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Farm Machinery and Equipment Safety Part II: Preventing Machinery Accidents During Operation¹

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It is important to be safety conscious when dealing with any job that requires the use of machinery. Statistics show that the majority of machinery-related accidents occur as the result of human negligence. Errors include: taking shortcuts to save time; failure to read the operator's manual; ignoring a warning; improper or lack of instruction; failure to follow safety rules; and improper or lack of maintenance

OPERATION OF FARM MACHINERY

The operation of farm machinery is serious business, and should be treated as such. To avoid any type of machinery-related injury strict safety practices must be employed.

- Never operate machinery under the influence of drugs or alcohol. The operator not only puts him/herself in danger but also anyone who may be working with them or in the general area. There is never an exception to this rule.
- Before allowing anyone to use a power tool or piece of equipment whether it be a family member, friend or an employee, the person should have complete training in the item to be used, and be made aware of hazards that may occur with its misuse. Training should be done by a person knowledgeable of that particular piece of equipment. Besides actual training

programs, manuals should be read from cover to cover.

- Protective clothing should be worn during the operation of farm machinery. Never wear baggy or loose fitting shirts or pants. Loose clothing is easily caught in rotating machine parts. Once caught in a moving part, it is almost impossible to escape without injury.
- Most machinery is designed for one rider, not two or three. This rule should be strictly enforced. Research conducted in Ohio found that 1% of tractor fatalities in that state involved extra riders; 73% of these victims were under 10 years old. In 42% of the cases the driver was the father or a brother, and 24% of the drivers were between the ages of 11 and 15⁸.
- Do not allow anyone to ride on machinery except the driver because they can easily be thrown or knocked off the vehicle.
- Persons should not be allowed to ride in the bucket of loaders, on tongues between truck/tractor and the implement, or on any implement being towed. In the instance when a rider on an implement such as a hay wagon is necessary, extra precautions should be taken to avoid any injury to this person.

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- Keep all people away from work areas and working machinery unless they are actively involved in the work. Many people are needlessly injured when watching, simply because they are unaware that they are in the way of flying debris or the machine itself. Most are also wearing inadequate protection.
- Motors should be shut-down on any piece of equipment that is being refueled. Employees should be instructed on how to properly refuel equipment; do periodic maintenance checks on the tank, pump, hose, nozzle; and to abide by safety rules such as no smoking when around the fueling area.
- Whenever parking or leaving a piece of machinery for any length of time; even to check a malfunction; the motor should always be shut off, brakes engaged, the transmission in park-lock or in gear, keys removed and any attachments (in the case of a baler or mower) disengaged. Numerous people are seriously injured or killed being run-over by improperly parked tractors, with or without the engine running.
- Safety guards should always be in place when operating any piece of machinery.
- All tractors should be equipped with Roll Over Protective Structures (ROPS). Nearly all tractor flips or roll overs without ROPS result in fatalities. Most newer tractors come equipped with a factory installed ROPS. It is important to remember that not all tractor cabs are ROPS. Some are designed strictly to shield the operator from the weather. Check with the tractor manufacturer to determine if the cab is an ROPS cab. If a tractor without a ROPS is being used, it is suggested that a ROPS be installed. However, a ROPS is not something thrown together in the machine shed. ROPS need to be properly designed, manufactured and installed in order to be fully effective. Contact your local farm equipment dealer for purchase and installation information.
- Seat belts should be worn when operating machinery equipped with ROPS. Seat belts will keep you within the safety zone of the ROPS in the case of a flip or roll-over. Even when operating machinery equipped with an enclosed cab, it is important to use seat belts to prevent the likelihood of being thrown out the door, through a window or into the cab frame.
- Falling Object Protective Structures (FOPS) should be installed on equipment where the user runs the risk of being struck by falling debris. Equipment where this type of structure may be necessary would be front end loaders. Details regarding installation would follow the procedures outlined for ROPS above.
- All farm equipment traveling on any roadway should be equipped with an approved Slow Moving Vehicle (SMV) emblem. Emblems should be placed on all tractors and any implements that will be towed. Emblems should be in good shape and clean. Broken, worn or discolored emblems should be replaced.
- Farm equipment used on public roadways require lights conforming to state motor vehicle codes.
- Often because of the high level of noise associated with machinery it is advisable to develop a system of hand signals to use during operation. A standardize system of signals has been developed by the American Society of Agricultural Engineers⁵. A copy of these signals is available through ASAE.
- All implements and attachments should be used in the proper manner for which they were designed, and lowered completely to the ground when exiting or shutting-down the tractor. Never over-load wagons.
- If a piece of equipment becomes clogged or jammed, never attempt to clean out the blockage until the machine is shut off and all moving parts come to a complete stop.
- Never tow an implement improperly hitched to a tractor or truck. Equipment being towed should be hitched directly to the draw bar with a hitch pin secured in place by a cotter pin. Do not tow implements with chains, cables or ropes. The breakage of chains, cables and ropes while towing can cause severe, even fatal injuries to the driver and bystanders. The draw-bar on a tractor or the hitch on a truck should be kept as low as possible. Know the maximum height recommended by the tractor manufacturer and do not exceed this height. Never attach equipment to the tractor frame or axle. The improper balance can cause a back flip-over.
- Terrain should always be taken into consideration when driving farm vehicles. When a tractor's center

of gravity moves behind the point where the rear tractor wheels are touching the ground, a flip-over is likely. To prevent tractor roll-over, avoid driving on steep slopes, through ditches, on extremely rough ground, or over stumps and large rocks. Do not drive along the edge of steams or pits. The chance of the bank collapsing from the weight of the tractor is a high possibility. When traveling downhill, always keep the tractor or truck in gear. Do not free wheel . Seek an alternate route around potential danger areas. If an alternate route is not possible, proceed cautiously at slow speeds.

- Do not try to tow loads that are too heavy for the tractor. Too much towing weight can cause a tractor to become out of control do to the whipping action of the load.
- Many tractor accidents involve excessive speed. Drive at a speed appropriate for: 1) the job your are doing; 2) the terrain over which you are traveling; and 3) the piece(s) of equipment you are using. Remember to slow down whenever making turns.
- When traveling on public roadways, obey traffic laws. Many tractor related accidents occur when traveling on roadways. Within the last 10 years there has been a sharp increase in the number of tractor/roadway accidents⁹. This is due in part to the increase in auto traffic on rural roads and the increased need for farmers to have equipment on the road to get from field to field.

In the past ten years, the all-terrain vehicle (ATV) has become a common piece of machinery on numerous farms. Regardless of its popularity, the ATV is one of the most dangerous and deadly pieces of equipment. One out of every two ATV fatalities involves children under the age of 14. In the past five years there have been over 900 ATV related deaths nation-wide. These unnecessary deaths and injuries could have been prevented for the most part by following simple safety rules.

MAINTENANCE OF FARM MACHINERY

- During the repair of any machinery, appropriate protective clothing should be worn. This includes helmets, goggles, gloves, hearing protection and safety shoes. Do not wear baggy clothing. Loose fitting clothing easily becomes caught in rotating machinery parts.
- All machinery should be maintained regularly. Any worn or broken parts should be replaced immediately, not fixed in a temporary manner. However, when repairs are done, the machine should be fixed according to manufacturers specifications.
- When repairs are made, any guard removed during repair must be replaced before the equipment is used.
- Tire inflation needs to be checked periodically to prevent flats and blowouts.
- Whenever preparing to work on a piece of equipment, wheels need to be blocked to prevent movement and any jacks used should be stable and in good condition.
- Brakes, hitches, safety chains, springs and shackles, should be inspected regularly for wear, broken or missing parts and cracks in the welds.
- Hydraulic and air lines should be inspected for wear and cracks. Any indication of damage to these lines should be immediate grounds for replacement of the line. Caution should be taken when working on hydraulic systems. Make sure all pressure in the system is relieved and that the fluid is cool before loosening any fittings or removing lines. Wear leather or rubber gloves.

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