other remote monitoring

Photographing the Scene



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Photographing An Incident Scene

- Accurately document the incident scene and other relevant items
- Document the situation at the time of the incident
- Document the situation from the perspective of the victim
- Make sure you have a system to ensure that you can identify the photos in the future (photo log, audio sound track, photo sequencing)
- Take photographs as soon as possible after the incident.

Orientation Shots

- Before taking a close-up an orientation photo should be taken



Take Photos from the Point of View of Those Involved



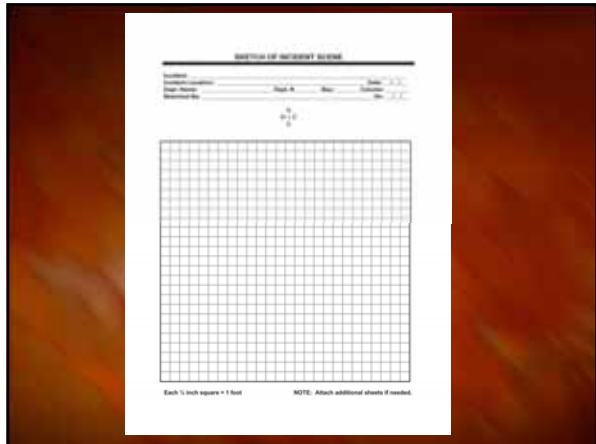
What the driver was doing

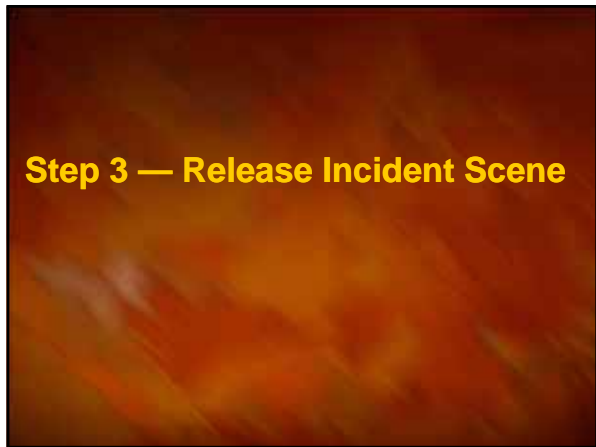


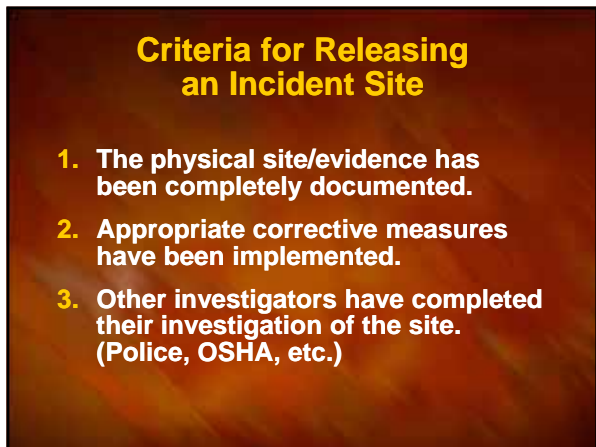
What the driver could see

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Before Health & Safety can release the scene its members should:

- Conduct a complete health and safety inspection of the work area, equipment and/or machinery.
- Verify that health and safety controls are in place.
- Ensure that hazards have been eliminated and/or controlled.
- Ensure that no new hazards were created.

Why Incident Investigation?

Two Approaches

Traditional thinking

- Find the cause
- Who did it?
- Focuses on who
- Ignores the process

Lowers responsibility and accountability

System Thinking

- Look for causes
- Why did it happen?
- Focuses on causes and solutions
- Manage the process

Increases responsibility and accountability

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There are only two sources of information during an accident investigation

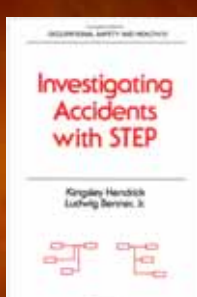
- **People**
 - Communicating
 - Observing
- **Things**
 - Observing
 - Analyzing
 - Reading
 - Listening



SAFETY SOLUTIONS

Initial goal is to document the accident scene and interview those who were immediately involved.

Mental Movie Concept



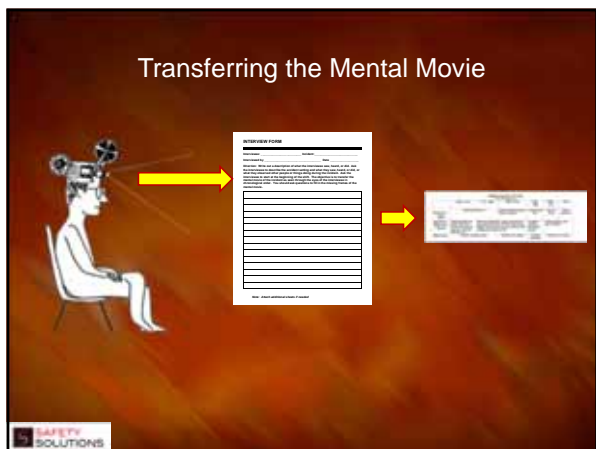
SAFETY SOLUTIONS

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The first law of accident investigation states that everyone and everything is always someplace doing something during the accident.

The witness has it, you need it, the witness doesn't have to give it to you.



SAFETY SOLUTIONS

Where and how to interview – preferred order

1. At the scene
2. Reviewing photos and possibly video
3. Away from job, taking notes only

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Interview

- Victim(s)
- Co-workers
- Supervisors
- Workers that perform similar jobs in other departments or on different shifts
- Engineers
- Maintenance Personnel
- Witnesses
- Emergency Personnel
- Medical Personnel
- Equipment Suppliers

Use tape recorders only under special circumstances.

What are examples of special circumstances?



Comments

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Interview Reminders

- Prioritize interviews based upon importance of information, emotional condition and availability.
- Select a comfortable, private, non-threatening place
- Explain who you are and what you are doing
- Explain that you need his/her help to understand, as accurately as possible, what happened
- Ask for help
- Be sensitive to the emotional state of the individual
- Ask the individual to tell you what he/she saw, heard or did - start at the beginning
- The most important question "and then what happened?"
- Remember the mental movie
- When possible "walk through" the actions of the individual (people recall things best in order of occurrence)
- Take your time
- Don't use tape recorder except under special circumstances

STEP WORKSHEET MATRIX

TIME →

A
B
C

STEP - Sequentially Timed Event Plotting Procedure



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The witness has it, you need it and the witness does not have to give it to you.

Number 1 Rule for: Incident Investigations, Audits and Inspections

- See what you see.
- Not what you want to see.
- Not what you saw yesterday.
- Not what you thought you would see.
- Not what someone told you to see.

See what you see.

Sequentially Timed Events Plotting


	Time			
	8:00 AM	8:15 AM	8:30 AM	8:45 AM
Victim				
Co-worker				
Supervisor				
Machine				
Vehicle				
Valve				

People
And
Things

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Identify Hazards

A condition, set of circumstances, or the inherent property of a material that can cause injury, illness, or death.

- Crushing
- Shearing
- Noise, vibration
- Chemical, gases, fumes, mists, dusts
- Entanglement
- Pinch point
- High pressure
- Electrical
- Ergonomics-posture, force, repetition
- Lifting
- Work organization
- Staffing
- Overtime
- Slippery surfaces
- Working at heights
- Fire
- Radiation



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Hazards –Tip of the Iceberg



Surface hazards

Hazardous situations
Often don't see hazardous situations related to:

- Normal tasks
- Abnormal but foreseeable tasks
- Infrequent task
- Upset conditions and unplanned events
- Interaction of materials
- Unanticipated tasks

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Mental Movie Concept



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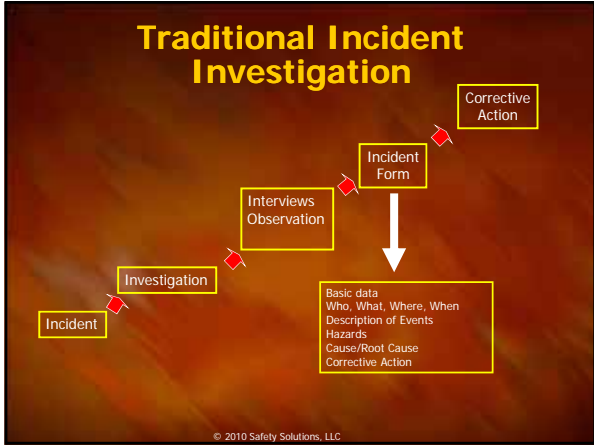




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New View/Paradigm

Incident Investigation = Problem Solving

Effective problem solving means the problem never happens again.

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Cause and Effect Analysis

Problem: Machine repairman fractured arm while adjusting locating pin on machine xx.

Present → Past

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Comparison

Traditional Incident Investigation
Past → Present (incident)

Cause and Effect Analysis
Present → Past

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Sort the cards into effects and causes.

Wrong hydraulic fluid Hydraulic oil leaked onto step

Fell off machine step Step slippery

Employee's sprained ankle

Ankle landed in awkward position

Slipped on bottom step Seal leaked

Sort past to present.

Wrong hydraulic fluid Hydraulic oil leaked onto step

Fell off machine step Step slippery

Employee's sprained ankle Ankle landed in awkward position

Slipped on bottom step Seal leaked

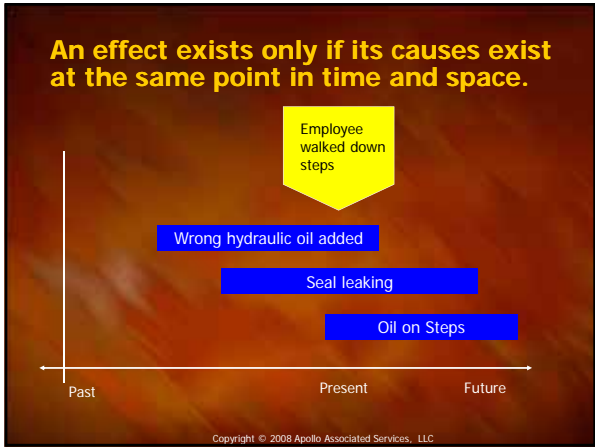
Card Exercise

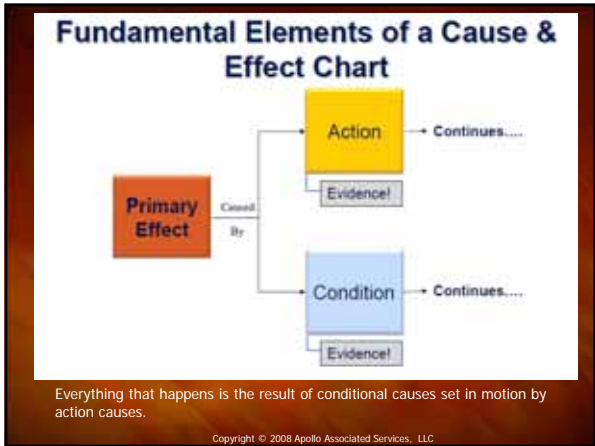
- Sort the cards by effects and causes.
- Arrange the cards into a cause and effect chart – from past to present.

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Causes

- **Action** – momentary causes that interact with conditions to cause an effect.
(usually end in “ed”, seal leaked, employee slipped, coil bumped, circuit energized)
- **Condition** – Causes that exist over time.
(the existence of a noun, oil exists)

Continue asking “caused by” which minimizes storytelling, forces present to past, and elicits specific responses

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If you get stuck

- Think “caused by”, “because”, “why”
- Think about man, machine, method and material

Safety Committee example

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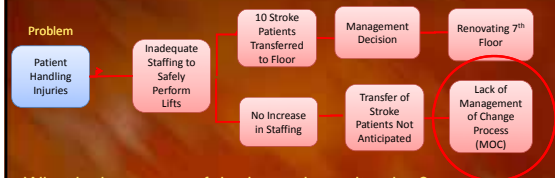
Causes and effects are often not closely related in time and space.

This is especially true of the most important causes.

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Cause and Effect Charting



What is the source of the hazardous situation?

Preventive Action System Improvement

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Practice Cause and Effect Charting

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How come we can find all the hazards and hazardous situations after an incident but not before?

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All health and safety professionals miss some hazards.

Some miss a lot more than others.

Important Questions

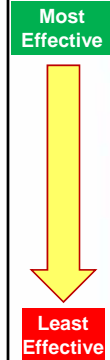
- Did we know about the hazard?
- Did we know about the hazardous situation?
- If we did know about it, was it properly controlled?
- If it was properly controlled, did the controls drift?

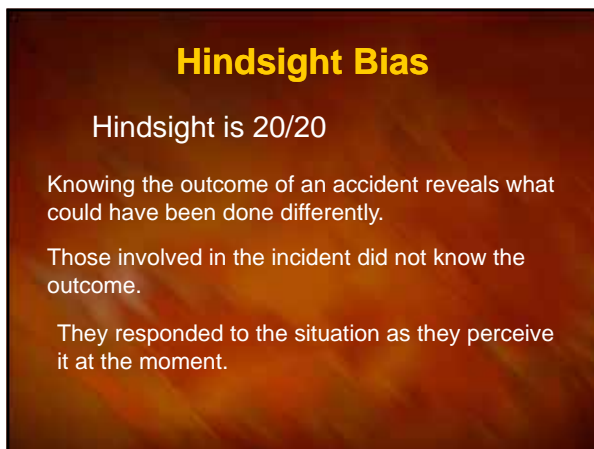
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Hierarchy of Controls	
Controls	Examples
Elimination	<ul style="list-style-type: none"> Design to eliminate hazards, such as falls, hazardous materials, noise, confined spaces and manual material or patient handling Improve the process to eliminate the task
Substitution	<ul style="list-style-type: none"> Substitute for less hazardous material, reduce energy by lowering speed, force, amperage, pressure, temperature and noise
Engineering	<ul style="list-style-type: none"> Ventilation systems, machine safeguarding, sound enclosures, circuit breakers, platforms and guard railing, interlocks, lift tables, conveyors and balancers
Warnings	<ul style="list-style-type: none"> Signs, backup alarms, smoke detectors, computer messages, beepers, mirrors, horns, labels and instructions
Administrative	<p>Procedures</p> <ul style="list-style-type: none"> Safe job procedures, staffing, rotation of workers, equipment inspections, lockout, universal precautions, changing work schedules and pre-job planning <p>Training</p> <ul style="list-style-type: none"> Hazard communication, confined space entry, lockout and safe work procedures
Personal Protective Equipment	<ul style="list-style-type: none"> Safety glasses, hearing protection, face shields, respirators, gloves, safety harnesses and lanyards





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