

## Tractor, Machinery and Equipment Safety

Machinery and equipment safety is a major concern in agricultural operations. When working around machinery and equipment such as tractors, trailers, PTOs, harvesting machinery, etc., it is important to take safety precautions. Observing safety rules and taking appropriate precautions can prevent injury, or save your life or the life of a co-worker. Prevention techniques are a must if one is to work safely around this machinery.

### TRACTORS

Tractor incidents are the leading source of death and injury on farms<sup>1</sup>. According to the U.S. Department of Labor, there was an average of 265 worker deaths per year in tractor-related incidents from 1992 to 2002<sup>2</sup>.

Prevention of these tractor related incidents include proper maintenance, training and enforcement of safe operation and rules. Injuries and deaths have resulted from lack of roll-over protection structure (ROPS), lack of proper guarding of power take off shafts (PTOS), improper or non-use of seatbelts and improper operation of the tractor. This includes excessive speed, driving on too steep an incline, inexperienced or immature drivers, and operators under the influence of alcohol or drugs and fatigue.

Spending hour after hour in the field can become monotonous and, in some cases, can lead to carelessness. One tip for staying alert -- the use of ear plugs can help reduce fatigue caused by the constant noise of the tractor, even when equipped with a cab.

**Tractor operators need to be trained to practice the following safety procedures:**

- Know your tractor. Prior to operating your tractor, review your tractor operator's manual. Each tractor is different.
- Perform a pre-check prior to operating the tractor. Make sure your tractor is in good working condition.
- Check to insure that the tractor is properly set up with roll-over protection (ROPS) and seat belts are in working order. If your tractor has ROPS - wear your seatbelt. According to research, when used in combination, roll bars and seatbelts are 98% effective in preventing tractor-related injuries and deaths<sup>3</sup>.
- Start your tractor only when you are in the driver's seat.
- Don't try to "by-pass" start a tractor.
- In the event you need to jump start your tractor, use extreme precaution and proper equipment. Jumper cables should be in good condition. Be sure to use eye protection when using jumper cables. After hooking up the jumper cables, return to the driver's seat before attempting to turn on the ignition.
- Never start a tractor from the ground. Tractors can and do run over people.
- Always turn off the tractor engine when fueling.
- Turn off the engine before dismounting the tractor. People are injured and killed each year as the result of being run over by a tractor.

**The Experienced  
Workers'  
Compensation**

- Never get off a tractor that is running.
- NO RIDERS! Tractors are designed to carry only the driver.
- Keep small children away from tractors and equipment. Each year, hundreds of kids are injured or killed as a result of falling from the tractor or piece of equipment.
- Know the terrain you will encounter and plan accordingly.
- Use extra care when driving on uneven ground such as incline.
- Keep a tractor in gear when going downhill, allowing the engine to serve as a brake.
- Use precaution when backing up a slope. If the center of gravity moves to a point behind where the rear wheels are in contact with the ground, a tractor can roll over.
- Balance your load, including the weight of the load on a trailer or implement, and keep wheels spread wide apart whenever possible.
- Reduce speed before turning, especially when using a loader.
- Take extra precaution when making tight turns. A tractor can pivot around an axle and flip over. Reduce your speed.
- Shield moving parts. Shields provided by the manufacturer should be kept in place at all times, except when servicing.
- Never attach a post or log to the rear wheels when the tractor is stuck in the mud.
- Carry a first aid kit and dry chemical extinguisher on the tractor.

## IMPLEMENTS AND TRAILERS

- Inspect equipment prior to use. Make sure it is in good working order.
- Guard all nip, pinch, shear and pull-in points.
- Hydraulic lines must be securely fastened and in good condition. Repair leaky lines prior to use.
- Assure all "stops" and "speeds" are set correctly.
- Always hitch and unhitch on solid, level ground.
- Ask a co-worker to "stay clear," and help guide you into position.
- Always use two people to lift trailer and implement tongues, use jacks and stands when possible.
- Hitch only to your tractor's drawbar. Never hitch to the axle or other high point. Take up slack slowly, never jerk.
- Always use the proper hitch pins.
- Never connect or disconnect hydraulic hoses when your engine is running.
- When hitching and unhitching equipment, it may be necessary to "chock" tractor or trailer wheels.
- Keep the hitch as low as possible, preferably 17 inches. Never let the hitch get above 21 inches.
- Never attempt to adjust, clear, clean or repair implements while running. If this must be done, follow procedures outlined in the operator's manual carefully.
- Be careful of free wheeling parts -- watch and listen for motion.
- Reduce speed to idle, turn off the engine and set the brake before dismounting machinery.

- Never allow riders on machinery, trailers or other equipment you are using.
- Recognize stored energy in springs, hydraulic systems, raised loads, etc. Follow your operator's manual when releasing this stored energy.
- When using trailers, make sure that they are in good working condition. Check that tires are in good condition and properly maintained. Never use a trailer with cracked stringers. Broken rack boards and protruding nails or bolts can cause injuries.

### OVER THE ROAD SAFETY

When planning to drive over a hard roadway, the following are some important steps to follow:

- Adjust ballast for road transport
- Adjust and lock the wheel brake pedals together.
- If your tractor is 4-wheel drive, disengage before running on hard surface.
- If your tractor is 2-wheel drive, do not engage the differential lock when driving on a hard surface.
- Keep loaders, buckets and implements "low" during transport.
- Make sure all pins and safety chains are properly in place.

### POWER TAKEOFF

Operating power take off shafts (PTO) is the cause of many accidents every year in farming operations. The PTO comes with protective shields -- use them whenever the equipment is in use. It is absolutely critical that PTO shields be kept in place. An unguarded shaft, running at 1000 rpm's can wrap material, such as clothing, around it at the rate of eight feet per second.

### SUMMARY

One of the most important factors in reducing machinery and equipment incidents is that you know the equipment you work with including the specific hazards and understand and follow the proper safe operating procedures. While proper training and enforcement of safety rules are critical, no amount of knowledge will protect you from equipment related accidents unless it is serviced and maintained in good condition.

This Risk Management Bulletin is intended to give you a general overview of proper safety procedures when operating your equipment. However, every piece of equipment is different; make sure you are thoroughly familiar and provide specific training on any tractor or piece of machinery or equipment you work on. Read the manual and plan your training accordingly.

For additional information or assistance, contact your Safety & Health consultant.

<sup>1</sup> National Safety Council, 2005

<sup>2</sup> U.S. Department of Labor's Census of Fatal Occupational Injuries, 2002

<sup>3</sup> Seatbelt use during tractor overturns. Myers ML, Cole HP, Westneat SC. University of Kentucky, Lexington, USA. melmyers@bellsouth.net