TOOLBOX TALKS #2

Power take-off (PTO) safety

Purpose:

To promote the safe use of PTOs and ensure correct, well-maintained guarding.

Why:

To reduce the risk of serious injury or fatality when using PTOs.

TIAH Capability Framework area:

This aligns with the knowledge and skills in the Health and Safety area.
https://tiah.org/tiah-capability-framework

Talk leader instructions:

- Prepare to do the talk in a suitable/quiet location with no distractions
- Consider using some of the resources as part of the talk, e.g., showing a video
- Engage with participants, ask questions, and give everyday examples
- Conclude with a brief review
- Get everyone to sign the form. Make sure to write the name of the farm and the date. Keep a copy in your Health and Safety records
- Ensure all participants have access to a copy of this document to refer to once the session has finished. This could be electronic and emailed or printed

Notes:

tiah.org

Background

Power take-off (PTO) is the shaft that connects a power source (usually a tractor) to a piece of equipment such as a baler or mower. A basic PTO unit is made up of a spline connector and U-joint at each end and a shaft in the middle. They're extremely dangerous if used and not correctly guarded or if the guard isn't maintained regularly.

Main learning points

5 minutes

Injuries and fatalities involving PTOs

Every year people are killed or seriously injured in accidents involving PTOs and PTO drive shafts. Most of these accidents are preventable if the PTO and PTO drive shafts are fitted with guards that are well-designed, properly used and maintained.

Optional - Show this demonstration video:
https://www.youtube.com/watch?v=CcIRpSj4mk8

Optional - Take a look at this short video of what happened to one man: PTO shaft accident:
https://www.youtube.com/watch?v=gzNJrytf1g8

PTOs can spin at 540 or 1000 rpm (rotations per minute) when at operating speed. 540 rpm is 9 rotations per second, and 1000 rpm is almost 17 rotations per second! At these speeds, a person's limb can be pulled into and wrapped around a PTO stub or driveline shaft several times before the person, even if they have extremely fast reflexes, can react.

Q: What checks should you do for PTO guard shafts?

Check that the guard is:

- Made to a recognised standard such as BS EN ISO 5674
- The correct size and length for the shaft, both when closed and when extended
- A non-rotating type, with the restraining device (for example, securing chains) in place
- Properly used and maintained. Clean and lubricate guards regularly
- Supported when not connected. Don't rest it on the drawbar or drop it on the ground, and don't suspend it by the restraining device
- Safe from damage, for example, by livestock, when the machine is in store

Don't use adaptors to allow a 21-spline 1000 rpm shaft to drive a 6-spline 540 rpm shaft.

Be aware of regulation EN12965, which says collar locks are allowed on the primary drive shaft connected to the tractor. This means push-pin or certain collar locks with exposed springs are prohibited on new machines. *Push pins may be used on second-hand machines.*

Notes:

Suggestions/ ideas:

What checks should you do for PTO guard shafts? Continued…

- Check the connection between the power unit stub, PTO and machine/ equipment
- Ensure that the master shield is in position before engaging the machine/ equipment
- If the PTO guard turns when the PTO is engaged, it may be damaged or disconnected from the anchor point

Damaged PTOs or guards must be replaced before use.

Discussion points

8 minutes

Q. The basics…What do you do if a PTO guard isn't fitted?

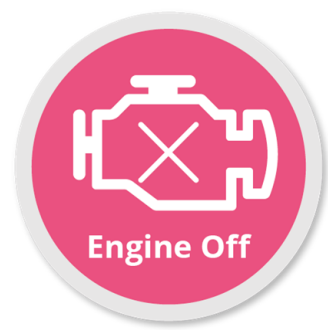
Don't, under any circumstances, use the machine. Report it. Take the machine out of use until a PTO guard is fitted.

Q. If you need to clear a blockage, what's the first thing you should do?

Disengage the power drive first by carrying out a 'safe stop'.

1. Handbrake on
Make sure the handbrake is fully applied

2. Controls in neutral
Make sure all controls and equipment are left safe



3. Engine off
Stop the engine

4. Key out
Remove the key

Q. What issues (if any) have you experienced when working with a PTO?

This could include things like issues with the chains, near misses, how to get the cover off to grease it, improper guards, etc. If there was an issue, what was the solution?

Q. When's a good time to do maintenance checks on the PTO?

It's always best to maintain a PTO before and after it was last used, before taking a break, or at the end of the day.

Q. What are some of the things you can do to work safely when using PTOs?

Answers might include things like:

- Making sure the PTO drive shaft is fitted with well-designed guards that are properly used and maintained. *If you're unsure, speak to your manager or supervisor to check*
- Never step over a rotating shaft
- Don't wear loose-fitting clothing around PTO-driven equipment
- Tie back long hair or secure it under a hat before operating equipment
- Ensure no one is too close before engaging the PTO drive, e.g., sound the tractor horn to warn bystanders
- Don't turn too sharply, as this could cause the lower links or tractor tyres to foul the PTO drive shaft. Lower link arms may need adjusting to prevent this
- Always disengage the PTO drive when making sharp turns
- Don't wear scarves or loose items such as anorak cords, which could be caught in moving parts, tie back long hair, and wear overalls or close-fitting clothing
- Make sure you've had adequate training and information if you're going to be working with PTOs
- Don't rush, take your time!

Summary/Wrap-up

1 minute

An entanglement with a PTO shaft is likely to have serious consequences. Don't rush, and don't take a chance. Get into the ha bit of doing regular checks on the PTO each time you use the machinery, making sure the PTO is well maintained and making sure damaged PTOs or guards are replaced before use.

Resources:

FSF: Safety and maintenance tips:

https://www.yellowwellies.org/pto-safety-maintenance-tips/

https://www.yellowwellies.org/working-with-machinery/

Farmers Guide: Tips on PTO safety and maintenance to combat a major cause of farm accidents:

https://www.farmersguide.co.uk/business/farm-safety/tips-on-pto-safety/

HSE: Power take-offs and power take-off drive shafts:

https://www.hse.gov.uk/pubns/ais40.pdf

bsi: BS EN 12965:2019:

https://knowledge.bsigroup.com/products/tractors-and-machinery-for-agriculture-and-forestry-power-take-off-pto-drive-shafts-and-their-guards-safety?version=standard

Toolbox Talk participants

Toolbox Talk: **Power take-off (PTO) safety**

Name of farm ……Date …….

Talk leader name……

Name	Signature	Date

Disclaimer: This Toolbox Talk is intended as a general guide and is designed to be used to help increase risk awareness, safe work practice, and personal and team development. It's not legal advice and doesn't take the place of induction, work and health and safety training.