The Power Take-Off (PTO) is a shaft powered by farm machinery that rotates at high speeds and provide power for a wide array of implements (i.e. post hole diggers, small rotary mowers, augers, etc.) that are attached to the equipment. The PTO shaft rotates at a much faster speed than human reaction time, therefore it is necessary to take precautions to avoid dangerous situations. The PTO system or implement input driveline may connect either directly to the tractor stub, or indirectly through a pedestal connection as illustrated in the picture. Both devices are used to attach the shaft from the tractor to the implement.

**PTO stub** shaft is what transfers power to the PTO-run equipment. Moving at top speeds of 540 rpm (9 times/second) or 1,000 rpm (16.6 times/second) most incidents involving PTO stubs result from clothing being caught by an engaged and unguarded PTO stub.

**PTO drivelines** are the shafts that run from the tractor's PTO shaft stub to the machine that is to be powered. Because it is attached to the PTO stub, the driveline rotates just as fast as the stub.

The entanglement with PTOs stub and driveline can result in scalping, dismemberment, or death. Below are some statistics of incidents involving PTO entanglement according to National Agricultural Safety Database (NASD):

- Involve the tractor or machinery operator **78 percent** of the time.
- Shielding was absent or damaged in **70 percent** of the cases.
- Entanglement areas were located at the PTO coupling, either at the tractor or implement connection just over **70 percent** of the time.
- A bare shaft, spring loaded push pin or through bolt was the type of driveline component at the point of contact in nearly **63 percent** of the cases.
- Stationary equipment, such as augers, elevators, post-hole diggers, and grain mixers were involved in **50 percent** of the cases.
- Semi-stationary equipment, such as self-unloading forage wagons and feed wagons, were involved in **28 percent** of the cases.
- Nearly all incidents involving moving machinery, such as hay balers, manure spreaders, rotary mowers, etc., were non-moving at the time of the incident (the PTO was left engaged).
- Only four percent of the incidents involved no attached equipment. This means that the tractor PTO stub was the point of contact **4 percent** of the time.
Safe Operating Procedures:

- To prevent contact with spinning parts, the PTO system’s guards must include a driveline shield, a master shield, and an implement shield (see picture beside).
  - Guards shall be free from damage and maintained in a safe operation condition.
  - Regularly inspect the guards to ensure they are in safe operating condition.
  - Additional Information about PTO Shield Program can be reached on New York Center for Agricultural Medicine and Health (NYCAMH).

- Always disengage the PTO and shut off the tractor before dismounting to clean, repair, service, or adjust machinery.
  - For adjustments that require the implement being powered by the PTO (for example, when sharpening blades on a harvester), trained operators should take the following precautions to avoid the risk of entanglement:
    - Wear close fitting clothing to prevent entanglement of loose clothing parts.
    - Tie back long hair and remove any jewelry, headphone wires, straps, or anything that could become entangled.
    - Always walk around tractors and implements instead of stepping over a rotating shaft. Never come near an active PTO.
    - Do not work alone around PTO-driven machinery. If entanglement occurs, a coworker may be able to stop the PTO shaft in time to prevent more serious injury, or death.

- Keep all bystanders away from PTO-driven equipment.
- Prevent PTO driveline separation from the PTO stub when driving on irregular terrain and during turns.
  - Always use the driveline and implements recommended by the machine manufacturer.
  - Make sure that the PTO driveline is securely locked onto the tractor PTO stub shaft.
  - When driving engage power to the shaft gradually and avoid tight turns that pinch rotating shafts between the tractor and machine.
- If you are unsure, get assistance from your supervisor prior to the use of a power take-off.