Propane Industry Safety Talks

Complete Set

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This document includes a comprehensive set of all 45 ***Safety Talks*** available from PERC. Smaller sets that include only those ***Safety Talks*** relevant to specific topic areas are also available. These include: ***Personal Safety & Injury Prevention; Vehicle Inspection & Safety; Hazardous Chemicals & Materials; Filling & Delivery of Containers; Bulk Propane Delivery and Transfer; Propane Characteristics, Combustion, and Odorization; Customer Care & Service;*** and ***Mobile Crane Safety***.

COMPLETE SET

Safety Talk Master List – Table of Contents continued

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Safety Talk Trainer Tips

A well-trained propane workforce is essential to protecting the health and well-being of employees and consumers. An important component in building an effective program is to conduct regular discussions on safety topics relevant to your work and workplace.

One of the most efficient and effective methods of doing this is through ***Safety Talks***. These concise presentations touch on a variety of safety issues that are important to employees in their day-to-day jobs. Moreover, ***Safety Talks*** help create an environment to discuss specific or timely safety topics, identify potential problems, or highlight specific safety concerns.

Safety Talks are typically much briefer in nature than full-scale training courses. They are meant to supplement or refresh — not replace — formal training. Each ***Safety Talk*** is designed to be delivered in 10 to 15 minutes. Whether you choose to give them on a weekly or monthly basis, ***Safety Talks*** will help you keep employees engaged and actively thinking about safety.

WHY ARE *SAFETY TALKS* IMPORTANT?

Companies often work hectic schedules to accommodate customer needs. ***Safety Talks*** **may be a primary place that employees hear about a particular safety or health issue important to them in their day-to-day jobs.** It's essential to communicate these in a manner that is straightforward and easy-to-understand. Thus, if more information is needed, employees will know how to seek out expertise from an appropriate resource.

KEEP RECORD OF *SAFETY TALKS*

It's important to keep a record of each ***Safety Talk,*** including the following:

- ☑ Who attended.
- ☑ Topics covered.
- ☑ Resources used.
- ☑ Date presented and instructor.

This information is not only useful for administrative reasons, but it also provides a sense of importance to the employee as to why he/she is there in the first place. It also can help you in determining additional training needs. Check your company's policy for recording and reporting safety meetings.

Safety Talk Trainer Tips continued

HOW TO MAKE A *SAFETY TALK* IMPACTFUL

When planning your talk, there are several things to take into consideration as to how to deliver it in an impactful manner:

- ☑ Consider how the topic is relevant to the employee. Is it something he/she will come across in their job?
- ☑ Consider the amount of time you have to deliver the information. Don't try to cram too much into a short time frame. Determine the hierarchy of your messages and go from there.
  - *— A typical rule of thumb: "What are the top two or three things I would like my employees to remember after they've attended my Safety Talk?"*
- ☑ Although you want to be factual in your delivery, discuss the issue in commonly understood words.
  - *— Employees are more apt to listen and retain information if they feel like it's coming from you in a personal manner — as a stakeholder in the issue — as opposed to hearing something that is being read to them from a manual.*
- ☑ It is important that your employees understand why they are in the ***Safety Talk*** in the first place. A proven way to help them retain the information is by incorporating the following three principles into your presentation:
  - *— Tell them what they'll hear in the* ***Safety Talk.***
  - *— Communicate the information.*
  - *— Remind them what they heard.*
- ☑ What is the potential hazard or safety issue?
  - *— To help you set the stage, explain the nature of the hazard or issue. What are the potential repercussions to them, their coworkers, and even customers, if they don't act responsibly?*
- ☑ How can they help prevent a hazard or issue from occurring?
  - *— This is the portion of your talk that covers if any applicable rules or regulations apply.*
- ☑ Consider creating a scenario where something is not compliant and have your workers point out what it is. A discussion about "What's wrong with this picture?" can make this a collaborative, educational opportunity.
  - *— Look for opportunities to make the Safety Talk interactive. People often respond better when they are participating in a conversation as opposed to being lectured to.*
  - *— Use real-life examples and props.*
- ☑ Are there things that you can bring into the ***Safety Talk*** that the employee uses in his/her day-to-day job? This can personalize the experience into something that resonates with them.
  - *— If possible, hold the* ***Safety Talk*** *on-site, or in an area where your employees are most likely to experience the subject matter. This personalizes the issue and can help them better understand how to best respond if the issue ever arises.*
  - *— Think about role playing. This is a great way to make the experience both interactive and hands-on.*
  - *— Consider starting the session with a compelling statistic, question, or statement about the topic — something that will resonate with participants and help generate discussion.*
  - *— Don't be afraid to point out what might seem to be obvious. In your presentation, and your handouts, include a section about potential hazards to employees — either on your premises or where they may be throughout the course of the day.*

Safety Talk Attendance Form

SAFETY TALK TOPICS COVERED:

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RESOURCES USED (Attach Copies if Required):

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DATE:

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CONCERNS/ISSUES:

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RESPONSE/FOLLOW-UP ACTIVITIES:

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PARTICIPANTS:

Name	Signature
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INSTRUCTOR NAME (PRINT):_____

INSTRUCTOR SIGNATURE:_____

INSTRUCTOR TITLE: _____

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Safety Talk

Using Personal Protective Equipment (PPE)

Personal Protective Equipment (PPE) plays an important role in ensuring your safety when handling propane. While OSHA sets out certain employer requirements, it is your responsibility to know which PPE is required for specific tasks, how to use it appropriately, and secure it for your assignment. Always follow manufacturer and employer guidelines on the equipment's purpose, limitations, proper fit, and maintenance.

COMMON PPE AND TYPICAL USES INCLUDE:

- **Head and face protection, including face shields, protective goggles, and hard hats —** used for welding, chipping, grinding, drilling, or using air-powered tools for breaking concrete or hard surfaces. Goggles are also required for dispensing propane or repairing tanks, as leaking gas can be harmful to eyes. Hard hats are necessary during tank installations/moves or when working in crawl spaces or other small areas where irregular structures can cause head cuts or bruises.
- **Earplugs —** required any time steady or impulse noise levels are higher than 85 decibels, such as when using jackhammers. See your company's measures and guidelines.
- **Respirators —** vital in removing harmful substances from the air or supplying breathable, clean air. Consult relevant Safety Data Sheets (SDSs), your company's procedures, or your supervisor for which type of respirator to use with your specific task.
- **Hands, arms, and feet protection, including gloves and work boots —** required when dispensing or transferring propane, moving tanks or cylinders, handling pipes, or cutting or welding.

Depending on your work area or job function, your employer may require additional protection. If you are unsure of the proper PPE to use for a particular task, ask your supervisor.

SECURING, USING, AND MAINTAINING PPE:

- It is the job of everyone at your site to clean, store, and maintain PPE properly so that it is readily available when needed. Follow your employer's guidelines.
- Remove and report any damaged, cracked, or otherwise compromised PPE to your supervisor immediately, and request replacement.
- Check and follow manufacturer and employer protocols for cleaning and repairing PPE.
- Your safety is top priority. Advise your supervisor if you believe additional PPE is required or helpful for a particular task.

Discussion Topics

1. Whose responsibility is it to ensure you have the correct PPE for your job?
2. What should you do if you arrive at a job site and no PPE is available?
3. Is it acceptable to use PPE that is in poor condition if it is the only available PPE on site?

LEARNING ACTIVITY

Set up a number of scenarios where PPE is necessary. Have participants explain which PPE is necessary for which tasks and why.

Source: ***Basic Principles and Practices of Propane*** (PERC)

For more information about using personal protective equipment, visit **propanesafety.com.**

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Safety Talk

Using and Maintaining Fire Extinguishers

Because propane is flammable, fire extinguishers must be available at all facilities and on all vehicles. They can keep a small incident from becoming a major accident. It is important that all workers and operators understand how to maintain and use fire extinguishers, in the event of a safety-related issue.

THINGS TO KNOW ABOUT FIRE EXTINGUISHERS:

- ☑ NFPA 58 requires at least one fire extinguisher be available at a bulk propane plant. Multiple extinguishers are a good idea in a large or spread-out facility.
- ☑ OSHA requires that employees be trained to use fire extinguishers when they are first hired and every year thereafter. Advise your supervisor if you are due for training.
- ☑ Fire extinguishers are vital for creating escape routes or for small fires, such as those involving combustible materials. They are not intended to put out a large blaze or propane fire.
- ☑ Make sure no propane leaks are present when using a fire extinguisher.

UNDERSTANDING FIRE EXTINGUISHER RATINGS:

- ☑ Fire extinguishers are rated by the NFPA by the class(es) of fire they are suitable for suppressing. Most extinguishers carry multiple ratings.
  - — Type A: Paper, wood, or other similar fires
  - — Type B: Flammable liquid or propane
  - — Type C: Electrical
- ☑ Per NFPA 58, all propane delivery vehicles should carry one portable fire extinguisher having a minimum capacity of 18 lb. of dry chemical with a B:C rating. Check your local or state codes if they require a higher rating.

STORING, INSPECTING, AND MAINTAINING FIRE EXTINGUISHERS:

- ☑ Know the location(s), condition, and limitations of all fire extinguishers at your plant or on your vehicle.
- ☑ **Monthly Inspections —** Every propane facility must verify that fire extinguishers are intact and fully charged each month. Check with your supervisor for your site's schedule.
- ☑ **Annual Inspection —** Once a year, all units must be inspected by a fire inspection company or the fire department. These agencies will affix a special tag to the extinguisher, showing the test date.
- ☑ It is your job to frequently check the fire extinguisher in your work area or on your service vehicle. If the extinguisher is due for inspection, low on charge, damaged, or missing an inspection tag, notify your supervisor immediately.

Discussion Topics

1. You are ready to leave for a job site and notice that your vehicle's fire extinguisher is missing. How should you respond?
2. What could occur if you use a fire extinguisher not rated for the specific incident?

LEARNING ACTIVITY

Conduct a demonstration on the proper use of extinguishers for various types of fires. Cover specific suppression strategies applicable to paper, electrical, or propane incidents.

Source: ***Basic Principles and Practices of Propane*** (PERC)

For more information about using fire extinguishers, visit **propanesafety.com.**

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Safety Talk

Basic Fire Prevention Rules and Procedures

Because propane is flammable, everyone involved in its handling must know and follow fire prevention and containment rules at all times. Your knowledge will help protect against property damage and ensure the safety of you and your customers.

RULES TO FOLLOW WHEN WORKING WITH PROPANE:

- ☑ Observe all fire prevention signs posted at the plant and warnings marked on containers with flammable material.
- ☑ Note the location of emergency shutdown controls and fire extinguishers at the plant and on the truck.
- ☑ Never block access to fire control equipment, including fire alarms, fire extinguishers, sliding fire doors, fire escapes, and sprinklers.
- ☑ Know how to use the fire extinguishers and inspect them frequently to verify they are properly sized, properly rated, and fully charged.
- ☑ Keep all ignition sources — including cigarettes and open flames — away from propane transfer areas. Never turn on or off any electrical switch in the area of a propane discharge. If power must be turned off to avoid a fire, turn it off from the circuit breaker in another location not affected by the discharge.
- ☑ Know the telephone number of the local fire department.
- ☑ Report any leak to your supervisor immediately.

STEPS TO FOLLOW WHEN A FIRE OCCURS:

In the unlikely event of a fire or an uncontrolled propane leak, remain calm and take the following steps, if it is safe to do so.

- ☑ If there is an emergency shutdown device, activate it.
- ☑ Immediately eliminate any sources of ignition.
- ☑ Evacuate the immediate area, contact the fire department, and do not re-enter until it has been determined safe. Move and stay upwind of a propane leak, fire, or vapor cloud.
- ☑ Shut off the electrical power at the main power source.
- ☑ If the fire involves a propane delivery vehicle on a highway, block off the roadway at least 2,500 feet in both directions from the accident.
- ☑ Contact your supervisor from a safe location. Do not approach the fire.
- ☑ Evacuate the area and wait for fire fighters to arrive.

Discussion Topics

1. How do you verify your plant's extinguishers are fully charged?
2. There is a fire at the plant and you left the area but realize you did not activate the emergency shutdown device. What should you do?

LEARNING ACTIVITY

Set up a situation with potential hazards (incorrect signs, missing fire extinguishers, etc.). Have participants identify problems and discuss what may occur if these issues are not remedied.

Source: ***Propane Delivery Operations and Cylinder Delivery*** [PERC]

For more information on fire prevention rules and procedures, visit **propanesafety.com.**

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Safety Talk

Personal Risk Assessment

Being safe at work is a right and responsibility of all propane personnel. To ensure the safety of you and those around you, it is essential that you perform a personal risk assessment before starting any task. This will help you determine what precautions you need to take and prevent possible accidents or injuries.

SURVEY YOUR SURROUNDINGS AND REMOVE POTENTIAL HAZARDS:

As you prepare for your task, ask yourself:

- ☑ Is the equipment heavy? Can it tip over? Can I slip and fall or injure myself in any way?
- ☑ Will I be safe in completing this on my own, or do I need help with this job?
- ☑ If something were to fall, tip, catch fire, etc., would I be close enough to be affected?
- ☑ What is the worst that can happen?

If you believe the task could cause personal injury, secure tools to help reduce or eliminate your risk. Always determine the safest way to do the job before you begin.

CONFIRM YOUR TRAINING IS SUFFICIENT:

If you have not been trained to perform a task, do not attempt it. In every situation, confirm:

- ☑ Have I been trained to safely do this job?
- ☑ Am I confident I have the knowledge and skills to perform this task?

If you are not comfortable with the task you are to perform, talk with your supervisor. If you discover something that you don't understand while performing a task, stop and get help.

USE THE CORRECT TOOLS AND WORK TECHNIQUES:

- ☑ Make sure you have the right equipment to do the job and that it is in good working order.
- ☑ Once your work equipment is ready, determine what personal protective equipment (PPE) is necessary to do the job safely and use it.
- ☑ Make sure you understand the proper techniques to employ for any given scenario. This includes getting in and out of the cab; getting onto and off of the truck bed; moving cylinders, materials, and equipment; and walking and working on various surfaces.

Any issues encountered as you go through these checklists should be addressed prior to carrying out any task.

Discussion Topics

1. A new task must be completed, but you have not been trained for it. The steps are very similar to other tasks that you perform, and you are confident you can handle this one. Your company is also short-staffed. How do you proceed?
2. Discuss how to determine what PPE is required for various scenarios.

LEARNING ACTIVITY

Stage a work environment with a few unusual elements. Have participants conduct their pre-task surveys and review any special issues.

Source: ***Propane Personal Safety*** (PERC)

For more information about assessing and managing personal risk, visit **propanesafety.com.**

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Safety Talk

Using Good Body Mechanics

Propane workers lift, move, and carry cylinders, hoses, and other cumbersome objects in the course of their daily work. Using good body mechanics is key to getting your job done safely and efficiently. The following principles and tips will help safeguard your physical health and minimize the chance of injury.

USE PROPER POSITIONING AND LIFTING TECHNIQUES:

- **Keep the load close to your body —** Holding materials away from your body will make them seem heavier (the "lever arm effect") and cause as much as 10 times more stress to your back. Always hold materials such as hoses and cylinders close.
- **Keep your back in a neutral position —** Always try to equalize pressure on the discs in your back to keep your muscles, bones, and ligaments in their strongest, most efficient range or position.
- **Use proper lifting techniques —** Use a *Power Lift* (which leverages body stability and strength) for heavy materials such as cylinders, and focus on *upper-body support* when picking up a lightweight tool or component. If you are unfamiliar with these techniques, request to be trained.
- **Protect your shoulders —** When you extend your arm to *pull* something, you can put a lot of stress on your shoulder area. This can result in shoulder sprains and rotator cuff tears. To properly position your shoulders, keep your elbows close to your body and below your shoulders whenever possible.

MINIMIZE FORCE:

- Minimize forced effort or strain to your back and upper body by using equipment designed to lift, push, pull, or carry.
- Use handcarts, dollies, or other mechanized equipment to move cylinders.
- Use the right tools for any task at hand.

If you are unsure of what tools and equipment are available to you — or need additional resources to perform your job safely — talk with your supervisor.

REDUCE REPETITION:

Over time, repetition of a task can cause fatigue or injury. To reduce the potential for issues of this nature:

- Plan your work to minimize the number of times you need to handle or move something.
- Change hands when possible to reduce stress on any single muscle group.
- Change tasks if you start feeling fatigue in any one muscle group or stress on your body, especially your neck and back. Check with your supervisor to see if you can switch jobs with a co-worker or temporarily do something different to give overworked muscles a rest.

Always factor in personal limitations before performing a job, and secure assistance when you need to do so. Even with the best techniques, some jobs should not be performed on your own.

Discussion Topics

1. Why is it important to use proper lifting techniques when moving or lifting heavy objects?
2. You are at a client site to deliver a large cylinder and realize that you left your dolly at the last job. Is it okay to manually move the cylinder? How do you make that determination?

LEARNING ACTIVITY

Walk participants through the steps of performing a Power Lift versus one that focuses on upper-body support, emphasizing specific movements, bends, and rotations that minimize stress.

Source: ***Propane Personal Safety*** (PERC)

For more information about good body mechanics on the job, visit **propanesafety.com.**

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Safety Talk

Reducing Slips, Trips, and Falls

When you are focused on your work, you may miss issues that can pose potential hazards. However, a slip, trip, or fall could result in serious injury — one that may affect your ability to perform your job. By exercising precautions and staying aware of your environment and circumstances, you can greatly reduce the likelihood of such issues.

PERFORM A PERSONAL RISK ASSESSMENT EVERY TIME, AT EVERY JOB:

- ☑ **Always perform a personal risk assessment for every job.** This should take into account weather conditions, route and travel issues, and any special requirements of particular job sites. Examine your surroundings as soon as you arrive to know in advance if surfaces are wet or icy or if there are any other factors that could pose potential dangers.
- ☑ Follow safe practices for entering and exiting your vehicle, and avoid situations where you feel your safety may be compromised. Always use three points of contact.

WATCH FOR HAZARDS:

- ☑ Watch for hazards on your path of travel. For propane drivers, these hazards are typically between the truck and the tank.
- ☑ Toys, trash, or tree branches on a customer's premises can cause problems, especially in the winter season. Be aware of hazards under snow that cannot be seen easily.
- ☑ When you are at a commercial or construction site, be cognizant of trash, scrap materials, or uneven surfaces. Conduct a personal risk assessment and make sure your path is clear before you make the delivery.

Discuss any hazards that need to be cleared with the customer. If the customer is not at home during the delivery, contact your supervisor about how to proceed.

WEAR APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT (PPE):

- ☑ Be aware of hazard issues and respond accordingly. If you often encounter slippery surfaces, make sure you wear shoes with slip-resistant soles.
- ☑ If your locations necessitate work boots, keep your boots in good repair. Check them often to ensure your soles provide for adequate traction. Replace any footwear that is worn or tattered.
- ☑ To prevent slips, trips, and falls in winter conditions, wear ice cleats. They easily stretch to fit over your shoes or boots and give you more traction on the ice and snow.

Discussion Topics

1. Why is it important to conduct a personal risk assessment for every job?
2. You have received an out-of-gas call from a customer. Upon arriving, you find that trash and other debris have not been cleared and you do not have safe entry. How do you respond?

LEARNING ACTIVITY

Create a job scenario that has several hazards and weather issues. Have participants identify these issues and discuss appropriate actions to take.

Source: ***Propane Personal Safety*** (PERC)

For more information about handling slips, trips, and falls, visit **propanesafety.com.**

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Safety Talk

Properties of Static Electricity

Static electricity is electricity at rest, but if a conductive path is present, it can result in a spark or static discharge. In propane operations, this spark can ignite and cause a fire or even an explosion. It is important to understand static electricity, where and how it can arise, and how to reduce risks of a static ignition.

FACTS ABOUT STATIC ELECTRICITY:

- ☑ Static electricity occurs when two materials touch and separate, thus creating an imbalance of electrons and a positive charge. Benign in many situations, static electricity can be extremely dangerous around propane.
- ☑ Static sparks give off energy in the form of heat or light.
- ☑ The level of static charge is affected by speed of movement, humidity, material size, and materials' electrical properties (conductive or non-conductive). Metals, wet fabrics, wet concrete, and the human body are common conductive materials.
- ☑ Higher humidity reduces static generation significantly. However, polymeric materials such as HDPEs, PVCs, and plastic films do not retain moisture and thus can charge to extreme voltages even in high humidity.
- ☑ Even through they do not throw sparks, non-conductors can transfer their electrical energy to something or someone that can cause a spark. This is called *induction*.
- ☑ **The smallest static spark we can see or feel (about 3,000 volts) has double the energy required to ignite propane.**

CAUSES OF STATIC ELECTRICITY:

In propane operations, static electricity can be caused by a number of factors, including:

- ☑ Walking through a facility or across a carpet.
- ☑ Fuel flowing at high velocity through a small opening.
- ☑ Friction from wind blowing over cellophane or stretch wrap near cylinders.
- ☑ Putting on or removing conductive clothing.
- ☑ Picking up a charged item, without static discharge control footwear, and/or not grounding yourself after putting the item down.

WAYS TO REDUCE STATIC ELECTRICITY:

- ☑ Identify where static electricity may be coming from, and use signage and floor markers to label all static discharge control areas. Limit access to authorized personnel only.
- ☑ Use a grounding path for static charges you may develop or carry. Make sure all process and handling equipment is grounded and bonded in accordance with electric codes.
- ☑ Follow your company's guidelines on static discharge footwear and PPE, and use static-safe floor mats and other plant-supplied safety tools.
- ☑ Make sure you understand how to control static generation and provide safe grounding paths. Talk with your supervisor if you need training.

Discussion Topics

1. Which common situations and activities at your workplace can generate static electricity?
2. How might humidity levels affect a specific job task? How do your precautions change in low-humidity versus high-humidity situations?

LEARNING ACTIVITY

Display various fabrics (including uniforms or other employee clothing) and plant materials (stretch wrap, metal, etc.). Demonstrate how static can occur and which items may pose greater hazards.

Source: ***Static Electricity in the Propane Industry*** (PERC)

For more information about static electricity, visit **propanesafety.com.**

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Safety Talk

Static Discharge Prevention Tips

The release of static electricity (static discharge) can be extremely hazardous in propane operations. By using the following tips, you can help prevent and control static discharge and ensure a safe working environment for yourself and your coworkers.

EIGHT SAFETY TIPS FOR PREVENTING STATIC DISCHARGE:

1. **Know the area.** Every propane facility has designated *Static Discharge Control Areas* — places where propane vapors may be released or pooled. These include areas where any propane transfer, processing, or storage occurs. Be aware of where these locations are, and take appropriate prevention measures when nearby.
2. **Ground yourself.** Workers can conduct or carry a significant amount of static electricity as they move about the plant. Always wear static-safe footwear or conductive wristbands, and use a static-safe floor or floormat to safely discharge any buildup before handling propane.
3. **Check your attire.** Cotton and cotton blends generate less static electricity than most synthetic materials, and thus are the typical propane uniform fabric. Wear your uniform and be aware of any garment or layers that "snap" or "crackle" when removing. Never put on or remove clothing inside a Static Discharge Control Area.
4. **Clean up.** Check that all HDPEs, PVCs, and other synthetic materials are out of Static Discharge Control Areas.
5. **Follow regulatory code.** Electrical equipment inside a Static Discharge Control Area must be installed in accordance with NFPA 58 and state electrical codes and regulations. Metal and non-electrical stationary equipment, such as rollers, should also be grounded.
6. **Observe your processes.** Most static electricity comes from the friction between materials, even if they are non-conductive. Review your facility's processes and activities and take action to reduce any apparent risk.
7. **Limit access.** Limit access to Static Discharge Control Areas to trained propane workers who understand how to perform the particular task and handle static discharge safely.
8. **Speak up.** Propane personnel who work in Static Discharge Control Areas can provide the best information on potential threats and hazards. Let your supervisor know of any issues you become aware of.

Discussion Topics

1. You have been engaged to perform a new task and believe that it may produce a significant static electricity issue. How do you respond?
2. You notice that several plastic trays and some plastic wrap are present inside a Static Discharge Control Area. You need to fill cylinders quickly for a waiting customer. What should you do?

LEARNING ACTIVITY

Stage a Static Discharge Control Area, and walk your participants through what to do when entering, working in, and leaving the area.

Source: ***Static Electricity in the Propane Industry*** (PERC)

For more information about static discharge prevention, visit **propanesafety.com.**

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Safety Talk

Performing Pre- and Post-Trip Vehicle Inspections

Regular inspections are required by the DOT to ensure your vehicle is in good condition and reduce the chance of an accident or a breakdown. The following guidelines are for pre- and post-trip inspections. Check your company's procedures for required monthly, annual, and other inspections applicable to your particular vehicles.

PREPARING FOR INSPECTIONS:

- ☑ **Select a location —** Find a good location to park the vehicle away from people, other vehicles, low-hanging wires or tree limbs, and any other potential hazard.
- ☑ **Prepare the vehicle —** Remove the keys from the ignition, set the parking brake, and use wheel stops* correctly to prevent movement.
- ☑ Select the appropriate personal protective equipment (PPE), and have a clean cloth handy to wipe lights and reflectors, along with a tire pressure gauge.

CONDUCTING PRE-TRIP INSPECTIONS:

Pre-trip inspections should be conducted at the beginning of the work day. They require:

- ☑ **A vehicle walk-around —** Check oil level, belts, hoses, tires, lights, and gauges to make sure no changes have occurred since the last inspection.
- ☑ **A review of the last Driver Vehicle Inspection Report (DVIR) —** Review the last DVIR and sign the report only if no problems were noted. By signing the report, you acknowledge that you've read the report and all necessary repairs have been made.

CHECKING FOR ISSUES ON-ROAD:

- ☑ Keep your eye on all gauges for trouble signs, and stay tuned to changes in your vehicle's performance.
- ☑ Inspect your cargo tank discharge system and emergency discharge controls before transferring propane.

CONDUCTING POST-TRIP INSPECTIONS:

Follow company and DOT requirements and prepare a DVIR at the end of the work day. Your post-trip inspection should cover the operation and condition of:

- ☑ Service brakes, including trailer brake connections and parking brake
- ☑ Steering mechanism
- ☑ Windshield wiper(s)
- ☑ Horn
- ☑ Coupling devices
- ☑ Lighting devices and reflectors
- ☑ Tires, wheels, and rims
- ☑ Rear-vision mirror(s)
- ☑ Emergency equipment, including fire extinguisher, reflective triangles, and electrical fuses

Conduct your pre- and post-trip inspections the same way every day. Record any deficiencies or defects on the DVIR. Any issue should be addressed immediately.

*The 2014 edition of NFPA 58 has replaced the term "wheel chocks" with "wheel stops."

Source: ***Propane Delivery Operations and Cylinder Delivery*** (PERC)

For more information regarding vehicle inspection, visit **propanesafety.com.**

Discussion Topics

1. Why is it important to inspect your vehicle before and after each use?
2. Why is it important to thoroughly complete a DVIR at the end of each work day?

LEARNING ACTIVITY

Have a vehicle available and have participants conduct a pre- and a post-trip inspection. Encourage questions and discuss issues.

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Safety Talk

Safe Driving Practices

Safe driving practices are a must for propane delivery drivers. Since your vehicle is larger and heavier than most other on-road vehicles — and you have a higher center of gravity — you need to know how to maintain vehicle control; drive safely; and manage accidents, breakdowns, or emergencies quickly.

DEFENSIVE DRIVING TIPS:

- ☑ Before setting out, note any issues with your route, surrounding area, or weather conditions. Schedule appointments with these in mind.
- ☑ Keep a safe following distance between you and the vehicle in front of you.
- ☑ Understand how to accommodate load and suspension shifts and manage skids.
- ☑ Check your blind spots often, keep your eye on other drivers by using your mirrors, and use your lights or horn as needed to make other drivers aware of your presence.
- ☑ Keep your vehicle well serviced to ensure proper tire pressure and condition.

BE COGNIZANT OF ROAD CONDITIONS:

Adverse weather and road conditions can be especially hazardous. Be alert and cautious as you manage your vehicle. When driving in poor conditions, remember to:

- ☑ Clean the vehicle's windows before heading out, and use your wipers and defroster as needed.
- ☑ Turn on your headlights and marker lights.
- ☑ Reduce speed, increase your following distance between vehicles, and pay close attention to other motorists.

ADDITIONAL WAYS TO REDUCE RISKS:

Combined with a high center of gravity, liquid surges and suspension shifts can cause changes in vehicle performance or loss of vehicle control, which could result in a rollover. To reduce risks:

- ☑ **Distribute the weight of cargo evenly.**
- ☑ **Monitor tire pressure and condition.** Excessive wear or improper inflation can increase risk. In the case of a blowout, steer your vehicle in a straight line, then reduce power and gradually brake as you steer out of traffic lanes.
- ☑ **Regain control of the vehicle before making any change in direction or speed.** Regain control of the vehicle before reducing speed, and then apply controlled braking. If possible, gradually maneuver completely off the road and onto the shoulder.
- ☑ **Compensate for blind spots.** Larger vehicle size and higher center of gravity result in blind spots to the sides and rear. Check mirrors frequently, use turn signals, and maintain proper lane location. Consider blind spots whenever backing the vehicle to ensure your cylinder delivery vehicle or bobtail will not strike anything.

Discussion Topics

1. Inclement weather is creating hazardous conditions in transit to a customer site. How should you handle this situation?
2. What should you do in the event of a tire blowout?

LEARNING ACTIVITY

Review the various sources available to propane drivers for gaining information on road and weather conditions. Discuss situations where it is safe to proceed to the next job site versus those that are not.

Source: ***Propane Delivery Operations and Cylinder Delivery*** [PERC]

For more information on safe driving practices, visit **propanesafety.com.**

PROPANE education & research COUNCIL

Safety Talk

Selecting Safe Delivery Routes and Protecting Property

As a propane delivery driver, you are responsible for protecting people and property in the course of your job. The following tips can supplement your company's safety plan and help you prevent any unnecessary issues.

PLANNING AND SETTING OFF ON YOUR ROUTE:

- ☑ **Plan for the issues of delivery vehicles —** Know the height and weight of your vehicle and any bridges or road sections that require extra safety measures.
- ☑ **Drive with caution and vigilance —** Follow all recommended instructions at railroad crossings and drawbridges and posted hazmat route signs, and be prepared for any detours due to local restrictions.
- ☑ **Adjust for weather —** Maintain speed appropriate for conditions. Plan ahead if you need to change your route for easier travel, and make customer appointments accordingly.

Vehicle flashers must be used at all railroad crossings and any time the vehicle is stopped except for routine traffic stops.

PROTECTING CUSTOMER LANDSCAPING, PROPERTY, AND STRUCTURES:

You will encounter a variety of issues and obstacles in day-to-day deliveries and service. Understand the size and restrictions of your vehicle, and always exercise good judgment.

- ☑ Keep your vehicle on roadways, driveways, or surfaces adequate to support its weight.
- ☑ **Avoid attempting travel over small private bridges or culverts —** Park your vehicle and use a dolly to transport cylinders to the delivery location. If you're driving a bobtail, use the full length of the delivery hose to reach across the bridge to the LP-gas containers. Be aware of landscaping/decorative items that the hose may damage when pulling it to the container.
- ☑ Close all gates after driving through to prevent loss of pets or livestock. Park in a location that allows room for other vehicles to come and go freely.
- ☑ Stay alert to the activities and movement of children and pets.
- ☑ Upon job completion, conduct a vehicle walk-around to ensure your exit path is clear. Know the locations of telephone poles and utility boxes to confirm you can clear them.

Discussion Topics

1. The customer tells you other propane drivers have crossed his bridge without issue, but as you approach, you feel it might not be secure. What is your best course of action?
2. As you are exiting, you collide with an old birdhouse the customer has at her site. How do you proceed?

LEARNING ACTIVITY

Discuss a recent incident in a propane delivery or gas-related event. Discuss what was handled properly and what should have received more attention. Ask participants for input and suggestions.

Source: ***Propane Delivery Operations and Cylinder Delivery*** [PERC]

For more information on selecting safe delivery routes, visit **propanesafety.com.**

PROPANE education & research COUNCIL

Safety Talk

Handling Vehicle Accidents and Emergencies

Accidents and emergencies that involve propane vehicles are particularly dangerous because of the chance of a hazardous material leak or fire. Hazards can also arise from fitting problems, overfilled containers, or transportation issues and may be detected en route. It is critical that propane drivers are prepared to handle these situations in an efficient and safe manner.

HANDLING ACCIDENTS OR ISSUES WITH NO PROPANE LEAK OR A CONTAINED LEAK:

- **Move the vehicle off the road and position it for safety —** Set the parking brake, shut down the engine, activate signal flashers, set the wheel stops*, check valves and containers for damage, and put out safety triangles to keep unauthorized people away from your vehicle.
- **Ensure safe conditions at the accident site —** Check for fuel spills or hazardous materials, then move and stay a safe distance away. Make sure no one is hurt and call your supervisor.

HANDLING ACCIDENTS OR ISSUES WITH A PROPANE LEAK:

- Stop, park your vehicle, and shut off your engine a safe distance from the road, other vehicles, and potential ignition sources.
- Use hazard warning signal flashers and warning triangles. However, flashers should be considered as a possible source of ignition.
- Immediately exit the vehicle, take your documents with you, and get your fire extinguisher as a preventive measure to contain non-propane fires.
- Determine if anyone is injured, and assist them if you are qualified to do so.
- Move up-wind of a leak or vapor cloud, and only activate emergency shutdown devices away from the leak if it is safe to do so. Do not pass through an area with a leak or vapor cloud.
- Call your supervisor from a safe location to report the incident. Your supervisor will make the determination whether to call 911.
- Move and direct other people away from the area.

ADDITIONAL CONSIDERATIONS SPECIFIC TO YOUR VEHICLE:

With a cylinder delivery truck:

- Check the condition of the cylinders and their valves and make sure they are all still present. Also, look for any fuel spills.

With a bobtail:

- If involved in a rollover, exit if you are able to and it is safe to do so.
- You may not know the condition of the vehicle and may need to rely on emergency response personnel to assess and handle the situation. Do not move the vehicle on your own.

ADDRESSING NON-PROPANE FIRES:

- Stop your vehicle in a location away from highly populated areas or buildings, shut off the engine, exit the cab, and call the fire department.
- Use your fire extinguisher to contain small fires if it is safe to do so.
- One of the greatest risks of fire is caused by driving on a flat or soft tire. Never leave a smoking tire unattended.

All accidents must be detailed on your company's Accident Report Form and reported to the DOT.

*The 2014 edition of NFPA 58 has replaced the term "wheel chocks" with "wheel stops."

Source: ***Propane Delivery Operations and Cylinder Delivery*** (PERC)

For additional information about handling accidents or emergencies, visit **propanesafety.com.**

Discussion Topics

1. While driving a cylinder delivery truck, you smell a faint odor of propane. How do you respond?
2. You have been in a collision, and you detect a strong propane smell but cannot detect the source. What steps should you take?

LEARNING ACTIVITY

Stage an imaginary accident involving a vehicle that has a propane leak. Discuss all potential hazards and talk participants through your company's safety actions.

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Safety Talk

Entering and Exiting the Truck

As a propane delivery driver, you get in and out of your truck several times a day. While it is a routine procedure, many injuries in the propane industry occur while entering or exiting the vehicle, including twisted ankles, back strain, or even head injuries. The following rules and precautions will help you reduce your risks of injury.

WHEN GETTING INTO OR OUT OF THE CAB:

- ☑ **Keep three points of contact —** Put two hands and one foot or one hand and two feet on the vehicle at all times. This is called the "three-point rule."
- ☑ **Face the truck —** Many injuries happen when drivers try to exit the truck without turning around. Jumping down or just stepping out without first turning toward the truck can result in significant injury.
- ☑ **Keep hands free while climbing —** If you are holding an object, put it down before entering or exiting the cab.
- ☑ **Check the ground —** Always check the ground and sides of the truck before you step down. Be careful to avoid any ice, loose debris, potholes, or other issues.
- ☑ **Caution on the last step —** Stay alert during the last move when you stop climbing down and start walking. This change in movement is a frequent cause of falls or slips.

WHEN CLIMBING ON OR OFF THE TRUCK BED:

The back of the truck does not always have the hand and foot holds to establish three good points of contact. Whenever possible, place the load back by the gate, where you can reach it without climbing in. If you must climb in the truck bed, use one of these options:

- ☑ Sit in the bed and turn.
- ☑ Use two hands and a knee.
- ☑ Climb up from the bed corner.

Make sure your grip and foot contacts are solid before making any moves. Exit the same way you entered. Never jump down from the truck bed.

QUICK TIPS ABOUT USING LIFT GATES:

Some propane trucks are equipped with service gates to move cylinders from the truck bed to the ground and back again. If you need to enter the truck bed:

- ☑ Follow your company's policy regarding standing or riding on lift gates.
- ☑ As you maneuver around the lift gate, make sure the area where you place your feet is free from water, ice, debris, or anything that might cause a slip.
- ☑ Make sure to have an adequate grip and solid footing at all times.

Discussion Topics

1. What adjustments might you need to make when entering or exiting your vehicle in harsh weather conditions?
2. Your supervisor calls when you pull up just in time for a scheduled appointment. What procedures do you follow while taking a phone call as you exit the vehicle?

LEARNING ACTIVITY

Practice using the three-point rule when exiting a cab or climbing out of a truck bed on different types of vehicles.

Source: ***Propane Personal Safety*** (PERC)

For more information about entering and exiting propane vehicles safely, visit **propanesafety.com.**

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Safety Talk

Vehicle Parking and Security

As a propane delivery driver, you must follow NFPA 58 and DOT regulations to ensure the safety and security of your vehicle. The following Safety Talk reinforces these rules, offering guidance on where to park, as well as practices to avoid theft, vandalism, abuse, or other issues.

WHEN PARKING INDOORS AT PUBLIC GARAGES OR BUILDINGS:

Before parking your vehicle in a public garage or other building, ensure that:

- ☑ All liquid propane is purged from the cargo tank, piping, pump, meter, hoses, and other equipment.
- ☑ All portable propane containers are removed from the vehicle.
- ☑ The vapor pressure in the piping, pump, meter, delivery hose, and related equipment is reduced to approximately zero.
- ☑ All valves are closed, and the delivery hose or valve outlets are plugged or capped.

WHEN PARKING INDOORS AT NON-PUBLIC BUILDINGS:

Before parking indoors at a non-public building — including a bulk plant — ensure that:

- ☑ The building is constructed in accordance with NFPA 58.
- ☑ The premises are under the control of the operator (owner) of the vehicle.
- ☑ Floor-level ventilation is provided in all parts of the building where vehicles are parked.
- ☑ Primary shutoff valves on the cargo tank and other containers are closed, and the delivery hose outlets are plugged or capped (except the engine fuel container).
- ☑ Propane containers have been gauged or weighed, no propane container will be located near a heat or ignition source, and no leaks are present.

WHEN PARKING OUTDOORS:

If your vehicle will be left unattended, such as while delivering propane, make sure that:

- ☑ It is not parked in congested areas.
- ☑ It is parked on a street adjacent to the service location and is transporting containers or cargo of 3,500 gallons water capacity or less. Stay at least 50 feet away from high-population buildings such as churches, schools, apartment buildings, or hospitals.
- ☑ It is not parked on or within five feet of the traveled portion of a public street or highway except for brief periods when the operation requires the vehicle to be parked and it is not practical to park the vehicle in any other place.

SECURITY ISSUES:

Every propane company is required to have its own detailed security plan to prevent theft, vandalism, product leaks, or fire. You can reduce potential hazards by:

- ☑ Staying with your vehicle at all times, except when performing job-related duties.
- ☑ Keeping a 100-foot, unobstructed view of your vehicle while making deliveries.
- ☑ Following your company's security and hazmat protocols, attending required security training, and understanding how to recognize and mitigate any security risks.

Discussion Topics

1. You arrive at a location late and are unable to find parking that complies with safety standards. How do you proceed?
2. Because of weather conditions, you need to park further out than usual. As you walk the route, you realize that you will not be able to see your vehicle while making the delivery. What should you do?

LEARNING ACTIVITY

Demonstrate how to prepare a vehicle for parking or storing in a garage. Discuss instances where it may and may not be safe to store a propane vehicle.

Source: ***Propane Personal Safety*** (PERC)

For more information about vehicle parking and security, visit **propanesafety.com.**

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Safety Talk

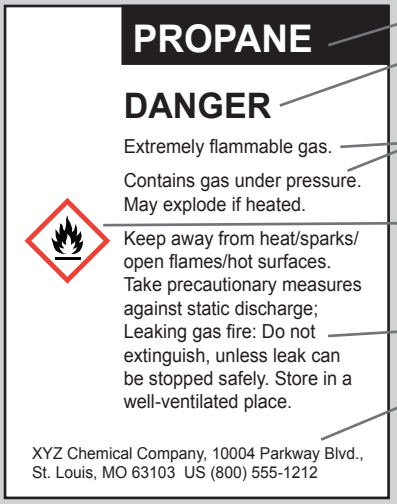
OSHA Requirements for Labels in Revised Hazard Communication Standard

In March 2012, the Occupational Safety and Health Administration (OSHA) updated its ***Hazard Communication Standard (HCS)*** to become more aligned with the United Nations' ***Globally Harmonized System (GHS) of Classification and Labeling of Chemicals.*** This Standard requires workers be trained to facilitate their recognition and understanding of the new labels and safety data sheets.

NEW LABEL REQUIREMENTS PROVIDE UNIFORMITY

- The HCS mandates that information about chemical hazards be conveyed on labels using quick visual notations that provide immediate recognition of hazards. The labels also must provide instructions on how to handle the chemical so that users are informed about how to protect themselves.

Per new OSHA requirements, the following must be included on hazardous materials labels:



Illustrative sample only. Not an actual label.

Product identifier: How the hazardous chemical is identified.

Signal word: Alerts the reader/user to a potential hazard and indicates the level of severity. There are only two words that are used as signal words, **"Danger"** and **"Warning."** If more than one applies, only the more severe will appear on the label.

Hazard statement(s): Describes the nature of the hazard(s) of a chemical, including, where appropriate, the degree of hazard. For example: **"Can cause damage to kidneys through prolonged or repeated exposure when absorbed through the skin."** All applicable hazard statements must appear on the label.

Pictogram: Graphic symbols used to communicate specific information about the hazards of a chemical. OSHA's required pictograms must be in the shape of a 90-degree-angled square and include a black hazard symbol on a white background with a red frame sufficiently wide enough to be visible easily.

Precautionary statement(s): Recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous chemical or improper storage or handling.

Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party: All hazardous chemical labels must include appropriate contact information.

All information contained on the Hazardous Materials Label must coincide with the information contained on the Safety Data Sheet (SDS) for the chemical.

OTHER TYPES OF LABELS

- OSHA pictograms do not replace the diamond-shaped labels that the U.S. Department of Transportation (DOT) requires for the transport of chemicals, including chemical drums, chemical totes, tanks, or other containers.
- Companies can continue to use rating systems such as National Fire Protection Association (NFPA) diamonds or Hazardous Materials Information System (HMIS) requirements for workplace labels as long as they are consistent with the requirements of the HCS. It is required that employees have immediate access to the specific hazard information.
- OSHA requires that all hazardous material containers transported in commerce be labeled according to DOT regulations and include the proper shipping name and material hazard class.
- For cylinders of 100 pounds propane capacity or less, NFPA 58 requires a warning label that includes information on the potential hazards of propane. Check to determine whether this requirement has been adopted in your jurisdiction.

Discussion Topics

1. Identify labels that are common to the propane industry and your company. Discuss how the new label standards differ from older labels.
2. Discuss the importance of understanding and recognizing all visual and text elements that are included on the labels.

Source: ***OSHA Hazard Communication Awareness Training*** (PERC)

For more information regarding labeling requirements, visit **propanesafety.com.**

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Safety Talk

Understanding the Safety Data Sheet (SDS)
An Integral Part of the Hazard Communications Toolbox

The Occupational Safety and Health Administration (OSHA) recently revised its ***Hazard Communication Standard (HCS)*** to better align with the United Nations' ***Globally Harmonized System (GHS) of Classification and Labeling of Chemicals.*** As a result, the Safety Data Sheet (SDS) will be standardized by hazard category to make information easier to locate when working with these materials.

WHAT IS AN SDS?

- ☑ A Safety Data Sheet (SDS), formerly known as a Materials Safety Data Sheet (MSDS), provides information about chemical hazards. Anyone who might come into contact with the chemical should understand potential dangers and how to safely handle the product. Although each SDS may look a bit different, they all must provide the same information. An SDS must explain, in English, how to safely use, handle, and store a hazardous chemical.
- ☑ The SDS must be updated when significant changes are made to the chemical compound or previously unknown health and physical hazards are discovered.

COMMON SECTIONS WITHIN AN SDS:

All SDSs contain the same basic sections, in the following order. Sections 12, 13, 14, and 15 are not enforced by OSHA.

- ***Section 1: Identification —*** Identifies the chemical on the SDS as well as the recommended uses. Also provides supplier contact information.
- ***Section 2: Hazards Identification —*** Explains the chemical's hazards and the appropriate warning information associated with those hazards.
- ***Section 3: Composition and Information on Ingredients —*** Indicates ingredient(s) contained in the product, including impurities and stabilizing additives. This includes information on substances, mixtures, and all chemicals where a trade secret is claimed.
- ***Section 4: First Aid Measures —*** Describes the initial care that should be given by untrained responders to an individual exposed to the chemical.
- ***Section 5: Fire-Fighting Measures —*** Provides recommendations for fighting a fire caused by the chemical.
- ***Section 6: Accidental Release Measures —*** Offers recommendations on the appropriate response to spills, leaks, or releases, including containment and cleanup practices, to prevent or minimize exposure to people, properties, or the environment.
- ***Section 7: Handling and Storage —*** Delivers guidance on the safe handling practices and conditions for safe storage of chemicals. Because many workplaces have different storage considerations and hazards on site, be sure to read your company-specific SDS for the chemical you will be working with.
- ***Section 8: Exposure Controls/Personal Protection —*** Indicates the exposure limits, engineering controls, and personal protective measures that can be used to minimize worker exposure. NOTE: You should always consult your company's PPE policy for any further instructions.
- ***Section 9: Physical and Chemical Properties —*** Identifies the physical and chemical properties associated with the substance or mixture.
- ***Section 10: Stability and Reactivity —*** Covers the reactivity hazards of the chemical and chemical stability information.
- ***Section 11: Toxicological Information —*** Identifies toxicological and health effects information or indicates that such data are not available.
- ***Section 12: Ecological Information —*** Helps evaluate the environmental impact of the chemical(s) if it were released to the environment.
- ***Section 13: Disposal Considerations —*** Offers guidance on proper disposal practices, recycling, or reclamation of the chemical(s) or its container, and safe handling practices.
- ***Section 14: Transport Information —*** Delivers guidance on classification information for shipping and transporting of hazardous chemical(s) by road, air, rail, or sea.
- ***Section 15: Regulatory Information —*** Identifies the safety, health, and environmental regulations specific for the product that are not indicated elsewhere on the SDS.
- ***Section 16: Other Information —*** Indicates when the SDS was prepared or when the last known revision was made. The SDS may also state where the changes have been made to the previous version. You may wish to contact the supplier for an explanation of the changes.

Source: *OSHA Hazard Communication Awareness Training* (PERC)

For more information regarding SDS requirements, visit **propanesafety.com.**

PROPANE education & research COUNCIL

Safety Talk

Handling, Storing, and Transferring Methanol and Other Flammable Liquids

Propane delivery drivers and plant operations personnel will come into contact with various flammable and combustible liquids that require caution. The most common is methanol, which you may need to inject into propane storage containers to displace moisture. As a toxic substance, methanol must be handled with caution.

HAZARDS OF METHANOL AND PRECAUTIONS:

- ☑ Methanol should never come in contact with your skin, eyes, or mouth. Always wear appropriate personal protective equipment (PPE) whenever you handle methanol.
- ☑ Methanol is highly flammable. Any container used for methanol must be approved for flammable liquids and equipped with a self-closing and sealing spout.
- ☑ Methanol typically does not produce a visible flame or smoke when it burns, thus a methanol fire can be difficult to detect.
- ☑ Methanol vapors in confined spaces have an effect similar to ether. Breathing methanol spilled onto clothing or the tightly closed cab of your vehicle can make you drowsy or unconscious.
- ☑ Methanol is an aggressive solvent and should be used sparingly.

Refer to the Safety Data Sheet for Methanol for additional information and precautions.

OUTDOOR STORAGE REQUIREMENTS:

- ☑ Store methanol and other flammable liquids in approved storage tanks or metal drums.
- ☑ Make sure outdoor storage areas or tanks are at least 20 feet away from propane transfer areas, and isolated from ignition sources and other combustible materials. Flammable liquids should not be stored in cylinder fill rooms or any enclosed area that has open electrical wiring.
- ☑ Make sure that drums and bulk tanks are labeled to indicate their contents and associated hazards.
- ☑ Never store filled containers in direct sunlight or near intense heat sources.

Your company may have additional guidelines regarding outdoor storage and marking for flammable liquids. Check with your supervisor.

RULES WHEN TRANSFERRING METHANOL OR OTHER FLAMMABLE LIQUIDS:

- ☑ Isolate the transfer area from potential ignition sources, and wear proper PPE throughout the operation.
- ☑ When working with metal safety cans, use an electrical bond to connect the can and the storage drum.
- ☑ Ensure liquid storage drums are grounded. Grounding may be by individual electrical wire to a grounding stake, or by connection to a common grounding strip that is electrically grounded.
- ☑ Ensure that receiving containers are approved and labeled for the liquid. The label should state the common name of the liquid, such as GASOLINE, METHANOL, NAPHTHA, or PAINT THINNER.
- ☑ Exercise care to avoid spills. In the event of a spill, clean up promptly, following your company's spill and disposal procedures.
- ☑ Never fill a methanol container 100% full. Allow room for liquids or vapors to expand.

Discussion Topics

1. Leaving a customer site, you realize that you have spilled a substance you think may be toxic onto your uniform. How do you respond?
2. During inclement weather, you have flammable liquids to transfer to outdoor tanks. Is it acceptable to store the transfer container indoors for a limited time?

LEARNING ACTIVITY

Demonstrate the correct way to ground liquid storage drums. Have participants handle the stakes and wires to ensure they are comfortable with the process.

Source: ***Propane Delivery Operations and Cylinder Delivery*** and ***Basic Plant Operations*** (PERC)

For more information about handling methanol and other flammable liquids, visit **propanesafety.com.**

PROPANE education & research COUNCIL

Safety Talk

Anhydrous Ammonia Properties and Hazards

Since some propane distributors transport both propane and anhydrous ammonia, there is the possibility of contamination of bulk propane containers. In addition to affecting propane's performance, such contamination can present safety risks. By understanding the characteristics and hazards of anhydrous ammonia, you can detect contamination and help avoid potential hazards.

PHYSICAL PROPERTIES OF ANHYDROUS AMMONIA

Anhydrous ammonia (or simply "ammonia") shares some of the same characteristics of propane, but has some notable differences to help in its detection.

- ☑ Anhydrous ammonia is a compound of nitrogen and hydrogen. Similar to propane, it is a colorless gas with a characteristic pungent odor.
- ☑ At room temperature and atmospheric pressure, anhydrous ammonia is lighter than air, whereas propane is heavier than air.
- ☑ Compressed and cooled, anhydrous ammonia is a colorless liquid and is lighter than water.
- ☑ At atmospheric pressure, its boiling point is -28°F versus -44°F for propane.
- ☑ In a closed, pressurized container, anhydrous ammonia is stored and transported as a liquid, and vaporizes when depressurized.

HAZARDS OF ANHYDROUS AMMONIA

- ☑ Anhydrous ammonia is both caustic and hazardous.
- ☑ Anhydrous ammonia is an inhalation hazard. At certain concentrations, exposure to anhydrous ammonia can disable or suffocate you.
- ☑ Direct contact with your skin or eyes can cause frostbite, burns, or blindness.
- ☑ Under certain conditions, it is flammable, chemically reactive, and potentially explosive.
- ☑ Anhydrous ammonia is corrosive to brass, copper, and their alloys. Exposure to anhydrous ammonia causes a blue-green corrosion on the brass portion of the container valve.
- ☑ Anhydrous ammonia weakens brass valves on propane containers, which can cause cracks and product leakage. Such damage can lead to violent, unexpected expulsion of the valve and cause serious injury or even death.

Always use appropriate PPE and handling procedures when working around ammonia. Make sure you are familiar with the most current Safety Data Sheet and your plant's safety protocols and know how to respond in the event of a spill or accidental exposure.

Discussion Topics

1. How do anhydrous ammonia properties differ from those of propane? Why is it important to understand these differences?
2. What kinds of PPE should be used when handling anhydrous ammonia?

LEARNING ACTIVITY

Using pictures, online resources, or actual propane containers, if available, have participants identify damage and corrosion caused by anhydrous ammonia versus other sources.

Source: ***Basic Plant Operations*** (PERC)

For more information about anhydrous ammonia properties and hazards, visit **propanesafety.com.**

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Safety Talk

Recognizing and Testing for Anhydrous Ammonia

Because of the safety hazards posed by anhydrous ammonia, propane workers should be trained and cognizant of how to detect anhydrous ammonia contamination at both the bulk plant and in portable containers. The tips below will help supplement your knowledge and ability to test for, detect, and address issues.

RECOGNIZING AND TESTING FOR CONTAMINATION IN PORTABLE CONTAINERS:

- ☑ **Odor or visual evidence.** You can recognize anhydrous ammonia contamination by its smell or by evidence of a blue-green corrosion on brass or copper fittings. If either of these signs are present, stop your activity, isolate the container, and alert your supervisor.
- ☑ **History of contamination or suspect circumstances.** If no visible signs exist, but there is reason to believe there may be an ammonia issue, perform a ***litmus test*** (see below) to determine whether that the tank is contaminated.

Contaminated containers are often purged with water in an effort to remedy. Even if this occurs, ammonia vapor may still remain. It is important to test all returning containers for evidence of such vapor, as it could damage a propane system's copper and brass components.

RECOGNIZING AND TESTING FOR CONTAMINATION IN BULK TANKS:

The best ways to recognize possible contamination in bulk storage tanks is by odor or evidence of corrosion. However, since corrosion may take time, it is important to also:

- ☑ Perform a litmus test (see below) to confirm that the tank is contaminated.
- ☑ Stop activities, isolate the container, and alert your supervisor.
- ☑ Follow your company's guidelines about what to do with the potentially affected container.

If a litmus test is positive for ammonia, stop all deliveries, secure the tank, and consult with your supervisor for the best approach to remedy.

STEPS FOR PERFORMING A LITMUS TEST:

- ☑ Obtain a bottle of distilled water; clean tweezers; a clean, dry cloth; and a package of red litmus paper.
- ☑ Remove work gloves, as they could affect litmus readings and invalidate the test.
- ☑ Clean and wipe the tweezers with the water and dry cloth.
- ☑ Remove one piece of litmus paper from the package using the tweezers. Do not allow the litmus paper to touch anything.
- ☑ Carefully soak the litmus paper with distilled water.
- ☑ Open any valve that is in the vapor space such as the service valve or fixed maximum liquid level gauge.
- ☑ Hold the paper directly in the stream of propane vapor for at least 30 seconds.

If the litmus paper remains red, verify that your company's policies allow the container to be put back into service. If the litmus paper turns blue, the propane may be contaminated with anhydrous ammonia. Notify your supervisor and follow your company's safety protocols.

Discussion Topics

1. As you unload cylinders at a site, you notice bluish discoloration around the fittings, but are unsure if it is corrosion. The customer has expressed need for immediate propane delivery. How do you respond?
2. The results of a litmus test on a propane container are inconclusive. What should be your next steps?

LEARNING ACTIVITY

Walk participants through the process of performing a litmus test. Discuss your company's specific procedures for testing for ammonia and for handling potentially contaminated tanks.

Source: ***Basic Plant Operations*** (PERC)

For more information about recognizing and testing for anhydrous ammonia, visit **propanesafety.com.**

PROPANE education & research COUNCIL

Safety Talk

Safety Precautions When Performing Maintenance Activities

It is important to use good judgment and safety practices when performing basic maintenance activities. Because these are tasks you may do less frequently, make sure to refresh your knowledge from time to time. Review your company's guidelines prior to any maintenance task, and use the following tips for support.

AVOID FIRE HAZARDS

- ☑ Remove all ignition sources, flammable liquids, and combustible materials to a safe distance away from the area you are working. Observe all precautions that apply within a Static Discharge Control Area.
- ☑ If you need to disconnect a hose or pipe to gain access to a repair area, proceed with caution as the line will likely still contain propane vapor. Follow the same precautions as you would any other time when handling propane.
- ☑ Electrical equipment, enclosures, and connections used in a bulk plant must conform to NFPA 70, to ensure that, even in the event of a failure, they cannot ignite propane. Even so, do not perform any maintenance or repairs on electrical equipment if you are not trained and certified to do so.
- ☑ When handling flammable liquids, observe the precautions on their labels and most recent Safety Data Sheets (SDSs).

AVOID PERSONAL INJURY

- ☑ When inspecting or servicing bulk plant equipment, always wear appropriate personal protective equipment (PPE), including eye protection, earplugs, footwear, gloves, hard hats, or other gear as required by your company.
- ☑ When painting storage tanks or piping, refer to the coating manufacturer's SDS for specific PPE and safety precautions.
- ☑ When climbing ladders on tanks or towers or working on elevated surfaces, injury can result from a fall. Set up on stable ground, wear PPE, and exercise caution when climbing up or down to the ground.
- ☑ Bulk plants may use forklift trucks to move heavy loads. Do not operate a forklift truck unless you are properly trained and qualified as required by OSHA. If you need to be retrained, see your supervisor.

Discussion Topics

1. Why is it important to follow the most current SDS for any chemical or gas?
2. You need to make a quick repair, but cannot access the area with your ladder. You have a durable crate that will fit the space and allow you to reach. Is it okay to use the crate?

LEARNING ACTIVITY

Review the specific maintenance activities that employees might be asked to perform at your facility. Discuss how to select PPE and safety equipment, as well as any unique precautions, for each task.

Source: ***Basic Plant Operations*** (PERC)

For more information about performing maintenance activities, visit **propanesafety.com.**

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Safety Talk

Handling Cylinders

Handling cylinders is an important part of your daily routine. The following guidelines can help you ensure against hazards, ease physical demands, and avoid injury. However, never attempt to move a propane cylinder of any kind if you feel it is too risky or do not have the necessary resources to do it safely.

TECHNIQUES FOR LIFTING, MOVING, OR CARRYING A CYLINDER:

- ☑ **Always try to reduce strain, force, and repetition.** Rotate job tasks, use different muscle groups, and keep your work positioned between your waist and chest. Eliminate any issue that increases lifting height.
- ☑ **When loading cylinders onto a truck,** push the bottoms of cylinders onto the bed to minimize shoulder strain. Organize loads to avoid unnecessary work or reloading.
- ☑ **When unloading cylinders,** remove all straps to prevent awkward body mechanics. Park the truck to minimize transport distance.
- ☑ **When carrying the cylinder,** keep it close to your body and keep your back in a neutral position. If you are placing it in a cage, do not bend at the waist when placing on the bottom shelf. Support your upper body to avoid back strain.
- ☑ **If using a handcart,** move it slowly and use your legs and upper body muscles for power. It is always better to push than pull.

If you see a falling cylinder, let it fall! Don't risk the chance of getting hit or straining yourself.

CONSIDERATIONS FOR HANDLING 420# CYLINDERS:

As one the biggest cylinders you will move without a crane, 420# cylinders require extra caution:

- ☑ Before attempting any move, review your path and clear obstacles, identify whether the cylinder is full or empty (and thus its weight), and determine what equipment or assistance is needed.
- ☑ When you need to lay the cylinder down or stand it up, get a broad base of support. Get close to the load, get a good grip on the collar, arch your back, and lift smoothly using your legs.
- ☑ If you have to drag the cylinder on the ground, use a plastic tarp to reduce friction and make the load easier to move. Use steady, smooth movements and keep your back arched.
- ☑ To move a 420# cylinder on hard surfaces, roll it on the foot ring. Keep a stable stance with your elbows close to your body.
- ☑ For soft or uneven surfaces, a cylinder can be rolled on its side if it is safe to do so. Consider:
  - — If there is gas in the cylinder, the relief valve may be in the liquid space. Do not leave the cylinder on its side any longer than necessary.
  - — The more gas there is, the harder it will be to control.
  - — The gauge float may become damaged by rolling, especially if the cylinder is empty.

Discussion Topics

1. You have spent most of the morning moving cylinders and your back and neck are starting to get sore. What should you do?
2. Shortly after you start moving a 420# cylinder, it gets stuck in soft ground conditions. What measures should be taken to remove it? Do these steps change for a filled tank versus an empty one?

LEARNING ACTIVITY

Have a 420# cylinder available and discuss how to move it safely under various conditions. Provide for hands-on practice and Q&A.

Source: ***Propane Personal Safety*** (PERC)

For more information about handling cylinders, visit **propanesafety.com.**

PROPANE education & research COUNCIL

Safety Talk

Inspecting Cylinders

As a propane delivery driver, you must visually inspect cylinders prior to filling, prior to loading, and when new cylinders are received at the bulk plant. By following the 4-step inspection process, you can ensure safety throughout the delivery process and reduce the potential for equipment failure or hazard.

STEPS FOR INSPECTING DOT/ICC CYLINDERS:

☑ **1. Check the cylinder requalification date.** Check the month and year for requalification, along with the letter (such as "S" or "E") indicating the requalification method used. If the date has passed, the cylinder must be requalified before putting back into service.

All DOT/ICC cylinders used to transport propane must be requalified 12 years after their manufacture date, and every 5, 7, or 12 years thereafter, depending on the method used for the last requalification.

☑ **2. Determine the overall fitness of the cylinder.** Carefully examine each cylinder before filling or loading for transport. Look for cracks or leaks; bulging; dents; damaged or defective valves, foot rings, or pressure relief devices; and any evidence of abuse, heat damage, or excessive rust.

Pay close attention to the valves and fittings, and check any abnormal condition reported by the customer. Remove any cylinders that do not pass your inspection.

☑ **3. Identify required cylinder markings.** Confirm that the cylinder is stamped with the following markings. If a marking is missing or illegible, remove it from service.

- Tare weight, in pounds
- Water capacity, in pounds
- Name of manufacturer
- Specification design code
- Serial number
- Manufacturer original test date
- Current requalification date
- Dip tube (DT) symbol
- Requalification identification number (RIN) *(not present on new cylinders)*

☑ **4. Identify required cylinder labels.** Labels should be readily visible during transportation, not obstruct any other required cylinder markings, and be placed against a background of contrasting color. Every cylinder must have the following labels, either separately or in a combined 3-in-1 label:

- Shipping label
- Consumer information/warning label
- OSHA warning label

Check your company policy about any other labels your site requires. Replace or apply new labels if any label is not present or is illegible.

Discussion Topics

1. Arriving to the customer site, you realize that the cylinder slated for delivery has no consumer/warning label, but appears brand-new. How should you proceed?
2. Why is it important to ensure that cylinders are requalified on their specific schedules?

LEARNING ACTIVITY

Have cylinders on site in various conditions. Ask participants to inspect each cylinder and explain whether it is fit for service or in need of repair, and what actions to take in each case.

Source: ***Propane Delivery Operations and Cylinder Delivery*** (PERC)

For more information about inspecting cylinders, visit **propanesafety.com.**

PROPANE education & research COUNCIL

Safety Talk

Filling Vehicle-Mounted ASME Tanks

In addition to filling cylinders, you may also fill motor and mobile fuel tanks mounted to a vehicle. It is your responsibility to understand how to operate filling equipment, perform routine inspections, and follow regulations to ensure safety.

PROPANE FILLING OPERATION RESPONSIBILITIES:

Be sure you are knowledgeable and comfortable with all procedures for:

- ☑ Inspecting customer containers to ensure that they are safe for filling.
- ☑ Filling containers to their proper levels and preventing overfilling.
- ☑ Communicating product information and warnings to customers.
- ☑ Maintaining a secure propane filling and transfer area.
- ☑ Shutting down and securing the filling station in an emergency.

Contact your supervisor if you need to be trained in any of these areas.

BEFORE FILLING ASME MOTOR AND MOBILE FUEL TANKS:

- ☑ Be sure no one is inside the vehicle and the vehicle ignition is turned off.
- ☑ Inspect the tank to be sure it has all the correct markings, is in good condition, and is safe for filling.
- ☑ Restrict customers from the immediate area around the liquid propane transfer operation.
- ☑ Make sure there are no ignition sources or combustible materials within 25 feet of the filling connection, or metal-working operations within 35 feet.
- ☑ Use appropriate PPE, following your company's guidelines.

If filling a motor fuel tank on an RV, be sure to turn off all appliance pilot lights and electronic ignition systems.

WHILE FILLING ASME MOTOR AND MOBILE FUEL TANKS:

- ☑ Connect the fuel hose to the tank fill valve.
- ☑ Open the vent valve on the fixed maximum liquid level gauge and check for flow. If vapor appears, continue the filling process. If liquid appears or if the valve does not operate properly, discontinue the filling process and consult your supervisor.
- ☑ Start the pump, and slowly open the value on the hose end.
- ☑ Close the hose end valve when a white mist or fog is emitted from the fixed maximum liquid level gauge, then close the fixed maximum liquid level gauge.
- ☑ Shut off the pump.
- ☑ Slowly loosen the filler adapter to vent any trapped liquid propane. Wait until it stops venting before completely disconnecting the adapter.
- ☑ Check the valve for leaks and replace the dust cap.

Discussion Topics

1. As you prepare for filling, you notice that a tank appears damaged, but the customer insists it is fine to fill. How should you proceed?
2. Why is it important to confirm that no metal-working operations are nearby the filling area?

LEARNING ACTIVITY

Practice the correct process to fill a vehicle-mounted ASME tank. Discuss safety issues and make sure participants understand how to recognize potential hazards.

Source: ***Propane Delivery Operations and Cylinder Delivery*** [PERC]

For more information about filling vehicle-mounted ASME tanks, visit **propanesafety.com.**

PROPANE education & research COUNCIL

Safety Talk

Using Cylinder Dollies and Lift Gates

Dollies and lift gates are essential equipment for delivering and moving cylinders. By understanding how to maintain and use them properly, you can help ensure safe deliveries and prevent personal injury.

MAINTAINING CYLINDER DOLLIES:

- ☑ Store dollies in a readily accessible location. Firmly secure cylinder dollies to the truck to prevent them from moving and damaging cylinders, or falling off the vehicle.
- ☑ Keep dollies in good repair. Make adjustments for loose wheels or any other issue promptly.

WHEN USING CYLINDER DOLLIES:

- ☑ Use the correct dolly for the job. ***Exchange cylinder dollies*** are for moving exchange cylinders up to 100 lbs. propane capacity. Higher-weight cylinders require a ***stationary cylinder dolly.*** Contact your supervisor if the dollies available do not match the job requirements.
- ☑ Exercise caution. Valves damaged by dropping or tipping over the cylinder can release pressurized and flammable gas.
- ☑ Wear personal protective equipment when using dollies to avoid coming into contact with liquid propane.
- ☑ Make sure any lift gate is large enough to hold the dolly so it doesn't roll when loading and unloading cylinders, especially when parked on an uneven surface.

If using a motorized dolly, follow the manufacturer's instructions.

MAINTAINING LIFT GATES:

Inspect your vehicle's lift gate frequently and make or schedule any necessary repairs. Check for:

- ☑ Low reservoir levels or hydraulic fluid leaks and proper pivot point bearing lubrication.
- ☑ Worn or damaged hydraulic hoses or fittings.
- ☑ Any damage to pinch-point warning tape or other warning labels, and replace as necessary.
- ☑ Excessive corrosion on mounting bolts, cylinder mounts, travel arms, or lift gate pieces.
- ☑ Frayed or loose cables or cable-attaching mechanisms, cracked or broken welds, misaligned arms, or other travel components.
- ☑ Loose or damaged electrical wiring.

WHEN USING LIFT GATES:

- ☑ Park your vehicle on level or near-level ground before moving the dolly and cylinders onto the lift gate.
- ☑ Never ride, or let others ride, on the lift gate unless manufacturer's instructions allow it.
- ☑ Keep your hands off the lift gate when raising and lowering to avoid a pinch-point injury.
- ☑ Keep your feet clear of the lift gate landing area, especially while folding or unfolding two-piece platforms.
- ☑ Make sure the load is centered on the lift gate, and not able to tilt or fall.
- ☑ Operate the control levers or switches from a safe position as specified in the manufacturer's operating instructions.
- ☑ Do not try to catch a load if it does fall.

Source: ***Propane Personal Safety*** (PERC)

For more information about using dollies and lift gates, visit **propanesafety.com.**

Discussion Topics

1. You are setting out on a job and need to deliver several cylinders to one location. How do you determine what equipment is sufficient?
2. What can happen if your vehicle's lift gate is not properly maintained?

LEARNING ACTIVITY

Stage various scenarios for cylinder delivery. Have participants explain what type of dolly to select for specific jobs and how to safely move, load, and stack cylinders.

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Safety Talk

Delivering Cylinders to Residential Customers

Various cylinder systems exist at residential sites. It is important to understand these systems and to use protective measures throughout the delivery and installation process. The following steps offer guidance to ensure maximum safety.

STEPS FOR DELIVERING CYLINDERS TO RESIDENTIAL CUSTOMERS:

☑ **1. Position the delivery vehicle.** Ensure the brake is set properly. Check the area for open flames or ignition sources, and confirm there are no potential hazards.

☑ **2. Inspect the cylinder installation.** The installation area must be at least 10 feet away from any combustible materials, and pigtails and valves must be clear of debris. Place the cylinder in an upright and stable position on a firm, level foundation not in contact with soil.

Cylinders must be positioned at least 3 feet away from any building opening located below the level of the relief valve discharge and at least 5 feet away from any exterior ignition source. Pressure regulators must be positioned so that rain, ice, snow, sleet, or debris cannot enter or block the regulator vent.

☑ **3. Determine if an interruption of gas service occurred.** Look for signs of pressurized propane vapor by checking the cylinder service valve, fixed maximum liquid level gauge, and propane levels. ***Follow your company's guidelines for handling out-of-gas issues.***

☑ **4. Move cylinders to the installation site.** Confirm the customer's cylinder is empty, then carefully lower the full cylinder from your vehicle to the ground and move it to the installation site. Use your lift gate and dollies as necessary.

☑ **5. Determine whether it is an automatic or a manual installation.** In an automatic installation, the system will automatically switch to its reserves. The type of installation required at the residence will help you correctly replace the cylinders.

☑ **If an automatic installation:**

- Determine which cylinder is empty and close its service value.
- Change the supply indicator so that the reserve cylinder is the supply and the new cylinder is the reserve.
- Check that the indicator has changed color and disconnect the empty cylinder.
- Replace the empty cylinder with the full one and reconnect the pigtail.
- Turn on the service valve and check the connection for leaks.

☑ **If a manual installation:**

- Determine which cylinder is empty and close its service value.
- Disconnect the pigtail from the cylinder and remove the empty cylinder.
- Properly position the full cylinder, reconnect the pigtail, and turn on the service valve.
- Check the connection for leaks and turn the service valve off.

☑ **6. Return empty cylinders.** Return empty cylinders to the truck with the protective cap secured over the service valve and the cylinder stored in an upright position for transport.

Discussion Topics

1. What is the difference between delivering cylinders for manual versus automatic installations? What key things might you have to consider?
2. Why is it important to handle and store empty cylinders on your truck with the same caution as those that are full?

LEARNING ACTIVITY

Create a residential delivery scenario where there are issues in safe parking, cylinder condition, and pressurized propane vapor. Discuss potential hazards and solutions, while ensuring safety.

Source: ***Propane Delivery Operations and Cylinder Delivery*** [PERC]

For more information about residential deliveries, visit **propanesafety.com.**

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Safety Talk

Delivering Cylinders to Commercial Customers

Commercial cylinder delivery is less complicated than residential delivery, but has additional inspection requirements to ensure commercial storage facilities meet NFPA 58 regulations. Your vigilance in facility inspection and deliveries is key to ensuring safety.

KEY POINTS FOR INSPECTING COMMERCIAL STORAGE FACILITIES:

☑ **For indoor storage facilities,** check that:

- There is at least one fire extinguisher of a minimum of 18 lb. with a B:C rating, and storage racks are in good condition to allow for adequate protection of cylinders and valves.
- Is at least 300 feet away from any additional propane storage area on the same floor inside the building.
- No more than 300 lbs. of propane are stored at the location.

Cylinders can be stored only in buildings not frequented by the public.

☑ **For outdoor storage facilities,** confirm that the storage area:

- Is at least 10 feet from doorways in public buildings with only one means of exit and at least 5 feet away in buildings with at least two independent exits.
- Is at least 5 feet from ignition sources and at least 20 feet from gas pumps.
- The storage area is at least 300 feet away from any other propane storage area, and has no trash or debris within 10 feet.
- Is at least 10 feet away from other chemicals and combustibles.
- Is away from traffic and protected by a 6-foot-high industrial fence, OR is in a lockable, ventilated metal rack to prevent tampering.
- Has at least one fire extinguisher of a minimum of 18 lb. with a B:C rating if more than 720 lbs. of propane are stored.
- Has correct markings (i.e., Flammable Gas, etc.) and product identification labels.

If the facility does not comply with all requirements, notify your supervisor immediately.

STEPS FOR DELIVERING CYLINDERS TO COMMERCIAL CUSTOMERS:

☑ 1. Park and secure the delivery vehicle in a safe and appropriate area near the cylinder storage location.

☑ 2. Inspect the storage area.

☑ 3. Remove empty cylinders from the storage area. Before loading empty cylinders onto the truck, inspect them for signs of damage and missing parts, and verify that the DOT shipping labels are readable and proper. Then load and secure empty cylinders onto the truck. Defective cylinders should be properly tagged before transporting.

☑ 4. Unload full cylinders from the vehicle. Use proper handling methods to prevent damage to the cylinder or injury to yourself and others.

☑ 5. Properly position filled cylinders in storage racks with the relief valve at the top of the cylinder communicating with the vapor space. Make sure the fixed maximum liquid level gauge and service valve are shut.

☑ 6. Complete the appropriate company paperwork.

Discussion Topics

1. While inspecting a commercial storage facility, you note that its one fire extinguisher is due for requalification. What do you do?
2. Why is it important to inspect every commercial storage facility, at every delivery?

LEARNING ACTIVITY

Stage a commercial storage area with several issues that are not in compliance. Have participants identify each issue, note why it is potentially hazardous, and explain how to remedy.

Source: ***Propane Delivery Operations and Cylinder Delivery*** [PERC]

For more information about commercial cylinder deliveries, visit **propanesafety.com.**

PROPANE education & research COUNCIL

Safety Talk

Safety Precautions When Filling Containers

When filling containers, it is essential to be extremely cautious. This process can pose a number of risks. By understanding the potential hazards and following proper procedures, you can safeguard equipment and facilities and avoid personal injury.

EXERCISE CAUTION WITH HOSES AND CONNECTIONS:

- ☑ Regularly inspect hoses and fittings to ensure they are in good condition and that there are no leaks. Check for kinks, soft spots, bulges, and wear.
- ☑ Before connecting a hose, check the ACME threads, O-rings, or gaskets for signs of wear or damage that may compromise the connection between the hose and the container.
- ☑ Exercise caution when connecting or disconnecting a hose from a container.
- ☑ Keep valve caps and plugs in place to protect threads and keep dirt and debris out. Never open a hose end valve if it is not securely connected to a container.
- ☑ Propane hoses are under pressure. If a hose breaks or a connection fails, it can thrash about. Do not approach; shut off the propane supply immediately and contact your supervisor.

AVOID PERSONAL INJURY:

- ☑ Avoid letting propane come in contact with your skin or eyes. Always wear PPE, including gloves, safety goggles, and appropriate footwear.
- ☑ Use good body mechanics when lifting cylinders. Keep your back straight, hold the load close, and lift at the waist level with a smooth movement. Do not twist your body. Distribute the weight of the load across core muscle groups.
- ☑ When moving heavy cylinders, use a wheeled dolly, verify good condition of securing straps, push instead of pull, and back down any ramps.

ELIMINATE FIRE HAZARDS:

- ☑ Remove all ignition sources, flammable liquids, and combustible materials from the filling area.
- ☑ Observe all precautions that apply within any Static Discharge Control Area.
- ☑ If you notice any damaged or malfunctioning equipment that could potentially create a propane leak, immediately shut down the liquid supply system and contact your supervisor.

KNOW AND FOLLOW EMERGENCY PROCEDURES:

Even though it is unlikely, it is important to be prepared to handle any issue or potential hazard that arises while filling containers.

- ☑ Understand how to recognize an emergency and what actions to take.
- ☑ Know your company's evacuation plan, and review it periodically.
- ☑ Your safety and the safety of the people around you come first.

Discussion Topics

1. Why is it important to regularly inspect hoses and connections before filling a container?
2. What are some signs of potential danger when connecting or disconnecting a dispensing hose?

LEARNING ACTIVITY

Have hoses on display with various issues, both major and minor. Have participants demonstrate what to look for when inspecting, and discuss potential hazards of hose and connection issues.

Source: ***Basic Plant Operations, Student Manual*** (PERC)

For more information about safety precautions when filling containers, visit **propanesafety.com.**

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Safety Talk

Requalifying DOT Cylinders by Visual Inspection

Periodic requalification ensures that DOT cylinders are in good condition and able to carry propane safely. External visual inspection (indicated by the letter "E") is a requalification method that is done by propane personnel who are trained in applicable procedures. There are four major steps in performing a visual inspection.

PREPARE THE CYLINDER FOR INSPECTION:

- ☑ Verify the requalification date to ensure that the cylinder is within the time limit since the last inspection or test date.
- ☑ Gather forms to record inspection results promptly.
- ☑ Empty and clean the cylinder to ensure any damage or defects can be seen easily.

INSPECT THE CYLINDER:

- ☑ Look for signs of wear, abuse, or damage, including exposure to fire, excess rust, or corrosion.
- ☑ Check the entire cylinder and its appurtenances (neck, valves, foot rings, OPDs, etc.) for damage, distortions, dents, gouges, or dings.
- ☑ Weigh the empty cylinder to verify that the tare weight has not been reduced by corrosion beyond a safe tolerance.
- ☑ Record all findings as completely and accurately as possible.

LEAK TEST THE CYLINDER:

- ☑ Test the cylinder for leaks by charging it with propane vapor and using a suitable leak detector solution or device.
- ☑ Remove any leaking cylinder from service immediately.

PROCESS THE CYLINDER:

- ☑ Document the cylinder disposition, and mark the cylinder appropriately.
- ☑ Cylinders that pass the requalification inspection are given a disposition of "OK" on the inspection report, marked with required information, and returned to service. Cylinders are then marked with an "E" along with the inspection date, indicating they passed external visual inspection.
- ☑ Cylinders that do not pass the inspection are given a disposition of Rejected ("R" or "RM") or Scrapped (SC) on the inspection report, marked appropriately, and removed from service for repair or condemnation.

Regardless of the cylinder disposition, the inspection report must be fully completed for each cylinder. If questions or issues arise during the visual inspection process, contact your supervisor.

Discussion Topics

1. How do you decide whether a scuff, dent, or other issue is significant enough to remove a cylinder from service?
2. As you begin your inspection, you find that the cylinder is just a week out of the time limit for requalification. How should you proceed?

LEARNING ACTIVITY

Set up several cylinders with different issues, and have participants conduct visual inspections. Complete practice paperwork and review to ensure participants understand how to correctly record all elements.

Source: ***Basic Plant Operations, Student Manual*** (PERC)

For more information about requalifying DOT cylinders , visit **propanesafety.com.**

PROPANE education & research COUNCIL

Safety Talk

Handling Out-of-Gas Situations

Propane delivery personnel will handle out-of-gas situations on occasion. These "interruptions of service" merit quick response, since they may indicate leaks or other hazards. It is important that you understand potential causes so you can remedy problems quickly. Always follow your company's policies and procedures. The following additional tips will help safeguard you and your customers.

WHEN A SITUATION IS CALLED IN BY A CUSTOMER:

Various out-of-gas situations are reported by customers and forwarded to propane delivery personnel. When talking with the homeowner before you arrive:

- ☑ Tell him/her to close all appliance valves and the valve at the tank or the main shutoff valve located in the fuel line.
- ☑ Make arrangements for the customer to be home for a leak check and return to service.

WHEN A SITUATION IS DETECTED DURING A ROUTINE SERVICE CALL:

- ☑ Personally inspect to make sure the tank or cylinder and all appliance valves are closed.
- ☑ Charge the container to operating pressure or replace the cylinder.
- ☑ Check the container and connections for leaks with an approved leak detector solution.
- ☑ Perform a leak check per your company's operating procedures.
- ☑ Fill the container.
- ☑ Put the system back in service, if it is safe to do so.

WHEN RESPONDING TO A SITUATION WHERE THE CUSTOMER IS NOT PRESENT:

It's possible that no one will be home when you discover an out-of-gas situation. If you cannot gain access to appliances to perform a leak check, follow these safety steps:

- ☑ Close the container service valve.
- ☑ Charge the container to operating pressure or replace the cylinder.
- ☑ Check the container for leaks with an approved leak detector solution.
- ☑ Fill the container. Securely fasten a warning tag to the container service valve that includes the appropriate notice.
- ☑ Leave a notice at the door that explains that the gas is turned off and that the customer needs to call to restore service.

Regardless of how an out-of-gas situation is discovered, NFPA 54 requires that the propane marketer notify all affected users any time the gas supply is turned off and that a leak check be performed before placing the system back in service.

MINIMIZING OUT-OF-GAS CALLS:

You can help minimize out-of-gas calls by:

- ☑ Monitoring customers' propane needs.
- ☑ Anticipating changing requirements, such as higher propane usage due to weather or home improvements.
- ☑ Promoting customer awareness of propane storage levels.
- ☑ Promoting company services such as "keep full service," budget billing programs, and electronic liquid level monitors.

Source: ***Propane Delivery Operations and Cylinder Delivery*** [PERC]

For more information on handling out-of-gas situations, visit **propanesafety.com.**

Discussion Topics

1. A customer continuously has an out-of-gas situation. What could be the issue?
2. A homeowner is upset about having a service technician perform a leak test and having to pay to re-establish service. Discuss how to address his concerns in light of safety issues and company policy.

LEARNING ACTIVITY

Stage a situation where a "customer" calls in an out-of-gas report. Prepare scripts on different issues and have participants talk through the situation with the customer. Discuss ways to handle each scenario.

PROPANE education & research COUNCIL

Safety Talk

Bulk Propane Delivery

Delivering bulk propane to a customer location is a common task, but conditions and equipment can pose some challenges. The following guidelines will help you avoid personal injury and ensure safe, efficient bulk propane delivery.

TO SAFELY DELIVER BULK PROPANE:

- ☑ **Use three points of contact —** Park and position the bobtail and exit using three points of contact. Make sure you are facing the truck cab when doing so.
- ☑ **Set the wheel stops* —** To avoid unnecessary back strain, support your upper body with one hand on your knee as you position the wheel stops.
- ☑ **Check your path of travel for obstacles or issues —** The area from the truck to the tank may have easy-to-spot obstacles such as toys or a bicycle. But there could be other hazards hidden in the grass or under snow or ice. Always walk the path first to make sure it's clear before pulling out the hose.
- ☑ **Ensure the hose and reel are in good working condition —** Before you set out, check the propane hose and components, and make any necessary repairs or adjustments. If the reel needs lubrication or the hose is binding, moving the hose on the job will be more difficult.
- ☑ **Put the hose over your shoulder and hold it with both hands —** Be careful to avoid strain to your shoulders and lower back. Carrying the hose under your arm or pulling the hose with your arm extended behind you can cause serious injury.
- ☑ **Avoid pointing the nozzle at any part of your body —** Always take measures to ensure you do not come into contact with liquid propane or vapors.
- ☑ **Keep your body facing forward with your shoulders over your hips —** Twisting your back while walking can result in injury.
- ☑ **Switch shoulders to balance the work across muscle groups and reduce overall stress on your body —** While you do your initial walk, plan your most efficient route. For longer paths, switch shoulders or move the hose in two stages.

*The 2014 edition of NFPA 58 has replaced the term "wheel chocks" with "wheel stops."

Discussion Topics

1. Why is it important to walk the path to the tank before pulling out the hose?
2. As you prepare to fill your customer's tank, you find the hose is not unreeling properly. How should you proceed?

LEARNING ACTIVITY

Set up a bobtail at your site and have participants practice moving the hose from truck to "tank" then back again, using these guidelines. Discuss body mechanics that could reduce the potential for injury.

Source: ***Propane Personal Safety*** (PERC)

For more information about bulk propane delivery, visit **propanesafety.com.**

PROPANE education & research COUNCIL

Safety Talk

Cargo Tank Motor Vehicle (CTMV) Emergency Shutdown Systems and Bulkhead Components

Propane workers who operate CTMVs need to understand their equipment in order to maintain high safety standards. This Safety Talk covers components and systems that are essential in unloading operations.

BULKHEAD COMPONENTS

A bulkhead may be used for both loading and unloading, or be designated for unloading only. In either case, the bulkhead includes:

- ☑ One or more liquid connections.
- ☑ One or more vapor connections used for pressure equalization.
- ☑ A breakaway system on each connection to protect the piping system. Located just above the top of a stanchion, this system allows a safe breakaway, in the event of a propane overflow or accidental vehicle pullaway.

Bobtails offer different equipment and specifications than CTMVs. The pneumatic line, backflow check valve, and excess flow valve of a CTMV will close propane valves and protect facilities and personnel in an emergency situation. Specific liquid and vapor connections need to be considered for their applicability and safety in each situation.

EMERGENCY SHUTDOWN SYSTEMS

Every CTMV is required to have an emergency activation system that, when activated, stops the flow of propane and in some cases stops the engine. These systems consist of:

- ☑ A metered delivery service with a system that automatically stops the flow of propane and shuts down the engine after five minutes unless the operator uses a handheld remote unit to respond to a query issued by the system.
- ☑ A metered delivery service that has a passive emergency shutdown system that automatically stops the flow of propane within 20 seconds without human intervention in the event of a complete delivery hose break.
- ☑ A device that otherwise manually stops the flow of propane and shuts down the engine.

Emergency shutdown systems are essential, in that they provide for needed backup support to turn off the flow of any propane and confirm no gas release or power can pose unnecessary hazard.

Discussion Topic

1. Discuss components of the bulkhead and emergency systems and make sure participants understand how each element functions and what risks are possible if any component is compromised.

LEARNING ACTIVITY

Show participants all the elements of a CTMV's emergency shutdown system and make sure they are comfortable with all relevant procedures.

Source: ***Basic Plant Operations*** [PERC]

For more information about bulkhead components and emergency shutdown systems, visit **propanesafety.com.**

PROPANE education & research COUNCIL

Safety Talk

Hazards and Precautions for Propane Transfers

When working with propane, safety is paramount. The risks and precautions that apply to basic operations, such as filling and transporting cylinders, also apply to other activities. The tips below serve as a reminder of what to be aware of and precautions to follow during all propane transfers.

SAFETY TIPS FOR ALL PROPANE TRANSFERS:

- ☑ Remove all ignition sources, flammable liquids, and combustible materials to a safe distance away from the transfer area.
- ☑ Observe all precautions that apply within the Static Discharge Control Area.
- ☑ Always wear appropriate PPE.
- ☑ Inspect hoses and fittings before making connections. Correct any deficiencies and replace damaged components before proceeding.
- ☑ Avoid dragging hoses across the ground when making connections.
- ☑ Carry valves by the body. Carrying by the handwheel or operating lever can accidentally open the valve. Aim the valve outlet away from yourself and other people.
- ☑ Know the locations and operating procedures for emergency shutoff valves.
- ☑ Know your plant's emergency evacuation procedures, and check that gates are open to provide adequate egress locations in case of emergency.
- ☑ Take special care when unloading into multiple storage tanks simultaneously. Refer to your plant's procedures to determine which liquid and vapor valves should be open and closed, and how to monitor tank levels during the transfer.
- ☑ Per DOT regulations, make sure a "qualified person" is present during every transfer operation. This person is someone who has been trained on safe work practices, health and safety hazards of propane, and emergency response procedures.
- ☑ In the case of an equipment malfunction that cannot be fixed easily, secure the component if it is safe to do so, and follow's your company's policies and procedures. In some cases, you may need to apply a lock and tag to protect people nearby and prevent any issue.

Discussion Topics

1. As you prepare to fill cylinders on a very busy day, you notice that another employee is working in an area with equipment that blocks the exit. How do you proceed?
2. Why is it important to have a qualified person in attendance during propane transfers?

LEARNING ACTIVITY

Stage a common workday scenario or use an illustration with several issues that need to be addressed. Have participants identify hazards and discuss how to remedy.

Source: ***Basic Plant Operations*** (PERC)

For more information about hazards and precautions for propane transfers, visit **propanesafety.com.**

PROPANE education & research COUNCIL

Safety Talk

Determining the Amount of Propane to be Unloaded from a Cargo Tank Motor Vehicle (CTMV)

Before unloading a CTMV, you must verify that there is sufficient space in the bulk storage tanks to hold the CTMV's contents. There are two major steps you need to take: verify the CTMV's contents and determine available storage tank capacity.

VERIFYING THE CONTENTS OF A CARGO TANK:

- ☑ Check the bill of lading to ensure the cargo tank contains propane. If the bill of lading states otherwise, or if the tank is not clearly marked PROPANE or LP-GAS, notify your supervisor.
- ☑ Verify the presence of odorant using a sniff test or other means, and document the results as dictated by your company policy.
- ☑ Check the temperature and pressure readings to make sure the load is not contaminated.
- ☑ Record the % liquid volume in the cargo tank.
- ☑ Multiply the % liquid volume by the water capacity in gallons to determine the gallons of liquid propane in the cargo tank. *For example, if the liquid level in a 10,000-gallon cargo transport tank reads 80%, the tank contains 8,000 gallons of liquid propane.*

DETERMINING THE AVAILABLE STORAGE TANK CAPACITY:

- ☑ Refer to your company policy to determine the maximum permitted filling level (MPFL) in percent for each available storage tank.
- ☑ Calculate the number of gallons of liquid propane that can be added to each tank (% available capacity) by subtracting the % liquid volume from the MPFL.

  Example: with MPFL = 80%, current capacity = 69%

  % available capacity = 80% – 69% = 11%

- ☑ Multiply the % available capacity by the water capacity (WC) in gallons to obtain the gallons that can be added to the storage tank. Gallons available capacity = % available capacity x WC in gallons.

  Example: using a 30,000-gallon bulk storage tank available capacity of 11%

  11% x 30,000 gallons = 3,300 gallons

- ☑ Once you have determined available capacity for each storage tank, you can proceed to add the specified gallons of propane to all the available storage tanks. Make sure the total available capacity is greater than the gallons of propane in the cargo tank. Do not exceed MPFL limits.

If the volume in the cargo tank exceeds the total capacity available in the storage tanks, notify your supervisor.

Discussion Topics

1. You are ready to unload a CTMV and cannot locate information on the storage tank's MPFL. How should you proceed?
2. Why is it important not to exceed MPFL limits?

LEARNING ACTIVITY

Have participants do three calculations for determining available storage tank capacity with different liquid volume values.

Source: ***Basic Plant Operations*** (PERC)

For more information about unloading propane from CTMVs, visit **propanesafety.com.**

PROPANE education & research COUNCIL

Safety Talk

Unloading a Bobtail Using a Bobtail Pump

Bobtails have different components than other bulk delivery vehicles. By familiarizing yourself with the following steps, you can ensure the safe unloading of a bobtail.

POSITION THE BOBTAIL FOR THE UNLOADING PROCESS:

As you park the bobtail, position it so that:

- ☑ Both level gauges (bobtail and receiving container) are visible.
- ☑ Shutoff valves on both the bobtail and the receiving container are readily accessible.
- ☑ The bobtail is least 10 feet from the receiving container.
- ☑ Once positioned, turn off all electrical devices, set the parking brake, and use your wheel stops* to prevent unintended movement.

CONNECT THE HOSES AND CHECK FOR LEAKS:

- ☑ Attach the bobtail hose-end valve to the bulkhead connection with an adapter OR connect the bobtail hose-end valve to the bulkhead hose-end valve with an adapter, depending on the bulkhead configuration.
- ☑ Ensure vapor equalization by connecting the bulkhead hose with the hose-end valve to the bobtail vapor connection. This will minimize wear and tear on the transfer pump and avoid unnecessary slowdown.
- ☑ Open the bulkhead valves and check connections for leaks. Signs of a leak may include the persistent odor of propane, liquid escaping as white mist, or vapor that looks like hot air rising from hot blacktop.
- ☑ If a potential leak exists, close the bulkhead valves, tighten the connections, replace damaged seals, and/or replace the adapter. If the leak persists, do not unload your bobtail and contact your supervisor.

START THE TRANSFER:

- ☑ If unloading using metered delivery service, set the meter.
- ☑ Open the bobtail discharge valves including the hose-end valve and the internal valve. Open the last valve slowly to avoid slugging an excess flow valve.
- ☑ Engage the power takeoff (PTO), set the engine RPM to the proper speed, and begin pumping. Do not start the pump until the liquid line is open.
- ☑ Monitor storage tank levels throughout the transfer to ensure against leaks or overfilling.

END THE TRANSFER:

Stop the bobtail pump when one of the following occurs:

- ☑ All storage tanks reach maximum permitted filling level (MPFL).
- ☑ The cargo tank reaches empty.

Complete the process by closing all liquid and vapor valves on the bulkhead and the cargo tank. Bleed down and disconnect the liquid hose carefully.

Discussion Topics

1. As you are about to unload a bobtail truck, you realize that it is only six feet away from the storage container. How should you handle this situation?
2. In what situations is it okay to proceed if you believe a potential leak at the connections exists?

LEARNING ACTIVITY

Practice the process of unloading a bobtail. Supervise participants in the connection, transfer, and completion, identifying problems that can occur at various stages. Review your company's procedures for addressing such issues.

*The 2014 edition of NFPA 58 has replaced the term "wheel chocks" with "wheel stops."

Source: ***Basic Plant Operations*** (PERC)

For more information about unloading a bobtail, visit **propanesafety.com.**

PROPANE education & research COUNCIL

Safety Talk

Complete Combustion and Carbon Monoxide

The efficient combustion of propane requires a ratio of 1 part propane to 24 parts air. If this ratio is off or equipment is not working properly, propane may not combust completely. Incomplete combustion can be dangerous. It is your job to understand how to detect incomplete combustion and respond swiftly.

SIGNS OF INCOMPLETE PROPANE COMBUSTION:

- ☑ **Excessive water vapor —** Can be harmful to appliances' venting systems.
- ☑ **Soot —** Potentially damaging to property.
- ☑ **Aldehydes —** Toxic gas detectable by a sharp, penetrating odor, a metallic mouth taste, or a burning sensation in the nose and eyes.

If any of these are present, follow your company's guidelines for action.

*Incomplete combustion may also result in the release of **carbon monoxide**.*

Some propane companies handle carbon monoxide detection, while others refer calls to the fire department. If your company does address these issues, use the following guidelines:

WHEN TO CHECK FOR CARBON MONOXIDE AT CUSTOMER LOCATIONS:

Carbon monoxide (CO) can be deadly. However, because CO is odorless and colorless, it can be difficult to detect. Check for CO if any of the following conditions exist:

- ☑ A customer complains of chronic headaches or nausea.
- ☑ Houseplants are dying.
- ☑ There is a chronic odor and the source or cause cannot be located.
- ☑ Excessive water vapor forms on cool surfaces in the house.
- ☑ The odor of aldehydes is present.

USING PORTABLE CO DETECTORS:

If your company provides portable CO detectors, it is important that you are trained in their use. Always follow manufacturer instructions. Keep in mind:

- ☑ Portable CO detectors should be at or close to room temperature before testing the air.
- ☑ Samples should not be taken if the air temperature is above 125°F. Thus, it may not always be possible to check flue gases directly without additional equipment.

PLACES TO CHECK FOR CARBON MONOXIDE:

Always test different areas in the house or building to determine the highest CO level. Tests for CO should occur:

- ☑ In the air at head height
- ☑ Near gas appliances
- ☑ Close to heating ducts
- ☑ Near appliance diverters and fire doors on appliances in basements or utility rooms

If an appliance is suspected as the source of CO, it may be turned off before your arrival. Take readings before it is restarted, 1–2 minutes after it is restarted, and 15 minutes after it has been on to ensure accurate CO detection.

Source: ***Basic Principles and Practices of Propane*** (PERC)

For more information about complete combustion and carbon monoxide, visit **propanesafety.com.**

Discussion Topics

1. While servicing a dryer, you notice soot around the dryer vent. How do you respond?
2. Your customer asks about carbon monoxide and ways he can protect his family. What safeguards do you recommend?

LEARNING ACTIVITY

Have participants stage a mock CO check at their building. Discuss where and how to test, and actions necessary if CO is detected.

PROPANE education & research COUNCIL

Safety Talk

Odor Complaints, Gas Leaks, and Service Interruptions

A customer complaint about a gas odor requires prompt attention. A propane leak can exist for a long time without detection. To ensure against potential hazards or downtime, respond to propane odor reports swiftly, and follow your company policy for resolution.

FIELDING ODOR REPORTS:

- ☑ Use your company's policies and procedures when taking a customer odor/gas leak call. This will help you gather the information you need to determine the source and location of a possible leak, and help you give appropriate instructions to the customer.
- ☑ If the propane odor is detected *inside* a building, instruct the customer to immediately put out all smoking materials and other open flames; do not operate lights, appliances, telephones, or cell phones; shut off the gas if it is safe to do so; and leave the area.

AT THE CUSTOMER SITE:

The odor of propane suggests its presence, but cannot signify its concentration. Since you have no way of knowing the potential risk, always follow these precautions:

- ☑ Treat all leak reports as propane gas, until proven otherwise.
- ☑ Keep the area clear of open flames and electric sparks; do not turn on electrical switches, cell phones, or flashlights in the area.
- ☑ Use NFPA 54's three-minute leak test (www.nfpa.org), or your company's preferred leak-detection methods. Be aware of any other state and local guidelines that apply, and follow them accordingly.
- ☑ Once you have determined the source and extent of the leak, follow your company's policy and procedures for ways to remedy.

SERVICE INTERRUPTIONS AND REGULATIONS:

Propane delivery interruptions may occur when:

- ☑ Cylinders or containers undergo maintenance or when they are exchanged or repaired.
- ☑ Any changes are made to the gas distribution lines.
- ☑ There is a gas leak.
- ☑ There is an equipment failure or issue with customer payment.

Know the reasons and causes of a service interruption and respond appropriately. It is your job to respond promptly to a service interruption due to an appliance malfunction, a safety shutoff, or a pilot light shutoff.

Discussion Topics

1. Your customer has just had a propane delivery and calls to report an odd smell. How do you respond? What are the key questions asked and information gathered?
2. A customer, who has been dispatched to a number of times, once again complains of a propane odor in his kitchen. How do you respond?

LEARNING ACTIVITY

Simulate an odor complaint call. Have participants take the call and follow your company's policies and procedures. Discuss circumstances where immediate action may be required, and the appropriate steps.

Source: ***Basic Principles and Practices of Propane*** (PERC)

For more information about odor complaints, visit **propanesafety.com.**

PROPANE education & research COUNCIL

Safety Talk

Odorants: Purpose, Characteristics, and Maintenance

As a clean energy source, propane is naturally odorless. Thus, to ensure safety in handling propane, a commercial odorant is added. This odorant (most often, *ethyl mercaptan*) enables easy detection of any leaks or potential hazards that may be caused by them.

THINGS TO KNOW ABOUT ODORANTS:

- ☑ **They stink —** Odorants have an unpleasant and distinctive odor to enable them to be readily identifiable. This is often referred to as a "rotten egg" smell.
- ☑ **They are stable —** Propane odorants are inert, so they do not decompose or react with propane or its distribution systems or appliances.
- ☑ **They are non-corrosive —** Odorants are noncorrosive under conditions found in gas transmission, distribution, and utilization.
- ☑ **They are spotless —** Odorants burn completely in the gas flame to form products that are not corrosive, irritating, or toxic.

Propane gas must be odorized prior to delivery to the bulk plant.

VERIFY ODORANTS AT EVERY DELIVERY AND TANK FILLING:

- ☑ Per NFPA 58, you should conduct and document a "sniff test" during any delivery or filling of tanks. This will help determine that the propane is odorized. If the odor seems excessive, this test may indicate that there are leaks or issues at the customer site that need to be remedied.
- ☑ If you suspect propane is not properly odorized, follow your company's policies for responding.

ADDING OR PRESERVING ODORANTS:

With new containers, or ones that have been left open to the atmosphere, you must take precautions to maintain odorant integrity. Follow these practices to keep odorants from oxidizing and fading:

- ☑ Purge air and moisture from the propane container.
- ☑ Keep propane containers pressurized during shipping and installation at customer locations.
- ☑ Keep valves closed on units in storage to prevent air moisture from entering the container.

"Odorant fade" does not occur in containers that are in continuous use.

Discussion Topics

1. After delivering propane to a customer site, you detect the smell of propane. Should you dismiss your concern since it could be from the delivery?
2. Discuss company and other practices for documenting propane odorants.

LEARNING ACTIVITY

Assess participants' ability to detect propane under different circumstances. Discuss methods of detection and which hazards may apply in various scenarios.

Source: ***Basic Principles and Practices of Propane*** (PERC)

For more information about propane odorants, visit **propanesafety.com.**

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Safety Talk

Verifying Propane Odorization

Because propane is flammable, DOT regulations and NFPA 58 require that propane be odorized before delivery to a bulk plant or when the shipment will bypass the bulk plant. Propane personnel are required to verify the presence of odorant at various times, typically through a "sniff test." It is essential that you understand how to perform these tests safely and document them for your company.

WHEN PERFORMING A SNIFF TEST, AT TIME OF BULK PLANT DELIVERY:

- ☑ Protect yourself by wearing appropriate personal protective equipment (PPE).
- ☑ Vent only a small amount of liquid propane.
- ☑ Sniff only after the vent is closed and the liquid propane has vaporized.
- ☑ Understand your company's policies and procedures, including how to document the presence of odorant, and what to do if you believe propane is not properly odorized.

WHEN PERFORMING A SNIFF TEST, WHILE LOADING A BOBTAIL:

- ☑ After you secure the plant liquid transfer hose to the cargo tank connection and before you fill the cargo tank, briefly open and close the transfer hose end valve.
- ☑ Vent a small amount of liquid propane through a #54 vent and then close it.
- ☑ Sniff the area immediately after the liquid vaporizes.
- ☑ ***If you can smell propane odorant,*** proceed with loading your truck.
- ☑ ***If you cannot smell propane odorant, or smell anything unusual,*** do not load the cargo tank. Contact your supervisor immediately and tell others not to load until approved by the facility manager or supervisor.
- ☑ Record your sniff test on your loading ticket, daily routing report, or other company form and proceed with the loading operation.

IF YOU CANNOT SMELL PROPANE ODORANT:

In some situations, odorant can oxidize or fade, thus producing a potential hazard. If you cannot detect propane odor via sniff test (or other measure, such as an odorometer), carefully take the following actions:

- ☑ Do not load the cargo tank or cylinder.
- ☑ Disconnect the transfer hoses and secure them in their storage racks.
- ☑ Contact your supervisor immediately.
- ☑ Warn others not to load until approved by your supervisor. Your company may also require you to close and tag the withdrawal valves on the storage container so that the propane is not distributed to consumers.

Discussion Topics

1. While loading a bobtail, you detect a smell you do not recognize. What do you do?
2. Discuss company and other practices for documenting propane odorants.

LEARNING ACTIVITY

Secure an odorometer and stain tubes and discuss alternative methods to verify odorant in different situations.

Source: ***Propane Delivery Operations and Cylinder Delivery*** (PERC)

For more information about verifying propane odorization, visit **propanesafety.com.**

PROPANE education & research COUNCIL

Safety Talk

Providing Quality Customer Service

Propane customers have different applications, requirements, and knowledge. Make it a point to understand their needs and provide helpful answers and accurate information. Positive, professional interactions are key to keeping the customers you have and developing new ones. More important, quality, trustworthy customer service is critical in promoting the safe use of propane.

TIPS FOR EVERY CUSTOMER ENCOUNTER:

- ☑ **Be on time —** Be diligent about scheduling. Allow enough time to account for necessary work and travel between appointments. Call if you run late. It's better to schedule a job for the next day than to schedule an appointment that cannot be kept.
- ☑ **Check work orders —** Before heading to a job, check order information, such as account number, address, customer name, and a description of the work to be done. This ensures you are informed about their particular situation and ready to handle it when you arrive.
- ☑ **Develop a good relationship —** Treat your customers as you would like to be treated. Wipe your shoes before entering a customer's home, be prepared to take care of the task at hand, and show your concern about their issue — regardless of the size of the job.
- ☑ **Demonstrate integrity —** Never promise a customer something that can't be done. Verify that requested services make sense for your company to handle.
- ☑ **Build trust —** Do the job right the first time. If a mistake is made, don't be afraid to admit it. Address the issue and handle it quickly.
- ☑ **Manage angry customers the right way —** Occasionally, you may deal with an angry customer. Remain calm. Be as informative as possible, and don't take hurtful words personally. Apologize for the inconvenience and do whatever is within company policy to satisfy the customer. When your work is done, ask the customer to inspect the work area to ensure they are satisfied.

THREE ESSENTIALS OF PROFESSIONALISM:

- ☑ **Personal appearance —** Customers will make a judgment on your trustworthiness by your personal appearance. Always be neat and well-groomed, with your hair trimmed and out of your face. Keep your uniform clean and mended.
- ☑ **Equipment care and maintenance —** Even if they don't know how each tool is used, customers notice its condition. Make sure all equipment is cleaned, serviced, and repaired regularly.
- ☑ **Vehicle operation —** For both appearance and safety, clean and service your vehicle regularly. Safe and courteous driving habits are a must.

TIPS FOR ONGOING INTERACTIONS AND COMMUNICATIONS:

Oftentimes, customers may need follow-up support or information. This is especially true after an installation or a repair. It is important to remain patient and courteous at all times, and clearly answer any concerns the customer may have.

- ☑ Know your company policies and procedures for documenting safety-related contacts with the customer. Be sure to note the question or concern along with your response. If your company does not have a special form for this purpose, use a service work order or delivery ticket.
- ☑ If you cannot answer a customer's question accurately or completely, refer him/her to someone who can. Start with internal staff, but don't be afraid to refer to appliance service companies if you cannot handle the issue in-house.

Discussion Topics

1. Consider the following scenario: You are stuck on one job site and have an appointment at another in less than 30 minutes. What are your options?
2. What is the best way to handle follow-up situations when the work is clearly not a good fit for your business or personnel?

LEARNING ACTIVITY

Stage a situation with an angry customer. Have participants take turns at being the customer and the company representative. Discuss how the issue could be best handled.

Source: ***Basic Principles and Practices of Propane*** (PERC)

For more information regarding customer service, visit **propanesafety.com.**

PROPANE education & research COUNCIL

Safety Talk

Mobile Crane Safety: Crane Transport

Before leaving the yard or job site, a crane operator must prepare the crane for proper transport. Travel only with the boom retracted and in a stowed position as specified by the manufacturer.

THE FOLLOWING STEPS SHOULD BE TAKEN BEFORE YOU ENTER THE CAB OF YOUR VEHICLE:

- ☑ Make sure the crane is stowed properly.
- ☑ Make sure the outriggers are stowed securely and are not extended vertically or horizontally.
- ☑ Hook and sheave assemblies should be fastened securely to prevent swinging. The vehicle should never be driven with a load on the hook.
- ☑ All cargo, tools, and controls should be secured and stored properly for transportation.
- ☑ If transporting a tank, make sure it is secured properly. Tanks should be placed on cradles or strapped to the side rails of the vehicle. Two tie-down straps should be used to limit movement.
- ☑ Properly placard the vehicle if required.

AFTER YOU ENTER THE CAB OF YOUR VEHICLE:

- ☑ Make sure all steps and hand rails are clean and not slippery.
- ☑ Use three points of contact when entering or exiting the vehicle, moving only one foot or hand off the vehicle at a time.
- ☑ Make sure the power take-off (PTO) is disengaged.
- ☑ Release the parking brake.
- ☑ Make sure you know the height and weight of the vehicle and load you are carrying to avoid any route restrictions you may encounter.
- ☑ Drive carefully to your destination. Remember that your vehicle has a higher center of gravity than a passenger car or pickup truck.
- ☑ Vehicles that have a high center of gravity are more prone to roll over if the driver has to make an evasive maneuver or leaves the road and goes onto a soft shoulder or ditch.

Discussion Topics

1. Is it safe to travel with your crane unstowed if you are going a short distance?
2. What can happen if you do not properly stow your crane and you get on the road?
3. What should you do if your vehicle leaves the road and goes onto a soft shoulder or ditch?

LEARNING ACTIVITY

Demonstrate how to prepare for proper transport with a mobile crane that is commonly used by your company. Have employees actively participate in each step.

Source: ***Mobile Crane Safety in the Propane Industry*** (PERC)

For more information regarding safe mobile crane transport, visit **propanesafety.com.**

PROPANE education & research COUNCIL

Safety Talk

Mobile Crane Safety: Rigging

Proper rigging is critical to ensure a safe and efficient lift of the load. Only trained and qualified personnel should attach rigging to a crane's hook and load. Poor or improper rigging can result in personal injury, property damage, and damage to your vehicle or crane.

BASIC RIGGING HITCHES AND CONFIGURATIONS USED TO LIFT TANKS AND CYLINDERS INCLUDE:

- ☑ Lift-approved chains attached to the tank's lifting lugs are commonly used to move empty tanks.
- ☑ A double-basket hitch can be used to lift most types of above-ground tanks that have any amount of propane in them. The hitch consists of two single-basket hitches that pass under the load. When rigging a double-basket hitch, the legs of the hitches must be kept far enough apart to provide proper balance. The angle between the load and the sling should be at least 60 degrees or greater to avoid slippage. The most stable method for horizontal containers is to place the legs of the sling or strap on the outside of the tank feet.
- ☑ A double-basket hitch can be used to lift underground tanks. Since these tanks often do not have feet, they require extra caution when rigging.

BE SURE TO FOLLOW BASIC SAFETY RULES AND PROCEDURES BEFORE EVERY LIFT:

- ☑ Know the weight of the load.
- ☑ Know the center of gravity of the load. The center of gravity can easily shift when lifting containers that have liquid propane in them.
- ☑ Select a hitch that will hold and control the load.
- ☑ Ensure that the working load limit of the rigging equipment selected is sufficient for the load being lifted.
- ☑ Inspect all rigging equipment including hooks, slings, and straps being used. If slings or straps show signs of stretching, fraying, or excess wear, do not use them.
- ☑ Ensure sufficient protection of load, slings, and other rigging equipment that could be damaged during load-handling activities.
- ☑ Keep all unnecessary personnel away from the lift area.
- ☑ Lift the load a few inches off the ground, and check rigging and balance.
- ☑ If you are assisting the crane operator, you will need to know and provide correct signals to complete the lift.

Discussion Topics

1. What can happen if a load is not properly rigged?
2. Why is it important to use a double-basket hitch when lifting tanks that have propane in them?
3. What should you do if your hook has a missing hasp or your sling is frayed?

LEARNING ACTIVITY

Walk through all the steps of rigging a particular crane at your site. Ask each employee to handle a step and explain it to others.

Source: ***Mobile Crane Safety in the Propane Industry*** (PERC)

For more information regarding safe rigging, visit **propanesafety.com.**

PROPANE education & research COUNCIL

Safety Talk

Mobile Crane Safety: Site Assessment

Proper site planning and preparation are extremely important to ensure a safe and trouble-free lift. An assessment must be conducted before you bring any vehicle or equipment on the job site.

ALTHOUGH EVERY SITE IS DIFFERENT, THERE ARE SEVERAL FACTORS AND CONDITIONS YOU ALWAYS NEED TO CONSIDER BEFORE BRINGING THE CRANE ON-SITE:

- ☑ Determine the load weight and make sure it does not overload the crane. Refer to the crane's load chart to make certain that the lift will be performed within the rated capacity of the crane.
- ☑ Check the access routes to and from the work zone to ensure the crane can safely enter and exit.
- ☑ Choose a safe route that has the least impact on the property owner's landscape. Try to avoid or limit ruts and damage to grass, plants, trees, and fences.
- ☑ Carefully examine ground conditions to verify the ground's ability to support the weight of the crane and the load. Snow, mud, sand, and soft soil conditions should be noted and accounted for.
- ☑ Locate all underground utilities and structures. The weight of the vehicle and its outriggers can puncture or collapse underground pipes, utility lines and outlets, septic tanks and septic drain fields, cisterns and water wells, and underground electric dog fences. Always ask the property owner to identify the location of all underground utilities and structures.
- ☑ The area should be fairly level. Consult your owner's manual to determine the amount of slope that your crane can tolerate. As a general rule, side slopes, shoring locations, excavations, and trenches should be avoided.
- ☑ Check for power lines and other overhead objects. Remember, tree branches and other obstructions can hide power lines.
- ☑ Determine the radius requirements of the lift. Be sure that these requirements will not cause you to enter an electrical danger zone.

Discussion Topics

1. Even if you have been to the job site in the past, do you still need to conduct a thorough site assessment before conducting a new lift? Why or why not?
2. What can happen to your crane if you set up on soft or unstable ground?
3. Why is it important to know the location of every underground utility and structure at the job site?

LEARNING ACTIVITY

Act out a site assessment on your facility premises or a nearby location. Have all participants take part, and discuss special issues that might arise during different seasons.

Source: ***Mobile Crane Safety in the Propane Industry*** (PERC)

For more information regarding mobile crane site assessment, visit **propanesafety.com.**

PROPANE education & research COUNCIL

Safety Talk

Mobile Crane Safety: Crane Operator Requirements

Qualifications for personnel to operate a crane include proper training, good physical condition, and knowledge of your responsibilities at all times.

PERSONNEL PERMITTED TO OPERATE A CRANE MUST MEET THE FOLLOWING GENERAL REQUIREMENTS:

- ☑ Be "designated" by his/her company in the inspection and safe operation of a crane.
- ☑ Be trained by an experienced and qualified crane operator. In addition, the person must demonstrate a proficiency in performing all equipment operations.
- ☑ Understand load rating charts, and know all crane components and control functions.
- ☑ Understand the manufacturer's specifications for the maintenance and safe operation of the specific crane he/she is operating.
- ☑ Have a thorough knowledge of the requirements, regulations, and safety codes pertaining to the operation of the crane. All safety decals and emergency procedures must be understood.
- ☑ Be in good physical condition. Good vision, hearing, and depth perception, and the ability to recognize colors are required. Must demonstrate sufficient strength, endurance, agility, and coordination to meet equipment operation demands.

CRANE OPERATOR RESPONSIBILITIES INCLUDE:

- ☑ Exercising care and common sense when operating a crane or driving to a work site.
- ☑ Ensuring your safety and the safety of others.
- ☑ Paying full attention and concentrating when operating a crane. Never engage in any activity that will divert or distract your attention while operating the crane controls.
- ☑ Ensuring that the equipment is operating properly. The crane should be inspected by the operator prior to each use. Promptly report the need for any adjustments or repairs, and do not operate the crane until such repairs have been made
- ☑ Never operating a crane if you are physically or mentally unfit or under the influence of alcohol, drugs, medications, or any chemicals that may impair your abilities.

Discussion Topics

1. Why is it important to be properly trained in the operation of a crane?
2. What are some of the safety implications of not operating your crane correctly?
3. If you get a call on your cell phone from your supervisor while operating a crane, what should you do?

LEARNING ACTIVITY

Ask employees to share safety-related experiences they have encountered in their jobs. What techniques do they use to avoid distraction? What suggestions do they have for others about managing their cell phones while operating a crane?

Source: ***Mobile Crane Safety in the Propane Industry*** (PERC)

For more information regarding mobile crane operator requirements, visit **propanesafety.com.**

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Safety Talk

Mobile Crane Safety: Overhead Power Line Safety

Overhead power lines are among the biggest dangers that you will encounter as a crane operator or rigger. To protect yourself, your co-workers, and bystanders from electrocution while operating your truck or crane near overhead power lines, several safe operating guidelines should be followed.

PROPER PLANNING AND RECOGNITION ARE IMPORTANT:

- ☑ Conduct a visual site assessment before moving equipment onto a job site. Identify any above- or below-ground hazards. Walk the lift route.
- ☑ Always assume that an overhead line is energized unless an electric utility authority verifies that the lines are de-energized.
- ☑ Determine the voltage of each line. If the power line has a normal voltage of 350,000 volts or less, a 20-foot minimum clearance is required from the line's danger zone. If the voltage is unknown or above 350,000 volts, a 50-foot clearance must be maintained.
- ☑ When an energized power line is near the work area, create a barrier to identify the zone that the boom, hoisting line, hook, load, or crane components should not enter.
- ☑ If the lift cannot be performed outside the minimum clearance requirement, notify your supervisor or the electric utility and have the power lines de-energized before the lift is attempted.

SAFETY PRACTICES WHEN OPERATING YOUR CRANE NEAR POWER LINES INCLUDE:

- ☑ Carefully plan all work and crane movements that may be required to eliminate any chance of contact with a power line.
- ☑ Make sure to maintain proper clearance away from power lines at all times. No portion of the crane, its load, and attachments should enter the line's danger zone. If it is windy and there is potential for the line to sway, take this into account when you determine the minimum clearance.
- ☑ Always operate in conditions where the vehicle and equipment can be stabilized. Make sure to use your outriggers. Do not set up on soft soil, mud, snow, or other unstable ground conditions that could allow equipment to shift and move within the danger zone of the power line, without taking the necessary steps to ensure the stability of the crane.
- ☑ Reduce the crane's operating speed to allow more reaction time if needed.
- ☑ If the crane operator cannot maintain a safe clearance by visual means, designate a person to observe the clearance and to give immediate warning if the crane approaches the danger zone.
- ☑ Make sure all personnel are at a safe distance away from the crane and the power line at all times.

Discussion Topics

1. If a crane operator or rigger fails to observe proper power line safety requirements, what can happen?
2. What should you do if you are unsure that all work can be performed outside of the minimum distance requirement between the power line and the crane?
3. Why is it important to know the voltage of each power line at the job site?

Source: ***Mobile Crane Safety in the Propane Industry*** (PERC)

For more information on safe crane operation near power lines, visit **propanesafety.com.**

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Safety Talk

Mobile Crane Safety: Daily Inspections

Cranes and rigging equipment must be inspected regularly to identify potentially unsafe conditions. A thorough inspection program can help to reduce equipment failures and malfunctions. Every type of crane should be inspected by the operator prior to each use. Make sure you check the manufacturer's operating manual for inspection routines and items to check for on your specific crane.

PROPER INSPECTION OF YOUR CRANE AT START-UP GENERALLY INCLUDES:

- ☑ **Vehicle and Chassis —** Check oil level, battery, lights, and brakes. Check tires for proper pressure, cuts, and loose or missing wheel lugs.
- ☑ **Operation and Safety Decals —** Make sure all load charts, safety decals, and control decals are present and legible.
- ☑ **Anti-Two-Block System (telescopic cranes) —** Check for proper operation. Inspect for cracks, grooves, or damage.
- ☑ **Hydraulic System —** Check for proper oil level. Check hoses and fittings for leaks. Use caution as hydraulic systems can contain very hot oil and can be under extreme pressure.
- ☑ **Controls —** Check all control mechanisms for proper operation of all functions. Look for leaks, cracks, and excess wear.
- ☑ **Remote Control (if applicable) —** Check all remote functions for proper operation and damage.
- ☑ **Electrical Systems —** Check all lights and alarms for proper operation.
- ☑ **Hardware —** Check pins, sheaves, nuts, and bolts for breakage, excess wear, and tightness.
- ☑ **Covers and Guards —** Check for missing or improperly maintained covers and guards.
- ☑ **Hooks —** Check for the presence and proper operation of a safety catch or hasp. Check hooks for cracks or damage.
- ☑ **Slings and Wire Ropes or Cables —** Check for frayed edges, broken strands, kinks, flat spots, and end attachments. Check wire rope traveling around drums and sheaves for damage.
- ☑ **Overall —** Check crane for damage or missing parts, leaking cylinders, and cracked welds.
- ☑ **Fire Extinguisher —** Make sure a properly sized and rated fire extinguisher that is fully charged is on the vehicle.

If any problems or deficiencies are observed during the inspection, do not operate the crane until they have been repaired or it has been determined by a qualified person that the problems do not constitute a safety hazard.

Discussion Topics

1. Why is it important to inspect your crane prior to each use?
2. How can your safety and the safety of others be at risk if a crane defect or problem is not identified and repaired in a timely manner?
3. Whose responsibility is it to keep the crane in good working order?

LEARNING ACTIVITY

Have a crane available on site and adjust it to have deficiencies (missing equipment, burnt-out light bulbs, uncharged extinguisher, etc.). Have participants inspect the crane and note problems they find. Discuss how to remedy each issue.

Source: ***Mobile Crane Safety in the Propane Industry*** (PERC)

For more information regarding mobile crane inspection, visit **propanesafety.com.**

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