

# March 2017 Safety Meeting

## Power Take-Off System Safety

The power take-off (PTO) system on a bobtail is perhaps the most useful, yet dangerous set of components a driver comes in contact with on a daily basis. A PTO system harnesses the power of the truck engine to drive the truck's propane transfer pump. This is typically accomplished by a gear transfer unit attached to the side of the transmission. This transfer unit turns a shaft that 'drives' the transfer pump. The rotating PTO shaft is perhaps the biggest danger to the driver or other persons in the area. This meeting will discuss the dangers and safety measures all drivers should remember while working around this equipment.

*Case Study: A propane transport driver in West Texas made the decision to take a closer look at an operating PTO. His light jacket became entangled and pulled him into the rotating shaft. The shaft instantaneously ripped off his left arm and part of his shoulder. His other arm received compound fractures. He lost almost half his blood volume before he was found in the early morning hours by a deputy sheriff. Miraculously, he survived!*

### Notable Hazards

There are two major hazards associated with PTOs, entanglement and mechanical failure. Let's briefly discuss both.

Entanglement occurs when a person comes in contact with the rotating PTO shaft. A typical PTO shaft rotates between 540 and 1,000 rpm and it only takes 3 seconds to wrap 20 feet of rope! If your hair or a shoe string became entangled you wouldn't have any time to react. It only takes one loose thread or a few strands of hair to start the tragic chain reaction of ugly events to follow. Bruises, contusions, loss of skin and muscle mass, broken bones, scalping and even death can occur when entanglement occurs. PTO entanglement results in some of the most grievous injuries ever encountered in the workplace.

Mechanical failure occurs when some part of the PTO system fails (typically the drive shaft) and either causes personal injury to people in close proximity to the failure or subsequent damage to surrounding components such as the cargo tank. Mechanical failures can occur without injuries but the potential for widespread damage and injuries are magnified if the failure causes a propane leak.

### Precautions

Listed below are some precautions that all drivers and propane employees should take when working around PTO assemblies:

- Keep a safe distance from the shaft when rotating. Never place any part of your body inside the frame rails of a bobtail during pumping operations.
- Frequently inspect the condition of the shaft's u-joints and grease them with approved grease compounds according to manufacturer's recommendations.

- Keep children and other unauthorized personnel away from an operating truck.
- Be aware of damage that could occur when driving your truck. Road debris could damage PTO components while operating on the highway. Inspect your PTO system prior to engaging it.
- Listen for odd noises coming from the PTO during operation. Peculiar noises could indicate an impending failure.
- Follow manufacturer's instructions for maintenance and adjustments.
- If your PTO shaft is enclosed inside a shielding system never remove it and make repairs as required!
- Never perform repair operations under the vehicle while the PTO shaft is operating.
- Never over speed a PTO assembly by increasing engine speed. Over speeding a PTO is dangerous and can damage sensitive components.
- Check for loose set screws that attach u-joint yokes to the PTO shaft. Typically, these screws are held in place by safety wires but wires can fail causing the set screws to loosen.
- Do not step on or lean over a PTO shaft.
- Always closely follow the manufacturer's instructions concerning how to engage and disengage a PTO assembly. PTOs that are improperly engaged or disengaged can be damaged, thereby creating a safety hazard and reducing service life.

#### Class Discussion

Discuss with attendees any PTO-related comments or stories that might highlight this topic. Review the care and use of the specific PTOs your company has in inventory.

#### Closing Comments

PTOs provide hours and hours of trouble-free operation. It's very easy to forget just how powerful and even deadly they can become if not treated with the utmost respect. The next time you find yourself working around a PTO take that extra measure of precaution to protect yourself and others around you.

# March 2017 Safety Test

## Power Take-Off Safety

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Instructions: Read and answer each of the following questions. When complete, grade the test and review incorrect answers so each employee is “armed” with the correct answers before they leave the training.

1. A PTO assembly requires periodic service.
  - a. True
  - b. False
  
2. PTOs on a bobtail typically drive the truck’s alternator.
  - a. True
  - b. False
  
3. PTO shafts rotate between \_\_\_\_\_ and \_\_\_\_\_ rpm.
  - a. 10, 15
  - b. 100, 150
  - c. 540, 1,000
  - d. 5400, 10,000
  
4. The two principal dangers of a PTO assembly are entanglement and mechanical failure.
  - a. True
  - b. False
  
5. PTOs should never be over sped.
  - a. True
  - b. False
  
6. According to the lesson, a rotating PTO shaft can wrap up 20 feet of rope in \_\_\_\_ seconds?
  - a. 1
  - b. 2
  - c. 3
  - d. 4
  
7. The driver need not listen for strange noises coming from a PTO assembly.
  - a. True
  - b. False

# **March 2017**

## **Answer Sheet**

1. A
2. B
3. C
4. A
5. A
6. C
7. B

## MONTHLY SAFETY MEETING MINUTES AND ATTENDANCE RECORD

**Company Name:** \_\_\_\_\_

**City:** \_\_\_\_\_ **State:** \_\_\_\_\_

**Date:** \_\_\_\_\_ **Time Started:** \_\_\_\_\_ **Time Finished:** \_\_\_\_\_

**Instructed By:** \_\_\_\_\_ **Number Attending:** \_\_\_\_\_

**Subject Covered and Comments:**

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By my signature below, I certify that I attended and participated in this Safety Meeting and I understand the material presented.

Employee Name (Please print)	Employee Signature	*License Expires	**Endorsements	***Physical Exam
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				

\*Driver licenses may be for multiple years and require HazMat testing between license renewal periods. List expiration date.

\*\*Check licenses for proper endorsements and re-testing. (HazMat) List endorsements in this column.

\*\*\*Physical Examinations are good for 2 years from the original date of the exam or sooner by Physician's request. List original exam date in this column.

By my signature below, I hereby certify that the employees listed above have been trained in accordance with the applicable regulations and curriculum for this monthly safety meeting.

**Instructor's Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_