Commonwealth of Massachusetts
Executive Office of Labor and Workforce Development

Accident Investigations

Department of Labor Standards

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Things to Learn from this Training

- 1. Objective 1 Preserve the scene
- 2. Objective 2 Document, collect information
- 3. Objective 3 Identify contributing factors
- 4. Objective 4 Take corrective actions to prevent recurrence

Accident Investigation
also known as
Incident Investigation

George Santayana: Those who cannot remember the past are doomed to repeat it. 1863

- Accident investigation is a Reactive Method to achieve Safety and Safety.
- OSHA regulations are written in blood.
- Job Hazard Analysis/Risk Assessment is a Pro-Active method of achieving on-site Health and Safety Program rules.

Accident or Incident ??

- Freak Accidents: seems to imply it can't be prevented, that it was an act of God, fate destiny, Karma…can't control, __it happens.
- FA = things generally not covered by life insurance include :
- Acts of War
- Acts of God, stuck by lightening (unless job related), meteorite, skylab chunk
- Intentional self injury (suicide)
- Incident : any bad outcome the result of a variety of contributing factors acting together

Incident Investigation Premise

1) Incidents include = injuries, property damage, a close call, near miss/hit.
2) :can be anticipated and prepared for, prevented with thoughtful planning and analysis.
3) Most people don't plan to fail, but they often fail to plan.
4) Generally failing to plan is no accident, simply easier to do nothing.

What do these numbers mean to YOU?

- $9.8 million
- 60%
- $101,800
- $3,721

Top Most Expensive Injuries FY14

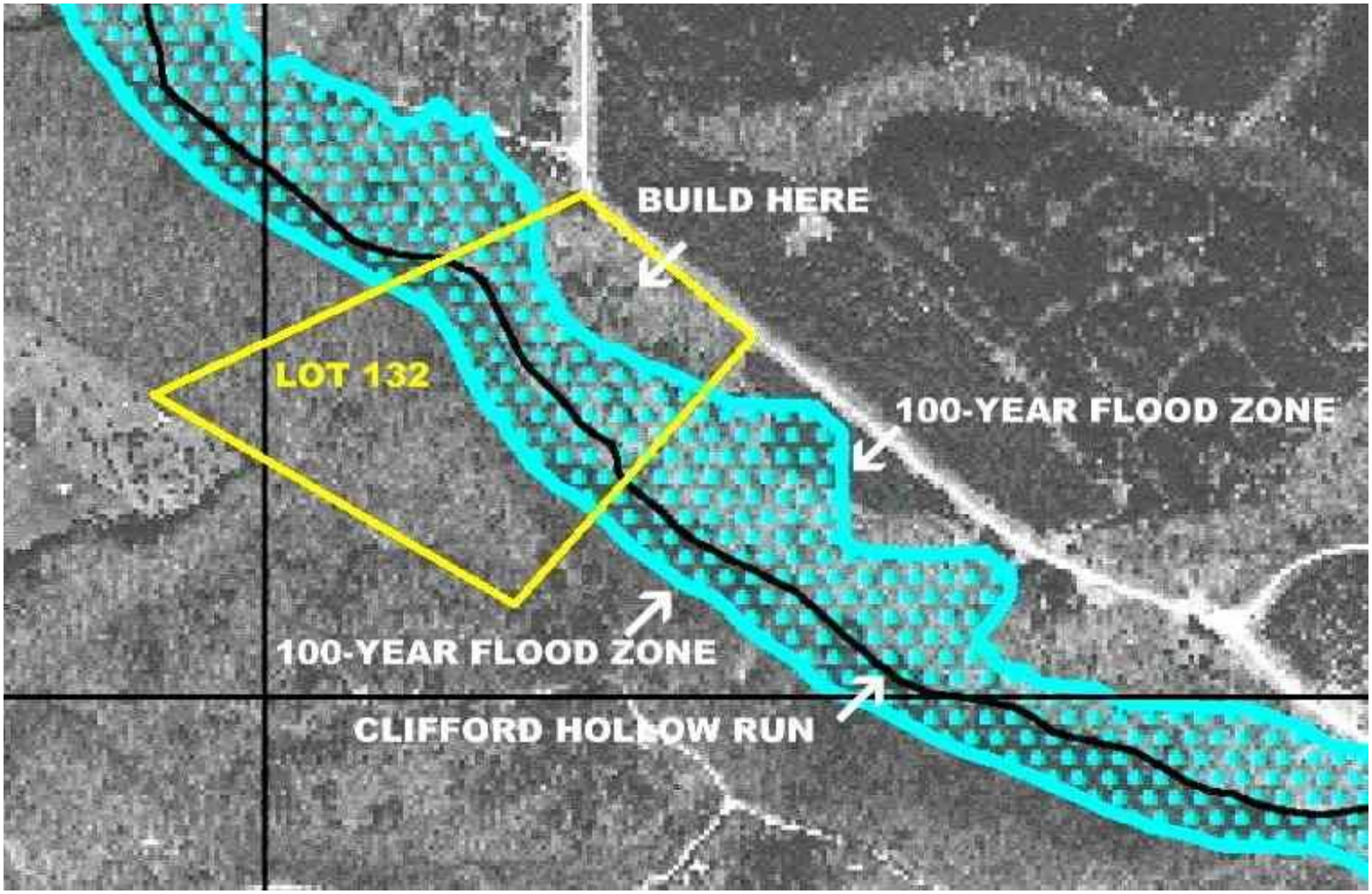
Event	Cost
Slip on Floor	$101,800
Slip on Ice	$ 76,500
Trip on sidewalk	$ 76,200
Lifting	$ 63,300
Assault by inmate against staff	$ 63,000
Assault by patient against staff	$ 51,620
Electrical shock	$ 46,800
Amputation	$ 46,400

Average for all injury events in FY14: $3,721.

Natural disasters exist, weather/environmental related, hard to anticipate, not impossible

Tornado,lightening storm shelter

Don’t build in flood zone



Tsunami Fukajima Japan, some advanced warning ocean sensors

Designed homes for storm surge

Volcano activity- unpredictable

Good choices requires planning

Fires in residences, workplaces

Security alarms, fire suppression and portable fire extinguishers

CLASSES OF FIRES	TYPES OF FIRES	PICTURE SYMBOL
A	Wood, paper, cloth, trash & other ordinary materials.	
B	Gasoline, oil, paint and other flammable liquids.	
C	May be used on fires involving live electrical equipment without danger to the operator.	
D	Combustible metals and combustible metal alloys.	D
K	Cooking media (Vegetable or Animal Oils and Fats)	

Smoke, heat, carbon monoxide detectors and alarms

Occupational injuries

- Most not a result of natural disasters, many are weather related
- Slips, trips, falls: ice, snow, wet floors, grease, oil
- Back and muscle strains sprains: lifting, ergonomics shoveling, blowing snow, equipment maintenance
- Lacerations (chainsaws, meat slicers, blades etc)
- Amputations (snowblowers, lawn mowers)
- Burns (welding, torch cutting, auto repair
- Electrical shock, lock out tag out
- Assaults, violence (corrections, police, nursing homes) stuck by (machine guards)

- Preserve and Document Scene
- Collect information
- Determine root cause
- Implement Corrective Actions

- OSHA's systems approach to preventing injuries

Why investigate?

- Prevent recurrence of injury, illness
- Save lives
- Save money both employer and employee
- Demonstrate commitment to Health & Safety
- Promote positive workplace morale
- Improves management efficiency
- Root cause: the underlying reasons unsafe conditions exist or if procedures or rules were not followed. Reflects management, design, planning, organization or operational failings. Incidents usually a domino effect of several, numerous overlapping failures.

What to investigate

- Investigate programs and procedures
- Not behaviors of individuals

- What organizational factors created the pre-condition that allowed a failure to happen.
- Was there a clear procedure, instructions to follow? Was it followed? Were there unusual pressures not to follow rule ?
- If using equipment is the manufacturers user manual present, was the equipment used as directed as it was designed?

If you don't get to the root

Mowing dandelion heads leads to proliferation and more recurrence.

Preservation, documentation

- In house use cones, tape, guards prevent equipment from being altered, taken away

- Interview any witnesses, use notes or record with permission, as soon as possible.
- Short term memory is a terrible thing to waste.
- Ideally interview multiple witnesses separately in private. They may not want to speak openly in front of supervisors for fear of punishment.
- Find facts verses fault. Contributing factors
- Sketch scene if photos not available
- Make photo notes ASAP

Incident checklist may include:

- Name of injured
- Employee's first language
- Job title at time of injury
- Employment __full __ part __temp__ seasonal
- Length of time employed _____years____months
- Description of injury: cut , burn, contusion, sprain, struck by, caught between
- Date and time : 12/14/16 4:32 pm
- Location: front steps
- Description of events: Crossing guard was stepping into cross walk when he was struck by a vehicle heading east at 8:03 am, on Speedway St.

Collecting information

- Equipment manuals – must have, online
- Industry guidance documents
- ANSI standards (consensus standards)
- Company policies (written down hopefully)
- Maintenance logs, records etc.
- Training records : who attended, what was discussed (right to know, fire extinguisher annual)
- Enforcement policies, records, audits, monitoring
- Previous corrective actions
- Note weather: sunny, raining, ice, snow, hail, temperature, windy

Who, what, when,

- **Who**: was injured, saw what happened, was working with the person, supervises or instructs, or monitors the employees work activities
- **What**: happened, was the injury, part of the body, the employee doing, been instructed to do, tools used, machine involved, task, precautions given, used, ppe used, ppe required, was done to contribute to accident, did employees who witnessed do, can be done to prevent recurrence.
- **When**: did it occur, start work, assigned to the task, hazards identified using JSA, supervisors last check in, employee sense something was wrong.

Where why how

- Where: did it happen, was the employee positioned, was the supervisor, witnesses.
- Why: was the employee injured, did he do it that way, was he working alone, wasn't PPE used, wasn't warned of hazards to avoid, was he in that position, using those tools or machines, didn't check with supervisor if something unusual was noticed, continue working under those conditions.
- How: did the employee get injured, could he avoided being injured, could fellow employees intervened, could supervision prevented this.

Information example

- During floor stripping, waxing an employee at a state hospital began having chest tightness and difficulty breathing. He was brought to the emergency room and was treated for and diagnosed with occupational asthma.
- The machine used to apply the floor stripper sprays the product that is auto diluted with water in front of a rotating brush and then a squeegee pools and vacuums the liquid to a holding tank.
- The SDS indicates the floor stripper contains: 25% ethanol amine, 25% 2-butoxy ethanol
- 10% sodium benzyl alcohol

Minuteman floor scrubber

Floor stripper – Safety data sheet

- 2 butoxy ethanol OSHA PEL = 25 ppm
- Caution can be absorbed through skin
- Mono ethanol amine PEL = 3 ppm 8 hours
- Benzyl alcohol AIHA TWA= 10 ppm

- Use appropriate engineering controls to keep employee exposures below recommended or statutory limits. Use with adequate ventilation.
- Use appropriate skin protection: impervious gloves, boots, torso protection if spraying or mist is possible.

Information begets more questions

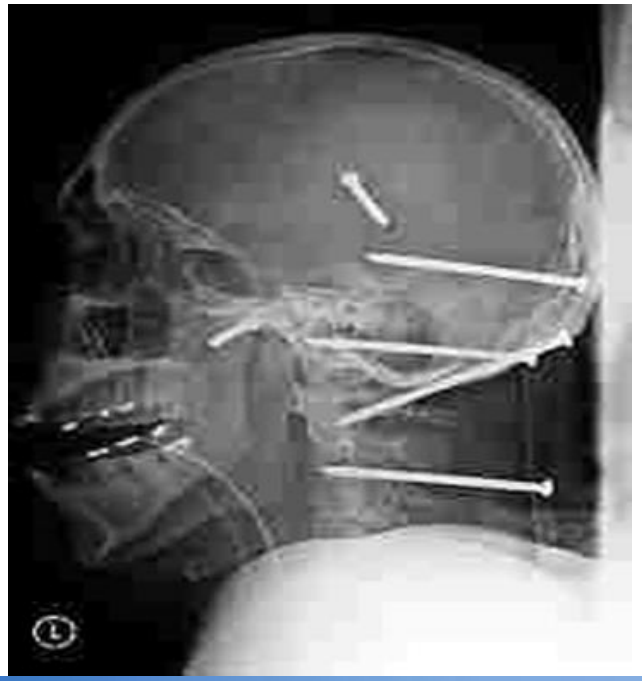
- Did anyone review the floor stripper SDS prior to choosing this product?
- Are there any greener less toxic stuff we can use?
- Have there been any other reported reactions to this product reports of skin rash, sore throats burning eyes etc.?
- Did the person using the machine get right to know training? Did they read the SDS and warnings?
- What is appropriate PPE to wear? Who figures this out? Do we have any policies, directions. How much is adequate ventilation? Fans, open windows. Do we have to strip the floors monthly?

Job Hazard Analysis if done was it effective? when was it done ?

- Break the operation into step by step distinct parts, then ask yourself;
- What's the worst thing that can happen at each step, and how likely is it?
- What can I do to protect my employee from injury?
- Engineering controls, Protective equipment, or job safety rule to use?

Identify the discrete steps needed to perform the task (roofing)

- Climb ladder, install fall protection system, anchor, retractable lanyard, full harness
- Pry off old shingles with pry shovel tool,
- Slide them off the roof, to tarp
- Hand place waste into barrels then transfer to dumpster
- Carry felt, tools, shingles to roof
- Unroll 30 lb felt, staple fasten
- Fasten shingles with nail gun
- Clean up, drive home



What's the worst that can happen

- The roof is pitched, you can lose your balance and fall to the ground and die.
- The bare plywood, and roll tar paper is slick, you can slip and fall from roof and die.
- Nail gun can double fire and a ricochet can come back up toward your face or body.
- Nail gun can slip and fall. If nail gun is in full automatic mode, can shoot nails into body
- While on ground, falling material can strike you causing lacerations, contusions.
- Hand and foot punctures on waste nails etc.

What rules can prevent injuries.

- Make sure ladder goes past roof landing by 3 feet, so when descending its safe
- Use slide boards at 90 degree angle to roof at least 2 x 10 (not 2 by 4 on side).
- Use a personal fall arrest system always!
- Wear a hardhat whenever you are below the work level and safety glasses always!
- Do not modify safety mechanism of nailing gun, do not use in fully automatic mode.
- Use puncture resistant gloves on holding hand substantial boots, foam kneeling pad

Contributing factors?

- No Fall protection program or inadequate,
- Slide guard was a 2 x 4 .. just a speed bump when sliding off a roof
- Gun is in fully automatic mode for speed
- Everyone else does it like we do and no one gets caught, disciplined, supervisor off
- Job is short duration, the location moves
- Supervisor is trying to maximize speed at the cost of safety of workers

Sample incident investigation

- Don’t add insult to injury stick to the facts.
- Who, what happened, where, when, how, then multiple whys that choice, until you find all contributing factors that together is the cause. Address the cause by modifying safety protocol, procedures or equipment.
- Roofer ended up with 6 nails in his head, one in the eye, and suffered a broken leg when he hit the ground. The nailgun was in fully automatic mode, while reaching for shingles he slipped on tar paper, lost balance and slid off roof, the gun discharged until he hit the ground. He was wearing steel toe boots, no safety glasses, no PFAS harness, slide boards were 2 x 4 projected only 2 inches at end of roof.

Contributing factors may include faulty beliefs

- A) I wouldn’t get hurt
- B) I wouldn’t get caught, no-one is monitoring.
- C) It won’t happen to me.
- D) I don’t really think management cares taking the extra care slows me down.
- E) I don’t like doing it that way!
- F) safety equipment is uncomfortable, too hot,cold, don’t fit right
- F) equipment failure..fogged up glasses, scratched
- G) Not my job to maintain equipment
- H) Ok bypassing a safeguard, or safety procedure

Why do we do the things we do.

- I never took the time to do a detailed job hazard analysis. Why? I never saw the value in it, safety is common sense, not rocket science. Why do you think there are OSHA regulations requiring this to be done? Regulations are barriers and hurtles the government uses to make my life miserable.
- The main reason I don't follow regulations, or other safe work practices is that I believe if I do, I will not get ahead. I don't think anyone cares how I get it done, it doesn't matter, just the result, the bottom line. Just get it done.
- IT MATTERS could be a matter of life and death

If you have good job hazard analysis, investigation ID's what went wrong with the protocol.

- Ask the victim to break down the steps in what they were attempting to do just before they were hurt, and determine choices they had, and why they made the ones they did.
- Determine if they were following a Job Hazard Analysis protocol for safe work practices, or their own protocol?
- If not, why not? There are reasons, the truth is out there. Your job is to identify them not to judge them. The verdict is already in.

Oxy-acetylene torch explodes

- Joe was cutting away a guard that needed to be replaced as the fastening bolts were stripped.
- He a portable abrasive electric grinder to clean and smooth the welded area
- No fire watch or PFE

What happened next?

- Joe shut off the gas at the gun handle leaving the fuel and oxygen lines pressurized.
- He MIG welded the new guard to the machine casing.
- He proceeded to grind on the weld to smooth = spark shower
- Guard that directs sparks gone
- The hot sparks burnt a hole in the gas line, it ignites, no back-flash arrestor in place.
- Joe ran to find fire extinguisher, but it was too late, fire was too big, the acetylene tank explodes

Useful “Why” questions to ask?

1) Why didn’t we require that a fire extinguisher is present when doing any torch or welding work?
2) Why don’t we have a fire watch set up when someone is welding or torch cutting?
3) Why don’t we shut off the regulator valves and bleed the lines off prior to starting to grind? How long would that take? Why was there no back-flash arrestors? Did we ever have them?
4) How often do we inspect the hose lines for signs of leaks or physical damage, why not every time?
5) How do you test the regulators, hose for leaks?
6) Did we have spark curtains? Are they set up? Why not? Where are they stored, what condition.

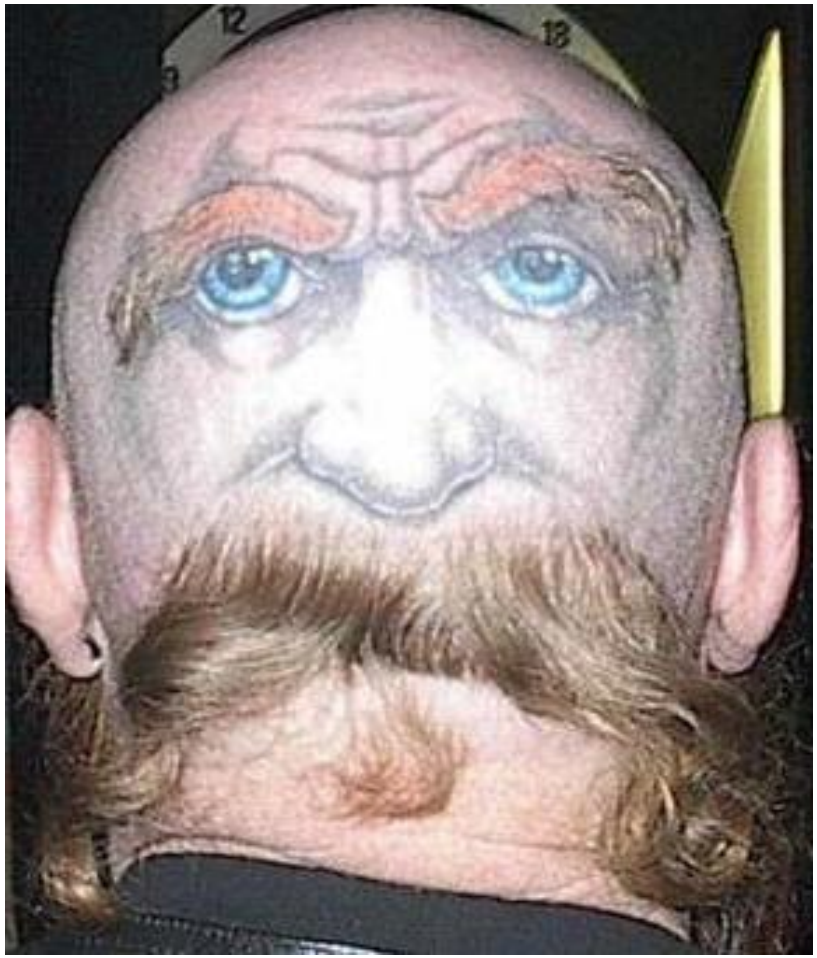
Other questions

- Why was the guard on the angle grinder missing? Who took it off? Do we still have it?
- Can it be put back on?
- The abrasive wheel looks too big for that grinder. It that the one it came with?
- What is the rpm of the grinder. Is that wheel approved for the rpm of that grinder?
- Who decided to replace this abrasive wheel with this one after the old one wore out?

Questions to avoid, blame game

- How come when anything bad happens its always to Joe? (no personal insults)
- Who told you to use the torch anyway you numb skull ? (No name calling, insulting intelligence, or thought processes)
- Why didn’t you use the saws-all in the first place? (Hindsight is always 20/20)
- Why didn’t you think to jump into the front end loader and snuff out the fire with 5 yards of sand? What’s the matter with you? (20/20)

Hindsight is 20/20



Make rules, then enforce them

- Monitor the degree of compliance to set rules
- Communicate results back to employees
- Take steps to ensure or improve compliance
- Start with friendly positive reinforcement then get progressively tougher.
- If no one is looking does a rule get broken ?

Without monitoring and enforcement; little incentive for compliance

Communication is key.

- 1910.23 (a) 3 I Hinged floor opening cover. If a floor hole is opened, then it must be guarded with a standard railing and toe board,….

- In this clip one person opens a hinged trapdoor to a stairway.
- Fails to let tech know that a hole is now opened.
- Be aware of work around you, especially when backing up, look where you're going go where you look. Report close calls
- ID the hazard
- Tell someone.

Open floor hole.

OSHA compliant hinged hatchway

Questions?

- 1. Objective 1 preserve the scene
- 2. Objective 2 collect info, research
- 3. Objective 3 identify contributing factors
- 4. Objective 4 implement changes to policy, procedures, programs to stop recurrence
- Do Job hazard analysis, review and improve

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Homework Exercise

Look at an injury/incident that happened at your facility in the past year.

- Try to figure out what are the key facts that contributed to the injury or fatality.
- Come up with key questions you would ask to get down to the root cause.
- Come up with one or more rules you might institute to prevent this type of accident from happening again in your workplace