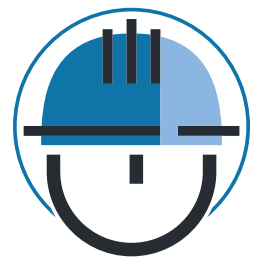




pec learn
SafeLandUSA™ 2021 Basic



STUDENT WORKBOOK



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SafeLandUSA™ 2021 Basic



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Module 1

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Life-Saving Rules Overview



Bypassing Safety Controls



Confined Space



Driving



Energy Isolation



Hot Work



Line of Fire



Safe Mechanical Lifting



Work Authorisation



Working at Height



LIFE-SAVING RULES



International Association of Oil & Gas Producers

Notes

Safety Culture

ACTIVITY: SAFETY CULTURE ASSESSMENT

DIRECTIONS		Agree 3 pts	Neither Agree or Disagree 2 pts	Disagree 1 pt
1.	I received a company- and site-specific orientation on my first day of work.	3	2	1
2.	I know the location of the facility's emergency response equipment (first aid kits, fire alarms, etc.).	3	2	1
3.	The safety training I have received addressed the risks I face at my workplace.	3	2	1
4.	I feel safe at my workplace.	3	2	1
5.	I feel informed about the possible safety hazards at my workplace.	3	2	1
6.	My company is truly committed to the health and safety of all workers.	3	2	1
7.	I believe my health and safety is a priority for my manager/supervisor.	3	2	1
8.	I believe any health and safety concerns raised would be made a high priority.	3	2	1
9.	I do not fear being reprimanded if I report an incident or injury.	3	2	1
10.	My manager/supervisor demonstrates their commitment to health and safety by leading by example.	3	2	1
11.	I feel that I would have management's support if I conducted a stop work.	3	2	1
12.	Workplace health and safety is considered to be at least as important as production and quality.	3	2	1
13.	There is a regular exchange about safety-related issues between workers and management.	3	2	1
14.	I understand my rights and responsibilities concerning safety at my workplace.	3	2	1
15.	All incidents are investigated quickly in order to improve safety at the workplace as soon as possible.	3	2	1
16.	My company has a safety committee.	3	2	1
17.	Safety decisions at my company are made by qualified workers.	3	2	1
18.	My workplace safety professional makes safety information and training opportunities available to me.	3	2	1
19.	My coworkers have the qualifications, skill, and knowledge to perform their jobs safely.	3	2	1
20.	I am aware of the facility's emergency evacuation plan.	3	2	1
21.	I am encouraged to report injuries, near misses, unsafe behavior, and safety violations in my workplace.	3	2	1



DIRECTIONS		Agree	Neither Agree or Disagree	Disagree
For each question listed, provide a rating on a scale of agree to disagree by filling in the numbered circle. Total your score using the scoring system at the bottom of the <i>Safety Culture Assessment</i> form. Share your results with the class if you are comfortable doing so. Participate in the class discussion.				
22.	Employees are encouraged to share new ideas on accomplishing their work more safely.	3	2	1
23.	My workplace has the personal protective equipment (PPE) I need to do my job safely.	3	2	1
24.	My workplace uses job hazard analyses on all jobs.	3	2	1
25.	I will not perform a work activity unless I know it is safe.	3	2	1
SCORING		TOTAL SCORE:		
Total your score. The maximum score is 75 and the minimum score is 25 .				
59-75	You and your company exhibit characteristics of a strong safety culture. Keep up the good work, but remember there is always room for improvement.			
42-58	The safety culture is well on its way; it just needs some support, guidance, and follow-through.			
25-41	Take opportunities to focus on safety during your daily tasks. Talk to your supervisor and members of your company's safety committee to find areas where you and your coworkers can help improve the safety culture of the company.			

Notes

ACTIVITY: HUMAN PERFORMANCE TOOLS

DIRECTIONS

Complete the Human Performance Tools exercise by matching the tool with the correct description. Write the letter for the matching description.

<p>A questioning attitude _____</p>	<p>A. Every worker has the obligation to stop work when they are unsure, when they witness an unsafe act, or when they have identified an unsafe condition.</p>
<p>Three-way communication _____</p>	<p>B. This type of attitude helps you and your coworkers make sure you really know the right information for the job and that there are no unknowns. It also helps you differentiate between facts and improper assumptions. Improper assumptions can create dangerous situations at work.</p>
<p>Stopping when uncertain _____</p>	<p>C. This is used to eliminate barriers to communication by confirming messages are correctly sent and received.</p>
<p>Self-checking _____</p>	<p>D. These are used to make sure workers follow the right steps in the right order. They are also used to help workers avoid repeating the same mistakes.</p>
<p>Peer-checking _____</p>	<p>E. These are formal reviews of a particular task or job that identify the potential hazards of a job so that control measures can be put in place before work begins.</p>
<p>Procedure use and adherence _____</p>	<p>F. This allows workers to take a few minutes to pause and focus their attention on the task at hand. Taking this extra time allows workers to understand what is being done, identify the potential outcomes, and put a plan in place if expected results change.</p>
<p>Job safety analyses (JSAs) _____</p>	<p>G. This occurs when a coworker verifies an activity or task to help reduce the chance for an error.</p>



General Safety

ACTIVITY: GENERAL SAFETY TOPICS

DIRECTIONS

Use the boxes on pages 6-9 to complete this exercise. List everything you know about the assigned topic as it relates to the workplace. Document your findings. Share your results with the class. Listen to the Instructor's explanation and correct your results as necessary.

CONTRABAND

List examples of prohibited items:

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Are workers allowed to be on medication? Please explain.

What is a company allowed to do during a search?

DRUG TESTING

What are the consequences for using, possessing, selling, distributing, concealing, or transporting any contraband on company or customer property?

Can you list the instances where workers may be required to be drug tested?

Are drug test results confidential?

WORKPLACE VIOLENCE

What is workplace violence?

What are some warning signs of workplace violence?

How can you stop or prevent workplace violence?



ACTIVE SHOOTER

What is an active shooter?

What should you do in an active shooter situation?

What should you do when law enforcement arrives at the scene?

INCIDENT REPORTING, INVESTIGATION, AND ROOT CAUSE

What should you do if you suffer a work-related incident, illness, injury, or near miss?

What is a near miss?

Match each term below with the correct description from the column on the right.

Recordable injuries

=====

A. Injuries that include work-related near-miss incidents and incidents that require first aid treatment.

Non-recordable injuries

=====

B. Injuries that include work-related fatalities, days away from work, restricted work or job transfers, and medical treatment beyond first aid.

Note: Both types of incidents must be reported to your supervisor.

What is the goal of incident investigation?

COMMUNICATION

What are some barriers that can reduce your ability to communicate?

What can you do to overcome communication barriers?

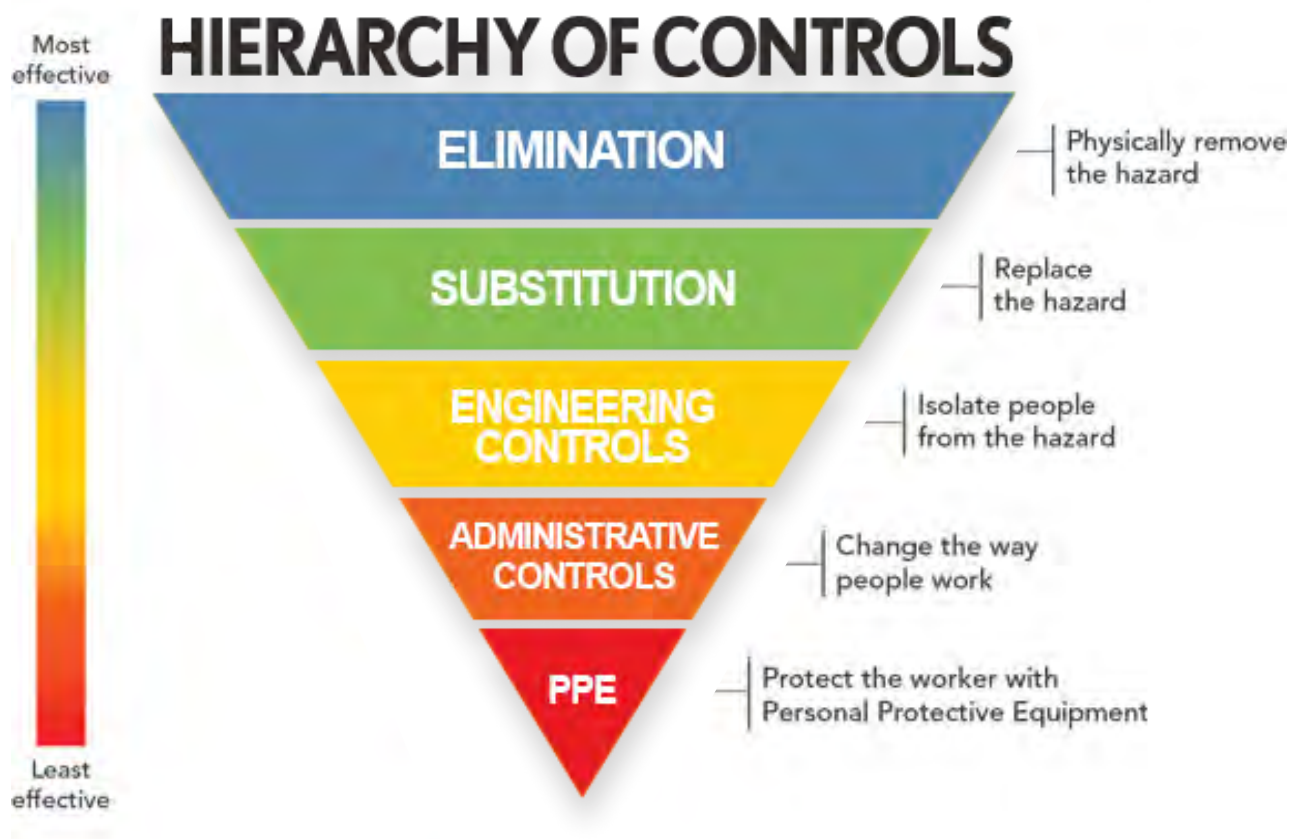
What is three-way communication?

Notes



Hazard Control

HIERARCHY OF HAZARD CONTROL



Notes

LIMITING WORKER EXPOSURE
ACTIVITY: TYPES OF ADMINISTRATIVE CONTROLS

DIRECTIONS	
Complete the Types of Administrative Controls exercise by matching each control with the correct description. Write the letter for the matching description.	
Fit-for-duty exams _____	A. The action and authority to change, slow down, or stop an unsafe act or condition.
Short service employee (SSE) programs _____	B. Used to make sure you are physically fit enough to safely do your assigned job duties without harming yourself or your coworkers.
Interventions and stop work authority (SWA) _____	C. A program set up for workers new to the oil and gas industry or new to a job that places the worker with a more experienced worker for a training period.
Job safety analyses (JSAs) _____	D. Written authorisations used to control potentially hazardous work and the environment where the work will be done.
Work permits _____	E. Formal reviews of a particular task or job that are completed before work begins.



JOB SAFETY ANALYSIS

Sample

JSA MUST BE COMPLETED FOR EVERY JOB TASK BEFORE WORK BEGINS.
 JSA MUST BE AMENDED OR UPDATED IF CONDITIONS OR JOB SCOPE CHANGES.

JSA Number:	JSA010203
PERMIT TO WORK REQUIRED:	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO

LOCATION (WORKSITE NAME)	DATE	TIME	SHIFT (Day or Night)	WEATHER
Plant-wide	XX/XX/20XX	7:30 pm	Night – 2 nd shift/ swing shift	Wind – northwest to southeast; cold, 66°F
DESCRIPTION OF JOB TASK				
Operate forklift to move load to and from unit				
EQUIPMENT IN USE				
Forklift				
PPE CHECKLIST				
<input checked="" type="checkbox"/> Hard Hat	<input checked="" type="checkbox"/> Protective Footwear	<input checked="" type="checkbox"/> Safety Glasses	<input checked="" type="checkbox"/> Hearing Protection	<input type="checkbox"/> Gas Monitor
<input checked="" type="checkbox"/> FRC	<input type="checkbox"/> Faceshield	<input type="checkbox"/> Goggles	<input type="checkbox"/> Reflective Vest	<input type="checkbox"/> Respirator (circle type): Air-purifying Supplied-air
<input type="checkbox"/> Other :				

SUPERVISOR NAME:	
------------------	--

PRINT NAME	SIGNATURE
------------	-----------

PRINT NAME	SIGNATURE
<p>WORKERS AND SUPERVISORS WILL REVIEW AND SIGN OFF ON THE JSA AFTER COMPLETING THE JOB STEPS PAGE. WORKERS WILL FOLLOW THE JOB STEPS ON THE JOB.</p>	

All workers on the jobsite must verify, review, and sign this JSA before work begins.



JOB SAFETY ANALYSIS *Sample*

JSA Number: **JSA010203**

**JSA MUST BE COMPLETED FOR EVERY JOB TASK BEFORE WORK BEGINS
JSA MUST BE AMENDED OR UPDATED IF CONDITIONS OR JOB SCOPE CHANGES**

PLANNED JOB STEPS (in order)	POTENTIAL HAZARDS (specific to each step)	HAZARD CONTROLS (eliminate or minimize risks)
1. <i>Inspect forklift</i>	<ul style="list-style-type: none"> Sharp edges/pinch points between moving parts and covers Damaged or defective forklift 	<ul style="list-style-type: none"> Wear PPE Use forklift inspection form Have trained worker complete inspection
2. <i>Pick up load</i>	<ul style="list-style-type: none"> Unbalanced/falling load Crush/tip-over hazards 	<ul style="list-style-type: none"> Keep workers away from lifted load Check that load is secure/balanced before lift Do not overload Wear seat belt
3. <i>Move load from unit</i>	<ul style="list-style-type: none"> Traffic Contact with people or vehicles Rollover or tipover hazards 	<ul style="list-style-type: none"> Stop traffic in the area Take route with least vehicular/worker traffic Use flagger Travel at slow speed
4. <i>Unload load</i>	<ul style="list-style-type: none"> Blocking access routes Improper storage Equipment damage 	<ul style="list-style-type: none"> Do not block access routes/safety equipment Place on even surface that can withstand load's weight Use a spotter
5. <i>Park forklift</i>	<ul style="list-style-type: none"> People (crush or struck-by injury) Uneven surfaces Tripping hazards (forks) Unauthorized use 	<ul style="list-style-type: none"> Use a flagger Avoid uneven surfaces Lower forks/chock wheels Remove key; LOTO



IOGP WORK AUTHORISATION LIFE-SAVING RULE

SAMPLE WORK PERMIT

Company:			Name:			Date:		
Permit Initiation: Date		Time	AM/PM	Permit Termination: Date		Time	AM/PM	
Note: A new permit must be obtained at the beginning of each new shift.								
Work Area:								
Equipment or System:								
Work Activity:								
POTENTIAL SOURCES OF IGNITION								
<input type="checkbox"/>	Abrasive Blasting			<input type="checkbox"/>	Pyrophoric Materials			
<input type="checkbox"/>	Electrical Tools (other than Int. Safe and explosion-proof)			<input type="checkbox"/>	Oxygen Enrichment			
<input type="checkbox"/>	Exothermic Chemical Reaction			<input type="checkbox"/>	Shock/Friction Sensitive Materials			
<input type="checkbox"/>	Handtools			<input type="checkbox"/>	Static Electricity			
<input type="checkbox"/>	Hot Tap			<input type="checkbox"/>	Welding/Cutting			
<input type="checkbox"/>	Internal Combustion Engines			Other:				
POTENTIAL FUELS (SPECIFY)								
<input type="checkbox"/>	Combustible Solids (wood, paper, plastic, etc.) within 35'			<input type="checkbox"/>	Flammable Dusts (sulphur, grain, etc.)			
<input type="checkbox"/>	Combustible Liquids (diesel, hydraulic oil, etc.) within 35'			<input type="checkbox"/>	Flammable Liquids/Gas (MEK, gasoline, natural gas, etc.) within 50'			
<input type="checkbox"/>	Explosives			<input type="checkbox"/>	Organic Peroxide			
<input type="checkbox"/>	Flammable Aerosols			Other:				
PRECAUTIONS								
<input type="checkbox"/>	Atmospheric Testing		<input type="checkbox"/>	Inspect Level Below		<input type="checkbox"/>	No Smoking	
<input type="checkbox"/>	Class I Electrical Tools		<input type="checkbox"/>	Inspect Work Area		<input type="checkbox"/>	Notify Adjacent Operations	
<input type="checkbox"/>	Firewatch		<input type="checkbox"/>	Isolate Lines		<input type="checkbox"/>	Purge	
<input type="checkbox"/>	Grounding & Bonding		<input type="checkbox"/>	MSDS Review		<input type="checkbox"/>	Remove/Cover Flammable Solids	
<input type="checkbox"/>	Inert		<input type="checkbox"/>	Non-Sparking Tools		Other:		
ATMOSPHERIC TESTING								
Instrument:			Serial#:			Calibration Date:		
Authorized Gas Tester:				Frequency: Initial, Continuous, Periodic _____ (Interval)				
Time								
Flammable Gas								
H ₂ S								
Other								
AUTHORIZATION SIGNATURES								
Job Supervisor:								
Maintenance Supervisor:								
Operations Supervisor:								

WORKER RESPONSIBILITIES**ACTIVITY: WORKER AND SUPERVISOR RESPONSIBILITIES****DIRECTIONS**

Watch the Work Authorisation Case Study video. Use the boxes on page 15 to answer the assigned question.

WORKER

What did the workers do wrong?

SUPERVISOR

What should the supervisor have done differently?



WORK AUTHORISATION RESPONSIBILITIES		
Worker Issuing Permit Responsibilities	Supervisor Responsibilities	Worker Responsibilities
Ensure the nature of the work is fully understood and that all hazards associated with the operation have been identified.	Make sure workers have received training in the permit-to-work system of the specific location.	Do not start work requiring a permit until it has been authorised and issued.
Ensure all necessary precautions are implemented before work begins.	Discuss the job fully with the worker issuing the permit and ensure the permit is posted at the worksite.	Have a good understanding of the work permit.
Inform all people who may be affected by the work before work begins, when the work is suspended, and when the work is complete.	Make sure workers have been briefed on the details of the permit, potential hazards, and precautions to be taken.	Ensure a briefing from the supervisor on the operation has been conducted and all workers understand the hazards and precautions to be taken.
Cross-reference permits for tasks that may interact.	Supervise the operation to ensure precautions are maintained throughout the operation and verify workers stay within the limitations outlined on the permit.	Follow the instructions outlined in the permit.
Make arrangements for the worksite to be examined before work begins, upon completion of the work, and when work is suspended.	Make sure workers understand that if circumstances change, work must stop and be reassessed.	Leave any equipment being used at the worksite in a safe condition once work is stopped.
Discuss all ongoing or suspended permits with the oncoming permit issuer.	Ensure the worksite is left in a safe condition and the permit issuer is informed of the completion or suspension of the operation.	Stop work and consult with the supervisor if any circumstances change.

Notes

COMPANY RESPONSIBILITIES

ACTIVITY: COMPANY RESPONSIBILITIES

DIRECTIONS

Review the additional details of the case and participate in answering the following questions as a class.

What else could the company have done differently to prevent the incident?

What should the company do moving forward to prevent this in the future?

Personal Protective Equipment



EYE AND HEAD

Notes



HEARING

Notes



HAND

Notes



RESPIRATORY

Notes



FOOT

Notes



BODY

Notes

IOGP Bypassing Safety Controls Life-Saving Rule

ACTIVITY: IDENTIFYING SAFETY CONTROLS

DIRECTIONS

Identify safety-critical controls that are used at your company, job, or at home.

Notes

**EXAMPLES OF VIOLATIONS****ACTIVITY: EXAMPLES OF VIOLATIONS****DIRECTIONS**

Review the examples of workers bypassing safety controls below. For each example, identify the potential reasons workers might have decided to bypass these controls. Share your findings with the rest of the class.

1. Bypassing the deadman switch of an abrasive blasting gun

2. Ignoring a portable gas monitor alarm

3. Removing the guard on a grinder

4. Using an emergency SCBA for routine work

5. Ignoring a control room alarm

6. Ignoring a barrier or exclusion zone

7. Cheating on a drug and alcohol test

ACTIVITY: AUTHORISATION

DIRECTIONS

Answer the questions below and participate in the discussion to follow.

What are some valid reasons for bypassing safety controls?

What must occur in order to bypass safety controls?

Notes



Notes



Module 2

The Hazard Communication Standard	24
Environmental	36
Industrial Hygiene	37



The Hazard Communication Standard

IDENTIFYING AND CLASSIFYING HAZARDOUS SUBSTANCES

SAMPLE LABEL


Product Identifier

CODE _____
Product Name _____

Supplier Identification

Company Name _____
Street Address _____
City _____ State _____
Postal Code _____ Country _____
Emergency Phone Number _____

Hazard Pictograms



Hazard Statements

- Highly flammable liquid and vapor.
- May cause liver and kidney damage.

Signal Word

DANGER

Supplemental Information

Direction for Use _____

Fill weight: _____ Lot Number: _____
Gross weight: _____ Fill Date: _____
Expiration Date: _____

Precautionary Statements

Keep container tightly closed Keep away from heat/sparks/open flame Only use non-sparking tools Take precautionary measure against static discharge Do not breathe vapors Do not eat, drink, or smoke when using this product	Dispose of in accordance with local, regional, national, and international regulations as specified First Aid: If exposed call Poison Control Center. If on skin (or hair): Immediately take off any contaminated clothing. Rinse skin with water. Wash hands thoroughly after handling In Case of Fire: use dry chemical (BC) or Carbon Dioxide (CO ₂) fire extinguisher to extinguish	Store in cool, well ventilated, locked place No smoking Use explosion-proof electrical equipment Ground and bond container and receiving equipment Wear protective gloves
--	---	---

Health Hazard



Carcinogenic, mutagenic, target organ toxicity, reproductive toxicity, respiratory sensitizer

Flame



Flammable, pyrophoric, self-heating, self-reactive, emits flammable gas, organic peroxide

Exclamation Mark



Irritant, narcotic effects, dermal sensitizer, respiratory tract irritant (less severe toxicity)

Gas Cylinder



Gas under pressure

Corrosion



Corrosive (chemical reaction with metals), chemical burns

Exploding Bomb



Explosive, self-reactive, organic peroxide

Flame Over Circle



Oxidizer

Environment



Aquatic toxicity (not required by OSHA, but required by EPA)

Skull and Crossbones



Severely toxic

SAFETY DATA SHEET BREAKDOWN	
Section	Required Information
1. Identification	Gives the product identifier, manufacturer, importer or responsible party, address, phone number, emergency phone number, and the chemical's recommended use, including any restrictions
2. Hazard(s) Identification	Identifies the chemical hazards and required label parts
3. Composition/Information on Ingredients	Details chemical ingredients, including any trade secrets
4. First Aid Measures	Identifies chemical exposure symptoms and effects, including required first aid treatment
5. Firefighting Measures	Identifies what hazards are created when the chemical is burning and lists suitable extinguishing equipment and techniques
6. Accidental Release Measures	Lists emergency procedures, including PPE requirements and proper containment and cleanup methods
7. Handling and Storage	Lists the precautions to follow for the safe handling and storage of the chemical and identifies any chemical incompatibilities; states if a chemical can be safely stored near another chemical
8. Exposure Controls/Personal Protection	Lists OSHA's PELs and the ACGIH's TLVs and identifies appropriate engineering controls and PPE
9. Physical and Chemical Properties	Details the chemical's properties
10. Stability and Reactivity	Identifies the chemical's stability and the possibility of hazardous reactions
11. Toxicological Information	Identifies the chemical's toxicity level and the different exposure routes to the body; details any signs and symptoms of exposure, including any acute or chronic effects
12. Ecological Information	Provides information to assess the environmental impact of the chemical if it were released into the environment
13. Disposal Considerations	Provides guidance for proper disposal, recycling, and reclamation practices
14. Transport Information	Provides guidance on classification information for shipping and transporting the chemical
15. Regulatory Information	Identifies safety, health, and environmental regulations specific for the product that are not indicated elsewhere on the SDS
16. Other Information	Identifies the preparation or last revision date of the SDS



ACTIVITY: SAFETY DATA SHEET EXERCISE

Read the scenarios below. Using the sample Safety Data Sheet on pages 29-35, answer the exercise questions for each scenario.



Part A

This is Carl. He's getting ready to work with Chemical Z. He knows how dangerous this chemical can be so he made sure to put on his impermeable gloves and his dust mask to protect against vapors. He wants to focus on the task at hand and doesn't want any distractions. Therefore he's left his reading glasses at home and opted for his contact lenses instead. He's also wearing his safety glasses, but he often takes them off as they tend to fog up or trap sweat which makes it hard to see, especially since today's temperature is at a scorching 104°F.

PART A

What did Carl do right?

What did he do wrong?

Part B

Carl starts working and is making great progress, until he accidentally spills some of Chemical Z. It splashes on his hands and arms, and he even gets some of it in one of his eyes. Carl squints his eye and immediately runs to the eye wash station. After rinsing for about 5 minutes, he washes his hands with soap and plenty of water. He takes a moment to compose himself and proceeds to clean up the spill. He uses regular dirt to help pick it up and then disposes of the dirt in the nearby ditch outside the shop.

PART B

What did Carl do right?

What did he do wrong?

Notes



Part C

After an eventful day, Carl has had enough and is getting ready to put everything away before calling it a day. He puts the half-full container of Chemical Z in the storage bin, which is cool and dry, and throws the empty container in the trash can outside the shop. As he's heading out, he notices he still has some irritation on his hands, so he applies some lotion to ease the discomfort. Carl leaves the site and heads home.

PART C

What did Carl do right?

What did he do wrong?

Notes

SAFETY DATA SHEET

Solvent

Page: 1
 Printed: 11/17/1901
 Revision: 11/16/1901

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name:	Chemical Z	
Company Name:	Veriforce	Phone Number:
	1234 Street	(555)555-5555
	Houston, TX 77362	
Web site address:	www.website.com	
Emergency Contact:	24 Hour Emergency Contact	(555)555-5555
Information:	Customer Service	(555)555-5555
Intended Use:	Thinning	
Product Code:	JHJGD3746764	

Additional Information

This product is regulated by the United States Consumer Product Safety Commission and is subject to certain labeling requirements under the Federal Hazardous Substances Act. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS). The product label also includes other important information, including directions for use, and should always be read in its entirety prior to using the product.

2. HAZARDS IDENTIFICATION

Flammable Liquids, Category 3
Acute Toxicity: Inhalation, Category 4
Skin Corrosion/Irritation, Category 2
Serious Eye Damage/Eye Irritation, Category 2B
Germ Cell Mutagenicity, Category 1B
Toxic To Reproduction, Category 2
Specific Target Organ Toxicity (single exposure), Category 3
Specific Target Organ Toxicity (repeated exposure), Category 2
Aspiration Toxicity, Category 1



GHS Signal Word: **Danger**

GHS Hazard Phrases:

- H226: Flammable liquid and vapor.
- H304: May be fatal if swallowed and enters airways.
- H315: Causes skin irritation.
- H320: Causes eye irritation.
- H332: Harmful if inhaled.
- H336: May cause drowsiness or dizziness.
- H340: May cause genetic defects.
- H361: Suspected of damaging fertility or the unborn child.
- H373: May cause damage to Central Nervous System (CNS) through prolonged or repeated exposure.

GHS Precaution Phrases:

- P201: Obtain special instructions before use.
- P202: Do not handle until all safety precautions have been read and understood.
- P210: Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
- P233: Keep container tightly closed.
- P240: Ground/bond container and receiving equipment.
- P241: Use explosion-proof electrical/ventilating/lighting equipment.
- P242: Use only non-sparking tools.

GHS format



SAFETY DATA SHEET

Solvent

Page: 2

Printed: 11/17/1901
Revision: 11/16/1901

P243: Take precautionary measures against static discharge.
 P260: Do not breathe gas/mist/vapors/spray.
 P264: Wash hands thoroughly after handling.
 P271: Use only outdoors or in a well-ventilated area.
 P280: Wear protective gloves/protective clothing/eye protection/face protection.
 P281: Use personal protective equipment as required.
 P235: Keep cool.

GHS Response Phrases:

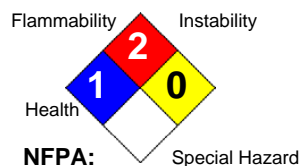
P301+310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
 P302+352: IF ON SKIN: Wash with plenty of soap and water.
 P303+361+353: IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
 P304+340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
 P305+351+338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 P308+313: IF exposed or concerned: Get medical attention/advice.
 P312: Call a POISON CENTER or doctor/physician if you feel unwell.
 P314: Get medical attention/advice if you feel unwell.
 P321: Specific treatment see label.
 P331: Do NOT induce vomiting.
 P332+313: If skin irritation occurs, get medical advice/attention.
 P337+313: If eye irritation persists, get medical advice/attention.
 P362: Take off contaminated clothing and wash before re-use.
 P370+378: In case of fire, use dry chemical powder to extinguish.

GHS Storage and Disposal Phrases:

P403+233: Store container tightly closed in well-ventilated place.
 P405: Store locked up.
 P501: Dispose of contents/container according to local, state, and federal regulations.

Hazard Rating System:

HEALTH	*	1
FLAMMABILITY	2	2
PHYSICAL	0	0
PPE		

**HMIS:****OSHA Regulatory Status:**

This material is classified as hazardous under OSHA regulations.

Potential Health Effects (Acute and Chronic):

Inhalation Acute Exposure Effects:
 May cause dizziness, headache, watering of eyes, eye irritation, weakness, nausea, muscle twitches, and depression of central nervous system. Severe overexposure may cause convulsions, unconsciousness, and death. Intentional misuse of this product by deliberately concentrating and inhaling can be harmful or fatal.

Skin Contact Acute Exposure Effects:
 May cause irritation, numbness in the fingers and arms, drying of skin, and dermatitis.
 May cause increased severity of symptoms listed under inhalation.

Eye Contact Acute Exposure Effects:
 This material is an eye irritant. May cause irritation, burns, conjunctivitis of eyes, and corneal ulcerations of the eye. Vapors may irritate eyes.

Ingestion Acute Exposure Effects:
 Harmful or fatal if swallowed. May cause nausea, weakness, muscle twitches, gastrointestinal irritation, and diarrhea. Severe overexposure may cause convulsions, unconsciousness, and death.



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5. FIRE FIGHTING MEASURES

Flash Pt:	NFPA Class II > 100.00 F		
Explosive Limits:	LEL: 0.5	UEL: 6	
Autoignition Pt:	No data.		
Suitable Extinguishing Media:	Use carbon dioxide, dry chemical powder, or foam.		
Fire Fighting Instructions:	Self-contained respiratory protection should be provided for fire fighters fighting fires in buildings or confined areas. Storage containers exposed to fire should be kept cool with water spray to prevent pressure build-up. Stay away from heads of containers that have been exposed to intense heat or flame.		
Flammable Properties and Hazards:	Combustible Liquid.		

6. ACCIDENTAL RELEASE MEASURES

Steps To Be Taken In Case Material Is Released Or Spilled:	Clean up:		
	Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind, out of low areas, and ventilate closed spaces before entering. Shut off ignition sources; keep flares, smoking, or flames out of hazard area.		
	Small spills:		
	Take up with sand, earth, or other noncombustible absorbent material and place in a plastic container where applicable.		
	Large spills:		
	Dike far ahead of spill for later disposal.		
	Waste Disposal:		
	Dispose in accordance with applicable local, state, and federal regulations.		

7. HANDLING AND STORAGE

Precautions To Be Taken in Handling:	Read carefully all cautions and directions on product label before use. Since empty container retains residue, follow all label warnings even after container is empty. Dispose of empty container according to all regulations. Do not reuse this container.		
	A static electrical charge can accumulate when this material is flowing through pipes, nozzles or filters, and when it is agitated. A static spark discharge can ignite accumulated vapors particularly during dry weather conditions. Always use proper bonding and grounding procedures.		
Precautions To Be Taken in Storing:	Keep container tightly closed when not in use. Store in a cool, dry place. Do not store near flames or at elevated temperatures.		

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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CAS #	Partial Chemical Name	OSHA TWA	ACGIH TWA	Other Limits
8052-41-3	Stoddard solvent {Mineral spirits; Aliphatic Petroleum Distillates; White spirits}	PEL: 500 ppm	TLV: 100 ppm	No data.
25551-13-7	Benzene, Trimethyl-	No data.	TLV: 25 ppm	No data.

Respiratory Equipment (Specify Type):	For OSHA controlled work place and other regular users, use only with adequate ventilation under engineered air control systems designed to prevent exceeding appropriate TLV. For occasional use, where engineered air control is not feasible, use properly maintained and properly fitted NIOSH approved respirator for organic solvent vapors. A dust mask does not provide protection against vapors.
Eye Protection:	Safety glasses, goggles, or face shields are recommended to safeguard against potential eye contact, irritation, or injury. Contact lenses should not be worn while working with chemicals.
Protective Gloves:	Wear impermeable gloves. Gloves contaminated with product should be discarded. Promptly remove clothing that becomes soiled with product.
Other Protective Clothing:	Various application methods can dictate use of additional protective safety equipment, such as impermeable aprons, etc., to minimize exposure. Before reuse, thoroughly clean any clothing or protective equipment that has been contaminated by prior use. Discard any clothing or other protective equipment that cannot be decontaminated, such as gloves or shoes.
Engineering Controls (Ventilation, etc.):	Use only with adequate ventilation to prevent build-up of vapors. Open all windows and doors. Use only with a cross ventilation of moving fresh air across the work area. If strong odor is noticed or you experience slight dizziness, headache, nausea, or eye-watering - Stop - ventilation is inadequate. Leave area immediately.
Work/Hygienic/Maintenance Practices:	A source of clean water should be available in the work area for flushing eyes and skin. Do not eat, drink, or smoke in the work area. Wash hands thoroughly after use.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical States:	<input type="checkbox"/> Gas <input checked="" type="checkbox"/> Liquid <input type="checkbox"/> Solid
Appearance / Odor:	Water / Rotten Eggs
Melting Point:	No data.
Boiling Point:	318.00 F - 385.00 F
Autoignition Pt:	No data.
Flash Pt:	> 100.00 F
Explosive Limits:	LEL: 0.5 UEL: 6
Specific Gravity (Water = 1):	0.78
Vapor Pressure (vs. Air or mm Hg):	0.3 MM HG at 68.0 F
Vapor Density (vs. Air = 1):	5 Air = 1
Evaporation Rate:	No data.
Solubility in Water:	No data.
Solubility Notes:	Very slightly soluble in cold water.
Percent Volatile:	100.0 % by weight.
VOC / Volume:	778.0000 G/L



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10. STABILITY AND REACTIVITY

Stability: Unstable [] Stable [X]

Conditions To Avoid - Instability: No data available.

Incompatibility - Materials To Avoid: Incompatible with strong acids, alkalis, and oxidizers such as liquid chlorine and oxygen.

Hazardous Decomposition or Byproducts: Decomposition may produce carbon monoxide and carbon dioxide.

Possibility of Hazardous Reactions: Will occur [] Will not occur [X]

Conditions To Avoid - Hazardous Reactions: No data available.

11. TOXICOLOGICAL INFORMATION

Toxicological Information: Refer to section 2 for acute and chronic effects.

CAS# 25551-13-7:
Standard Draize Test, Skin, Species: Rabbit, 500.0 MG, 24 H, Moderate.
Result:
Kidney, Ureter, Bladder: Changes in liver weight.
Endocrine: Changes in thymus weight.
Immunological Including Allergic: Decreased immune response.
- "Sbornik Vysledku Toxilogickeho Vysetreni Latek A Pripravku," , Institut Pro Vychovu Vedoucicn P, Marhold, J.V., Institut Pro Vychovu Vedoucicn, Pracovniku Chemickeho, Prumyclu Praha Czechoslovakia, Vol/p/yr: -,24, 1972

Standard Draize Test, Eyes, Species: Rabbit, 500.0 MG, 24 H, Mild.
Result:
Kidney, Ureter, Bladder: Changes in liver weight.
Kidney, Ureter, Bladder: Changes in bladder weight.
Nutritional and Gross Metabolic: Weight loss or decreased weight gain.
- "Sbornik Vysledku Toxilogickeho Vysetreni Latek A Pripravku," , Institut Pro Vychovu Vedoucicn P, Marhold, J.V., Institut Pro Vychovu Vedoucicn, Pracovniku Chemickeho, Prumyclu Praha Czechoslovakia, Vol/p/yr: -,24, 1972

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
8052-41-3	Stoddard solvent {Mineral spirits; Aliphatic Petroleum Distillates; White spirits}	n.a.	n.a.	n.a.	n.a.
25551-13-7	Benzene, Trimethyl-	n.a.	n.a.	n.a.	n.a.

12. ECOLOGICAL INFORMATION

No data available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method: Dispose in accordance with federal, state, and local regulations.

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14. TRANSPORT INFORMATION

LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Paint-Related Material, Exempt Combustible Liquid per 49 CFR 173.150(f)

DOT Hazard Class:

UN/NA Number:

Additional Transport Information:

The supplier may apply one of the following exceptions: Combustible Liquid, Consumer Commodity, Limited Quantity, Viscous Liquid, Does Not Sustain Combustion, or others, as allowed under 49CFR Hazmat Regulations. Please consult 49CFR Subchapter C to ensure that subsequent shipments comply with these exceptions.

15. REGULATORY INFORMATION

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
8052-41-3	Stoddard solvent {Mineral spirits; Aliphatic Petroleum Distillates; White spirits}	No	No	No
25551-13-7	Benzene, Trimethyl-	No	No	No

This material meets the EPA 'Hazard Categories' defined for SARA Title III Sections 311/312 as indicated:

<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	Acute (immediate) Health Hazard
<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	Chronic (delayed) Health Hazard
<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	Fire Hazard
<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	Sudden Release of Pressure Hazard
<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	Reactive Hazard

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
8052-41-3	Stoddard solvent {Mineral spirits; Aliphatic Petroleum Distillates; White spirits}	CAA HAP,ODC: No; CWA NPDES: No; TSCA: Yes - Inventory; CA PROP.65: No
25551-13-7	Benzene, Trimethyl-	CAA HAP,ODC: No; CWA NPDES: No; TSCA: Yes - Inventory; CA PROP.65: No

Regulatory Information Statement: All components of this material are listed on the TSCA Inventory or are exempt.

16. OTHER INFORMATION

Revision Date: 11/16/1901

Preparer Name: Veriforce

Additional Information About This Product: No data available.

Disclaimer:

The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to ensure proper use of these materials and the safety and health of employees.



Environmental

TYPES OF WASTE

INDUSTRIAL OPERATIONS

Various types of waste generated during industrial operations can include:

- Produced waters (brine waters co-produced with oil and natural gas)
- Drilling muds
- Cuttings
- Fracturing fluid returns
- Used oil
- Oil filters
- Antifreeze
- General plant trash

HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE

FIRST RESPONDER – AWARENESS LEVEL RESPONSIBILITIES

- ✓ Witness or discover a hazardous substance release
- ✓ Trained to start an emergency response sequence
- ✓ Do nothing beyond notifying the authorities

Notes

Industrial Hygiene

ACTIVITY: INDUSTRIAL HYGIENE – PART I

Fill in the correct key words or short phrases for each statement as the content is presented. Participate in the class review and correct your answers (if necessary).

INDUSTRIAL HYGIENE

1. *The science of anticipating, recognizing, assessing, and controlling workplace conditions that could cause worker injuries or illnesses is known as _____.*
2. *The most common way to be exposed to a hazard is through _____. When the hazard comes into contact with and is absorbed by our skin this is referred to as _____.*

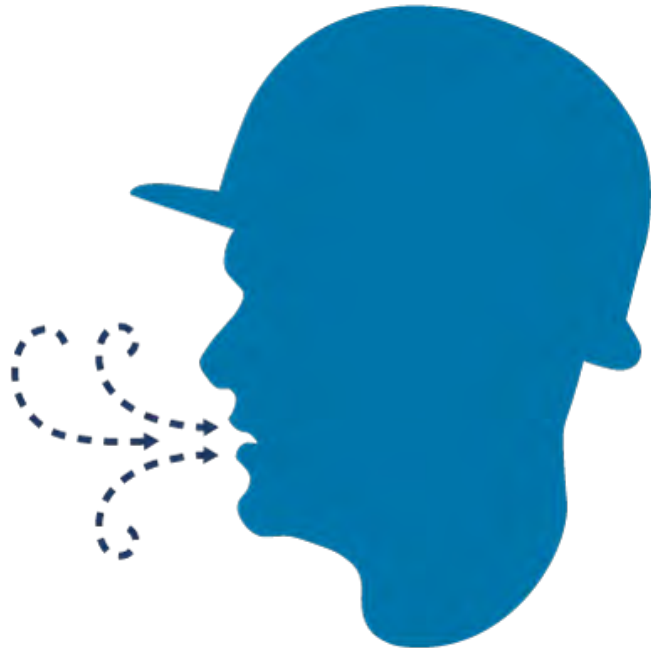
CHEMICAL HAZARDS

3. *When you inhale H_2S , the chemical affects your eyes, nose, brain, lungs, and the nerve pathways that connect them to each other. Specifically, H_2S paralyzes the nerves that interpret _____ for your brain.*
4. *Workers required to work in areas contaminated with H_2S concentrations over _____ or their company's action level must wear supplied-air respiratory protection.*
5. *Crystalline silica becomes respirable when it is cut, ground, drilled, or chipped. These respirable dust particles can penetrate deep into the _____ and cause disabling and sometimes fatal diseases.*
6. *In 1938, Secretary of Labor Frances Perkins concluded that silica dust was dangerous and that _____ can be prevented.*

Notes



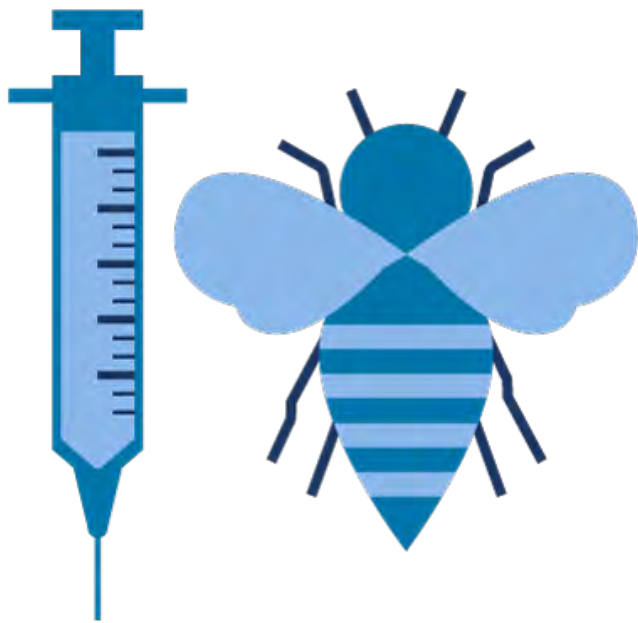
ROUTES OF EXPOSURE



INHALATION



INGESTION



INJECTION



SKIN ABSORPTION

CHEMICAL HAZARDS				
CHEMICAL	SOURCES OF EXPOSURE	COMMON ROUTES OF EXPOSURE	SYMPTOMS OF EXPOSURE	CONTROLS
Silica	<ul style="list-style-type: none"> Quartz, sandstone, and other types of rock Hydraulic fracturing operations Silica dust from transporting, moving, and refilling silica 	<ul style="list-style-type: none"> Inhalation 	<ul style="list-style-type: none"> Silicosis (respiratory disease) Lung cancer Tuberculosis and other pulmonary diseases Kidney and autoimmune diseases 	<ul style="list-style-type: none"> Safe work practices Respiratory protection
Mists and vapors	<ul style="list-style-type: none"> Paint solvents Spray mists 	<ul style="list-style-type: none"> Inhalation 	<ul style="list-style-type: none"> Headache and chest tightness Dizziness Fatigue Depression Tremors 	<ul style="list-style-type: none"> Eye and respiratory protection Proper ventilation in the area where you are working Monitoring and measuring blood levels of exposed workers
Lead	<ul style="list-style-type: none"> Paints and coatings Swallowing dust or fumes 	<ul style="list-style-type: none"> Inhalation Ingestion 	<ul style="list-style-type: none"> Fatigue Headaches Metallic taste in the mouth Stomach aches and pains Muscle and joint pains 	<ul style="list-style-type: none"> Monitoring worker exposure to lead Medical surveillance programs Full body clothing, gloves, hats, shoes, face shields, vented goggles, and respirators
Diesel particulates	<ul style="list-style-type: none"> Burning diesel fuel Soot Ash Metal shavings 	<ul style="list-style-type: none"> Inhalation Ingestion Absorption 	<ul style="list-style-type: none"> Eye, nose, and throat irritation Chest tightness Wheezing Headaches and lightheadedness Vomiting Lung disease and cancer 	<ul style="list-style-type: none"> Performing regular preventative maintenance Installing engine exhaust filters, cleaner-burning engines, and diesel oxidation catalysts Using special fuels or fuel additives like biodiesel Limiting vehicle speed Reducing or eliminating unnecessary engine idling or lugging Making sure the number of vehicles operating in an area does not go over the ventilation system's capacity SCBA with full facepiece
Benzene	<ul style="list-style-type: none"> Oil-based liquids and solvents 	<ul style="list-style-type: none"> Inhalation Ingestion Absorption 	<ul style="list-style-type: none"> Blood disorders Headaches and dizziness Nausea Eye, nose, and throat irritation Euphoria or giddiness Convulsions and loss of consciousness 	<ul style="list-style-type: none"> Monitoring affected workers Training Posting warning signs



CHEMICAL HAZARDS

CHEMICAL	SOURCES OF EXPOSURE	COMMON ROUTES OF EXPOSURE	SYMPTOMS OF EXPOSURE	CONTROLS
Hydrogen sulfide	<ul style="list-style-type: none"> • May be found in low-oxygen environments • Industrial operations • Oil and gas well-drilling operations 	<ul style="list-style-type: none"> • Inhalation • Absorption 	<ul style="list-style-type: none"> • Giddiness • Eye and respiratory tract irritation • Headaches and nausea • Brain damage • Death 	<ul style="list-style-type: none"> • Warning signs and alarms • Burning and flaring • Containment and dispersion • Ventilation and monitoring • Respiratory protection
Organic solvents	<ul style="list-style-type: none"> • Paint • Adhesives and glue • Degreasing and cleaning agents • Refining oil and natural gas production operations 	<ul style="list-style-type: none"> • Inhalation • Ingestion • Absorption 	<ul style="list-style-type: none"> • Dizziness • Drowsiness • Eye and skin irritation • Damage to liver, kidneys, and central nervous system (CNS) 	<ul style="list-style-type: none"> • Using close-system operations • Using exhaust ventilation systems • Isolating workers from direct contact • Solvent-resistant gloves, aprons, boots, face shields, and respirators
Carbon dioxide and nitrogen	<ul style="list-style-type: none"> • Flaring, incinerating, venting, and injecting acid gas • Purging tanks and equipment 	<ul style="list-style-type: none"> • Inhalation 	<ul style="list-style-type: none"> • Lung irritation • Respiratory infections 	<ul style="list-style-type: none"> • Posting warning signs • Training • Monitoring oxygen concentration in areas
Asbestos, fiberglass, and manmade mineral fibers	<ul style="list-style-type: none"> • Building materials • Vehicle products 	<ul style="list-style-type: none"> • Inhalation 	<ul style="list-style-type: none"> • Asbestosis (scar tissue in the lungs) 	<ul style="list-style-type: none"> • Periodic monitoring • Posting signs • Training • Respirators
Mercury	<ul style="list-style-type: none"> • Thermometers and fluorescent lightbulbs • Electrical switches 	<ul style="list-style-type: none"> • Inhalation • Absorption 	<ul style="list-style-type: none"> • Lung damage • Brain and kidney abnormalities • Skin rashes • Digestive system and CNS damage 	<ul style="list-style-type: none"> • Coveralls, booties, gloves, face shields, safety glasses • Practicing good hygiene
Diethanolamine	<ul style="list-style-type: none"> • Used to separate H₂S and CO₂ from oil and natural gas 	<ul style="list-style-type: none"> • Inhalation • Ingestion • Absorption 	<ul style="list-style-type: none"> • Eye, nose, and throat irritation • Skin irritation • Damage to liver, kidneys, and CNS 	<ul style="list-style-type: none"> • Ventilation • Safety goggles, face shields, gloves, aprons
Hexavalent chromium	<ul style="list-style-type: none"> • Fumes during welding operations • Dyes, paints, inks, plastics • Surface coatings and chrome plating 	<ul style="list-style-type: none"> • Ingestion • Absorption 	<ul style="list-style-type: none"> • Eye, nose, throat, and lung irritation • Mucous membrane irritation • Skin rashes 	<ul style="list-style-type: none"> • Limiting worker exposure • Wearing appropriate PPE
Methanol	<ul style="list-style-type: none"> • Paint removers • Aerosols • Gasoline 	<ul style="list-style-type: none"> • Inhalation • Ingestion • Absorption 	<ul style="list-style-type: none"> • Headaches • Poor coordination • CNS effects • Sleep disorders • Blindness 	<ul style="list-style-type: none"> • Gloves and safety goggles or glasses • Practicing good hygiene

ACTIVITY: INDUSTRIAL HYGIENE – PART II

Review the Biological Hazards and Physical Hazards information on pages 43-46 and complete the following questions.

BIOLOGICAL HAZARDS & BLOODBORNE PATHOGENS

1. List the sources of biological hazards.

2. What are some of the ways you can be exposed to bloodborne pathogens?

3. What is meant by “universal precautions?”

INFECTIOUS DISEASES

4. What causes infectious diseases?

5. How are infectious diseases transmitted?

6. List one thing companies can do to reduce the threat of infectious diseases in the workplace.

WORKPLACE AND PERSONAL HYGIENE

7. Biological hazards can be a problem when workers are in _____.
Illnesses can spread at rapid rates in close and _____ environments.

8. What are some measures that can promote personal hygiene and reduce the spread of illnesses caused by infectious diseases?

HIGH PRESSURE

9. How can workers control high pressure hazards?



ADVERSE WEATHER CONDITIONS

10. What should be the main concern during adverse weather?

TEMPERATURE

11. One of the main hazards of cold weather is _____. It happens when your body temperature drops below 95°F.

12. OSHA states that workers are at risk for heat stroke when their body temperature is over _____.

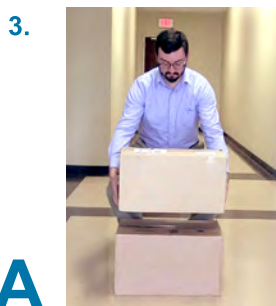
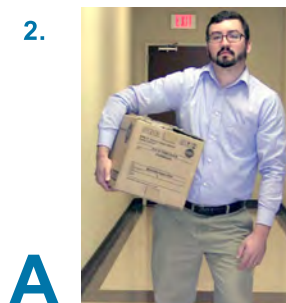
13. Match each condition with the correct description.

Heat cramps _____	A. Happens when your body cannot control your body temperature; this is the most serious heat-related illness and requires immediate medical attention.
Heat exhaustion _____	B. Painful muscle contractions caused by hard physical labor in high temperatures; can happen after work.
Heat stroke _____	C. Happens when your body overheats; symptoms include heavy sweating and a rapid pulse.

BACK INJURIES

14. List three proper lifting techniques.

15. Select the photos that show the right way to pick up, carry, and set down a box.



BIOLOGICAL HAZARDS

Biological hazards are biological substances that pose a threat to the health of living organisms. Biological hazard sources include bacteria, viruses, fungi, plants, animals, and humans. You can find biological hazards in dust, animal dander, natural or organic material like hay and straw, food, waste and waste water, blood, and bodily fluids. You can be exposed by breathing or swallowing these hazards, through needles or direct contact with blood or bodily fluids, and animal bites.

Reduce your exposure to biological hazards by properly storing your food, avoiding contact with potentially infected animals and items, washing your hands and face, wearing the right PPE, and taking the proper hygiene precautions when giving first aid.



Fungi is a biological hazard source.

BLOODBORNE PATHOGENS

Bloodborne pathogens are pathogenic organisms and microorganisms in human blood that can cause diseases in humans. You can be exposed to bloodborne pathogens through ingestion, sexual contact, direct blood-to-blood contact, using dirty needles, mucous membranes, and open cuts or sores. You may be exposed to bloodborne pathogens any time you give first aid to another person. OSHA's bloodborne pathogens standard applies to workers who may come into contact with blood and other bodily fluids during work. Infectious materials that are covered under OSHA's bloodborne pathogens standard are blood and blood components, human bodily fluids, tissues, organs, cells, tissue cultures, and infected animals.



Always take universal precautions when giving basic first aid.

There are several ways to prevent exposure. They include:

- Taking universal precautions
 - » Treating all blood, bodily fluids, and any other objects as if they are infected.
- Cleaning and covering all cuts or abrasions and avoiding contact with wounds or bandages
- Properly labeling, handling, and disposing of infected material
- Following company exposure control plans
- Using PPE
- Being trained
- Following housekeeping procedures



INFECTIOUS DISEASES

Infectious diseases, commonly known as “contagious diseases” or “communicable diseases,” are diseases caused by harmful microbes, or germs.

According to the Centers for Disease Control and Prevention (CDC), infectious diseases are a leading cause of illness and death throughout the world. Infectious diseases can be transmitted in many ways, including vector-borne, airborne, direct and indirect contact, and droplets.

Companies can reduce the threat of infectious diseases, such as COVID-19, in the workplace by:

- Having formal written policies in place for infection control and response to pandemics
- Offering yearly flu shots and other recommended vaccinations
- Requiring workers to stay at home if they feel sick
- Providing tissues and antibacterial soap
- Training workers

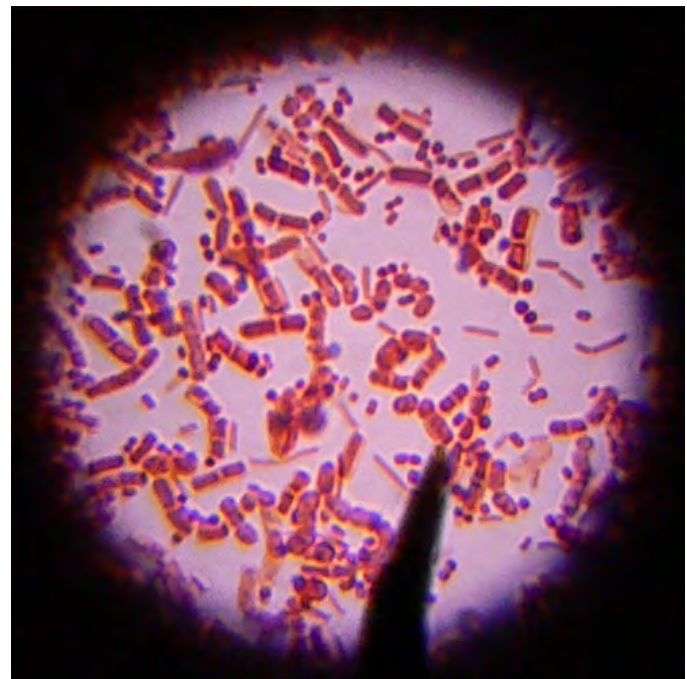
If you or a coworker are exposed to blood or bodily fluids, report the incident immediately and flush the area with running water. Wash the area with plenty of soap and warm water. Seek medical attention. Additional precautions you can take to prevent the spread of infectious diseases both at home and in the workplace include:

- Drinking only treated water
- Washing fruits and vegetables before eating them
- Not sharing personal items

Follow good housekeeping and personal hygiene practices to prevent exposure to infectious diseases.



Wash your hands regularly to prevent the spread of infectious diseases and viruses.



Infectious diseases are caused by harmful microbes and germs.

WORKPLACE AND PERSONAL HYGIENE

Biological hazards can be a problem when workers are in close quarters. Illnesses can spread at rapid rates in close, unclean environments. Workplace and personal hygiene help make a healthy and productive workforce while preventing the spread of infectious diseases and viruses. Good health starts with implementing hygiene policies:

- Keep work clothes clean and in good condition.
- Take regularly scheduled showers.
- Refrain from wearing fragrances that might offend or affect coworkers with allergies. Wear hair restraints when needed.
- Clean up after yourself in all shared and common areas.

PHYSICAL HAZARDS

Physical hazards include compressed air, adverse weather conditions, temperature, and back injuries.

HIGH PRESSURE

The oil and gas industry requires workers to work around many pieces of equipment that contain high pressure. Solid surfaces or fluids, such as liquids and gases, can exert pressure. When material fails due to improper work activities, damaged equipment, or the over-pressurizing of equipment, it can lead to serious injuries or death.



Over-pressurized equipment can lead to incidents, serious injuries, or death.

Workers can control high pressure hazards through regular inspection and maintenance and following company procedures when working with pressurized equipment. Workers should bleed out the pressure before opening valves, lines, or connections. When working with high pressure hoses, make sure they have the appropriate fittings, pins, or locking devices in place. Restrain or secure high pressure lines to prevent potential whipping and equipment failure by making sure they are secured to equipment with securement devices, such as whip-checks.

ADVERSE WEATHER CONDITIONS

The main concern during adverse weather is worker safety. Adverse weather includes:

- Lightning
- Tornadoes
- Hurricanes
- Floods
- Earthquakes

If adverse weather conditions occur, follow your company’s policy, which should include information on sheltering in place, evacuating, and shutting down operations.

COLD STRESS

Additional adverse weather conditions that pose hazards to workers are extreme cold and heat.

There are many hazards when you work in wintery conditions. One of the main hazards of cold weather work is hypothermia. Hypothermia happens when your body temperature drops below 95°F. Hypothermia is usually associated with freezing temperatures, but it can happen any time your body temperature falls below normal levels.

Other cold weather work hazards include:

- Slippery roads and car accidents
- Carbon monoxide poisoning from indoor heaters
- Slips, trips, and falls
- Burns
- Frostbite



HEAT STRESS

Work that involves high temperatures and humidity, radiant heat sources, direct physical contact with hot objects, or physical labor can cause heat stress. If you get too hot or your body cannot get rid of heat fast enough, you will develop heat stress.

OSHA states that workers are at risk for heat stress when their body temperature is over 100.4°F.

A worker's age, weight, metabolism, physical fitness level, alcohol and drug use, ability to adapt, and medical conditions can affect their sensitivity to heat. Heat-related illnesses include:

- Heat cramps – painful muscle cramps caused by hard physical labor in high temperatures; can happen after work
- Heat exhaustion – happens when your body overheats; symptoms include heavy sweating and a rapid pulse
- Heat stroke – happens when your body cannot control your body temperature; this is the most serious heat-related illness and requires immediate medical attention

Stay in the shade as much as possible. It is important to pay attention to heat illness symptoms, including unconsciousness, convulsions, dry skin, headaches, nausea, thirst, and weakness. Do not rely on your thirst to tell you when to drink water. Drink water every 15 to 20 minutes to stay hydrated in hot weather. Drinking sports drinks is good, but do not drink them instead of water.

BACK INJURIES

Severe back injuries can be the immediate result of using an improper lifting technique or lifting a load that is too heavy for your back to support. While a severe injury might seem like it is caused by a single incident, it is often caused by a combination of multiple injuries to your back over a long period of time.

Common signs of a back injury include pain, decreased mobility, numbness, stiffness, weakness, muscle spasms, popping or grinding joints, and a limited range of motion. If you think you have a back injury, tell your supervisor immediately.

Proper lifting techniques include the following:

- Position yourself close to the load.
- Spread your feet shoulder-width apart.
- Keep your knees bent and your back straight.
- Tighten your stomach muscles.
- Lift using the large muscles of your legs.
- Avoid twisting your body while lifting.
- Keep objects within the safe lifting zone between your waist and shoulders.

Stay in good shape and exercise your lower back so that you are prepared for safe lifting.



Drink water every 15-20 minutes to stay hydrated.

ENGINEERING AND ADMINISTRATIVE CONTROLS TO COMBAT BACK INJURIES

- Use alternatives to lifting, like mechanical lifting aids.
 - » Use battery-operated trucks, forklifts, pallet trucks, trolleys, conveyor hoists, and trucks with hydraulic lifts.
- Carry materials between waist and shoulder height.
- Revise the hazard control sections on existing JSAs.
- Use at least two people to lift heavy loads.
- Rotate from one job to another to prevent repetitive motion.

Notes



Notes



Module 3

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Emergency Action Plans

Emergency response responsibilities:

- ✓ Follow the company's emergency response plan.
- ✓ Know who to go to for additional information on the company's emergency response plan.
- ✓ Develop a mental plan for how to respond to an emergency.
- ✓ Mentally and physically go over personal emergency response plan.
- ✓ Know assigned evacuation route.
- ✓ Know how to report emergencies.
- ✓ Only assist if you are trained to do so.

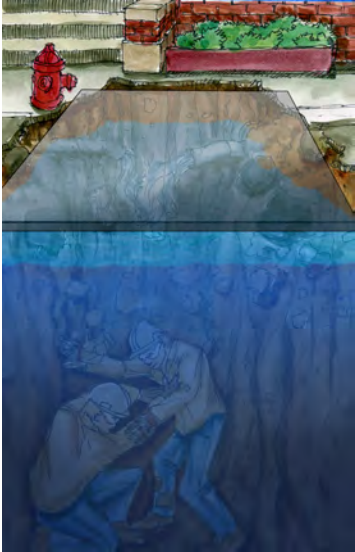
Your main responsibility during an emergency is self-rescue.

Notes

Excavation and Trenching

ACTIVITY: EXCAVATION INCIDENTS

After reviewing the assigned case study, answer the questions below.



OSHA News Release – Trench Collapse

Incident Summary: A crew was working in an approximately 12-ft. deep trench. Workers were not provided a ladder at all times, and at the time of the incident, one was not available. While working, the walls of the unprotected trench collapsed, breaking an adjacent fire hydrant supply line and filling the trench with water within seconds. Two workers died from the incident. An investigation by the US Department of Labor found the company failed to provide basic safeguards against the collapse and did not train their workers to recognize and avoid cave-ins and other hazards. As a result, the company was cited for a total of 18 willful, repeated, serious, and other-than-serious violations of workplace safety standards. The owner of the company was indicted for manslaughter and a fine of \$1,475,813 in penalties was proposed.

What type of work was being done?

What was the cause of the incident?

What was the outcome?

What would you have done differently?



PHMSA Failure Investigation Report – Third-Party Damage to Natural Gas Pipeline

Incident Summary: Two company owners were installing drainage tiles along with two of their field-based workers. One of the owners was using a tractor to pull a tiling plow. After installing approximately 400 ft. of tile, the plow became lodged and stuck. The owners retrieved a second tractor and placed it in front of the first tractor and tiling plow in an attempt to free them. A strap was attached between the two tractors to allow them to pull through the obstruction, a practice that had been utilized before on other tiling projects and resulted in successful liberation of lodged plows. What the workers didn't know was that the plow had impacted a natural gas transmission line.

The two owners began pulling with both tractors, causing the pipeline to rupture. One worker ran and survived with only minor scratches. The blowing gas ignited shortly after the worker ran past the lead tractor. Both owners fled their tractors and also ran, but were overcome by the heat of the fire when the blowing gas ignited, and neither survived. The other worker ran a different direction, receiving serious burns to 60% of his body. In addition to the two tractors, the tiling plow, a backhoe, two pickup trucks, and one tile spool trailer were destroyed. The value of this damaged equipment was estimated at approximately \$600,000.

The Pipeline and Hazardous Materials Safety Administration's (PHMSA's) investigation concluded that the cause of the failure was third-party damage. The pipeline was buried at a depth greater than that required by new construction regulations, while the tiling work was carried out at a depth of approximately 4 ft. Despite the company's familiarity with excavation notices and their receipt of public awareness documentation—including excavation safety information—no excavation notice was provided for this tiling work. It is possible that this incident might have been prevented if such a notice was provided.

What type of work was being done?

What was the cause of the incident?

What was the outcome?

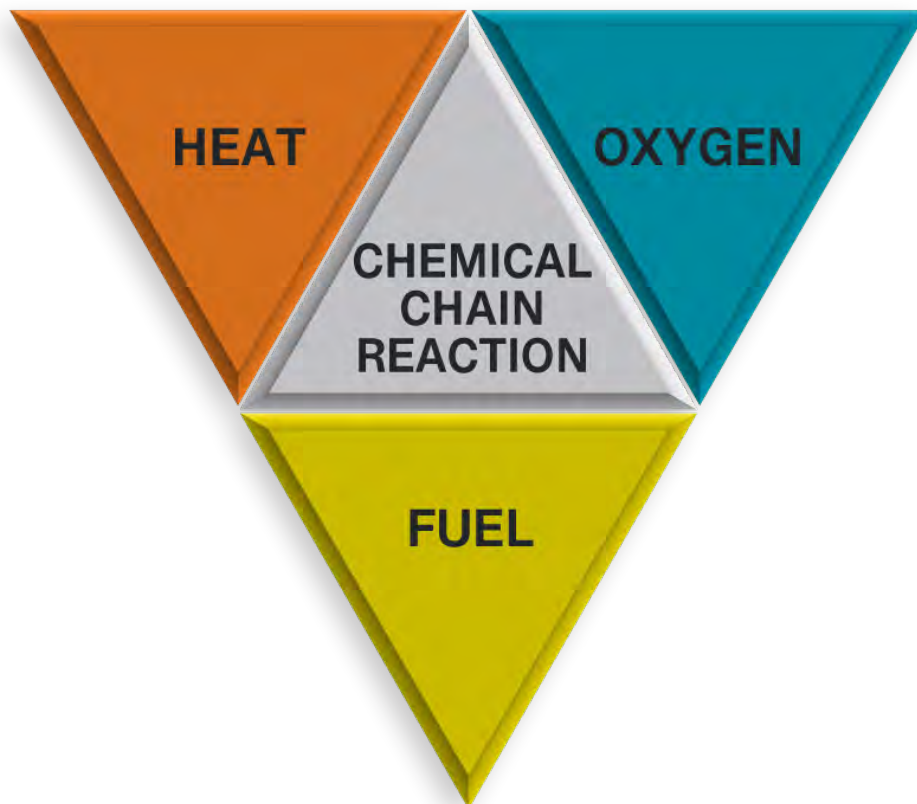
What would you have done differently?

Notes



IOGP Hot Work Life-Saving Rule

FIRE THEORY



FIRE TETRAHEDRON: THE FOUR ELEMENTS OF FIRE

Element	Examples	Explanation
Fuel	<ul style="list-style-type: none"> • Paper • Crude oil • Flammable metals • Cooking oils or fats (grease) 	Fuel can be any combustible material—solid, liquid, or gas. However, only a gas will burn. The heat converts the solid or liquid fuel into a vapor or gas that burns.
Oxygen	<ul style="list-style-type: none"> • Air • Ventilation • Stored oxygen 	Oxygen keeps a fire going. The oxygen and fuel react together to create an ignition. The air we breathe is about 21% oxygen. Fire only needs an atmosphere with 16% oxygen to burn.
Heat	<ul style="list-style-type: none"> • Ignition sources • Hot surfaces • Sparks • Open flames • Electrical arcs 	Heat is the energy necessary to cause the fuel to change into a vapor or gas. Anything with enough energy to cause an ignition is considered a heat source.
Chemical chain reaction	<ul style="list-style-type: none"> • Interaction between fuel, oxygen, and heat • Interaction between grease and air 	Fuel, heat, and oxygen interact to set off a chemical chain reaction that keeps the fire going.

FIRE PREVENTION, DETECTION, AND SUPPRESSION



SOLID COMBUSTIBLES

Paper, wood, cloth



LIQUIDS AND GASES

Hydrocarbon- and alcohol-based; natural gas, crude oil



ELECTRICAL EQUIPMENT

When electricity is eliminated, it becomes Class A



FLAMMABLE METALS

Magnesium, titanium, potassium



KITCHEN FIRES

Grease, cooking oils, fats



EXTINGUISHING METHODS	
Method	Description
Cooling and quenching	Reduces the temperature of a fire's fuel below its ignition source
Smothering and blanketing	Separates the fuel from oxygen
Fuel removal	Takes away the fuel source
Oxygen dilution	Decreases the amount of oxygen available to the fire
Chemical flame inhibition	Interrupts the chemical chain reaction



PASS METHOD

To extinguish a small fire, use the PASS method:

- » **P**ull the pin to ready the extinguisher for discharge.
- » **A**im low and point the extinguisher toward the base of the fire.
- » **S**queeze the lever to discharge the extinguisher.
- » **S**weep back and forth as you move closer to the fire.

Hot Work



Control flammables and ignition sources

- I identify and control ignition sources
- Before starting any hot work:
 - I confirm flammable material has been removed or isolated
 - I obtain authorisation
- Before starting hot work in a hazardous area I confirm:
 - a gas test has been completed
 - gas will be monitored continually

ACTIVITY: HOT WORK INCIDENT

DIRECTIONS

Watch the Hot Work Incident video. Apply the human performance techniques and identify how the techniques could have helped to obtain a different outcome.

ACTIVITY I	
HUMAN PERFORMANCE TECHNIQUE	DIFFERENT OUTCOME
<i>A questioning attitude</i>	
<i>Three-way communication</i>	
<i>Stopping when uncertain</i>	
<i>Peer-checking and self-checking</i>	
<i>Procedure use and adherence</i>	
<i>Job safety analysis</i>	

ACTIVITY II
<p><i>Identify what the pipeline or contractor company could have done differently.</i></p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>



ACTIVITY: POST-ACCIDENT PROTOCOL

After the incident, the operator did not review the incident with the involved workers and failed to evaluate the workers before they went back to work. The work that was being performed during the incident was completed a day later by the same crew.

RULES IN PRACTICE TECHNIQUES



TOOLBOX TALKS & SAFETY MEETINGS

- Can we learn from incidents that involved a Life-Saving Rule not being followed?



PRE-JOB PLANNING

- Are we doing any work today involving a Life-Saving Rule?
- How can we follow the Rule from start to finish?
- What needs to be in place?
- Is everything in place and in good working condition?



LAST MINUTE RISK ASSESSMENT

- Have I done all the actions associated with the Life-Saving Rules?
- Is everything as we discussed in the pre-job planning?
- Are there any line of fire hazards or ignition sources we didn't identify?



POST-JOB REVIEWS

- Did we take all the actions associated with the Life-Saving Rules?
- What went well? What didn't go well?
- Anything to note for the next time we have to perform this task or work in this area?



OBSERVATIONS & WALKABOUTS

- Do you see anyone performing work where a Life-Saving Rule is relevant?
- Are they following the Rule?
- Yes? Great, recognize it!
- No? Intervene!



INTERVENTION

- Intervene or stop the work if a Life-Saving Rule is not being followed.

POST-ACCIDENT PROTOCOL

Identify which techniques from page 58 the company failed to implement after the incident. Explain your answer.

IOGP Energy Isolation Life-Saving Rule

LOCKOUT AND TAGOUT (LOTO) TRAINING LEVELS

Level of Training	Responsibility	Training Required
Authorised worker	<ul style="list-style-type: none"> Locks out and tags out machines or equipment to perform servicing and maintenance 	<ul style="list-style-type: none"> Recognizing hazardous energy sources Identifying the type and amount of energy present Understanding the methods and means necessary for energy isolation and control Having the knowledge and skills necessary for the safe application, use, and removal of energy-isolating devices
Affected worker	<ul style="list-style-type: none"> Operates and uses a machine or equipment that is under LOTO while it is being serviced or maintenance is being performed Their job requires them to be in the area where service or maintenance is performed They do not service or maintain machines or equipment and do not perform LOTO 	<ul style="list-style-type: none"> Understanding the purpose and use of the energy control procedure Recognizing when the energy control procedure is being used Understanding the importance of not tampering with LOTO devices and not starting or using machines or equipment that have been locked out or tagged out Understanding the limitation of tags
Other worker	<ul style="list-style-type: none"> May be in the area where LOTO procedures are happening Informed about the LOTO procedures, the equipment that is being serviced or having maintenance done, and about the locks or tags put into place to prevent the startup of the machine or equipment 	<ul style="list-style-type: none"> Understanding the purpose and use of the energy control procedure Understanding procedures and prevention related to attempting to restart or re-energize the locked out or tagged out machines or equipment Understanding the limitation of tags



ACTIVITY: LOCKOUT/TAGOUT SEQUENCE

DIRECTIONS

Complete the Lockout/Tagout Procedure – Sequence Activity below by putting the correct number next to each step.

SEQUENCE	STEP IN LOCKOUT/TAGOUT PROCEDURE
	Isolate the equipment by turning all energy isolation devices to the “OFF” or closed position.
	Shut down equipment using normal controls.
	Confirm equipment isolation by trying to start up the machine or equipment using normal operating controls. Equipment is not isolated if it starts up or if the lights come on. Confirm isolation using tools like a voltmeter. Do not use tools to confirm isolation if you are not trained and authorised.
	Prepare for shutdown by getting permission to work on equipment. This includes the JSA and a LOTO work permit. Gather all written LOTO procedures. Identify the location of energy isolation devices. Get all equipment needed, including all locks, tags, chains, and fixtures. Get information on the type and amount of energy you are working with.
	Release all stored energy and set up the machine or equipment so that it cannot collect energy. Check the machine or equipment periodically to make sure stored energy is not collecting.
	Apply LOTO devices by having the authorised worker put a lock, tag, or both on each energy isolation device. Fixtures may be required to hold the energy-isolating device in the “OFF” position or to connect multiple locks. Test each energy isolation device. Place tags in the same place as a lock if a lock is used.

Notes



IOGP Confined Space Life-Saving Rule

CONFINED SPACE TYPES	
Confined Space	Permit-Required Confined Space
<p>A space that:</p> <ol style="list-style-type: none"> 1. Is large enough and so configured that an employee can bodily enter and perform assigned work 2. Has limited or restricted means for entry or exit 3. Is not designed for continuous employee occupancy 	<p>A confined space that has one or more of the following characteristics:</p> <ol style="list-style-type: none"> 1. Contains or has a potential to contain a hazardous atmosphere 2. Contains a material that has the potential for engulfing an entrant 3. Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section 4. Contains any other recognized serious safety or health hazard

ACTIVITY: CONFINED SPACE INCIDENT

DIRECTIONS

Watch the confined space incident video. List what should have been done differently by each party to change the outcome.

First worker:

Second worker and foreman:

Company:

CONFINED SPACE TRAINING LEVELS			
Level	Role	Responsibilities	Place in the Field
1	Entrant	<ul style="list-style-type: none"> Recognizes potential hazards Aware of external hazards Recognizes signs, symptoms, and consequences of exposure Maintains contact with the attendant Knows when to evacuate Notifies the attendant if evacuating Understands and uses PPE 	Inside of the confined space
2	Attendant <i>(Hole Watch)</i>	<ul style="list-style-type: none"> Trained as an entrant Continuously maintains an accurate count of workers Never allows unauthorised workers to enter the confined space Understands and recognizes potential hazards and signs of exposure in entrants Monitors activities inside and outside the space Maintains continuous contact with entrants Knows when to order entrants to evacuate Calls for rescuers if entrants need assistance to escape Never leaves the space unattended or has other duties Avoids entry in emergencies Performs continuous atmospheric monitoring 	Outside of the confined space
3	Supervisor	<ul style="list-style-type: none"> Trained as an entrant and attendant Verifies entry conditions are met Verifies emergency plans are in place Terminates entry and cancels permit Makes sure rescue services and means of summoning rescue are available Uses supervisory skills 	Inside or outside of the confined space directing the entrant, attendant, and possibly the rescuer
4	Rescuer	<ul style="list-style-type: none"> Trained as an entrant and attendant Understands and uses PPE and rescue equipment Provides basic first aid and CPR Conducts annual drills Responds to an emergency in a timely manner Knows about the hazards of permit spaces Received additional training 	On standby near the confined space

Notes



CONFINED SPACE ENTRY PERMIT

Confined Space Location/Description/ID Number _____ Date: _____

Purpose of Entry _____

Time In: _____ Permit Canceled Time: _____
 Time Out: _____ Reason Permit Canceled: _____

Supervisor: _____

Rescue and Emergency Services-

Hazards of Confined Space	Yes	No	Special Requirements	Yes	No
Oxygen deficiency			Hot Work Permit Required		
Combustible gas/vapor			Lockout/Tagout		
Combustible dust			Lines broken, capped, or blanked		
Carbon Monoxide			Purge-flush and vent		
Hydrogen Sulfide			Secure Area-Post and Flag		
Toxic gas/vapor			Ventilation		
Toxic fumes			Other- List		
Skin- chemical hazards			Special Equipment		
Electrical hazard			Breathing apparatus- respirator		
Mechanical hazard			Escape harness required		
Engulfment hazard			Tripod emergency escape unit		
Entrapment hazard			Lifelines		
Thermal hazard			Lighting (explosive proof/low voltage)		
Slip or fall hazard			PPE- goggles, gloves, clothing, etc.		
			Fire Extinguisher		

Communication Procedures: _____

DO NOT ENTER IF PERMISSABLE ENTRY LEVELS ARE EXCEEDED		Test Start and Stop Time:	
	Permissible Entry Level	Start	Stop
% of Oxygen	19.5 % to 23.5 %		
% of LEL	Less than 10%		
Carbon Monoxide	35 PPM (8 hr.)		
Hydrogen Sulfide	10 PPM (8 hr.)		
Other			

Name(s) or Person(s) testing: _____

Test Instrument(s) used- Include Name, Model, Serial Number and Date Last Calibrated: _____

CFM-Ventilation	Size-Cubic Feet	Pre Entry Time	<input type="checkbox"/> Central Notified Before Entrance	Time Notified:
			<input type="checkbox"/> Central Notified After Entrance	Time Notified:

Authorized Entrants

Authorized Attendants

PERMIT AUTHORIZATION	
I Certify that all actions and conditions necessary for safe entry have been performed.	
Name-Print:	
Signature:	
Date:	Time:

Entry Procedure Checklist: Complete the following steps before, during, and after a confined space entry:

Step 1

Obtain a Permit-Confined Space Entry Form from Program Coordinator.

Step 2

Notify Supervisor before the Confined Space Entry

Step 3

Verify Confined Space Meter has been calibrated and is in working order

Step 4

Complete the top portion of the Permit-Confined Space Entry Form

Step 5

Ensure all rescue equipment (e.g. tripod, body-belt, lanyard) is in place prior to entry

Step 6

Monitor the confined space with the MSA 4-Gas Detector prior to entry. The entrant and attendant should sign the permit authorization section on the bottom of the permit to ensure all actions and conditions necessary for safe entry have been performed.

Step 7

Employee entering the confined space should wear the 4-Gas Detector after the pre-atmosphere test. The employee should also have a full body harness and lanyard attached to the rescue tripod. Employee shall have a radio and any other necessary personal protective equipment.

Step 8

Employee can enter the confined once Step 7 is completed. The entrant and attendant should complete the Hazards of Confined Spaces and Special Requirements Section of the Permit-Confined Space Entry Form once the employee is within the confined space. The entrant should also gather the % Oxygen, % Explosive Gases, Carbon Monoxide, and Hydrogen Sulfide readings and communicate them to the attendant to place on the Permit Form.

Step 9

The attendant should maintain constant communication with the entrant until the entrant has exited the confined space.

Step 10

The attendant should contact Supervisor once the entrant has exited the confined space.

Step 11

The Permit-Confined Space Entry Form should be given to program coordinator, to file in the Confined Space Records.



Confined Space



Obtain authorisation before entering a confined space

- I confirm energy sources are isolated
- I confirm the atmosphere has been tested and is monitored
- I check and use my breathing apparatus when required
- I confirm there is an attendant standing by
- I confirm a rescue plan is in place
- I obtain authorisation to enter



Electrical Safety

TERMINOLOGY – QUALIFIED AND UNQUALIFIED WORKERS

QUALIFIED

Qualified workers are those who have had training on how to avoid the hazards of working on or near exposed energized parts.

UNQUALIFIED

Unqualified workers are those with little or no training on working on or near the following:

- Premises wiring
- Wiring for connections to supply electricity
- Outside conductor installations
- Optical fiber cables

OVERHEAD LINE SAFETY

Unqualified workers and the longest conductive object they may contact cannot be closer to any unguarded, energized overhead line than the OSHA-mandated minimum approach distance.

Kilovolts (kV)	Minimum Approach Distance
Minimum approach distance for 50 kV	10 ft.
Minimum approach distances for over 50 kV	10 ft. plus 4 in. for every 10 kV over 50 kV

PREVENTING ELECTRICAL INJURIES

DOS AND DO NOTS OF PORTABLE ELECTRICAL EQUIPMENT	
Do...	Do Not...
<ul style="list-style-type: none"> • Visually inspect each piece of electrical equipment before using it. • Make sure a cord's grounding prongs are undamaged. • Make sure plugs are of the same type and fit properly without force. • Plug into a nearby outlet so that in case of an emergency, the cord can be unplugged easily. • Replace damaged cord sections immediately. • Only use plugs with ground prongs. • Connect cords with approved couplers. • Use double-insulated tools. • Follow specialized procedures in wet work areas. • Understand and follow LOTO procedures. • Follow assured grounding programs. 	<ul style="list-style-type: none"> • Use cords with exposed wiring. • Use broken or faulty equipment and tools. • Raise or lower portable equipment by its cord. • Plug or unplug equipment with wet hands. • Lay electrical and extension cords or cables on floors, in walkways, or in similar locations. • Fasten extension cords with staples or hang them so that the outer jacket or insulation is damaged.

Notes



Notes



Module 4

IOGP Working at Heights Life-Saving Rule	70
IOGP Safe Mechanical Lifting Life-Saving Rule	77
IOGP Line of Fire Life-Saving Rule	79
IOGP Driving Life-Saving Rule	81



IOGP Working at Heights Life-Saving Rule

ACTIVITY: WALKING WORKING SURFACES

Review the *Walking Working Surfaces* section on pages 71-72 of the Student Workbook and answer the following questions and fill-in-the-blank statements. Participate in the class review and correct your answers (if necessary).

LADDERS

1. You should maintain _____ of contact with the ladder.
2. An open extension ladder must maintain a _____ ratio from the base to the top support.

SCAFFOLDS

3. A scaffold must be properly designed by _____ workers. It is important that scaffolding is only built, moved, altered, and dismantled under the supervision and direction of a _____.
4. Each worker on a scaffold more than _____ above a lower level must be protected from falling to that lower level. The type of fall protection depends on the type of _____.

AERIAL LIFTS

5. A company must _____ a machine operator for an aerial lift to be used. Workers must also be _____ in the safe operation of the aerial lift.

STAIRWAYS

6. You should always be able to keep one hand on the _____ when you use stairs.
7. Which of the following is true? (circle one)
 - a. Store objects or materials on stairs to maintain good housekeeping practices.
 - b. Rush going up or down the stairs to reduce the amount of time exposed to stairway-related hazards.
 - c. Carry as many loads as possible while using stairs to avoid multiple trips and reduce exposure.
 - d. Report damaged stairways to a supervisor immediately so they can be removed from service.

OPENINGS AND HOLES

8. Each worker must be protected from falling through any hole that is _____ or more above a lower level.

OVERHEAD PROTECTION

9. Debris nets, catch platforms, toeboards, and canopy structures can protect workers from _____.

WALKING WORKING SURFACES

LADDERS

Ladders are mainly designed to provide access to elevated areas and:

- Must only be used for the purpose for which they were designed
- Must be inspected before initial use in each workshift and more frequently as necessary
- Should be removed from service if the inspection identifies any visible defects that could cause worker injury

When using a ladder, you should:

- Get authorization to do elevated work.
- Clear the footing area and remove unnecessary materials from under or near the ladder.
- Put the ladder on a hard, flat, and clean surface.
- Fully open the ladder's legs.
- Maintain three-points of contact with the ladder.
- Only carry the necessary tools in your pockets or tool belt and secure them properly.
- Attach a hand line and lift items once you are on a stable surface.



Maintain three points of contact when using ladders.

If portable extension ladders are used:

- The top of the ladder must extend 3 ft. past an upper level when it is used to access a higher working platform
- An open extension ladder must maintain a 4:1 ratio from the base to the top support
- For every 4 ft. you extend the ladder vertically, move the base 1 foot out

SCAFFOLDS

Scaffolds are mainly designed as work platforms. They allow workers to do jobs that take a long time, require both hands, or require more than one worker.



A scaffold must be properly designed by qualified workers.

- Qualified means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated their ability to solve or resolve problems related to the subject matter, the work, or the project.

It is important that scaffolding is only built, moved, altered, and dismantled under the supervision and direction of a competent person qualified in these activities.

- A competent person is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to workers. The competent person has the authorization to take prompt corrective measures to eliminate these hazards or working conditions.

Scaffolds and scaffold components must be inspected by a competent person before workers are allowed to use them, before each shift, and after any situation that could affect their safe use.

Many companies use tags to indicate the condition of scaffolds. A red tag indicates that the scaffold should not be used – never work on a red-tagged scaffold.

Never exceed the maximum load capacity and only use scaffolds for their intended use based on the work you will be doing.

Workers are not allowed to work on scaffolds that are covered with snow, ice, or other slippery materials.

Each worker on a scaffold more than 10 ft. above a lower level must be protected from falling to that lower level. The type of fall protection depends on the type of scaffold.

AERIAL LIFTS

If a suitable work platform is not available, an aerial lift can be used to do elevated work. Aerial lifts, or man lifts, are one of the most common devices used to conduct work from elevated locations and are commonly used to replace traditional scaffolding.

Aerial lifts, sometimes referred to as manlifts, are any vehicle-mounted device (telescoping, articulating, or both) that is used to position workers. A company must authorize a machine operator for an aerial lift to be used. Workers must also be trained in the safe operation of the aerial lift.

STAIRWAYS AND HANDRAILS

Stairway accidents can cause severe injury and even death. Many stairway falls result from a loss of balance. Good design is important in reducing the potential for missteps by providing a means to retrieve our balance. The solution is to provide and use handrails.

- You should always be able to keep one hand on the handrail when you use the stairs.
- Do not rush while going up or down stairs.
- Never store objects or materials on stairs because workers could trip on them.
- Report damaged stairways or handrails to a supervisor immediately so they can be removed from service until they are repaired.
- Avoid carrying loads that block your line of sight.
- Be on the lookout for wet or slippery surfaces and alert other workers to them.

OPENINGS AND HOLES

Certain types of elevated work can involve floor or wall openings and holes. Incidents can happen if these are not properly guarded.

Each worker must be protected from falling through any hole that is 4 ft. or more above a lower level by one or more of the following:

- Covers
- Guardrail systems
- Travel restraint systems
- Personal fall arrest systems

Safety requirements vary and depend on the type of opening or hole.

OVERHEAD PROTECTION

Do not overlook the potential for dropped objects to fall from elevated surfaces. The consequences of falling objects include the potential to cause death, injury, structural damage, and damage to equipment or the environment.

Your company must protect you from falling objects by:

- Inspecting work areas for objects that could potentially fall
- Using debris nets, catch platforms, toeboards, and canopy structures
- Requiring workers to wear hard hats

THE ABCs OF PERSONAL FALL ARREST SYSTEMS	
Part	Description
<p>A Anchor point</p>	<ul style="list-style-type: none"> • A secure attachment point for equipment such as lifelines, lanyards, deceleration devices, and rope descent systems • Many falls happen because of a poor choice for the anchor point.
<p>B Full body harness</p>	<ul style="list-style-type: none"> • Made up of straps that secure a worker so the force of a fall is distributed over their shoulders, chest, waist, pelvis, and thighs
<p>C Connecting Device</p>	<ul style="list-style-type: none"> • Can include a lanyard, deceleration device, lifeline, or an acceptable combination of these • Deceleration devices, such as self-retracting lanyards (SRLs) should be attached to full body harnesses by a D-ring located in the middle of the worker's back.

Working at Height



Protect yourself against a fall when working at height

- I inspect my fall protection equipment before use
- I secure tools and work materials to prevent dropped objects
- I tie off 100% to approved anchor points while outside a protected area



Notes



ACTIVITY: WORKING AT HEIGHTS INCIDENT

Answer the following questions. Refer to the Human Performance Techniques on page 76 to answer questions 4-5.

ACTIVITY I

1. *What would you have done the moment you realized there was no proper anchor point?*

2. *What would you have done when you realized the work you were doing required you to get on top of the adjacent tank?*

3. *List some factors or reasons that might have led you to think about making the jump.*

4. *What human performance tools could have helped you avoid this incident and how?*

5. *If you were the witness, what human performance tools could you have used to help prevent the incident?*

ACTIVITY II

Use the Rules in Practice Techniques on page 76 to help you complete this activity

Explain how the company could have used the following elements to prevent the incident.

Toolbox talks and safety meetings:

Pre-job planning:

Last minute risk assessment:

Post-job reviews:

Observations and walkabouts:

Intervention:

**HUMAN PERFORMANCE TOOLS**

Tool	Description
A questioning attitude	This type of attitude helps you and your coworkers make sure you really know the right information for the job and that there are no unknowns. A questioning attitude helps you differentiate between facts and improper assumptions. Improper assumptions can create dangerous situations at work.
Three-way communication	Three-way communication is used to eliminate barriers to communication by confirming messages are correctly sent and received.
Stopping when uncertain	Every worker has the obligation to stop work when they are uncertain, when they witness an unsafe act, or when they have identified an unsafe condition.
Self-checking	Self-checks allow workers to take a few minutes to pause and focus their attention on the task at hand. Taking this extra time allows workers to understand what is being done, identify the potential outcomes, and put a plan in place if expected results change.
Peer-checking	Peer-checking is when a coworker verifies an activity or task to help reduce the chance for an error.
Procedure and adherence	Procedures are used to make sure workers follow the right steps in the right order. They are also used to help workers avoid repeating the same mistakes.
Job safety analyses (JSAs)	JSAs are formal reviews of a particular task or job that identify the potential hazards of a job so that control measures can be put in place before work begins.

RULES IN PRACTICE TECHNIQUES**TOOLBOX TALKS & SAFETY MEETINGS**

- Can we learn from incidents that involved a Life-Saving Rule not being followed?

**PRE-JOB PLANNING**

- Are we doing any work today involving a Life-Saving Rule?
- How can we follow the Rule from start to finish?
- What needs to be in place?
- Is everything in place and in good working condition?

**LAST MINUTE RISK ASSESSMENT**

- Have I done all of the actions associated with the Life-Saving Rules?
- Is everything as we discussed in the pre-job planning?
- Are there any line of fire hazards or ignition sources we didn't identify?

**POST-JOB REVIEWS**

- Did we take all the actions associated with the Life-Saving Rules?
- What went well? What didn't go well?
- Anything to note for the next time we have to perform this task or work in this area?

**OBSERVATIONS & WALKABOUTS**

- Do you see anyone performing work where a Life-Saving Rule is relevant?
- Are they following the Rule?
- Yes? Great, recognize it!
- No? Intervene!

**INTERVENTION**

- Intervene or stop the work if a Life-Saving Rule is not being followed.



IOGP Safe Mechanical Lifting Life-Saving Rule

LIFTING EQUIPMENT

PERSON IN CHARGE RESPONSIBILITIES

- ✓ Reviews the lift plan
- ✓ Makes sure controls are in place
- ✓ Makes sure the lift is carried out following the plan
- ✓ Makes sure the lift team has tested and understood visual or radio communications prior to the lift

Safe Mechanical Lifting



Plan lifting operations and control the area

- I confirm that the equipment and load have been inspected and are fit for purpose
- I only operate equipment that I am qualified to use
- I establish and obey barriers and exclusion zones
- I never walk under a suspended load



Notes

IOGP Line of Fire Life-Saving Rule

Struck-By	Caught-In or -Between
An injury that is caused by impact of an object alone	Requires the worker to make contact between two or more objects

Line of Fire



Keep yourself and others out of the line of fire

- I position myself to avoid:
 - moving objects
 - vehicles
 - pressure releases
 - dropped objects
- I establish and obey barriers and exclusion zones
- I take action to secure loose objects and report potential dropped objects



ACTIVITY: LINE OF FIRE INCIDENT PART I

Watch the video and answer the question below.

What must the company do to prevent this in the future?



ACTIVITY: LINE OF FIRE INCIDENT PART II

Launching and receiving operations often require workers to stand in front of the receiver door to remove the pigging device. Explain how each human performance tool could have helped to obtain a different outcome. Refer to the Human Performance Tools chart on page 76 if needed.

1. Questioning attitude:

2. Stopping when uncertain:

3. Self-checking:

4. Peer-checking:

5. Procedure and adherence:

6. Job safety analysis:

IOGP Driving Life-Saving Rule

DRIVING SAFETY

You can keep the roads safe by following safe driving practices and requirements. These include, but are not limited to the following:

- Wear your seat belt.
- Position mirrors and seats before you drive.
- Keep both hands on the wheel.
- Keep your eyes on the road.
- Drive defensively.
- Adjust your speed according to traffic and weather conditions.
- Keep enough space between you and other vehicles.
- Drive the posted speed limit.
- Avoid distractions.
- Stay out of the line of fire when working near moving vehicles.

VEHICLE INSPECTIONS

Pre- and post-trip vehicle inspections are important for driver safety. Some items should be inspected every day, while others can be inspected on a weekly or monthly basis.

Before driving any vehicle, inspect the:

- Engine compartment
- Inside and outside of the cab
- Gas level
- Tire pressure
- Windshield
- Washer fluid level
- Headlights
- Belts, fan, air conditioner, and power steering

CARGO SECUREMENT

Cargo securement is governed by the Federal Motor Carrier Safety Administration (FMCSA) and state laws. Cargo securement devices prevent materials from moving or falling from commercial motor vehicles. All vehicle structures, systems, parts, and components used to secure cargo must be in proper working order.

If loading and securement is part of your job, it is your responsibility to be familiar with the laws on how different types of loads should be secured.

ROAD HAZARDS

Road hazards include poor road and weather conditions, wildlife, debris, heavy traffic, and road work.

- Weather conditions can change road conditions. Any time you are unsure of road conditions, slow down, no matter what the posted speed limit is.
- Pay attention to wildlife crossing signs and frequently scan the edges of the road for wildlife.
- If you cannot avoid a collision, do your best to avoid a full, head-on collision. Do not put your life at risk by losing control of your vehicle to avoid hitting an animal.

PARKING AND BACKING

When parking, including when backing into a parking spot, be aware of potential hazards, like ground conditions, people, and equipment. Some companies may require you to back in to park. Do not back in if there is angled parking. Some companies may also have designated parking areas for workers. Know your company and host-company's policies.



ACTIVITY: WHAT WOULD YOU SAY?

Imagine your coworkers or family members are the ones making the following statements. Write down your responses to each.

- 1. The speed limit is more of a guide than anything. Everywhere you look, everyone is speeding. If the speed limit is 50 mph, I tend to go 60 or 65. I don't see a big difference, other than I'll get to where I'm going faster.**

- 2. I only wear my seatbelt if I'm going to drive on the highway or if my family is with me.**

- 3. I'm actually a better driver after I've had a few to drink. I know it's illegal, but I think that's what makes me more alert and vigilant on the road. Besides, I only have 2 or 3 beers anyway.**

- 4. Man, we've been really busy at work. I only got a few hours of sleep last night, and as soon as we get out of here, I have to drive 3-4 hours to be ready for tomorrow's shift.**

- 5. I only text while driving if my response is going to be brief. If it requires more than that, I will wait to get to my destination, or I will pull over on the side of the road.**

Driving



Follow safe driving rules

- I always wear a seatbelt
- I do not exceed the speed limit, and reduce my speed for road conditions
- I do not use phones or operate devices while driving
- I am fit, rested and fully alert while driving
- I follow journey management requirements



Notes



Acronyms

ACGIH	American Conference of Governmental Industrial Hygienists	IDLH	immediately dangerous to life or health
ANSI	American National Standards Institute	IOGP	International Association of Oil and Gas Producers
API	American Petroleum Institute	JSA	job safety analysis
BBS	behavior-based safety	kV	kilovolts
BLS	Bureau of Labor Statistics	LEL	lower explosive limit
CATV	community antenna television	LOTO	lockout/tagout
CDC	Centers for Disease Control and Prevention	N₂	nitrogen
CNS	central nervous system	NFPA	National Fire Protection Association
CO₂	carbon dioxide	NGP	natural gas pipeline
CPR	cardiopulmonary resuscitation	NHTSA	National Highway Traffic Safety Administration
CSB	Chemical Safety Board	NIHL	noise-induced hearing loss
dB	decibel	NIOSH	National Institute of Occupational Safety and Health
DOT	Department of Transportation	NSC	National Safety Council
EAP	Employee Assistance Program; emergency action plan	OSHA	Occupational Safety and Health Administration
FMCSA	Federal Motor Carrier Safety Administration	PASS	pull, aim, squeeze, sweep
FRC	flame retardant clothing	PEL	permissible exposure limit
GFCI	ground fault circuit interrupter	PHMSA	Pipeline and Hazardous Materials Safety Administration
GHS	Globally Harmonized System	PPE	personal protective equipment
H₂S	hydrogen sulfide	PPM	parts per million
HAZWOPER	Hazardous Waste Operations and Emergency Response	SAR	supplied-air respirator
HCS	Hazard Communication Standard	SCBA	self-contained breathing apparatus
HMIS®	Hazardous Materials Identification System		

SDS	safety data sheet	TLV-TWA	threshold limit values- time-weighted average
SSE	short service employee	V	volts
SWA	Stop Work Authority	WVP	workplace violence prevention

Definitions

ADMINISTRATIVE CONTROLS controls that alter the way the work is done, including timing of work, policies, and other rules and work practices, such as standards and operating procedures (including training, housekeeping, equipment maintenance, and personal hygiene practices)

AERIAL LIFT any vehicle-mounted device used to position workers

AEROSOLS mists made of tiny liquid particles that are easily inhaled

AFFECTED WORKER a worker who operates and uses a machine or equipment that is under lockout/tagout while it is being serviced or maintenance is being performed; this worker does not service or maintenance machines or equipment and does not perform lockout/tagout

AIR-PURIFYING RESPIRATOR (APR) a respirator that has an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing air through an air purifier

ANAPHYLACTIC SHOCK an extreme, often life-threatening, allergic reaction to a substance or an insect bite or sting

ANCHOR POINT a secure attachment point for lifelines, lanyards, or deceleration devices; part of a personal fall arrest system

ASBESTOS a naturally occurring, long mineral fiber used in building materials and vehicle products

ASSEMBLY POINT an area for workers to go to if there is an emergency; also known as muster area

ATMOSPHERIC HAZARDS hazards that can affect your body's ability to transport and use oxygen or have toxicological effects on your body

ATTENDANT (CONFINED SPACE) a worker who continuously maintains communication with and an accurate count of workers inside of a confined space; also known as the hole watch

AUTHORIZED WORKER a worker who locks out and tags out machines or equipment to perform servicing or maintenance

BEHAVIOR how you act; a physical display of your emotions and your attitude

BEHAVIOR-BASED SAFETY (BBS) a safety process that focuses on worker behavior

BENCHING when the walls of an excavation are angled in a series of steps, like a set of stairs

BENZENE a clear, colorless liquid with a sweet odor that is potentially toxic, flammable, and unstable

BIOLOGICAL HAZARDS biological substances that pose a threat to the health of living organisms

BLOODBORNE PATHOGENS pathogenic organisms and microorganisms in human blood that can cause diseases in humans

CARBON DIOXIDE (CO₂) nontoxic, nonflammable, colorless, tasteless, and odorless gas that, at high concentrations, can deplete oxygen, causing death

CHEMICAL FLAME INHIBITION fire extinguishing method that interrupts the chemical reaction and stops flaming

CHEMICAL HAZARDS chemical substances that can have toxic effects on the human body

COMMUNICATION the use of words, sounds, signs, or behavior to express or exchange information



COMPRESSED AIR a gas that is under greater pressure than the air we breathe

CONFINED SPACE a space that is large enough for a worker to enter, has limited or restricted entry or exit, and is not meant to be occupied for a long amount of time

CONTRABAND forbidden goods or merchandise

COOLING AND QUENCHING a fire extinguishing method that reduces the temperature of a fire's fuel below its ignition temperature

CORROSIVE a chemical that causes visible destruction of or irreversible alterations in living tissue by chemical action at the site of contact

CROSS-CONTAMINATION the unintentional transfer of bloodborne pathogens from one substance or object to another, spreading disease

DECELERATION DEVICE any mechanism that controls deceleration during a fall; part of a personal fall arrest system

DECIBEL (dBA) unit of measurement for sound

DE-ENERGIZED (EQUIPMENT) equipment with an open circuit that does not allow electricity to follow a continuous path

DIETHANOLAMINE normally an odorless white powder or clear liquid used to separate hydrogen sulfide and carbon dioxide from oil and natural gas in the oil industry

DOUBLE-INSULATED TOOL a tool encased in an insulator

DUST solid particles created by handling, crushing, grinding, colliding, exploding, or heating organic or inorganic materials

ELECTRICITY a form of energy that can be carried through wires and is used to operate machines, lights, and more

EMERGENCY ACTION PLAN a plan that identifies different emergencies that could happen at your workplace and the correct response actions for each of the potential emergencies

EMPLOYEE ASSISTANCE PROGRAM (EAP)

confidential health program designed to help workers overcome drug and alcohol addiction

EMERGENCY ACTION PLAN (EAP) a written document required by particular OSHA standards to facilitate and organize worker and company actions during workplace emergencies

ENERGIZED (EQUIPMENT) equipment that has a closed circuit that allows electricity to flow in a continuous current

ENERGY the ability to do physical and mental work; also the ability to change the position, speed, state, or form of anything that takes up space or has mass

ENERGY-ISOLATING DEVICE a mechanical device that physically stops the movement or release of energy

ENGINEERING CONTROLS controls that protect workers by removing hazardous conditions or by placing a barrier between the worker and the hazard

ENTRANT (CONFINED SPACE) a worker who works inside the confined space

ENTRY SUPERVISOR (CONFINED SPACE) a worker who verifies the confined space is safe to enter and directs the entrant, attendant, and possibly the rescuer

EXPOSURE the action that subjects you to hazards

FAULT CURRENT any electrical current that is not in its intended path

FIBERS a type of material in the form of one continuous strand or several long strands

FIRE DETECTION SYSTEM recognizes and alerts workers to a fire or signs of a fire; the first line of defense in any fire protection program

FLAME RETARDANT CLOTHING (FRC) clothing that is less likely to catch fire than regular clothing; protects you from flash fires, flames, and electrical arcs; self-extinguishing

FIRE THEORY the theory that fire needs four main elements in order to start; also known as the fire tetrahedron

FIRST AID medical attention that is usually given immediately after an injury while the victim is still at the location where the injury happened

FIRST RESPONDER: AWARENESS LEVEL

workers who may witness or discover a hazardous substance release and have been trained to start an emergency response sequence by notifying the proper authorities about the release during hazardous waste operations and emergency response

FIT-FOR-DUTY EXAMS a medical exam used to make sure you are physically fit enough to safely do your assigned job duties without harming yourself or your coworkers

FIT TEST a test that determines if a respirator fits you properly

FLASH FIRES a fire that spreads rapidly through an airborne fuel; can generate temperatures from 1,000°F to 1,900°F and last for up to 5 seconds

FUEL REMOVAL a fire extinguishing method that takes away the fuel source, either by shutting a valve for liquid or gaseous fuel or by letting the fuel be completely consumed while controlling the spread of the fire

FULL BODY HARNESS a protective device designed to secure a worker so that the force of a fall is distributed over their thighs, pelvis, waist, chest, and shoulders; part of a personal fall arrest system

FUMES fine particles created when solid particles are heated

GASES formless substances that expand to fill the space they are in

GROUNDING a procedure that gives stray electrical currents a safe place to go

GROUND FAULT CIRCUIT INTERRUPTER (GFCI) a fast-acting circuit breaker designed to shut off electric power in the event of a ground-fault hazard

HAZARD COMMUNICATION STANDARD (HCS) a standard designed to make sure you know what chemicals are on your jobsite, how they can affect you, and how you can avoid exposure to them

HAZARD STATEMENTS mandatory short sentences that describe a chemical's nature and how serious its hazards are

HAZARDOUS ATMOSPHERE atmospheres that are immediately dangerous to life or health (IDLH) or contain contaminants that exceed the permissible exposure limit (PEL) or threshold limit value-time-weighted average (TLV-TWA)

HAZARDOUS WASTE a form of solid waste that is harmful to people or the environment; meets the strict EPA definition of corrosive, ignitable, flammable, reactive, and toxic

HEALTH HAZARD chemicals that can harm your body or make you sick

HEAT CRAMPS painful muscle cramps caused by hard physical labor in high temperatures; can happen after work

HEAT EXHAUSTION illness that happens when your body overheats; symptoms include heavy sweating and a rapid pulse

HEAT STRESS a condition that happens when you get too hot or your body cannot get rid of heat fast enough; can be caused by work that involves high temperatures and humidity, radiant heat sources, direct physical contact with hot objects, or a lot of physical labor

HEAT STROKE illness that happens when your body cannot control your body temperature; this is the most serious heat-related illness and requires immediate medical attention

HEXAVALENT CHROMIUM a toxic form of chromium that is usually found during welding operations

HOSELINE (OR AIRLINE) RESPIRATOR a respirator that has a hose attached to it that draws air from an independent source, which is not carried by the user

HOT WORK work involving electric or gas welding, cutting, brazing, or similar operations that can produce sparks or flames

HYDROGEN SULFIDE (H₂S) a toxic gas that is colorless and collects in low-lying areas



HYPOTHERMIA illness that happens when body temperatures drop below 95°F

IMMEDIATELY DANGEROUS TO LIFE OR HEALTH (IDLH) an environment that causes negative health effects that cannot be reversed and reduces your ability to escape from a dangerous atmosphere

INCIDENT an unplanned event that could have caused or did cause workplace illness, injury, or property damage because of unexpected reactions from workers, equipment, materials, or the environment

INCIPIENT FIRE a fire in the beginning stage; a fire is not considered incipient when it is bigger than a trash fire or if it spreads beyond its original source

INDUSTRIAL HYGIENE the science of anticipating, recognizing, assessing, and controlling workplace conditions that could cause worker injuries or illnesses

INTERVENTION the action to change, slow down, or stop an unsafe act or condition

JOB SAFETY ANALYSIS (JSA) the formal review of a particular task or job that is completed before work begins

JOURNEY MANAGEMENT a planned and systematic process of reducing transportation-related risks within a company's operations

LADDERS devices mainly designed to provide access to elevated areas

LANYARD (FALL PROTECTION) a line that connects a full body harness to a deceleration device, lifeline, or anchor point; can be different lengths depending on the location of the anchor point, but all lanyards must limit a fall to 6 ft. or less

LEAD a heavy metal considered to be a chemical hazard that is usually found in paints and coatings and can cause negative health effects

LINE OF FIRE the path of a moving object or the path taken by a release of hazardous materials or energy

LOCK OUT the action of putting a lockout device on an energy-isolating device to hold the energy-isolating device in a safe position

LOCKOUT DEVICE a device that holds an energy-isolating device in a safe position that prevents the machine or equipment from being energized; includes key or combination locks, blank flanges, and bolted slip blinds

MEDICAL EVALUATION an assessment that determines if you have any medical conditions that could prevent you from using a respirator effectively

MENTORING the act of placing a short service employee with an experienced worker who does tasks correctly and safely

METHANOL an extremely flammable, colorless liquid; also known as methyl alcohol, or wood alcohol

NEAR MISS an incident or accident where no property was damaged and no personal injuries happened

NITROGEN (N₂) nontoxic, nonflammable, colorless, tasteless, and odorless gas that can deplete oxygen when at high concentrations, causing death

NOISE any excessive or unwanted sound

NON-PERMIT REQUIRED CONFINED SPACES confined spaces that do not contain or do not have the potential to contain hazards that are capable of causing serious physical harm or death

NON-RECORDABLE INCIDENT incidents that must be reported to your supervisor, but are not required to be recorded on your company's OSHA 300 Log; include work-related near-miss incidents and incidents that require first aid treatment

OBSERVATION PROCESS a process that uses an observation card to collect data on worker attitude, behavior, and action

ORGANIC SOLVENT a substance that can dissolve, or break down, another substance

OTHER WORKER a worker who may be in the area where lockout/tagout procedures are being performed

OXYGEN DEFICIENCY when there is less than 19.5% oxygen in the air

OXYGEN ENRICHMENT when there is more than 23.5% oxygen in the air

PEER-CHECKING a method in which a coworker verifies an activity or task to help reduce the chance for an error

PERMIT-REQUIRED CONFINED SPACE a confined space that contains or has the potential to contain a hazardous atmosphere; materials that have the potential to engulf, trap, or asphyxiate an entrant; an internal configuration where an entrant can become trapped or asphyxiated by inwardly converging walls or floors that slope downward and taper into a smaller cross section; or any other recognized serious safety or health hazards

PERMITS TO WORK written authorizations used to control potentially hazardous work and the environment where the work will be done

PERSONAL FALL ARREST SYSTEM used to stop a worker during a fall; includes a body harness, lanyard, deceleration device, and anchor point

PERSONAL PROTECTIVE EQUIPMENT (PPE) equipment that reduces worker exposure that cannot be controlled using engineering and administrative controls; the last line of defense between a worker and a hazard

PICTOGRAM a graphic that includes a symbol and other graphic parts that give you information about a chemical's hazards on a white background within a red diamond

PRECAUTIONARY STATEMENTS short phrases or sentences that describe how you can reduce the effects of exposure to a hazardous chemical

PRODUCT WARNING LABEL a label used to communicate a chemical's specific hazards

QUALIFIED WORKER (ELECTRICAL) a worker who has had training on how to avoid the hazards of working on or near energized parts and is authorized by their company

QUESTIONING ATTITUDE a type of attitude that helps you and your coworkers make sure you really know the right information for the job and helps you differentiate between facts and improper assumptions

RECORDABLE INCIDENT incidents must be recorded on your company's OSHA 300 Log. These incidents include work-related fatalities, days away from work, restricted work or job transfers, and medical treatment beyond first aid

RESCUER (CONFINED SPACE) a worker on standby near the confined space who responds to emergencies

RESPIRATOR a device that covers your mouth and nose and is designed to improve the air your lungs breathe in

SAFETY DATA SHEET (SDS) a document that gives detailed information about the hazards of a specific material and how to control those hazards

SCAFFOLDS any temporary elevated platform (supported or suspended) and its supporting structure (including points of anchorage) used for supporting employees or materials or both

SELF-CHECKING a process that allows workers to take a few minutes to pause and focus their attention on the task at hand. Taking this extra time allows workers to understand what is being done, identify the potential outcomes, and put a plan in place if expected results change.

SELF-CONTAINED BREATHING APPARATUS (SCBA) an atmosphere-supplying respirator where the breathing air source is designed to be carried by the user

SHELTER-IN-PLACE to find the nearest safe haven and stay there until an all-clear signal is given

SHIELDING using ready-made, protective structures like trench boxes to support the sides of an excavation

SHORING a complex system used to support the sides of an excavation that must be designed by an experienced engineer

SIGNAL WORD a single standardized word that communicates the level of severity of a potential hazard

SILICA a hard, colorless, and unreactive mineral; also called crystalline silica and respirable silica



SILICOSIS a respiratory disease caused by exposure to silica that makes it hard for your lungs to take in oxygen

SLING a device that attaches the load to the crane block hook; made of either fiber rope, synthetic web, wire rope, or chain

SLOPING angling the walls of an excavation in one continuous slope

SMOTHERING AND BLANKETING a fire extinguishing method that separates the fuel from oxygen

SOUND energy that is carried through space by pressure changes

STOP WORK AUTHORITY (SWA) your right to stop work when you or your coworkers are at risk because of the way a job is being done

SUPPLIED-AIR RESPIRATOR (SAR) an air-supplying respirator where the worker does not carry the source of breathing air; air is supplied from remote cylinders or a compressor

TAGLINE a rope attached to a load that offers a rigger control of the load without putting them in a dangerous position

TAG OUT the action of putting a tagout device on an energy-isolating device to make sure the energy-isolating device and the machine or equipment is not operated until the tagout device is removed

TAGOUT DEVICE a warning device, like a tag, that is put on an energy-isolating device to make sure the energy-isolating device and the machine or equipment is not operated until it is removed

TERRORISM the use of violence to scare a group of people as a way to achieve a political goal

THREAT the intention to inflict pain and injury; a hostile action

UNQUALIFIED WORKER (ELECTRICAL) a worker with little or no training on working on or near premises wiring, wiring for connections to supply electricity, outside conductor installations, and optical fiber cables

VAPORS the volatile form of substances that are normally found in a solid or liquid state at room temperature and pressure

WORK PERMITS written authorizations used to control potentially hazardous work and the environment where the work will be done

WORKER EXPOSURE RECORDS documents that show how much exposure a worker has had to a harmful substance

WORKER MEDICAL RECORDS documents that contain information about a worker's health status

WORKPLACE VIOLENCE any physical assault, threatening behavior, or verbal abuse that happens on company property or during job-related activities; includes intimidation, harassment, hostage situations, swearing and shouting out of anger, stalking, sexual assaults, fist fights, and shootings

ZERO TOLERANCE a policy that does not allow supervisors or others in authority to use their own judgment, favor one worker over another, or change the punishment to fit the circumstances

Activity Answer Guide

Module 1

HUMAN PERFORMANCE TOOLS, PAGE 5:

- A questioning attitude **B**
- Three-way communication **C**
- Stopping when uncertain **A**
- Self-checking **F**
- Peer-checking **G**
- Procedure and adherence **D**
- Job safety analyses (JSAs) **E**

GENERAL SAFETY TOPICS, PAGE 6:

Contraband

List examples of prohibited items:

- Drugs and drug paraphernalia
 - » Common types of drugs include cannabis, cocaine, ecstasy, hallucinogens, heroin, methamphetamine, amphetamine, rohypnol (“roofies”), and synthetic cathinones (“bath salts”), and prescription opioids.
- Unauthorized medication
- Alcohol
- Weapons

Are workers allowed to be on medication? Please explain.

It depends on whether the medication can have an adverse effect on your ability to perform your task correctly and safely. You should notify your supervisor if a medication can affect you. All medication, including over-the-counter medicine must be in its original container. Taking another person’s medication can cause adverse side effects and is prohibited.

What is a company allowed to do during a search?

Companies have the right to search any area of company property. Once you are on company property, you have officially given your approval for the company to conduct a search. Searches can be unannounced and can be done in parking lots; lodging provided by or paid for by the company; jobsites; company-owned, -leased, or -rented vehicles; and personal belongings, like lockers, desks, and lunch boxes. Refusing to cooperate in a search will result in you not being allowed onto company property.

Drug Testing

What are the consequences for using, possessing, selling, distributing, concealing, or transporting any contraband on company or customer property?

Consequences include, but are not limited to:

- Being escorted off the property
- Suspension
- Legal prosecution
- Disqualifications of benefits
- Termination
- Referral to Employee Assistance Programs (EAPs)
- EAPs are confidential health programs designed to help workers overcome drug and alcohol addiction. If your company does not have an EAP, call 1-800-662- HELP or visit www.findtreatment.samhsa.gov to find information on local programs and resources.

Can you list the instances where workers may be required to be drug tested?

Workers may be tested under many circumstances. Reasons for testing include:

- Pre-employment
- Post-incident
- Random
- Reasonable suspicion
- Return-to-duty
- Follow-up

Refusing to take a drug test will get you sent home and possibly banned from company property.



GENERAL SAFETY TOPICS, PAGE 6 (CONT'D):

Incident Reporting, Investigation, and Root Cause

Are drug test results confidential?

Drug test results are confidential.

Workplace Violence

What is workplace violence?

Workplace violence is any physical attack, threatening behavior, or verbal abuse that happens on company property or during job-related activities. Workplace violence includes intimidation, harassment, hostage situations, swearing and shouting out of anger, stalking, sexual assaults, fist fights, and shootings.

What are some warning signs of workplace violence?

- Aggressive behavior
- Failure to handle criticism
- Holding a grudge
- Displays of anger
- A fascination with weapons
- Threats
- Repeated aggressive outbursts
- Suicidal comments
- Verbal abuse
- Frequent bad moods

How can you stop or prevent workplace violence?

Your role in preventing workplace violence is important. Your behavior affects others and your actions can set an example for your coworkers. Make sure you respect your coworkers. Do not bring offensive material to work. Actions or comments that create an offensive or hostile working environment are not acceptable and will not be tolerated.

Company Role: Your company can help stop workplace violence from happening through workplace violence prevention (WVP) programs and zero tolerance policies. Companies are encouraged to assess the situations that put workers at risk and use a WVP program. Part of that program includes zero tolerance policies. Your company's zero tolerance policy means they will not tolerate any form of violence or harassment.

Active Shooter

What is an active shooter?

An active shooter is an individual actively engaged in killing or attempting to kill people in a populated area.

What should you do in an active shooter situation?

If you encounter an active shooter situation, it is recommended that you run, hide, or fight:

Run: Run to escape if possible. Getting away from the shooter(s) is the main priority. Leave your belongings. Help others escape if possible, but your job is to get away with or without them. Warn others from entering the area where the active shooter may be. Call 911 when you are safe. Be prepared to describe the shooter, their location, and any weapons you can identify.

Hide: If escaping is not possible, hide from the shooter's view and remain quiet. Silence all devices. Lock and block doors, close blinds, and turn off lights. Do not hide in groups. Try to communicate with help silently. Stay in place until given the all clear by law enforcement.

Fight: Fighting should be the last resort. If you must fight, commit to your actions and act as aggressively as possible. Recruit others to ambush the shooter with makeshift weapons. Be prepared to cause severe or lethal injury to the shooter.

What should you do when law enforcement arrives at the scene?

Once law enforcement arrives, they will go directly to the area where they hear shooting. Do not rush the officers or hold on to them for safety. Put your hands in the air with your fingers spread. Do not touch the officers or interfere in any way. Follow the officer's orders to evacuate the area and head to the designated safe zone.

What should you do if you suffer a work-related incident, illness, injury, or near miss?

Workers are required to report all work-related incidents, illnesses, injuries, first aid cases, near misses, hazardous working conditions, and property damage to their company. It is your duty to report any incident. Reporting helps companies prevent minor injuries from becoming major ones. If you are involved in an incident and do not report it, your company can take disciplinary steps against you.

Incidents: Incidents are unplanned events that could have or did cause workplace illnesses, injuries, or property damage because of unexpected reactions from workers, equipment, materials, or the environment.

What is a near miss?

Near misses are incidents where no property was damaged and there were no personal injuries, but where, given a slight shift in time or position, damage or injuries could have happened.

Match each term below with the correct description from the column on the right.

- | | | | |
|-----------------------|----------|---------------------------|----------|
| • Recordable injuries | B | • Non-recordable injuries | A |
|-----------------------|----------|---------------------------|----------|

What is the goal of incident investigation?

OSHA strongly encourages companies to investigate all incidents where a worker was hurt and near misses. The main goal of investigating an incident or near miss is to find the cause so that they do not happen again. Investigations should look beyond human error to find the root cause. They are not conducted to assign blame.

Communication

What are some barriers that can reduce your ability to communicate?

On the jobsite, there are many barriers that can reduce your ability to communicate. Some barriers to communication include, but are not limited to:

- | | |
|-----------------------------------|-------------------------------------|
| • Language | • Lack of knowledge and terminology |
| • Distractions and interruptions | • Personal beliefs |
| • Assumptions and interpretations | • Physical barriers |

What can you do to overcome communication barriers?

You can overcome communication barriers by:

- | | |
|---|---|
| • Communicating one thing at a time | • Communicating in an area free from distractions |
| • Communicating in the language the person best understands | • Using three-way communication |

What is three-way communication?

Three-way communication involves two people: a sender and a receiver.

1. The sender communicates clear, brief information to the receiver.
2. The receiver repeats the information back to the sender to confirm the message.
3. The original sender then acknowledges that the response was correct.

Three-way communication can be used to eliminate communication barriers.

TYPES OF ADMINISTRATIVE CONTROLS, PAGE 11:

- | | |
|---|----------|
| • Fit-for-duty exams | B |
| • Short service employee (SSE) programs | C |
| • Interventions and stop work authority (SWA) | A |
| • Job safety analyses (JSAs) | E |
| • Work permits | D |



WORKER AND SUPERVISOR RESPONSIBILITIES, PAGE 15:

What did the workers do wrong?

- The initial worker entered the tank without first:
 - » Taking a sample of the atmosphere to test for atmospheric hazards
 - » Completing a JSA or pre-job briefing
 - » Completing a work permit
 - » Assigning an attendant
 - » Donning a personal gas monitor
 - » Donning the proper PPE
- Three untrained coworkers entered into the tank to attempt a rescue.
- No workers immediately called for help or initiated the company's emergency response plan.
- The workers who retrieved the bodies were fortunate to not become victims themselves. They did not use the proper PPE or conduct air monitoring while retrieving the bodies

What should the supervisor have done differently?

- Reviewed potential hazards and mitigation measures with the crew before the worker entered the tank.
- Ensured a permit to work was properly completed, reviewed, and signed.
- Ensured the steps of the permit were followed before, during, and upon completion of the task.
- Immediately called emergency medical services and initiated the company's emergency response plan.
- Only sent in a trained and equipped worker to provide rescue.
- Provided the workers who retrieved the bodies with

COMPANY RESPONSIBILITIES, PAGE 17:

What else could the company have done differently to prevent the incident?

- Required work permits for all tasks requiring workers to work in or near open tanks.
- Required pre-job briefings and JSAs to be held before work begins for each task.
- Ensured workers were properly trained on the hazards of the job, hazard controls, and company policies and procedures before allowing workers in the field.

What should the company do moving forward to prevent this in the future?

- Hold daily toolbox talks.
- Conduct regularly scheduled emergency response training.

IDENTIFYING SAFETY CONTROLS, PAGE 19:

Identify safety-critical controls that are used at your company, job, or at home.

- Energy isolation devices
- Alarms
- Relief valves
- Machine guards
- Safety belts
- Circuit breakers
- Ground fault circuit interrupters (GFCIs)
- Emergency shutdown systems

EXAMPLES OF VIOLATIONS, PAGE 20:

Identify the potential reasons workers might have decided to bypass these controls.

- 1. Bypassing the deadman switch of an abrasive blasting gun**
 - Make the job or task easier
- 2. Ignoring a portable gas monitor alarm**
 - Alarm fatigue
- 3. Removing the guard on a grinder**
 - Safety control may be considered an obstacle to complete task
- 4. Using an emergency SCBA for routine work**
 - Not understanding limitations of equipment
- 5. Ignoring a control room alarm**
 - Alarm fatigue
- 6. Ignoring a barrier or exclusion zone**
 - Being distracted or not being aware of their surroundings
- 7. Cheating on a drug and alcohol test**
 - Intentional violation

AUTHORISATION, PAGE 21:

What are some valid reasons for bypassing safety controls?

- Deactivating controls for maintenance or testing (deactivating alarms)
- Startup, shutdown, or dynamic transition operations

What must occur in order to bypass safety controls?

- Stop work and notify supervisor if the bypassing of safety controls is required.
- Obtain authorisation before disabling or overriding safety equipment, deviating from procedures, or crossing a barrier.
- Company and management must have a detailed procedure in place for bypassing safety controls.

Module 2

SAFETY DATA SHEET EXERCISE, PAGES 26-28:

Part A

What did Carl do right?

- He used impermeable gloves.

Part B

What did Carl do right?

- He washed his hands with soap and plenty of water.
- He used dirt (earth) to clean up the spill.

Part C

What did Carl do right?

- He placed the half-full container of Chemical Z in a cool and dry place.

What did he do wrong?

- He used a dust mask instead of a NIOSH-approved respirator for organic solvent vapors.
- He also used contact lenses.
- He takes off his safety glasses regularly.

What did he do wrong?

- He rinsed his eyes for 5 minutes instead of the recommended 15.
- He disposed of the dirt in a nearby ditch.

What did he do wrong?

- He placed the empty container of Chemical Z in the trash can outside the shop. The empty container still had residue from the product and placing it outside in the heat can create a fire hazard, especially when the temperature is above 100°F.
- He was still experiencing skin irritation in his hands, and therefore should have sought medical attention.

INDUSTRIAL HYGIENE PART I, PAGE 37:

1. Industrial hygiene
2. Inhalation; skin absorption
3. smells
4. 10 ppm
5. lungs
6. silicosis

INDUSTRIAL HYGIENE PART II, PAGES 41-42:

1. Bacteria, viruses, fungi, plants, animals, and humans
2. You can be exposed through ingestion, sexual contact, direct blood-to-blood contact, using dirty needles, mucous membranes, and open cuts or sores.
3. Treating all blood, bodily fluids, and any other objects as if they are infected.
4. Harmful microbes or germs
5. Through insect bites (vector-borne), airborne, direct and indirect contact, and droplets.
6. Having formal written policies in place or infection control and response to pandemics; Offering yearly flu shots and other recommended vaccinations; Requiring workers to stay at home if they feel sick; Providing tissues and antibacterial soap; Training workers

**INDUSTRIAL HYGIENE PART II, PAGES 41-42 (CONT'D):**

7. Close quarters; unclean
8. Keep work clothes clean and in good condition; Take regularly scheduled showers; Refrain from wearing fragrances that might offend or affect coworkers with allergies; Wear hair restraints when needed; Clean up after yourself in all shared and common areas
9. Through regular inspection and maintenance of equipment and by following company procedures.
10. Worker safety
11. Hypothermia
12. 104°F
13. Heat cramps: **B**
Heat exhaustion: **C**
Heat stroke: **A**
14. Position yourself close to the load; Spread your feet shoulder-width apart; Keep your knees bent and your back straight; Tighten your stomach muscles; Lift using the large muscles of your legs; Avoid twisting your body while lifting; Keep objects within the safe lifting zone between your waist and shoulders
15. **A, B, A**

Module 3**EXCAVATION INCIDENTS, PAGES 51-53:****OSHA News Release – Trench Collapse****What type of work was being done?**

- Trench work – work not specified

What was the cause of the incident?

- The walls of a 12-ft. deep trench were unprotected.
- Basic safeguards against collapse were not provided.
- Adjacent structures that posed overhead hazards should have been supported.
- Workers were not trained to recognize and avoid cave-in and other hazards.
- Workers had no access to a ladder at the time of the incident.

What was the outcome?

- Two workers died.
- Eighteen willful, repeated, serious, and other-than-serious violations of workplace safety standards were issued.
- A fine of \$1,475,813 was proposed.
- The owner of the company was indicted for manslaughter.

What would you have done differently?

- Not entered the trench without being properly trained
- Refused to enter the trench without protective measures in place, such as shielding and shoring
- Conducted a JSA and pre-job briefing

PHMSA Failure Investigation Report – Third-Party Damage to Natural Gas Pipeline**What type of work was being done?**

- Installation of drainage tile/trenching

What was the cause of the incident?

- No excavation notice was provided for tiling work.
- The tiling plow became lodged with the pipeline.
- To free the plow, personnel hooked up a second tractor, allowing the tractors to pull together.
- The high-pressure natural gas pipeline ruptured as a result of these events.

What was the outcome?

- Both company owners died.
- One worker received burns to 60% of his body.
- One worker received minor scratches.
- The damage to two tractors, the tiling plow, a backhoe, two pickup trucks, and one tile spooler trailer totaled approximately \$600,000.

What would you have done differently?

- Called 811 before digging
- Started the tiling operation only after all lines in the area had been properly marked
- Stopped the operation and notified the pipeline operator the moment the plow became lodged near the area of the line
- Conducted a JSA and pre-job briefing

HOT WORK INCIDENT, PAGE 57:

Part I

A questioning attitude

- Workers should have asked for both the hot work and mud plug procedure.

Three-way communication

- Workers assumed the work area was isolated. Communication either verbally or through instrumentation, such as portable monitors, could have informed workers of the hazard.

Stopping when uncertain

- Workers should have used stop work authority once it became obvious that continuous monitoring was not being performed.

Part II

Identify what the pipeline or contractor company could have done differently.

- Hot work procedure should have been provided to personnel.
- Mud plug isolation procedure should have been provided to personnel.
- Personnel should have been trained on the requirements of the procedures.
- Personnel should have been provided gas monitoring equipment.
- The company should have ensured personnel installing the mud plug were operator qualified.
- Continuous gas monitoring should have been in effect.
- Fire watch should have been present.
- We don't know if a job safety analysis was performed. However, given what we do know about the incident, it is safe to assume a JSA was not conducted and should have been.

POST-ACCIDENT PROTOCOL, PAGES 58-59:

Identify which Rules in Practice Techniques the company failed to implement after the incident. Explain your answer.

Post-job reviews

- These types of reviews allow a company and workers to identify what went well and what didn't. More importantly, it provides an opportunity to address any concerns before the task is performed again.

Toolbox talks and safety meetings

- Workers can learn from incidents that involve a life-saving rule not being followed.

LOCKOUT/TAGOUT SEQUENCE, PAGE 60:

1. Prepare for shutdown by getting permission to work on equipment. This includes the JSA and a LOTO work permit. Gather all written LOTO procedures. Identify the location of energy isolation devices. Get all equipment needed, including all locks, tags, chains, and fixtures. Get information on the type and amount of energy you are working with.
2. Shut down equipment using normal controls.
3. Isolate the equipment by turning all energy isolation devices to the "OFF" or closed position.
4. Apply LOTO devices by having the authorized worker put a lock, tag, or both on each energy isolation device. Fixtures may be required to hold the energy-isolating device in the "OFF" position or to connect multiple locks. Test each energy isolation device. Place tags in the same place as a lock if a lock is used.
5. Release all stored energy and set up the machine or equipment so that it cannot collect energy. Check the machine or equipment periodically to make sure stored energy is not collecting.
6. Confirm equipment isolation by trying to start up the machine or equipment using normal operating controls. Equipment is not isolated if it starts up or if the lights come on. Confirm isolation using tools



ENERGY ISOLATION INCIDENT, PAGE 61:

Identify which Rules in Practice Techniques the company failed to implement after the incident. Explain your answer.

Probable cause

- The probable cause of the ignition was the unrestricted supply of electrical energy to the electrostatic components inside the heater treater, which were exposed to flammable vapors and oxygen.

Ineffective JSA

- The JSA for setting up and cleaning the heater treater was generic and for many of the described job steps of the JSA, the potential safety or environmental hazards, as well as the controls for mitigating those hazards were not specifically, adequately, sequentially, or completely followed.

Ignition sources not mitigated

- All potential ignition sources were not effectively removed or mitigated during the preparation for, and activities of, cleaning the heater treater. When the electrostatic heater treater was partially drained of fluids that were inside the vessel during production operations, there was a significant amount of space remaining where flammable vapors could accumulate. These vapors were not promptly or effectively removed from the vessel through ventilation methods, and the interior of the vessel was introduced to oxygen from the outside environment, leaving it vulnerable to a potential fire or explosion should a significant ignition source occur.

Lack of training and understanding of Energy Isolation Program and procedures

- **Training:** The company failed to train its workers on the Energy Isolation Program and associated procedures.
- **Hazard Awareness:** Workers appeared to not fully identify or understand the heating and electrical hazards associated with an electrostatic heater treater
- **Lockout/Tagout:** The breaker to the heater treater transformer, located in the nearby motor control center building, was fastened with a lock and tag, but was still in the “On” position.
- **Hazardous Energy:** The heater treater itself was equipped with a mounted disconnect switch, but this was also in the “On” position. There were also no apparent attempts to isolate the potential electrical energy using the disconnect switch.
- **Permit:** An Energy Isolation Permit for this task was dated the day before the incident and had a section for two approval signatures, but the same person signed for both of the approvals.

CONFINED SPACE INCIDENT, PAGE 62:

First worker should have:

- ensured a work permit was present
- notified others that he was going to enter
- ensured an attendant was standing by
- tested the atmosphere before entering

Second worker and foreman should have:

- activated the emergency response plan and called 911
- tested the atmosphere before entering
- notified others that they were going to enter

Company should have:

- provided training to employees on permit-required confined spaces, rescue procedures, and emergency action plans
- redesigned the work to prevent workers from having to enter the confined space

- worn a personal gas monitor
- worn the required PPE
- not entered if he didn't have the proper training
- implemented human performance tools
- ensured an attendant was standing by
- been trained on their company's site-specific rescue and emergency action plans
- implemented human performance tools (questioning attitude, self-checking, etc.)
- implemented the techniques for placing the confined space life-saving rule into practice (toolbox talks and safety meetings, pre-job planning, etc.)

Module 4

WALKING WORKING SURFACES, PAGES 70-71:

1. three points
2. 4:1
3. qualified workers; competent person
4. 10 ft.; scaffold
5. authorise; trained
6. handrail
7. **D.** Report damaged stairways to a supervisor immediately so they can be removed from service.
8. 4 ft.
9. dropped objects

WORKING AT HEIGHTS INCIDENT, PAGES 74-75:

Activity I

1. What would you have done the moment you realized there was no proper anchor point?

- I would have stopped the work and notified my supervisor.

2. What would you have done when you realized the work you were doing required you to get on top of the adjacent tank?

- I would have used the built-in ladders to get down from one tank and get on top of the other.

3. List some factors or reasons that might have led you to think about making the jump.

- Pressure from supervisors and the company to get the job done quickly
- Laziness for not wanting to use the ladders to get on and off the tanks
- Prior success with unsafe acts (e.g., I do this all the time and I never had an issue)
- Not concentrating on the task at hand (e.g., distracted by the work setting or by non-work factors)

4. What human performance tools could have helped you avoid this incident and how?

- **Questioning attitude and stopping when uncertain:** The moment it was evident there was no anchor point, I would have stopped and informed my supervisor.
- **Self-checking** would have reminded me to not attempt the jump. Instead, I would have used the built-in ladders of the ISO tanks.
- **JSAs:** The JSA could have identified the hazards and the control measures that needed to be in place. My participation in the JSA would have also reminded me of the hazards at play and of the dangers of working at heights.

5. If you were the witness, what human performance tools could you have used to help prevent the incident?

- **Peer-checking:** I would have recognized that my co-worker was not following the life-saving rule, and I could have intervened to stop him.
- **Stopping when uncertain:** I have the obligation to stop work when I am uncertain, when I witness an unsafe act, or when I have identified an unsafe condition.

Activity II

Toolbox talks and safety meetings

This could have reminded workers of the dangers of working at heights. Toolbox talks and safety meetings can also be used as learning opportunities to learn from previous incidents, near misses, or in this case, this particular event.

Pre-job planning

This could have identified the lack of proper anchor points. It could have also identified the fall protection gear as inadequate given the situation. The worker did not have the necessary fall distance at that height given the 6' lanyard.

Last minute risk assessment

A JSA could have identified hazards that might have been missed during the pre-job planning. One of the principles of human performance is that work doesn't always go according to plan. This would have also provided the necessary control measures for any newly identified hazards.

Post-job reviews

Assuming this task had been done in the past, post-job reviews could have determined what went well and what did not. This would have allowed the company to make the necessary adjustments before the task needed to be performed again.



WORKING AT HEIGHTS INCIDENT, PAGE 72 (CONT'D):

Activity II (CONT'D)

Observations and walkabouts

This could have identified the task being performed as working at heights, making the life-saving rule relevant. This would have allowed the worker and the company to ensure the lifesaving actions of the rule were followed.

Intervention

This would have empowered the witness to intervene and stop the work the moment it was evident that the life-saving rule was not being followed.

CRANE HAZARDS, PAGE 78:

What went wrong?

- Individual answers will vary. The official investigation findings are included in the case study video.

REFLECTION, PAGE 78:

- Individual answers will vary.

LINE OF FIRE INCIDENT PART I, PAGE 79:

What must the company do to prevent this in the future?

- Conduct a hazard assessment on the pig receiver.
- Modify the design of the receiving station. The lack of pressure gauges immediately downstream of the receiver isolation valve prevented the workers from identifying that pressure had been trapped. Even if pressure gauges were installed, there was no method for depressurizing or venting the line at the area in question.
- Rewrite pigging procedure to reflect hazards of stuck pigs in the receiver and the proper steps for dealing with such a situation.
- Revise JSA procedure to include guidewords such as “trapped energy” and “trapped pressure.”
- Conduct pigging safety awareness training and inform all personnel of the incident and of the new system modifications and revised procedure and JSA.
- Review energy isolation procedure as it applies to pigging operations.

LINE OF FIRE INCIDENT PART II, PAGE 80:

Questioning attitude

Workers should have questioned whether the pig reached the receiving chamber successfully, especially after knowing the pig had already been stuck prior to reaching the second pig signal.

Stopping when uncertain

When something doesn't go according to plan or procedure, there's a good probability that conditions have changed. This was evident the moment the second pig signal did not activate. When conditions change, workers should stop and reassess the situation. They should take extra precaution and not assume things are or will progress as expected, especially if the system does not offer a way to verify.

Self-checking

Self-checks allow workers to take a few minutes to pause and focus their attention on the task at hand. Taking this extra time would have allowed workers to understand what was happening, identify the potential outcomes (one of them being trapped pressure), and put a plan in place the moment the expected results changed.

Peer-checking

It is unknown whether a supervisor was present, but peer-checking is not limited to supervisors. Any of the workers could have employed a questioning attitude or offered a different perspective (being a devil's advocate) in order to examine the process and consider all possibilities.

Procedure use and adherence

Knowing what we know now, the existing procedures did not offer guidance for dealing with a stuck pig. However, the absence of this information in the procedure should have triggered workers to put into practice some of the other human performance tools that have already been discussed here (e.g., questioning attitude, stopping when uncertain, etc.).

Job safety analysis

It is unknown whether a JSA was used. However, workers might have identified the pig getting stuck in the transition zone as a potential hazard, especially if any of them experienced a similar situation in the past. Assuming the company makes the necessary modifications to the system, the revised JSA and procedure can guide workers to deal with a trapped pig in the future.

WHAT WOULD YOU SAY?, PAGE 82:

1. *The speed limit is more of a guide than anything. Everywhere you look, everyone is speeding. If the speed limit is 50 mph, I tend to go 60 or 65. I don't see a big difference, other than I'll get to where I'm going faster.*

Most people either don't understand the effects of speed or they don't grasp how fast they're actually going.

- The speed of a vehicle at 65 mph is similar to the speed of a vehicle falling off a 12-story building. The damage you and your car would suffer if you were to crash would be extremely similar.
- Even small speed increases can have a huge effect. According to a study conducted by the University of California at Berkeley, with each one percent increase in speed, the chance of a driver having an incident increases by 2%, the chance of a serious injury increases by 3%, and the chance of death rises by 4%.
- Lastly, your speed also affects your stopping distance. According to the Florida Department of Highway Safety and Motor Vehicles, a vehicle traveling at 50 mph would need 268 feet to completely stop. At 60 mph, it would take 359 feet. That's the length of a football field from goal post to goal post!

2. *I only wear my seatbelt if I'm going to drive on the highway or if my family is with me.*

- You should always wear your seatbelt, regardless of whether you'll drive on a highway or not. Most crash fatalities occur within 25 miles of home and at low speeds. Here's another way to look at it. Who wants to jump off a five-story building? You wouldn't want to even get close to the edge out of fear of falling. Well, the impact of falling from a five-story building would be the same as a person hitting the windshield at 40 mph.
- So you're willing to put on your seatbelt when your family is in the vehicle, but not when you're driving alone? What if you suffer an accident and die because you didn't have your seatbelt on? What's going to happen to your family once you're not around?

3. *I'm actually a better driver after I've had a few to drink. I know it's illegal, but I think that's what makes me more alert and vigilant on the road. Besides, I only have 2 or 3 beers anyway.*

- Alcohol affects people differently. However, even one alcoholic drink can impair your thinking, affect your vision, and slow your reflexes. This can significantly affect your reaction time, which is crucial for driving safely.
- According to the Centers for Disease Control and Prevention (CDC), three alcoholic drinks can reduce coordination, reduce your ability to track moving objects, cause difficulty steering, and slow your response to emergency driving situations.

4. *Man, we've been really busy at work. I only got a few hours of sleep last night, and as soon as we get out of here, I have to drive 3-4 hours to be ready for tomorrow's shift.*

- Operating a motor vehicle while fatigued or sleepy is often referred to as "drowsy driving." Most people don't see drowsy driving in the same light as drunk driving. However, the effects are quite similar.
- According to the CDC, being awake for at least 18 hours is the same as someone having a blood alcohol concentration (BAC) of 0.05%. At 24 hours, it is equal to a BAC of 0.10%, which is higher than the legal limit (0.08%) in all states.



WHAT WOULD YOU SAY?, PAGE 82 (CONT'D):

5. *I only text while driving if my response is going to be brief. If it requires more than that, I will wait to get to my destination, or I will pull over on the side of the road.*

- There are three categories of driver distractions.
 - » Visual – taking your eyes off the road
 - » Manual – taking your hands off the wheel
 - » Cognitive – thinking about anything other than driving

Texting is so dangerous because it involves all three categories.

- Even a brief text can be dangerous. However, the distraction is not limited to your response. Most of the time, the need to text is triggered by having received a text in the first place. According to the US Department of Transportation, it takes 5 seconds to read a text. During this time, your eyes are off the road and at 55 mph you can drive the length of...you guessed it - a football field. Imagine all of the things that can stand in the path of your vehicle in that distance.