

An Introduction to Traumatic Injuries and Environmental Hazards on the Farm: Part I Tractors - What the Heck is a PTO?

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A 21-year old farmer was using a tractor to power equipment that was unloading silage (chopped corn plants) into a blower to fill a silo. He decided to step over the driveline shaft behind the tractor instead of walking around. As he did so, the farmer slipped and his slightly torn sweatshirt got caught in the knuckle area where the shaft connects to the power take-off (PTO) post of the tractor. Almost immediately, his right arm was wrapped around the shaft and the shaft was spinning against the inside of his arm and chest. Fortunately, the farmer's father was nearby running the blower and was able to shut off the PTO in less than a minute and call EMS. First responders report he has multiple open fractures of his forearm and humerus and are wondering what they should do as the arm is still wrapped around the driveline shaft.

A 65 year old farmer was mowing a ditch near his farm when the tractor rolled over. The tractor had no rollover protective structure. EMS is calling you because he is alive but has a head injury, and the tractor is pinning his legs and is lying partially across his pelvis. Gas is leaking down onto the patient's face and torso. They are asking for your advice regarding how to proceed.

Introduction

Life on the farm is very dangerous. In fact, according to a Bureau of Labor and Statistics report from 2012, the agriculture, fishing and forestry sector had more occupational fatalities per 100,000 full-time equivalent workers than any other industry.¹ There are many reasons for this high rate of injury including a relative lack of safety training and personal protective device use, fatigue and carelessness, lack of emergency preparedness, and the exposure of high risk groups like children and elderly to hazardous environments.

The incidence of farm injuries is probably underestimated due to a lack of epidemiological studies surveillance data.

Less than 20 states maintain databases on farm fatalities.² Death certificates are useful, but often do not provide enough detail to determine the specific agent involved or cause of farm-related deaths. Press clippings of deaths and more serious injuries in agriculture have also been used as a surveillance tool.^{3,4} Purdue University has a database in which they have been collecting U.S. injury and death cases related to grain bin and gravity flow wagon events, and agricultural confined spaces.⁵ One of the best sources for national data is the Census of Fatal Occupational Injuries which is maintained by the Bureau of Labor Statistics.⁶ However, the incidence of less

severe agricultural injuries is largely unknown, as most occur on smaller farms where mandatory reporting is not required.

Tractor incidents are the leading cause of machinery-related death and injury on farms.^{7,8} From 2003-2011, there were 1,533 tractor-related deaths in the U.S.⁸ The tractor is an essential piece of machinery that is used nearly every day on the average farm. There are many ways that one may be injured due to the tractor's wide range of applications including pulling and powering the use of other implements both on- and off-road. Although regular maintenance of tractors includes making sure all safety equipment is functional, nonuse or lack of basic safety equipment is a major contributor to injuries. More recent safety innovations are lacking on older tractors which are still widely used across the country.

Many healthcare providers may have little or no experience or knowledge about the hazards of farm-related work. This article is the first of three in which we will introduce basic terminology, safety concerns, mechanisms of injury, and rescue information related to the agricultural environment. Knowledge of the mechanisms involved is invaluable in assessing patients with agricultural mishaps and appreciating the injuries that might result. In Part I, we will

explore the safety issues related to tractors.

Rollovers and Rollover Protective Structures

Tractor rollovers are a common cause of agriculture-related deaths and serious injuries and result in about 200 deaths per year.⁹ Most commonly these rollovers are to the side (85%) and often occur while operating on sloped land, or in a ditch while performing maintenance mowing or while driving along a road.¹⁰ Tractors have a relatively high center of gravity which makes them more vulnerable to rollovers. This can be exacerbated when a front loader on a tractor is carried too high during travel. See Figure 1.

Rear rollovers usually occur when there is an unsafe hitch attachment with a chain or winch from the tractor to a relatively immobile object that needs to be moved, such as a tree stump or farm equipment mired in mud. In such a situation, the rear tires become a pivot point if hitched higher than the tractor drawbar. Distraction usually contributes to the rollover, as focus is directed on getting the object out rather than on a potential safety hazard. The tractor can turnover in less than a second crushing the operator.

Figure 1. Front end loader. Tractor with a slightly raised front end loader.



A Rollover Protective Structure or ROPS, as it is commonly called, is a safety device designed to protect the driver in the event the tractor overturns. The ROPS is a roll bar that may be built into the cab of a tractor or be exposed in tractors without cabs. See Figure 2. All tractors with ROPS have seat belts and use of the seat belt is critical to keeping the driver within the zone of protection. Tractor rollover-related injuries and death are reduced by 99% when ROPS are combined with operator use of a seatbelt.¹¹ However, rollover injuries are still prevalent, because many tractors do not have ROPS or the seat belts are not used.

ROPS and seatbelts have been installed on virtually all new tractors sold in the U.S. since 1985 following a voluntary agreement of tractor manufacturers to improve

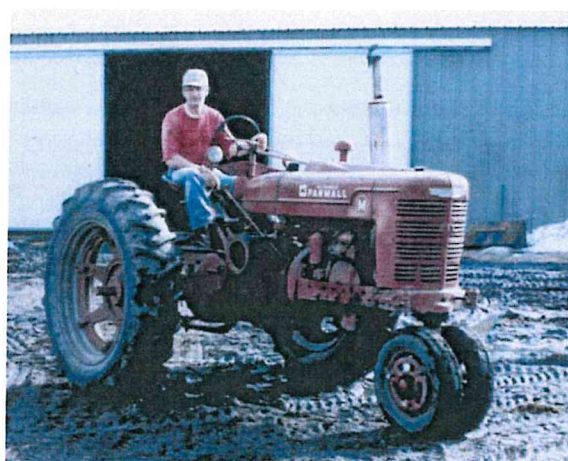
from tractor rollovers through implementation of mandatory ROPS installation.^{12, 23-25}

Unfortunately, U.S. farmers often do not use their seat belts when driving ROPS-equipped tractors.^{9, 14} Excuses for not belting include inconvenience due to frequently getting in and out of the seat during chores, being uncomfortable, and not believing that they are necessary for safety. Although a ROPS tractor cab will usually keep the driver in the critical zone of protection, operators have been thrown out of cabs during overturns and they are more likely to be injured inside the cab if not wearing a seat belt.

It should be noted that not all cabs have ROPS. Older tractors may only have a weather cab without a ROPS

Figure 2. Rollover protective structure (ROPS).

The first photo shows a tractor with a ROPS (the bar structure just behind the seat) and the second shows a farmer driving an older tractor without a ROPS.



Safety.¹² However, the average age of tractors on U.S. farms is approximately 26 years old¹³, and only about 50% of the estimated 4.8 million tractors in the U.S. have ROPS installed.^{9, 14-17} For many older tractors, manufacturers have made an aftermarket ROPS retrofit, which is available for approximately one-half of the U.S. tractors currently lacking them.^{18, 19} Purchase and installation of a ROPS retrofit has been estimated to cost between \$400 and \$2500.^{18, 20-22} This cost and the perceived lack of benefit by U.S. farmers have limited the success of retrofitting efforts.²¹ In contrast, Northern European countries have virtually eliminated fatalities which will offer very little, if

any, protection in a rollover. A cab where the seat does not have a seat belt indicates there is no ROPS (unless the seat belt was removed by a previous owner).

The key points are that a ROPS and seatbelt must be used concurrently in order to decrease rollover related injury and death²⁶, and farmers with older tractors should be encouraged to have them retrofitted with ROPS and seatbelts.²⁷ See Box 1 for tractor rollover rescue procedures from the Farm Safety Association which has been amalgamated into the Workplace Safety & Prevention Services organization in Canada.²⁸

Box 1. Tractor Rollover Rescue Procedures²⁸

- Shut off the tractor engine. Even if it isn't running, rear wheel movement could start it up.
- Always block or crib the tractor to prevent it from tipping or shifting and causing more injuries.
- If the ground is soft, it may be possible to dig the victim out from under the tractor.
- Lifting the tractor is the best way to deal with rollovers of large, modern tractors. A second tractor or a tow truck will be needed to perform the lift.
- If a tractor must be rolled away from the victim, careful blocking is required to minimize settling of the lower side.
- Place cribbing under the tractor as it is raised. Nonessential rescuers should stand well clear to avoid injury if the cable or chain breaks.
- Hydraulic jacks can be used to lift smaller tractors. Block the axle on both sides to prevent the tractor from rocking onto the victim.
- Air bags can be used to raise an overturned tractor. They are more stable if stacked alternately with the blocking.
- If a victim is pinned under one side of a small tractor, eight to 10 people may be able to roll the machine enough to free the victim.
- Fire is a threat in an overturn situation as spilled fuel may be present. A fire hose or ABC-type extinguisher should be available throughout the rescue.
- Consider alternative methods before using oxyacetylene cutting equipment to free a victim.

Extra Riders on Tractors

Studies have shown run-overs are the second leading cause of tractor-related death and that 50% of these involve an extra rider who falls off and is run over by the tractor.²⁹

³⁰ Except for specially designed tractors with a trainee seat, only the operator should be allowed on a tractor. Often, extra riders sit on fenders, stand on hitches, ride in loader buckets, or ride in the cab. The most common cause of injury with extra riders is being run over by a wheel of the tractor or equipment being towed, often after the tractor hits a bump, a person loses their grip or a fender bolt loosens.

A study from Ohio found that 97% of tractor fatalities related to extra riders were in children age 15 or younger.³¹ Despite the dangers, up to 80 percent of farm children routinely ride with family members on tractors.¹³ Parents perceive less risk when they feel in control and probably feel a false sense of security in having a child on a tractor with them. But, in fact, most fatalities result from a child falling off the tractor with their parent driving. The

only fail safe prevention is implementation of a strict no-rider rule on tractors.

Child Operators

It is typical for farm children to be driving tractors by age ten.³² Many are operating them at even younger ages and in some cases, parents have modified tractor levers and pedals to enable a smaller child to reach them. Young operators often learn to drive on older tractors that lack a ROPS which may put them at greater risk of injury should something unexpectedly happen.

Many children lack the strength to routinely and effectively operate brakes, clutches, and steering mechanisms. Due to their size, they may also lack a full field of vision compared to an adult operator.¹³ Moreover, even if a child is physically able to operate a tractor, they may not be ready mentally. Many children simply do not have the cognitive abilities to process all stimuli and make appropriate judgment calls while operating a tractor or other machinery. A Michigan/Ohio

study found that tractor operators under 14 were involved in 9 times more accidents per hour of exposure than those 25-44 years of age.³³

Children on farms often operate tractors and other machinery on roads and pose a risk to themselves and other vehicles sharing the road. Only 14 states have laws regulating youth operating tractors on public roadways and only 6 states require a driver's license to operate a tractor on a public road.^{34, 35} While there are national regulations limiting employment of those less than 16 years of age in agriculture, those regulations do not apply if working for parents or legal guardians.³⁵ See Box 2 for some recommendations related to young tractor driver development with information from the North American Guidelines for Children's Agricultural Tasks (NAGCAT).³⁶

Use on Public Roads

Tractors and other machinery are often used on public roads so that farmers may move supplies and crops from field to field or to market. This is inherently dangerous to both the machinery operator and to other motorists on the road because of the increased risk of a crash (37-39). This is most likely to occur during the fall harvest season with October usually being the worst month (40). A motor vehicle collision (MVC) with a farm vehicle is about 5 times more likely to produce a fatality than other types of MVCs (40). In addition, the non-farm vehicle driver in a crash is over 5 times more likely to be injured than the driver of the farm vehicle (41).

A major hazard of tractors and other machinery being on public roads is their speed. Most self-propelled farm

Box 2. Recommendations for Young Tractor Driver Development including information from the North American Guidelines for Children's Agricultural Tasks (NAGCAT)³⁶

- Parents should utilize NAGCAT to explore whether their child's physical, perceptual, cognitive, social and sociocultural development is advanced enough to start driving tractors.
- Before starting, adults need to make sure that:
 - All safety features are in place (rollover protection structures, seatbelts, shields, proper lighting and marking)
 - Basic service check is completed
 - Children do not operate tractors after dark or in bad weather
 - Work area has no hazards
 - Child and adult can communicate by cell phone, walkie-talkies, other methods
 - Long hair is tied up
- Parent should closely observe how they handle different situations, how often and easily the child is distracted, and how quickly they respond.
- Let the child get the feel of the tractor by performing little jobs around the homestead first.
- When ready to make the next step, have the child work in a large, open, flat field and keep a close eye at first to see how they get along.
- Parents may want to verbally test the child to see how they would handle various situations.
- WATCH constantly at first. When the child shows he or she can do the job, CHECK every few minutes. Appropriate supervision will change as a young driver gains experience and matures.
- A child should be 16 years or older to drive an articulated tractor or drive on a public road.

machinery has a maximum speed ranging between 15 and 35 mph. This can be dangerous for other motorists because it is extremely difficult to judge the speed of a slow moving vehicle (SMV). If traveling 55 mph, it only takes 5 seconds to close a gap the length of a football field on a tractor driving 15 mph.⁴² This is also true for towed equipment, as pickups and other vehicles are often used to pull machinery on public roads at slow speed. Often the machinery is wider than the lane or even the entire road, creating another hazard. Meeting another vehicle on the crest of a hill (resulting in decreased time for reaction) or while on a bridge (minimal room to maneuver) can be devastating. Therefore it is important for both the general public and farm machinery operators to be aware of these dangers, and to be patient while sharing the road.^{43,44}

Tractors making a left turn on a public road can also create a potentially dangerous situation. Often the tractor operator will swing to the right just prior to turning, in order to make a wide left turn. To a motorist, it may appear that the machinery is turning right or that the operator is moving over to allow them to pass. However, this is often not the case and a crash occurs as the farm machinery turns left into the path of the passing vehicle.

Devices that improve safety on public roads include lights and turn signals (however, a lot of farm equipment lack these), and SMV signage. Lighting and signage requirements on farm equipment vary by state.³⁵ Although all states require SMVs to have at least one headlight and taillight (some require two), there are no other universal laws. Blinking or flashing lights on farm vehicles alert traffic and may mitigate roadway crashes.⁴³

Many states, but not all, require SMV emblems on equipment traveling less than 25 mph. This emblem is a large, highly reflective orange and red colored triangular sign. See Figure 3. It should be mounted with the point facing upwards and bottom edge centered 3-6 feet above the ground on the rear of any vehicle or towed equipment traveling at speeds less than 25 mph. Unfortunately, some farm operators do not place the emblems on their equipment or fail to maintain them.¹⁶ A serious concern is that less than 30 percent of the general public is able to identify and state the meaning of the SMV emblem.³⁵

The use of pilot or escort vehicles is another way to

Figure 3. Slow moving vehicle (SMV) emblem. The SMV emblem should be mounted at the rear of any vehicle or towed equipment traveling less than 25 mph.



increase tractor and other agricultural machinery safety on public roads. Pilot vehicles drive ahead and/or behind a wide load, with the operator warning traffic of a possible hazard with the use of lights or signs.

By-Pass Starting

By-pass starting, sometimes called jump-starting, involves starting a tractor using some other means than the normal starting system. Almost always this involves starting the vehicle while standing on the ground, usually between the front and rear wheels. Farmers may do this if it is too cold to get an engine to turn over without a boost to the battery, or it may seem easier to warm up the engine by starting it using a screwdriver to arc across the starter terminals rather than climbing up onto the tractor seat and properly starting the vehicle. This creates a very dangerous situation if the tractor was previously left in gear, as the vehicle will lurch forward during by-pass starting and may run over someone on the ground, often the person who started the vehicle. This occurs so suddenly that most farmers cannot react fast enough to avoid catastrophe.⁴⁵ A strict rule of “no bypass-starting” is the best way to avoid this danger.

Duals

The term 'duals' refers to an extra set of wheels that may be added to the tractor by the operator in order to increase traction and decrease soil compaction by increasing the area of contact between the tractor and the ground. The process of adding the extra tires is hazardous due to the size and weight of the wheels, which are usually handled manually during installation. The wheels, weighing hundreds of pound each, can fall on the handler causing a crush injury.

Tire Ballast

Fluid, which is referred to as ballast, is sometimes added to tractor tires to increase their weight if extra traction is needed. Common liquids used for ballast include water, calcium chloride, ethylene chloride, propylene glycol, windshield washer fluid, methanol, and flat fill/polyurethane foam. It is an important safety issue for workers to know which fluid is in the tires, and what measures should be taken if exposed to that liquid. When adding air to fluid-filled tires, liquid can blow into one's eyes or onto the skin if the air nozzle is not completely secure on the tire. Basic first aid should be started no matter what fluid comes in contact with the skin or eyes, including flushing with copious amounts of clean water.

Loaders

Front end loaders are a very useful tractor accessory and commonplace on farms. When a loader bucket is attached to a tractor, the weight distribution of the tractor is changed. Furthermore, the weight distribution changes every time something is picked up or removed from the loader. Adding counterweights to the tractor is essential to maintain weight balance when a loader is attached.

One of the more common causes of tractor rollovers is the altered weight balance caused by front end loaders, including when working on inclines. Other potential hazards of a front end loader include people riding in the loader, or being lifted in the loader to repair objects otherwise out of reach. See Figure 4. Front end loaders are not engineered to lift people, and there are no safety features available for someone riding in the bucket.⁴⁶

Hitching

Figure 4. Front end loader being used as a lift. This is a very dangerous situation, and loaders should never be used in this manner.



tractor and is a safety hazard that is often overlooked. The act of hitching is dangerous because there is usually one person standing between the implement and the tractor to ensure proper alignment, while another person is operating the tractor. The person on the ground is susceptible to crush injuries and being run over.

One needs to ensure proper safety when disconnecting an implement from a tractor or other vehicle as well. The implement should be parked on a flat surface with wheel stops placed in front of and behind the implement wheels to prevent it from rolling on its own. Common wheel stops, or chocks, include pieces of wood, cement block or bricks.

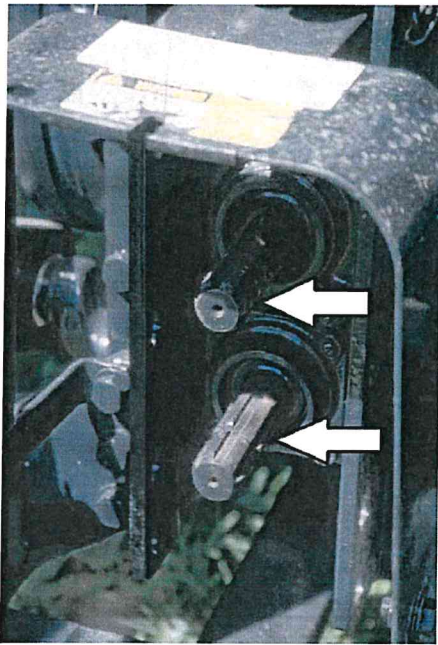
Improper hitching is another area of concern. Tractors have areas that are meant for attaching loads, including a drawbar or three point attachment depending on the load. Attaching the load to an incorrect area of the tractor is a very common cause of rear rollovers (see rollover section above).⁴⁶

Power Take-Off (PTO)

A PTO is a post at the back of the tractor that transfers power from the tractor to another implement such as a grain auger, manure spreader, or hay baler. See Figure 5. Implements which utilize a PTO have a driveline shaft which connects to the PTO post of the tractor via a knuckle area at the end of the shaft called a U-joint. When the

tractor PTO is engaged, the connected driveline shaft spins under power from the tractor's engine, providing power to move the implement's component parts. The PTO spins fast, the usual standard is 540-1000 revolutions per minute (RPM) or about 9-16 rotations per second, and in a clockwise direction.

Figure 5. Power take-off (PTO). The PTO is a post (in this case, two posts) at the back of the tractor which can be used to transfer power to another implement to move its component parts. The implement connects to the PTO via a driveline shaft which has a U-joint at the end of it.

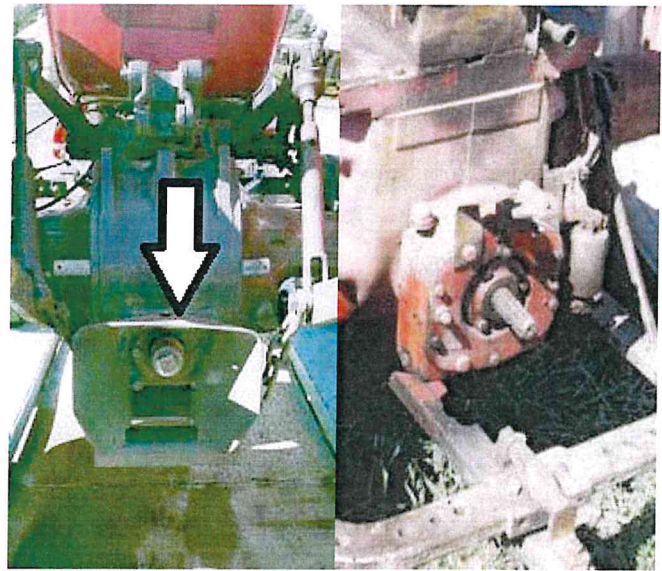


The most common mechanism of injury is when a piece of loose clothing or hair gets caught around the spinning shaft, usually at the U-joint where it is connected to the tractor or where the two parts of the driveline shaft slide together. Once caught around the shaft, there is no time for the person to react due to its high rate of speed, and the person may be pulled into and around the shaft resulting in limb fractures, amputations, and even death. In fact, of the 674 cases involving a PTO identified in the U.S. from 1970-2003, 40% of them were deaths, and about 40% of the survivors whose injuries were known had suffered an amputation.⁴⁷

Shielding is standard equipment on PTO units and has

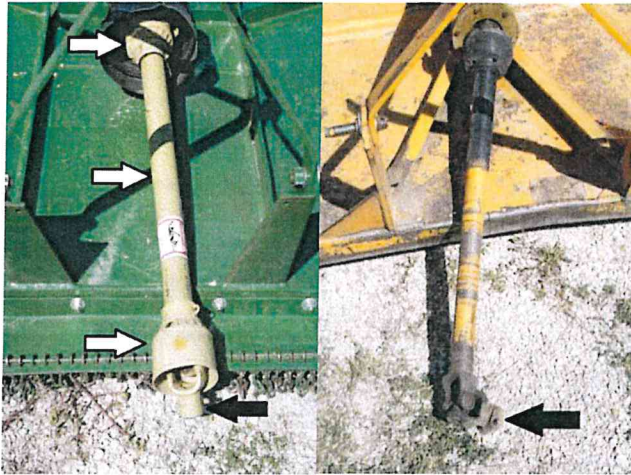
greatly reduced the danger of using new equipment. This includes master shields over the tractor PTO post (see Figure 6) and driveline guards and power input connection guards over the driveline shaft of implements (see Figure 7). However, these shields are easily removed for maintenance and are often not replaced.¹⁶ Since 1994, the industry standard is that all master shields for PTO tractor posts are hinged to facilitate servicing and this has been very effective in preventing routine removal. Still, there are countless old, modified, damaged and unguarded PTOs and driveline shafts that are presently being used that are dangerous. In one study, shielding was either missing or damaged in 70% of PTO entanglement injuries.⁴⁸

Figure 6. Master shield. The first photo shows a tractor with a master shield over the PTO post. In the second photo, the master shield has been removed, probably for servicing, and never replaced. This increases the danger of possible entanglement when the PTO is being used.



It is important to replace PTO master and driveline shaft shields after performing maintenance. Replacements may be purchased if they are worn out or missing. Many companies even offer free replacement PTO master shields and decals. Driveline shaft shields can usually be purchased for \$50 or less. Unfortunately, farmers are often reluctant to replace shields due to the time involved, and often prefer to accept the increased risk.⁴⁹

Figure 7. Driveline and power input connection guards. The first photo shows an implement with these guards in place (see white arrows) and the second photo demonstrates an unguarded driveline shaft. At the end of the shaft is the U-joint (see black arrows) which connects to the PTO post of a tractor.



Seventy-eight percent of PTO injuries involve the machinery operator.⁴⁸ One should never wear loose clothing when operating machinery, especially around PTOs. Shirt tails, shirt sleeves, and pant legs should be tucked in tight. A study has shown that lighter materials such as cotton thread as compared to heavier materials such as leather bootlaces, and longer material as

compared to shorter, are more likely to become entangled.⁵⁰ One should never have loose hair around PTOs as there have been many reports of scalping injuries, especially in females.^{47,51} It is also important to not exit or enter a tractor from the rear when the PTO is attached and the tractor is running as this may accidentally engage the PTO starting mechanism. In addition, the tractor engine should be shut off completely when doing any maintenance, as most injuries occur when the tractor is idling. See Box 3 for National Institute of Occupational Safety and Health (NIOSH) recommendations to prevent PTO and driveline injuries.⁵²

If someone is injured by a PTO shaft, a basic set of safety steps should be followed during rescue efforts. First, make sure the source of power is turned off and disconnect the implement driveline shaft from the tractor PTO post. The rescuer may need to turn the shaft in a counter clockwise direction to free the person. Most implement driveline shafts have two components that facilitate attachment to the tractor (a male shaft sliding into the female shaft). If one pulls the shaft straight out after disconnecting it from the tractor, it may come apart into the 2 pieces, making it easier to free the person. It is also acceptable to bring the entire shaft with the person into the Emergency Department. See Box 4 for PTO rescue procedures from the Farm Safety Association which has been amalgamated into the Workplace Safety & Prevention Services organization in Canada.²⁸

Box 3. Recommendations to Prevent PTO and Driveline Injuries from the National Institute of Occupational Safety and Health (NIOSH)⁵²

- Always disengage the PTO and turn off the tractor ignition before leaving the tractor seat and approaching the driveline.
- Do not perform maintenance or adjustments until both the driveline and the machinery have completely stopped moving.
- Follow the manufacturer's instructions whenever maintenance or adjustments are performed on any farm machinery.
- Warn anyone who might come near an operating PTO about the entanglement hazard.
- Instruct all farm family children and untrained adolescents never to approach, operate, or perform maintenance on PTO-driven machinery.
- Do not wear loose-fitting clothing or jewelry near operating farm machinery.
- Tie back or otherwise secure loose hair, but be aware that even short or tied-back hair may become entangled in moving equipment.

Box 4. PTO Rescue Procedures²⁸

Always start by shutting off the tractor and making sure it will not restart.

- Next, chock the tractor wheels so that the tractor cannot move.
- There are several methods that can be used to remove a victim from a PTO shaft:
 1. Disconnect the PTO shaft from the rest of the tractor, and turn the shaft counterclockwise to unwrap the tightly wrapped cloth and tissue that may be around the shaft. This material will not slip off the shaft after the PTO shaft is disconnected, but must be unwrapped.
 2. Place the PTO drive unit in neutral and turn the PTO shaft counterclockwise to unwrap the person from the shaft. This may require using a large pipe wrench or putting a small shaft or bar into the yoke of the PTO unit and turning with considerable pressure.
 3. You may be able to disconnect the hitch pin that attaches the trailing equipment to the tractor and move the tractor forward to pull the PTO shaft apart. After the PTO shaft separates into two parts, you will have to turn the shaft counterclockwise to remove the victim. If the shaft is solid, the rescuers may have to cut it with a cutting device such as a portable power grinder, hacksaw or oxyacetylene torch.
- If there are combustible materials in the area, rescuers should be extremely careful when using any type of flame-producing equipment, or even portable grinders that produce sparks. If such equipment must be used, adequate fire equipment must be readily available in case a fire starts. If explosive products such as gasoline have been spilled in the area, open flames must not be used. In this case, rescuers and observers should be alert and not smoke in the area.
- While the victim is being removed from the PTO shaft, other rescuers must provide life support to the victim and monitor vital signs continuously. Extrication is only the first step of saving the victim's life.
- If an arm, foot, leg or other part of the body was amputated, it should be located and handled properly for possible reattachment and transported with the victim.

Summary

This article is the first of three intended to be a resource for health professionals across the spectrum wishing to become more knowledgeable about deaths and injuries associated with agricultural work and their prevention or treatment. In Part I, we have focused on tractor-related injuries. See Box 5 for a summary of

tractor safety recommendations from the Centers for Disease Control and Prevention (CDC).⁵³ Awareness of the varied and ever present hazards in the farm workplace, and how that might impact the rescue and treatment of related injuries is essential to the well-being of ranchers and farmers, as well as their families and employees.

Box 5. Tractor Safety Recommendations from the Centers of Disease Control and Prevention (CDC)⁵³


- All tractors should be equipped with a rollover protective structure (ROPS). Limit use of tractors not equipped with ROPS.
- A seatbelt should always be used when operating a tractor equipped with ROPS.
- Avoid crossing slopes whenever possible and use appropriate speeds for the operating conditions.
- Do not allow extra riders on tractors and other farm equipment; follow the “ONE SEAT-ONE RIDER” rule.
- Hitch only to the drawbar and hitch points that the manufacturer recommends.
- When transporting materials using a loader, keep bucket in lowered position.
- Lower hydraulic equipment to the ground when not in use; raised equipment can lower suddenly if the hydraulic lines lose pressure—crushing anything, or anyone, underneath.
- Use available handholds and care when getting on or off the tractor; slips and falls cause injuries.
- Know and follow medication labeling; some medications may impair judgment and/or ability to operate vehicles or machinery.
- Always start the tractor from the operator’s seat with the transmission and power takeoff in neutral and the parking brake engaged. You should never bypass-start a tractor.
- Always disengage the PTO and turn off the tractor ignition before leaving the tractor seat and approaching the driveline.
- Ensure that tractors are properly shut down after each use.

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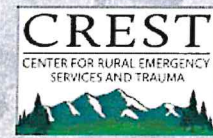


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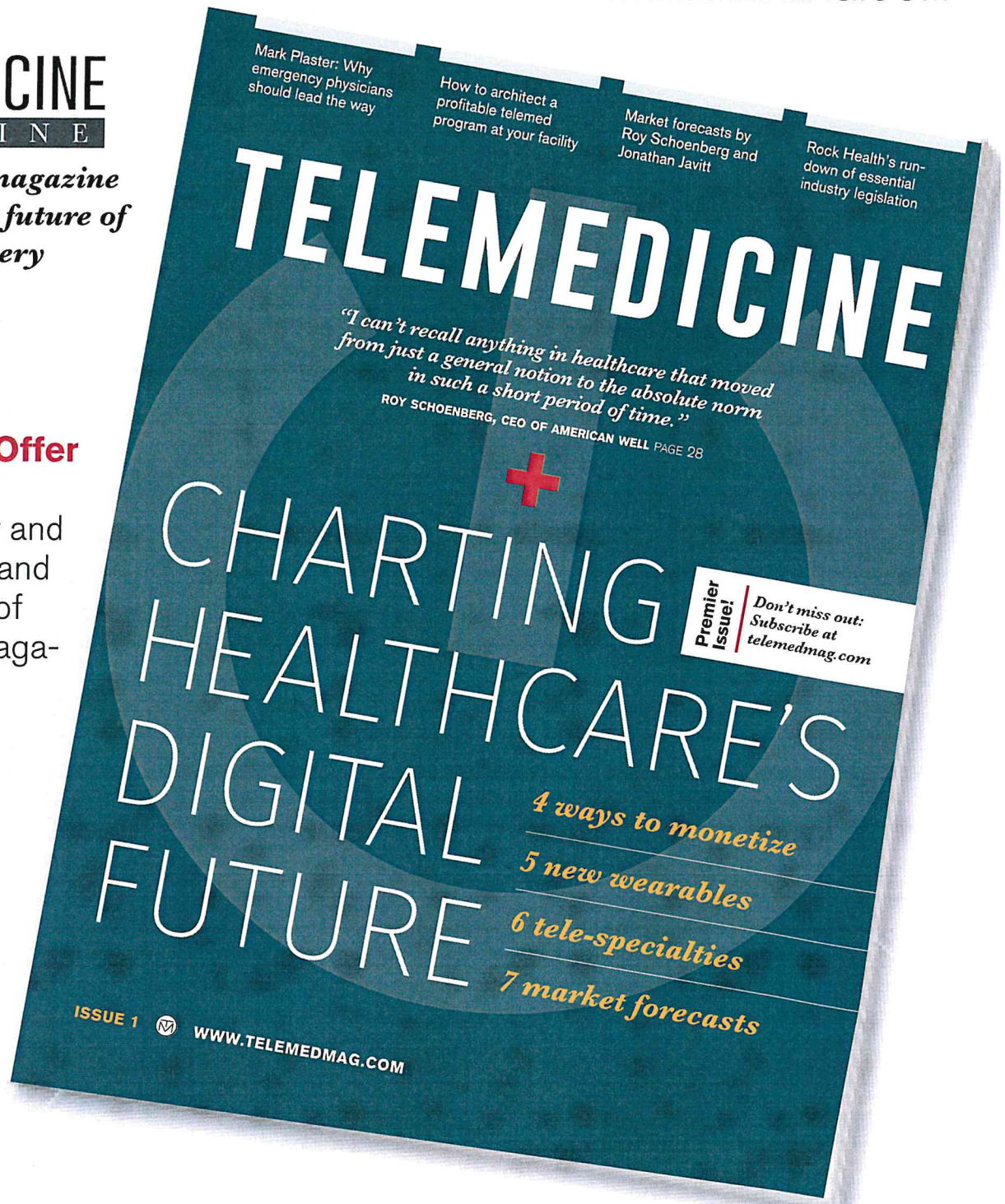
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