

5.1 Explain the following contributions that increased agricultural technology has made to reduce the number and severity of agricultural related injuries.

- Fewer workers exposed to hazards
- Increased productivity
- Fewer repairs in the field
- Less exposure to livestock
- Increased safety features
- Standardization
- Required and improved training
- More automation/machine monitoring

5.2 Identify hazards when implements are attached to tractors.

- Changed center of gravity
- Added weight
- Overhead clearances may be reduced
- Visibility may be limited for operator
- Equipment is wider

5.3 Identify and explain the following four basic methods used for mounting or connecting powered implements to the tractor and give an example of each.

- Frame-mounted – (i.e. sprayer tank, mower)
- Front-mounted – (i.e. mower, powered tiller)
- Drawbar – (i.e. forage wagon, baler, manure spreader)
- Three-point hitch – (i.e. post-hole digger, plow, back blade)

5.4 Describe the safe procedures for hitching an implement to the drawbar including the following points.

- Hitching only to the drawbar
- Use safety hitch pins and safety chains
- Correct use of jack stands
- Drawbar adjustment
- Not standing between tractor and implement during hitching

5.5 Explain the importance of drawbar adjustment and clevis hitch positioning in preventing PTO-driveline damage or PTO shaft separation.

5.6 List the steps for safely hitching a three-point implement to a typical farm tractor as described in the operator’s manual.

- Check for compatibility of 3-point categories
- Check for bystanders
- Back the tractor as close to the implement as possible
- Secure the tractor
- Hitch on a flat surface
- Connect the tractor’s lower lifting arms to the lifting pins on the implement
- Connect the top (center) link to the implement
- Connect any required hydraulic hoses and/or PTO

5.7 Explain the function of the PTO-driveline system and why it can be a potential hazard to equipment operators and bystanders.

5.8 Identify and explain the difference between the two primary categories of PTO-driveline systems.

- 540 rpm
- 1000 rpm

5.9 Explain why overspeeding PTO-operated equipment can be hazardous.

5.10 Identify the following key components of the PTO-driveline system.

- Shielding
- PTO-stub shaft
- PTO shaft
- Connector
- Universal joints/yokes
- Over-running clutches
- Retaining chain

5.11 Identify the primary types of PTO-driveline shielding.

- PTO stub-shaft guard
- Master shield
- Integral-journal or “spinner” shield
- Fully-shielded universal joint
- Secured “spinner” shield
- Fully-shielded drivelines
- Tunnel shields (on older equipment)

5.12 Explain the correct procedures, as described by the operator’s manual, for safe attachment and removal of a PTO driveline to the stub-shaft of a typical agricultural tractor.

- Completely shut off tractor and power to the PTO system
- Lift the implement PTO driveline to the height of the PTO stub-shaft of the tractor
- Release the locking mechanism
- Connect the implement PTO driveline to the stub-shaft by sliding into place
- Secure and fasten all parts
- Make sure all shields are in place and functional

5.13 Explain the function of the hydraulic system.

- Transfer fluid power
- Provide rotary or linear movement
- Is less efficient

5.14 Identify the location and explain the function of the following components of a remote hydraulic system on a typical tractor-powered implement.

- Couplings
- Cylinders
- Pump
- Conduit/hoses
- Control valves (manual and solenoid)
- Motors

5.15 Describe the following hazards associated with exposure to pressurized hydraulic systems.

- Exposure to hot fluids
- High-pressure skin penetration
- Component failure or collapse
- Residual pressure

5.16 Describe the safe method for examining the hydraulic system for possible leaks.

- Shutdown all equipment
- Release all pressure on the system
- Use cardboard to check for leaks
- Never use hands
- Wear eye protection

5.17 Identify by name and explain the basic function and hazards associated with each of the following types of tractor-powered agricultural machinery.

- Forage harvesters
- Round and square balers
- Manure spreaders
- Rotary cutters/mowers
- Grinders and mixers
- Front-end loaders
- Post-hole diggers
- Chemical sprayers
- Portable augers
- TMR (total mixed ration) wagons