PLANT SAFETY
A SYSTEMATIC APPROACH
Presented by: Don Graham, Jensen Precast

Why should we worry about safety in the work place?
- To meet some Government mandated Standards
- To protect the well being of our work force because is the ethical and moral thing to do

Barriers to safety
- Management has a reactive rather than proactive focus
- Lack of understanding (vocabulary, confusing regulations?)
- Risks & hazards are poorly communicated or ignored
- Safety is considered a cost ... not an investment
- Cost/benefit analysis is rarely applied to justify the safety case
- Productivity takes precedent

Value vs. Priority
What's the Difference?
- Priority Slogan: Safety First (until production falls behind)
- Value Slogan: Safe production or no production

Value vs. Priority

A Safety Culture is,
When all employees in an organization perform their duties in a safe manner, promote safe behavior and protect others without supervision – all this on their own!
A Safety Culture must also be, a core value of the organization with:

- Recognition and rewards for those that exhibit it
- Reinforcement of rules when deficiencies are observed
- Swift action, positive or negative, whenever needed

What is a Culture

- Is the set of values, conventions, or social practices associated with a particular field.
- In this case, the field is safety

What is Attitude

- Is a mental position (feeling or emotion) with regards to a state or a fact

What is Behavior

- Is the manner of conducting ourselves or the response of an individual to his or her environment

What is Motivation

- Is what causes us to act in a particular manner
How do we deal with **attitudes** in a safety environment?

**We do not!**

- We are not qualified health professionals to deal with it.
- These are mental positions based on feelings and emotions.

How do we deal with **behaviors** in a safety environment?

- We educate everyone about the company's expectations regarding their safety and how these affect themselves and the organization.

How do we **motivate** people in a safety environment?

- We need to find out what they like and want in an effort to implement the safety culture.

Incentives/Rewards are a good motivator

- When employees accomplish something or are caught doing something right,
- But you need to ensure that it is **timely and public** to promote repeat behavior!

**Discipline - reinforcement**

- Are necessary; however, we need to identify the rationale behind it (the why) that led to the unsafe action for it to be effective.

**The 4 elements of an Effective Safety and Health Program**

ANSI/ASSE Z10-2012 Standard
Common Characteristics of Exemplary Workplaces

1. Use of organized and systematic methods to
   - Assign responsibility to managers, supervisors, and employees
   - Inspect regularly for and control hazards
   - Orient and train all employees to eliminate or avoid hazards

Management Commitment and Employee Involvement

1. They are complementary
   - Management commitment provides the motivation and resources for organizing and controlling activities within an organization
   - Employee involvement provides the means through which workers develop and express their own commitment to S&H protection

Recommended Actions:

1. Assign and communicate responsibility for all aspects of the program
2. Provide adequate authority and resources
3. Hold managers, supervisors, and employees accountable for meeting their responsibilities
4. Review program operations at least annually, to evaluate, identify deficiencies, and revise, as needed

Management Commitment and Employee Involvement

Recommended Actions:

1. State clearly a plant safety and health policy
2. Establish and communicate a clear goal and objective for the program
3. Provide visible top management involvement in implementing the program
4. Encourage employee involvement in the program and in decisions that affect their safety and health
Worksite Analysis

- Involves worksite audits, to identify not only existing hazards, but also conditions and operations where potential hazards may occur
- Effective management actively analyzes the work and the worksite to anticipate and prevent hazardous conditions

Recommended Actions:

- Conduct periodic surveys for safety and health issues
- Analyze processes, materials, and equipment
- Perform routine job hazard analyses
- Provide a system for employees to notify management about apparent hazardous conditions

Recommended Actions:

- Provide for investigation of accidents and “near misses”
- Analyze injury and illness trends over time

Hazard Prevention and Control

- Triggered by a determination that a hazard or potential hazard exists
- It prevent hazards by effective design of job or job site
- Where elimination is not feasible, control hazards to prevent unsafe and unhealthful exposure
- Elimination or control must be accomplished in a timely manner

Recommended Actions:

- Establish procedures for timely correction or control of hazards, including
  - Engineering controls (eliminate)
  - Administrative controls (control)
  - Personal protective equipment (protect)

Recommended Actions:

- Provide for facility and equipment maintenance
- Plan and prepare for emergencies
  - Training and drills, as needed
- Establish a medical program
  - First aid on site
  - Physician and emergency care nearby
Safety and Health Training

• Addresses the safety and health responsibilities of all personnel

• Most effective when incorporated into other training about performance requirements and job practices

• Required by OSHA in many Standards

Recommended Actions:

• Ensure that all employees understand the hazards to which they may be exposed and how to prevent or control exposure to these hazards

• Ensure that all employees are trained in the required safety procedures to follow during the performance of their duties

• Ensure that supervisors carry out their safety and health responsibilities

Do you have an effective safety and health program?

• Walk into the plant, concentrate in the work area and ask yourself three questions

  1) Are the employees doing the job safely?
  2) Are there any hazardous conditions present?
  3) Does anything look different, out of place?
Remember:
To ignore a condition is to accept the condition

My philosophy:
Asking me to overlook a single hazard is the same as asking me to have a complete disregard for your life

ACCIDENT COSTS
What is an accident?

An unplanned, unexpected event that interferes with or interrupts normal activity & potentially leads to personal injury or dollar loss

Hidden Cost of Accidents

Indirect Costs:
- 4 or more times direct cost
- Not typically covered by insurance
- Deducted from company profit margin

SALES TO COVER COSTS*

<table>
<thead>
<tr>
<th>Accident Costs</th>
<th>5% Profit</th>
<th>10% Profit</th>
<th>15% Profit</th>
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<tbody>
<tr>
<td>$ 1,000</td>
<td>$ 20,000</td>
<td>$ 10,000</td>
<td>$ 7,000</td>
</tr>
<tr>
<td>$ 5,000</td>
<td>100,000</td>
<td>50,000</td>
<td>35,000</td>
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<tr>
<td>$ 10,000</td>
<td>200,000</td>
<td>100,000</td>
<td>67,000</td>
</tr>
<tr>
<td>$ 20,000</td>
<td>400,000</td>
<td>200,000</td>
<td>134,000</td>
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*Source: OSHA's Safety Pays Web Site, 2004

More cost of accidents

<table>
<thead>
<tr>
<th>Company</th>
<th>Premium</th>
<th>Experience Modifier</th>
<th>Final Premium</th>
<th>Projected 5+ years</th>
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<tbody>
<tr>
<td>X</td>
<td>$100,000</td>
<td>1.0</td>
<td>$100,000</td>
<td>$500,000</td>
</tr>
<tr>
<td>Y</td>
<td>$100,000</td>
<td>0.8</td>
<td>$80,000</td>
<td>$400,000</td>
</tr>
<tr>
<td>Z</td>
<td>$100,000</td>
<td>2.0</td>
<td>$200,000</td>
<td>$1,000,000</td>
</tr>
</tbody>
</table>
Legal Issues and Liability

- As a result of accidents:
  - Your company could be involved in a lawsuit
  - Because of personal liability, you could be named as a defendant in a lawsuit
  - You could have criminal charges filed against you due to negligence

Why accident investigations?

- The key result should be to prevent a recurrence of the same accident.
- Fact finding:
  - What happened?
  - What was the root cause?
  - What should be done to prevent recurrence?

The aim of the investigation is not to:

- Exonerate individuals or management.
- Satisfy insurance requirements.
- Defend a position for legal argument.
- Or, to assign blame.
The aim of the investigation **is to:**

- Change the work climate by correcting unsafe conditions, procedures, or actions.
- Determine the sequences of events leading to failure.
- Identify the cause of the accident.
- Find methods to prevent accident from recurring.

Why accident investigations fail...

1. Lack of time to complete
2. It is not my job
3. I have other things to worry about
4. It is the Safety guy job
5. Lack of motivation to complete
6. Lack of accountability
7. Lack of skills & knowledge
8. Investigation stopped short and didn’t reveal all causes of the accident

What is a root cause?

- The defining, underlying reason(s) for the problem.
- If this cause is eliminated and/or controlled then the problem does not occur again.
- Our goal then is to find the root cause of the event we are trying to eliminate!

Example

- Joe has to bend down to pick up material from the floor
- Joe hurts his back
- Reason given: Joe is too old to do the job
- Surface cause: poor material placement
- Root causes: inadequate training, no training plan, no recognition of hazard.

Root cause analysis cannot be done by witch hunting!!!!

- Search out the last person, blame it on him and ignore everything else
- You’ll never find all of the errors by witch hunting.
- Without the causes you won’t find the solutions.
Determining causes

- The root cause is the most fundamental and direct cause of an accident or incident
- There may be one or more contributory causes, in addition to the root cause
- Accident Investigation is ineffective unless all causes are determined and corrected

Elements of the investigation

- Describe who was involved
- Describe what happened
- Establish a time line
- Determine location of incident & all factors
- Establish a chain of events to understand how the incident occurred
- Determine the root cause

First goals of the investigation

- Establish the following:
  1. Who
  2. What
  3. When
  4. Where
  5. How
  6. Why-why-why-why-why-why (after 5 why’s or more you may find the root cause)

Investigation strategy

- Gather information
- Search for and establish facts
- Isolate essential contributing factors
- Find root causes
- Determine corrective actions
- Implement corrective actions
Determine causes

• Employee actions
  • Safe behavior, at-risk behavior
• Environmental conditions
  • Lighting, heat/cold, moisture/humidity, etc.
• Equipment condition
  • Defective/operational, guards, leaks, broken parts,
• Procedures
  • Existing (or not), followed (or not), appropriate (or not)
• Training
  • Was employee trained - documentation

The accident

Accident causation

The accident: Fall from a ladder
The result: Broken ankle
The unsafe act: Climbing a defective ladder.
The unsafe condition: A defective ladder.

Common reaction: The stupid jerk does not know how to use a ladder. All the work I have to do and he just ruined my day with more paperwork.

Accident causation

THE QUESTIONS:
Why did he need a ladder?
Why wasn't he properly trained?
Why wasn't he reminded not to use it?
Why didn't the employee know not to use it?
Why did the supervisor allow its use?
Why do we have a defective ladder?
Why wasn't it tagged?

Possible corrective actions

1: Replace the ladder.
2: Forbid use of ladder.
3: Fix or get rid of ladder.
4: Train employee to use ladder
5: Conduct site inspections

Prepare a report

• Accident Reports should contain the following:
  – Description of incident and injuries
  – Sequence of events
  – Pertinent facts discovered during investigation
  – Conclusions of the investigator(s)
  – Recommendations for correcting problems

Was the fall the employee fault?
What is the root cause?
CONDUCTING A RISK ASSESSMENT

Risk
- The likelihood that damage, loss or injury will be caused by a hazard and how severe the outcome may be.
- Cause = Effect

Risk Assessment
- Is a systematic method of looking at work activities, considering what could go wrong, and deciding on suitable control measures
- Part of the difficulty is that potential loss and probability of occurrence can be very difficult to measure.

Risk Causes
- Equipment
- Individual
- Environmental
- Work practices

Environmental risk factors
- Wet floors
- Poor lighting
- Poor housekeeping
- Cluttered areas
- Weather
- Noise
- Overhead obstacles
- Enclosed spaces

Equipment risk factors
- Lack of guarding
- Leaking hoses
- Lack of maintenance
- Operator misuse
- Lack of safety devices
- Faulty parts
- Old equipment in use
Work practices risk factors

- No standard operating procedures
- Emphasis in production levels
- No rules enforcement
- No job safety analysis
- Lack of proper training
- Crowded work area
- Inadequate P.P.E.
- No hazards identification survey

Individual risk factors

- Rushing
- Lack of attention
- Failure to wear P.P.E.
- Bypassing safety mechanisms
- Failure to follow safety procedures
- Lack of training
- Opportunism

Need to Evaluate

- Severity (what degree of injury this hazard may cause)
- Exposure (how many employees are exposed to this hazard)
- Probability (what are the chances that an accident may occur)

Equals: risk assessment priority

Severity

- 1- Negligible
  (THIS HAZARD IS NOT LIKELY TO PROUCE AN INJURY)
- 2- Marginal
  (THIS HAZARD MIGHT CAUSE A MINOR INJURY)
- 3- Critical
  (THIS HAZARD MIGHT CAUSE SEVERE INJURY)
- 4- Catastrophic
  (THIS HAZARD IS LIKELY TO CAUSE DISABILITY-LOSS OF LIFE)

Exposure

- 1- Minimal
  (A FEW EMPLOYEES INVOLVED A FEW TIMES A DAY)
- 2- Moderate
  (A FEW EMPLOYEES INVOLVED FREQUENTLY, OR MANY EMPLOYEES OCCASIONALLY)
- 3- High
  (MANY EMPLOYEES INVOLVED FREQUENTLY)

Probability

- 1- Minimal
  (THIS HAZARD WILL NOT CAUSE AN INCIDENT)
- 2- Moderate
  (THIS HAZARD IS LIKELY THAT IT WILL CAUSE AN INCIDENT)
- 3- High
  (THIS HAZARD WILL CAUSE AN INCIDENT)
Risk assessment priority rating

- 10 POINTS = EMERGENCY
- 8-9 POINTS = EXTREMELY IMPORTANT
- 6-7 POINTS = VERY IMPORTANT
- 4-5 POINTS = SOMEWHAT IMPORTANT
- 3 POINTS = LEAST IMPORTANT

Risk Assessment Form

<table>
<thead>
<tr>
<th>Date:</th>
<th>Due Date:</th>
</tr>
</thead>
</table>

Describe hazard below:

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Severity</th>
<th>Value (LxS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rare</td>
<td>1</td>
<td>Negligible</td>
</tr>
<tr>
<td>Remote</td>
<td>2</td>
<td>Minor</td>
</tr>
<tr>
<td>Occasional</td>
<td>3</td>
<td>Moderate</td>
</tr>
<tr>
<td>Frequent</td>
<td>4</td>
<td>Major</td>
</tr>
<tr>
<td>Almost Certain</td>
<td>5</td>
<td>Catastrophic</td>
</tr>
</tbody>
</table>

Action to take:

- Provide adequate lighting
- Design safety into equipment
- Provide proper ventilation
- Provide adequate walking surfaces
- Design workplace
- Replace faulty equipment
- Automate tasks
- Provide adequate working areas

Engineering controls

Administrative controls

- Plant safety surveys
- Hold supervisors accountable
- Provide training
- Inspect equipment and tools
- Keep records of inspections
- Conduct safety analysis
- Generate standard operating procedures
- Develop a Safety Committee

Protective personal equipment

- Ensure employees wear PPE.
- Conduct hazard assessments
- Train in PPE usage
- Provide fall protection
- Provide ear and eye protection
- Inspect PPE regularly
- Have PPE available
- PPE is last line of defense

Remember

- Risk can be eliminated and/or controlled
- We owe it to our employees to have a safe workplace
- Regulations are “minimum” standards
- The cost of an accident more than justify the cost of prevention
Let’s get it right

• Job Hazard Analysis a.k.a. Job Safety Analysis or Job Hazard Assessment (JHA or JSA)
• It is an orderly process for identifying hazards in every work activity that may cause harm if not controlled.
• Can be a valuable tool for training all employees in the steps required to perform their jobs safely

What is a hazard?

• The potential for harm
• Is often associated with a condition or activity
• If left uncontrolled, can result in an injury or illness

What is a Job Hazard Analysis?

• Focuses on job tasks
• Identify hazards
• It focuses on the relationship between the worker, the task, the tools, and the work environment.
• Ideally, after you identify hazards, you will take steps to eliminate or reduce them

Defining the term “job”

• A job /occupation
  – carpenter, electrician, mechanic, welder.
• In JHA, the word “job” refers to:
  – A task that contains several steps –
    • replacing a defective ballast on a fluorescent light;
    • changing a tire on a vehicle;
    • planting a tree
Break Job Into Steps

- A step is a single activity
  - advances a work assignment
  - is a logical portion of that assignment.

- In JSA,
  1. Separate the job into distinctive steps
  2. List the actions needed to complete every step of the job

Definition of key words

- Job Task - change a light bulb
- Job Step - climb ladder
- Hazard - defective ladder
- Exposure - injury from ladder fall
- Control - inspect ladders before use and remove from service if defective

What jobs are appropriate for a job hazard analysis?

- Highest injury or illness rates
- Potential to cause severe or disabling injuries or illness
- A simple human error could lead to a severe accident or injury
- Jobs new to your operation or have undergone changes in processes and procedures
- Complex jobs that require written instructions

What are the four basic steps?

1. Select the job to be analyzed
2. Break the job down into sequential steps
3. Identify potential hazards for each step
4. Determine preventive measures

Let's review the parts of a JHA
### Job Safety Analysis Worksheet

**XYZ Company**

**Title of Job/Operation:** Change tire on pickup truck

<table>
<thead>
<tr>
<th>Sequence of Basic Job Steps</th>
<th>Potential Hazards</th>
<th>Recommended Safe Job Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Raise vehicle</td>
<td>Struck by vehicle</td>
<td>Engine must be shut off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Observe area.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Removing tripping or stumbling</td>
</tr>
<tr>
<td></td>
<td></td>
<td>hazards or uneven terrain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wear gloves and other</td>
</tr>
<tr>
<td></td>
<td></td>
<td>appropriate clothing</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Follow instructions in owner's</td>
</tr>
<tr>
<td></td>
<td></td>
<td>manual or posted near jack</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exhaust system may be very hot</td>
</tr>
<tr>
<td></td>
<td></td>
<td>do not touch</td>
</tr>
<tr>
<td>2. Change Tire</td>
<td>Struck by vehicle</td>
<td>Put vehicle in gear or park.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Following parking instructions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>in owner's manual or posted</td>
</tr>
<tr>
<td></td>
<td></td>
<td>near jack</td>
</tr>
<tr>
<td>3. Lower Vehicle</td>
<td>Struck by jack</td>
<td>Same as step 2.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Same as step 2.</td>
</tr>
</tbody>
</table>

**Avoid two common errors**

1. Making the breakdown too detailed resulting in an unnecessarily large number of steps
2. Making the job breakdown so general that the basic steps are not distinguishable.

- As a rule, the job safety analysis should contain less than twelve (12) steps. If more steps are needed, the job should be broken into separate tasks.
Spray mold with form oil

- Get the can
- Fill the can with form oil
- Pump the can
- Carry the can
- Deposit the can
- Aim the nozzle
- Push the trigger
- Spray the mold

Get the can and fill it with form oil
- Carry it to the mold
- Spray the mold

"The safety classes are great. The more I’m away from the plant....the safer I feel."

THANK YOU AND HAVE A SAFE DAY!

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