Welcome to the Brewers Association Brewery Safety Boot Camp 2018

You need the BA Hazard ID Card and Participant Guide
Introduction

• A lot to cover in a short time
• Participant guide?
• Brewery hazards postcard?
Emergencies

• If we have to evacuate...
• Or find an AED
• On site EMTs: Call: 615-401-1300
• REST ROOMS!
Ground rules

• Ask questions right away!
• I may defer to a future slide
• Defer to break time, or after session
• Share with me
• Respect?
The topics

- Cost of safety
- The benefits
- Causal factors
- General duty clause
- Hazard assessment
- Control
- Lessons Learned

- Back injuries, etc.
- Walking working
- Electrical
- Chemicals/ ppe
- Burns
- Lock Out and Control Hazardous Energy
- Confined Space
- Powered industrial trucks
Show of hands

Have you ever worked in a factory?

How long in the brewing industry?
• less than 18 months
• Less than 3 years

How many barrels brewed/ year?
• less than 2,000 bbls
• 2,000 - 5,000 bbls
• > more than 5,000

Do you have a safety program?

Safety training?
Cost of injuries
What are the costs?

- Lost time, production
- Lost equipment
- Lost product
- Lost worker
Cost to Person?

- Medical treatment
- Lost wages
- Physical Therapy
- Mental Therapy
- Lost career
- Affect on Family?
Top 10 most disabling work injuries:

1. Overexertion by lifting, pushing, pulling, holding, carrying, or throwing object.
   23% of work comp.

2. Falls on same level.
   18% of work comp.

3. Falls to a lower level.
   9.2% of work comp.

4. Struck by object or equipment.
   7.4% of work comp.

5. Other exertions or bodily reactions.
   6.5% of work comp.

   6.2%.

7. Slip or trip without a fall.
   3.8%.

8. Caught in/ compressed by equipment or objects.
   3.3%.

9. Struck against object or equipment.
   3.2%.

    3%.

Liberty Mutual Research Institute for Safety’s Workplace Safety Index. $68 Billion
BA work injury survey
Estimated Average cost

- Employer shares direct costs through workers' comp policy.
- Employer pays all the indirect costs.
- Additional sales based on 20% profit margin
- “I’ll use my personal insurance coverage”??

<table>
<thead>
<tr>
<th>Injury Type</th>
<th>Direct Cost (Shared)</th>
<th>Indirect Cost (Employer Only)</th>
<th>Total Cost</th>
<th>Additional Sale (Indirect Only)</th>
<th>Additional Sale (Total)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electric Shock</td>
<td>$ 93,858</td>
<td>$ 103,243</td>
<td>$ 197,101</td>
<td>$ 516,219</td>
<td>$ 985,504</td>
</tr>
<tr>
<td>Burn</td>
<td>$ 40,188</td>
<td>$ 44,206</td>
<td>$ 84,394</td>
<td>$ 221,034</td>
<td>$ 421,970</td>
</tr>
</tbody>
</table>
Causal Factors

State of Mind
- Lack of knowledge; Training
- Distracted
- Rushing
- Frustrated
- Angry
- Fatigued
- Complacent

Risky Behavior
- Oblivious
- Eyes not on task
- Mind not on task
- In Line of fire
- Balance/ traction/ grip
- Normalized Hazards
Quality and Safety

Can feel distraction, rushing, frustration, anger, fatigue…

Be self aware to recognize

Stop work, and change state of mind

Self-trigger to correct behavior
Reasons for safety

• Value of your time?
• How much can you lose?
• Employee Well being
• Direct Loss against profit
• Insurance premiums
• Control business risks
• Compliance
Affect on employee

• Feels wanted
• Feels cared for
• Are happier
• Quality improves

• Employee/ asset
• When injured, work stops
• If hurt, can’t work
• No product, no profit
Profit/ Loss: Safety Saves Money

- 1 burn will cost:
  - Direct Cost: $40,188
  - Indirect Cost: $44,206
  - Total Cost: $84,394

- At 10% profit,
  - Sales to cover indirect cost: $442,068
  - Sales for total cost: $843,940

- Employer pays indirect costs
- Worker comp co-pays Direct costs
- Worker comp premiums increase
- Injuries cost more than safety program
- OSHA fine?
Our experience...

- Lidding machine
- Lids stick together
- Can’t let 2 lids in
- Reach in with fingers
- Can is spinning

Spinning Can cuts a finger!
Spinning Can cuts a finger!

- Shut down line
- First aid, or stitches?
- Lost time for canning team
- Clean can line of flesh
- Throw out impacted cans
- Can cost
- Lost product
- Product cost
- What costs did I miss?
Corrective actions?

• PPE?
• “Kick out” device
• “Lid picker”
• Accumulation table
• S- curve

• Outsource canning
Consider Risk to my business

If I break me

If I break others

If I break the recipe

If I break product

If I sell something contaminated

If I break equipment
SEC. 5. Duties (OSHA General Duty Clause)

(a) Each employer:

(1) shall furnish... a place of employment...free from recognized hazards likely to cause, death or serious physical harm;

(2) shall comply with occupational safety and health standards in this Act.

(b) Each employee:

shall comply with occupational safety and health standards and all rules, regulations..., which apply to your own actions and conduct.
• Move hoses
OSHA to BA Safety Member

OSHA can lock your doors just as quickly as TTB
Safety by Design

- During brewery pre-planning and design
- During equipment purchase
- During renovation or re-model
- Before code enforcement
- Before injury
- Before damage

- Grates to cover drains
- Handrails and Stair rails
- Grippy floors
- Hooks to anchor ladder to tank
- Outlets close enough to eliminate extension cords
- “Rollers” to move heavy loads
Hazard Assessment Process
BA Hazard ID & Evaluation Tool Card

- Hazards are *what can hurt me*
- What in brewery can hurt me?
- **Not** how likely will it happen
- How do I use the card?
BA Hazard Card & Hazard Assessment Tool

- Conduct a walk through
- Identify hazards and sources
- Organize hazard data
- Analyze hazard data
- Specify hazard controls
Hazard assessment for tasks with Back injury risk

- Lifting grain sacks
- Manually palletizing newly bottled product
1. Conduct a walk through

- Look at Area
- What are steps of the task
- What activities in each step
2. ID hazards and sources

• Use the Hazard Card to help
• What hazards are in each activity?
• What can go wrong in activity?
• Is it always part of that activity?
• If Reposition the activity, can it still go wrong?
3. Organize hazard data

• Create a list
• List each step in task
• List each activity in step
• List all hazards in each activity
• What injuries can each hazard cause?
## Risk Rating Matrix

<table>
<thead>
<tr>
<th>Consequence</th>
<th>People</th>
<th>Information</th>
<th>Property</th>
<th>Ecosystem</th>
<th>Reputation</th>
<th>Capability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor injury or first aid treatment</td>
<td>Injury requiring treatment by medical practitioner and/or time off work.</td>
<td>Minor insolvency in the enterprise and/or collapse and/or loss of 5% or less of total assets.</td>
<td>Minor damage or loss of &lt;5% of total assets.</td>
<td>Damage or loss of &lt;25% of total assets.</td>
<td>Damage or loss of &lt;50% of total assets.</td>
<td>Damage or loss of between 50% and 60% of total assets.</td>
</tr>
<tr>
<td>Major injury / hospitalisation</td>
<td>Major injury / hospitalisation</td>
<td>Major insolvency in the enterprise and/or collapse and/or loss of &gt;5% of total assets.</td>
<td>Major insolvency in the enterprise and/or collapse and/or loss of &gt;25% of total assets.</td>
<td>Major insolvency in the enterprise and/or collapse and/or loss of &gt;50% of total assets.</td>
<td>Major insolvency in the enterprise and/or collapse and/or loss of &gt;75% of total assets.</td>
<td>Major insolvency in the enterprise and/or collapse and/or loss of 100% of total assets.</td>
</tr>
<tr>
<td>Single death and/or multiple major injuries</td>
<td>Single death and/or multiple major injuries</td>
<td>Single death and/or multiple major injuries</td>
<td>Single death and/or multiple major injuries</td>
<td>Single death and/or multiple major injuries</td>
<td>Single death and/or multiple major injuries</td>
<td>Single death and/or multiple major injuries</td>
</tr>
<tr>
<td>Multiple deaths</td>
<td>Multiple deaths</td>
<td>Multiple deaths</td>
<td>Multiple deaths</td>
<td>Multiple deaths</td>
<td>Multiple deaths</td>
<td>Multiple deaths</td>
</tr>
</tbody>
</table>

### Chance Probability Frequency

- **E: Almost Certain**
  - Is expected to occur in most circumstances: >95%
  - Will probably occur in most circumstances: >85%
  - Might occur at some time: >25%
  - Could occur at some time: >10%
  - May occur only in exceptional circumstances: <5%

- **D: Likely**
  - Is expected to occur in most circumstances: >95%
  - Will probably occur in most circumstances: >85%
  - Might occur at some time: >25%
  - Could occur at some time: >10%
  - May occur only in exceptional circumstances: <5%

- **C: Possible**
  - Is expected to occur in most circumstances: >95%
  - Will probably occur in most circumstances: >85%
  - Might occur at some time: >25%
  - Could occur at some time: >10%
  - May occur only in exceptional circumstances: <5%

- **B: Unlikely**
  - Is expected to occur in most circumstances: >95%
  - Will probably occur in most circumstances: >85%
  - Might occur at some time: >25%
  - Could occur at some time: >10%
  - May occur only in exceptional circumstances: <5%

- **A: Rare**
  - Is expected to occur in most circumstances: >95%
  - Will probably occur in most circumstances: >85%
  - Might occur at some time: >25%
  - Could occur at some time: >10%
  - May occur only in exceptional circumstances: <5%

### Likelihood

- Slip on wet surface
4. Analyze hazard data

1. Evaluate each hazard of “stepping onto the pallet, and placing the case of bottles”
4. Analyze hazard data

1. Evaluate each hazard by
   • Type: slip and fall
   • Risk: break pallet slat and twist ankle; or break ankle?
   • Likelihood: low
   • Severity: lower
4. Analyze hazard data

2. Note co-existing hazards:
   - Type: sharps
   - Risk: break pallet slat and drop bottles
   - Likelihood: low
   - Severity: medium to high
4. Analyze hazard data

3. Note co-existing hazards:
   • Type: ergonomic
   • Risk: strain back muscles
   • Likelihood: medium, increases if pallet breaks
   • Severity: low to high, increases if pallet breaks
5. Specify hazard controls

- For each hazard, list all controls
- Is adjustable height stand a “control”?
- How does it work?
- How many hazards can it eliminate?

On your forklift?

Or on an adjustable height pallet jack?
Back safety and ergonomics
Walking and Working surfaces
Walking and working surfaces

- Fall hazard: condition that can hurt me
- Fall on same level, or to a lower level
- Slips or trips
The Magic Half Inch!
Walking gait: Minimum Foot Clearance

- Brain seeks energy efficiency
- Brain learns **Minimum Foot Clearance**
- 1/2 inch
- Thicker than a 1/2 inch?
- Clearance decreases with fatigue
- Trip on it
Steps and stairs and MFC

- Brain sees lowest 3 steps, and top step
- By 3rd step, brain knows exact step
- Brain acts to barely clear step

- Brain thinks all steps are consistent
- If a step is off by a 1/2 inch...
- Fatigue decreases lift
Housekeeping 1910.22

- Clean, orderly, sanitary
- Must be Dry
- If wet, drain it
- Dry standing place: platforms, mats
- Inspect, maintain, and repair
- Includes: parking lot, loading area
Free Control of Hazard
Free Control of Hazard
Ladder
Ladders

• Face all ladders to balance on toes
• Tie ladders so they don’t slip away
## Corrosion Resistance Guide for Fiberglass

<table>
<thead>
<tr>
<th>Chemical</th>
<th>75°F</th>
<th>150°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acetic Acid, 5%</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Acetic Acid, 10%</td>
<td>R</td>
<td>NR</td>
</tr>
<tr>
<td>Aluminum Sulphate</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Ammonium Hydroxide, 5%</td>
<td>R</td>
<td>NR</td>
</tr>
<tr>
<td>Aluminum Nitrate</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Benzene Sulfonic Acid, 5%</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Calcium Chloride</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Chlorine Dioxide, 15%</td>
<td>R</td>
<td>NR</td>
</tr>
<tr>
<td>Chromic Acid, 5%</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Copper Sulphate</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Ethylene Chlorhydrin</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Ethylene Glycol</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Ferrous Sulphate</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Fatty Acids, 100%</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Fluorsilic Acid, 10%</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Hydrochloric Acid, 1%-10%</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Hydrochloric Acid, 37%</td>
<td>R</td>
<td>NR</td>
</tr>
<tr>
<td>Kerosene</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Magnesium Chloride</td>
<td>R</td>
<td>NR</td>
</tr>
<tr>
<td>Methyl Alcohol</td>
<td>R</td>
<td>NR</td>
</tr>
<tr>
<td>Naptha</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Nitric Acid, 5%</td>
<td>R</td>
<td>NR</td>
</tr>
<tr>
<td>Phosphoric Acid, to 85%</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Sodium Bicarbonate</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Sodium Bisulfate</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Sodium Carbonate</td>
<td>R</td>
<td>NR</td>
</tr>
<tr>
<td>Sodium Chloride</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Sodium Hydroxide, 5%</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Sodium Hypochlorite, 5%</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Sodium Nitrate</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Sodium Silicate</td>
<td>R</td>
<td>NR</td>
</tr>
<tr>
<td>Sodium Sulfate</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Sour Crude Oil</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Sulfuric Acid, to 10%</td>
<td>R</td>
<td>R</td>
</tr>
<tr>
<td>Sulfuric Acid, 30—50%</td>
<td>R</td>
<td>NR</td>
</tr>
<tr>
<td>Trisodium Phosphate</td>
<td>R</td>
<td>NR</td>
</tr>
<tr>
<td>Xylene</td>
<td>R</td>
<td>R</td>
</tr>
</tbody>
</table>

**NOTE:**
1) “R” is recommended
2) “NR” is not recommended

**Solvents Not Recommended for Immersion**

- Acetone
- Carbon Disulphide
- Carbon Tetrachloride
- Ethylether
- Methyl Ethyl Ketone
- Toluene
Mobile Ladder stand and Mobile Ladder platform
Take a risk of losing your way of life? Or...
Electrical
National Electrical Code
NFPA 70
NFPA 70e
UL listing
Electrical safety
Subpart S Electrical 1910.303 to 1910.399

- Regulates fixed equipment
- Cover openings in boxes
- Use it as it was designed
- Switches vs. Disconnects
- Equipment access in emergency
1910.307 Hazardous locations

- Electrical in dust environments
- Includes exit signs, lights, motors, cords
- Emergency lights, signs, etc.
- Dust traps heat in motors
Cord safety

- Rated for amps is used for
- Outlet and cover plate get hot
- Cord plug gets hot at outlet box
- Two plugs get hot
- Cord gets hot
Keep access clear
NFPA 70e: HOST AND CONTRACTOR RESPONSIBILITIES

• **110.3(A)** Host employer tells hazards to contract employer
  • Include all info the contractor needs to assess safety
• **110.3(B)** Contractor trains employees on electrical safety
  • Communicates hazards identified by the host
• Contractor must report to host, any new hazards found
• **110.3(C)** “…shall be documented meeting (with host)”
Very low energy arc
Ground Fault Circuit Interrupters

- Require GFCI in all **wet area** circuits
- Measures **difference in current**
- Causes “ZERO POWER”
- Check by “test” button
National Electrical Code and OSHA

Will I still get shocked? 1/40 second

Picture 7

\[ Y = \sin(2\pi f t) \]
Burns
Scalding liquids

I asked:

What are Top 5 ways to get a boot full of hot wort?

First answer from everyone!

1. Tuck your pants into your boots
2. Wear shorts
What are your top 5 ways to get a bootful?

• How do you prevent burns?
• Do we have procedures?
• Do we follow them?
• Do we share lessons learned?
• What do I tell “the new guy”? 

BrewersAssociation.org
Control of Hazardous Energy and a Confined Space
Hazardous Energy

Energy:
- Air pressure
- Heat or cold
- Steam: Pressure and Heat
- Gravity
- Mash rake?
- Water
- Electricity

Non-energy?
- Gas vapors: O2, CO2
Control Hazardous Energy

- Why use a lock?
- Only one key for my lock
- Never give away my key
- No one else can use my key
- No one else can remove my lock
Control Hazardous Energy

- Annual visual observation of a LOTO
- Annual training required
- Methods of energy isolation
- Recognize sources of energy
- Written procedure required
- Close valves
- Shut off circuits
- Disconnect lines
- Written procedure to remove LOTO
**SHUTDOWN, LOCK, TAG & TEST SEQUENCE**

<table>
<thead>
<tr>
<th>#</th>
<th>STEP</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Notify</td>
<td>Notify all affected employees that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and isolated out to perform the servicing or maintenance.</td>
</tr>
<tr>
<td>2</td>
<td>Review Lockout Procedure</td>
<td>The authorized employee shall refer to the company procedure to identify the type and magnitude of the energy that the machine or equipment utilizes, shall understand the hazards of the energy, and shall know the methods to control the energy.</td>
</tr>
<tr>
<td>3</td>
<td>Perform Machine Stop</td>
<td>If the machine or equipment is operating, shut it down by the normal stopping procedure (depress the stop button, open switch, close valve, etc.).</td>
</tr>
<tr>
<td>4</td>
<td>Isolate Energy</td>
<td>De-activate the energy isolating device(s) so that the machine or equipment is isolated from the energy sources.</td>
</tr>
<tr>
<td>5</td>
<td>Lockout Energy</td>
<td>Lock out the energy isolating device(s) with assigned individual lock(s).</td>
</tr>
<tr>
<td>6</td>
<td>Dissipate Energy</td>
<td>Stored or residual energy (such as in capacitors, springs, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc.) must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc.</td>
</tr>
<tr>
<td>7</td>
<td>Attempt Restart</td>
<td>Ensure that the equipment is disconnected from the energy sources by (1) checking that no personnel are exposed, then verify the isolation of the equipment by operating the push button or other normal operating controls or by testing to make certain the equipment will not operate. Caution: Remove control operating control(s) to neutral or &quot;off&quot; position after verifying the isolation of the equipment.</td>
</tr>
</tbody>
</table>

**RESTORE TO SERVICE SEQUENCE**

<table>
<thead>
<tr>
<th>#</th>
<th>STEP</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Check Machine</td>
<td>Check the machine or equipment and the immediate area around the machine to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact.</td>
</tr>
<tr>
<td>2</td>
<td>Check Area</td>
<td>Check the work area to ensure that all employees have been safely positioned or removed from the area.</td>
</tr>
<tr>
<td>3</td>
<td>Verify Machine</td>
<td>Verify that the controls are in neutral.</td>
</tr>
<tr>
<td>4</td>
<td>Remove Lockout</td>
<td>Remove the locks, tags and lockout devices and re-energize the machine or equipment. Reverse the order of all lockout-tagout procedure steps from bottom to top starting from the last page. Note: The removal of some forms of blocking may require re-energization of the machine before safe removal.</td>
</tr>
<tr>
<td>5</td>
<td>Notify</td>
<td>Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for use.</td>
</tr>
</tbody>
</table>

---

**Control H**

**Locks & Tags Needed**

Steam pressure and burn hazard. Ensure steam and heat have dissipated before proceeding.

---

**North Wall**

**South Side View**

**North West Side View**

---

**ALWAYS PERFORM A MACHINE STOP BEFORE LOCKING OUT DISCONNECTS**

<table>
<thead>
<tr>
<th>ID</th>
<th>Source</th>
<th>Location</th>
<th>Method</th>
<th>Check</th>
<th>Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Electrical 400V</td>
<td>Disconnect located at the MCC</td>
<td>Move E-1 disconnect to off.</td>
<td>Lockout Hasp and Lock</td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>Hot Water Supply</td>
<td>Disconnect above the Boiler</td>
<td>Turn W-1 valve off.</td>
<td>Verify pressure has bled off.</td>
<td>Cable Lockout</td>
</tr>
<tr>
<td>03</td>
<td>Hot Water Return</td>
<td>Disconnect above the Boiler</td>
<td>Turn W-2 valve off.</td>
<td>Verify pressure has bled off.</td>
<td>Cable Lockout</td>
</tr>
<tr>
<td>04</td>
<td>Gas Natural Gas</td>
<td>Disconnect on West side of Boiler</td>
<td>Turn G-1 valve off.</td>
<td>Verify pressure has bled off.</td>
<td>Universal Ball Valve Lockout</td>
</tr>
</tbody>
</table>

---

**OPENING A GUARD DOES NOT CONSTITUTE A LOCKOUT!**

Any machine modifications must be shown in procedure. Contact facility to update procedure.
LOTO this too
Confined space

• Hard to get in and out
• Big enough to get into
• Not meant to stay in it
Permit Required Confined Space?

- Unsafe atmosphere
- Hot mash
- Liquids
- Hot vessel
- Mash rake
- Grain silo
Confined space

- **Eliminate** what can hurt me
- **Control** what can hurt me
- **Perform** lock out
- **Isolate** from “Inflow and Outflow”

- §1910.146,
- BA Confined Space BMP
- OSHA eTool,
- OSHA Confined Space Advisor
Effective Ventilation: Research

- U of MICHIGAN study: Confined Space ventilation.
- Studied gases, shapes, other variables.
- Results: 20 ACH so entrant can breathe.
- Purge time: Cubic feet / blower CFM
- Purge time equals 1 single air exchange.

No matter your plan, a gas monitor must verify
Calculating “AIR CHANGES Per HOUR”

• Feet\(^3\) / CFM\(^\text{Blower}\) = purge time

• 10 barrel tank: 45Ft\(^3\) roughly

• 45 cfm should clear in 1 min

• Bathroom fans: 50 cfm to 120 cfm

How long to clear the smell?
I need a Carbon Dioxide sensor!

- Oxygen is 20% of air, **1 in 5**
- It takes **5% CO2** to displace **1% O2**
- PEL of CO2 is 5,000 ppm, or 0.5%
- Or only displaces 0.1% Oxygen
- Causes fatigue
- Heart skips beats
Confined space rescue Plan

• Must have a rescue plan for entries
• If 911 is your plan, refer to OSHA Fact Sheet
• Talk to your fire department
• Do they have the right equipment?
• Will they be available if you call?
• Or rescuing a cat from a tree?
Powered industrial trucks

Reference PIT Best Management Practices found on BA site
Overload, unbalanced, incorrect use
Chemical safety
Chemicals/ ppe
Common chemical hazards in breweries

• Written program is required
• Trained before works with every chemical
• Proper label on every container
• SDS for every chemical
• SDS always available
Common chemical hazards in breweries

- Acid
  - Acid-Based Detergents, Nitric, Phosphoric
- Base/Alkaline
  - Sodium hydroxide (NaOH), “caustic soda”
  - Caustic/Hypochlorite Solutions
- Oxidizer
  - Most sanitizers are oxidizers
- Flammable
  - Oxygen
- Asphyxiant
  - Carbon Dioxide
  - Nitrogen
Common chemical hazards in breweries

- **Acid**
  - Acid-Based Detergents, Nitric, Phosphoric

- **Base/Alkaline**
  - Sodium hydroxide (NaOH), “caustic soda”
  - Caustic/Hypochlorite Solutions

- **Oxidizer**
  - Most sanitizers are oxidizers

- **Flammable**
  - Oxygen

- **Asphyxiant**
  - Carbon Dioxide
  - Nitrogen

- **Acid**
  - Acid-Based Detergents, Nitric, Phosphoric

---

**GHS Classification**
- Skin Corrosion/ Irritation: Category 1
- Serious Eye Damage/Eye Irritation: Category 1
- Specific Target Organ Toxicity (Single Exposure): Category 3
- Oxidizing Liquids: Category 2

**GHS Label Elements**
- Signal Word: Danger
- Symbols: 

**Hazard Statements:**
- Causes severe skin burns and serious eye damage.
- May cause respiratory irritation
- May intensify fire, oxidizer

**Precautionary Statements:**
- Prevention:
  - Do not breathe mist, vapors or spray.
  - Wash hands and any exposed skin thoroughly after handling.
  - Wear protective gloves. Wear eye/face protection. Wear protective clothing.
  - Use only outdoors or in a well-ventilated area.
  - Keep away from heat.
  - Keep away from clothing/combustible materials.
  - Take any precaution to avoid mixing with combustibles.
  - IMMEDIATELY CALL A POISON CENTER OR PHYSICIAN.

- Response:
  - Eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
  - Skin: Take off immediately all contaminated clothing. Rinse skin with water or shower. Wash contaminated clothing before reuse.
Common chemical hazards in breweries

• Acid
  • Acid-Based Detergents, Nitric, Phosphoric
• Base/Alkaline
  • Sodium hydroxide (NaOH), “caustic soda”
  • Caustic/Hypochlorite Solutions
• Oxidizer
  • Most sanitizers are oxidizers
• Flammable
  • Oxygen
• Asphyxiant
  • Carbon Dioxide
  • Nitrogen

• Base/Alkaline
  • Sodium hydroxide (NaOH), “caustic soda”
  • Caustic/Hypochlorite Solutions
Common chemical hazards in breweries

• Acid
  • Acid-Based Detergents, Nitric, Phosphoric

• Base/ Alkaline
  • Sodium hydroxide (NaOH), “caustic soda”
  • Caustic/ Hypochlorite Solutions

• Oxidizer
  • Most sanitizers are oxidizers

• Flammable
  • Oxygen

• Asphyxiant
  • Carbon Dioxide
  • Nitrogen

• Oxidizer
  • Most sanitizers are oxidizers
  • Don’t use Nitrile gloves

GHS Classification
Skin Corrosion/Irritation: Category 1
Serious Eye Damage/Eye Irritation: Category 1
Specific Target Organ Toxicity (Single Exposure): Oxidizing Liquids Category 2

GHS Label Elements:
Signal Word: Danger
Symbols:

Hazard Statements:
Causes severe skin burns and serious eye damage.
May cause respiratory irritation
May intensify fire; oxidizer

Precautionary Statements:
Prevention:
Do not breathe mist, vapors or spray.
Wash hands and any exposed skin thoroughly after handling.
Wear protective gloves, wear eye/face protection. Wear protective clothing.
Use only outdoors or in a well-ventilated area.
Keep away from heat.
Keep away from clothing/combustible materials.
Take any precaution to avoid mixing with combustibles.

Response:
-Eyes
IMMEDIATELY CALL A POISON CENTER OR PHYSICIAN.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

-Skin
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. Wash contaminated clothing before reuse.
Common chemical hazards in breweries

- Acid
  - Acid-Based Detergents, Nitric, Phosphoric
- Base/Alkaline
  - Sodium hydroxide (NaOH) “caustic soda”
- Oxidizer
  - Most sanitizers are oxidizers
- Flammable
  - Oxygen
- Flammable
  - Oxygen

Use only with equipment cleaned for Oxygen service.

- Keep away from clothing, incompatible materials and combustible materials. Keep reduction valves, valves and fittings free from oil and grease.
- In case of fire: Stop leak if safe to do so.
- Protect from sunlight when ambient temperature exceeds 52°C/125°F. Store in a well...
“Nitric acid got too hot in the kettle...
A thick, yellow cloud of Nitric haze formed”

**Avoid:** Extreme temperatures.

**Fatal by:** spasm, inflammation, larynx and bronchi edema, chemical pneumonitis, pulmonary edema.

Aspiration causes pulmonary edema.

**Inhalation** effects delayed; respiratory chemical burns

**Doctors:** inhalation damage to 30 hours.

Causes systemic effects; acute pulmonary edema, asphyxia, chemical pneumonitis; upper airway edema obstruction.
Hazardous materials Storage
Chemical safety & Emergency Response Plan

6. Accidental release measures

Personal Precautions
Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Use personal protective equipment.

Environmental Precautions
Should not be released into the environment. Do not flush into surface water or sanitary sewer system. See Section 12 for additional ecological information.

Methods for Containment and Clean Up
Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Sweep up and shovel into suitable containers for disposal.

7. Handling and storage

- What is your plan?
- Special equipment to use?
- Sorbants?
- Neutralizer?
- Plan for safe disposal
- Not for down the drain

BrewersAssociation.org
Plan to follow!

- Dogfishhead spilled nitric acid
- They followed their plan.
- Workers were evacuated.
- The tasting room was evacuated.
- The day’s schedule was postponed.
- No one was hurt.
- Complements from OSHA!
Eye wash and showers

- Within **10 seconds**, or **55 feet**
- On same level, **no stairs**
- Low water velocity to limit damage
- Temperature from **60°F to 80°F**
- Hotter increases corrosive actions
- **20 minute** water supply

Minimum flow rates of:

- **0.4 gallons/min** for eyewash
- **3 gpm** eye/face wash
- **20 gpm** showers; **400 gallons/ 20 min.**
PPE for brewers

- BA Best Management Practice PPE
- 1910 Subpart I
- Note the glasses
- Gloves
- Pants outside boots
Face Protection

- If face can be injured, protect it
- If can absorb, protect it
- Inspect for scratch, crack, pits
- Dirty shield fogs up faster
Chemical glove example: nitrile
Hand Protection

• 1.1 million hand injuries
• 2014 ER visits and lost time from work

• Affect ability to perform tasks.
• Slow to heal
• Heal poorly

1. Lacerations,
2. Crushes,
3. Avulsions or detachments,
4. Punctures,
5. Fractures

DO WE GO RIGHT TO CHOOSING PPE?

joint cartilage, and fingernails work together
Blade Safety

- What gets cut?
  Free hand, Leg, Side of body

- In-appropriate cutting tools.

- It’s a drywall knife, not box cutter

- Remove regular knives, replace with approved cutting tools.

- Use tools designed for specific job

- Use scissors to cut grain bags

- Inspect: sharp blade, solid mount, spring action

- Dull blades increase risk
Back safety and ergonomics

1. Keep your spine neutral
2. Keep your spine neutral
3. Keep your spine neutral
Protect your back, and shoulders