



Skid-Steer Safety for Farm and Landscape

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Skid-steers are compact, powerful, and versatile machines. They fit into small spaces to scoop out animal wastes or to lift a tree into a landscape site. They quickly move payloads of rock, feed, manure, or building materials. Numerous attachments make the skid-steer as valuable as any farm or utility tractor. The usefulness of skid-steers for agricultural and landscape operations is hard to overstate but they are not without their limitations. The skill and knowledge required for safe operation is often misunderstood and sometimes underestimated.

This fact sheet addresses the safe use of the skid-steer loader as used in agricultural or landscape operations. Hazards associated with skid-steers, keeping the skid-steer in safe operating condition, and operator safety considerations are discussed. Since



skid-steers are often used by employees, how OSHA (Occupational Safety and Health) regulations apply to skid-steers used in agricultural and landscape businesses is also reviewed.

Skid-Steer Hazards

The major hazards of skid-steer use include being: run-over by the machine; caught in an attachment; crushed between machine parts; trapped by loads that roll or drop into the operator station, and pinned by rollover or tipping of the machine. Runover can occur when: an operator falls from the skid-steer while operating it; workers on the ground near the skid-steer move out of the sight line of the operator; the operator carries riders in the skid-steer bucket and they fall;

or bystanders wander into the work area and are not seen by the operator. Statistics show that these riders and bystanders are often young children, but may be co-workers or other helpers who have duties near the work area.

Entrapment injury can occur when the operator or helper attempts to maneuver controls and levers from outside the skid-steer's protective frame, or from miscommunication between the operator and the helper. Hands and arms have been mangled or amputated after being crushed between the lift arms of the skid-steer and the frame of the machine. Feet and legs have been crushed between the skid-steer and accessories such as buckets or tree augers attached to the lift arms. Working beneath a raised skid-steer bucket has led to entrapment which may result in a fatal crush injury.

Loads may roll back into the operator station if the skid-steer is being used to pick up material that is bulky and doesn't fit in the bucket adequately or is not properly secured. The skid-steer's protective frame offers some protection from the hazard of larger objects that do not break apart, but smaller objects, such as feed containers, landscape stones or brick pavers, may enter the operator station and injure the operator.

A skid-steer can tip forward from excessive weight in the bucket or from a heavy attachment if it is in a raised position. A forward tip can throw the operator out of the protective cab if the seat restraint is not used, allowing the skid-steer to runover the operator or the operator to be crushed by the skid-steer bucket and/or load. Skid-steers should have ignition interlocks that prevent operation of the machine if the seat belt is not buckled or the restraint bar is not in place. Operators sometimes disable these safety devices and expose themselves to serious injury or death from a tipping incident. A rollover can occur anytime the machine is being operated on steep slopes or uneven terrain. Skid-steers can be unstable when combined with a heavy load in the loader bucket raised high.

Other hazards can also lead to injury or death. Improper mounting and dismounting of the skid-steer can result in serious slips and falls. Overtaxed hydraulic systems may develop high pressure leaks and fail within close proximity to the operator, which may result in an injection of hydraulic oil into a person's body. Injection of hydraulic oil can result in an amputation of a limb if not treated quickly and properly. Hooking and unhooking attachments may result in severe crushing or pinching injuries to hands and fingers.

Skid-Steer Machines and Stability.

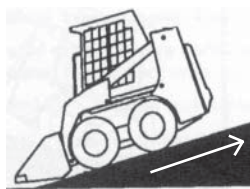
The skid-steer's center of gravity is constantly shifting as the machine is used. Sitting on a level surface, two-thirds of the skid-steer's weight is in the



rear section of the machine and low to the ground at the rear axle. Lifting a load transfers weight to the front axle: the higher the load the higher the skid-steer center of gravity.

Excessive weight in the bucket (stone or feed) or attachments (rock hound or tree pincher) can tilt the machine forward. Loads must be carried low to keep the center of gravity low. At the same time, do not carry the load so low that the bucket or attachment digs into or hits obstacles or curbing. Know the manufacturer's weight limit and do not exceed this limit.

Moving a skid-steer over uneven ground is often necessary. Rules governing the machine's center of gravity should be remembered and practiced. Keep the heavy part of the machine and load pointed uphill. If traveling with no load, keep the back end of the machine pointed uphill (go downhill frontward; go uphill in reverse). If traveling with a load, keep the load pointed uphill (back down the hill; travel forward up the hill).



When loading the skid-steer onto a low trailer, load with the bucket attached or back the skid-steer onto the trailer. It is best to avoid carrying loads on rough, uneven terrain: if you must operate on uneven terrain keep the load as low as possible without scraping the ground and watch your speed.

ROPS, FOPS, Side-Screens and Operator Restraints

A skid-steer without a rollover protective structure (ROPS), a falling object protective structure (FOPS), side screens and an operator restraint invites injury and death. The ROPS provides protection against being crushed by the machine should it overturn. The FOPS provides overhead protection against tree limbs, overhead hazards on construction sites, and loads that may fall from the loader bucket. Side-screens eliminate the risk of the operator reaching out of the cab and becoming caught between lift arms and the skid-steer frame.

A seat belt or seat-bar restraint helps keep the operator in the skid-steer seat and in control of the machine. A sudden pitch forward of the machine can throw the operator out of the cab. In the event of an overturn the operator will stay secured inside the cab. ROPS, FOPS, side-screens and seat restraints have been offered as standard equipment on skid-steers for many years. These safety features work together to provide a "zone of protection" for the operator. Newer skid-steer machines should have an escape hatch in the roof or rear window: be sure the escape hatch is operational, but do not remove it unless in an emergency. If your machine does not have all these devices, talk to a dealer about retrofitting or upgrading your machine.

Interlocks and Attachment Locks

Interlock devices may refer to electrical (ignition) or hydraulic system locks tied into the operator restraint system or to mechanical locks of the lift arms. An operator restraint interlock system will prevent the engine from being started or hydraulic controls from being engaged if the operator restraint is not fastened or positioned correctly. *Do not disable this interlock and insist that everyone use it.*

Hydraulic cylinder lift arm lockout devices may be engaged from inside the operator's cab or may be engaged outside the cab at the hydraulic

cylinder. When the boom is in the up position for any repair or maintenance, the lift arm hydraulic cylinder lockout device must be engaged. Countless deaths from crushing have occurred when lift arms were not blocked. Be sure that all operators understand the severity of the risk and know how to engage lockout devices. If the lockout device is not working, fix it.

Attachments to the lift arms must be securely fastened. It is difficult to secure these lock levers from inside the cab. Standing up in the cab and leaning out to lock these attachments increases the risk of falling out and being run over. Shut off the machine, exit it properly, and then secure the locking levers. An assistant can also lock the levers. Be sure to shut down the machine to avoid the risk of crushing the helper between the bucket/accessory and the lift arms or skid-steer itself. Make sure that an inexperienced helper has been properly trained on how to securely fasten locking levers. A bucket or landscape accessory that is improperly fastened can come loose when it is raised or used, increasing risk to operators and on-ground helpers.

Reverse Signal Alarms/Beacon Lights

Reverse signal alarms and beacon lights may not be standard equipment on all farm or landscape skid-steer machines, depending upon age of the machine. Some construction sites and their business contract requirements call for landscapers to have operable skid-steer reverse signal alarms and beacon lights. These alarms give notice to on-ground co-workers of the movement of the skid-steer. Use these alarms and maintain them to reduce risk of running over and pinning co-workers between the machine and an obstacle. Reverse signal alarms and beacon lights are economical and easy to install. Check with your dealer to learn more about backup alarms and beacon lights.

Hydraulic System Safety

Hydraulic pressure systems pose many hazards that may be overlooked. Hydraulic system pressure often exceeds 2000 pounds per square inch (psi). Pin-hole leaks can develop from hoses even if there is no visible damage. If a leak is suspected, do not use your hand to search for the leak. Injury from injected hydraulic oil will demand immediate emergency medical treatment. If treatment is not obtained it may result in amputation of the hand or arm. Use a piece of cardboard or mirror

to inspect for leaks by passing the material over the suspected leak. Leaks should be fixed immediately. If you are an employee, report suspected leaks to the owner of the machine or your supervisor. Hydraulic hoses and fittings become very hot. Severe burns can result by grabbing these components. Wear gloves or place your hand near the hydraulic part to sense for heat before touching it.

Connecting hydraulic hoses must be done with safety in mind. Be sure hoses are correctly routed to avoid pinching between lift arms and the bucket or attachment to prevent damage. Landscape accessories that can pivot (e.g., rock rakes and tree augers) can pinch the hydraulic hose with potential for loss of pressure under load and/or spraying the operator with hot hydraulic oil. Before disconnecting hydraulic hoses, shut down the machine and relieve the system pressure by working the control handle back and forth. High pressure in the system may prevent disconnecting the hoses if it is not relieved.



Personal Protection

Skid-steers are often operated in dirty and dusty environments, inside buildings where machine noise reverberates off walls and exhaust fumes become trapped. They may be operated in situations that require manual operations in close proximity to the skid-steer. All operators should wear a bump cap or hard hat, steel-toed shoes, long pants and gloves. Depending upon the machine and where and how it is being operated, hearing protection and eye protection should also be worn. Always wear eye protection when checking hydraulic hoses and connections. To protect against a buildup of machine exhaust fumes, open as many doors and windows as possible, use large exhaust fans, and shut off the machine and take frequent breaks outside the building. This is especially important if there is a strong smell of exhaust fumes in the air.

OSHA Regulations

Current OSHA standards and regulations for agriculture and landscaping do not specifically address skid-steer machines. However, OSHA regulations do require employers to protect hired workers from several hazards associated with operating and maintaining machinery, and from generally recognized hazards. Therefore ROPS and FOPS, guarding of pinch points and crush points, operator restraint, hydraulic cylinder lockout, warning signs, handholds and steps, and training requirements are common safe use issues that must be addressed in agricultural and landscape situations.

OSHA is restricted from expending funds to enforce standards in agricultural operations and other small businesses that have 10 or fewer employees, but this restriction does not exclude agricultural or small businesses from OSHA regulations. The distinction between not being able to enforce regulations while still being subject to the regulations is important because of what is called OSHA's "general duty clause." The general duty clause is applicable to employers even if they have only one employee. This clause imposes a duty on the employer to provide a place of employment free of recognized hazards that are likely to cause death or serious injury even if no specific standard is applicable.

To prove a general duty clause violation, OSHA must show that the hazard in question is: a) foreseeable in the workplace; b) recognized by the employer or industry; c) likely to cause death or serious injury; and d) feasible to correct. The hazards of skid-steer operation and methods for preventing and controlling these hazards are well known and feasible. Ignoring or circumventing these hazards could result in significant penalties for an employer should an employee become injured while operating the skid-steer. Additionally, because these hazards

and their prevention are well recognized, an injury resulting from ignoring or circumventing the hazard exposes the employer to civil suits by the injured party, their family or their insurance company.

Operating the Skid-Steer

In addition to the hazards and issues discussed, there are many more suggestions relating to operator actions and behaviors important to safe skid-steer operation. These suggestions have been assembled on a stand-alone page named "Operating the Skid-Steer" inserted in this fact sheet or that follows this page if you are viewing this fact sheet online. Following these operating suggestions will significantly reduce hazards and risk associated with skid-steer uses.

Summary

By following the suggestions offered in this fact sheet and in your skid-steer owner's manual serious injury and death from skid-steer operations can be avoided. Readers can find additional safety references and training materials by visiting the web sites of the National Agricultural Safety Database (www.cdc.gov/nasd), the Association of Equipment Manufacturer's (www.aem.org), or by contacting skid-steer dealers and manufacturers. Spanish language versions of safety references and training materials are available from both NASD and AEM.

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Operating the Skid-Steer

Operator error often overshadows machine safety design. Below is a list of items closely connected to safe skid-steer operation. Follow these suggestions to reduce risk of injury when operating a skid-steer.

- No riders anywhere: not in the bucket and not in the operator's lap (e.g. toddlers)
- Learn the blind spots of operation: bystanders, especially children, can be in that blind spot. Valuable property (buildings, equipment) may also be in blind spots and can be destroyed when hit by the skid-steer.
- Never swing, lift, or move a load over top of anyone.
- Position yourself to avoid bumping control levers.
- Wear snug fitting clothes that will not catch on levers.
- Develop knowledge of standard hand signals for communications.
- Learn to smoothly operate the skid-steer's moving, steering, and lift controls.
- Know the materials you are loading. Objects like large stones can fall out of the bucket into the operator's cab when the bucket is rolled too far back.
- Use the 3-point method to enter and exit the skid-steer: two hands and one foot or one hand and two feet are in contact with the machine at all times. Use foot pads and hand holds.
- Drugs, alcohol, and even medications can impair the operator's ability to react. Heed warnings of medications that restrict the operation of machinery for a prescribed period of time.
- Use tie-down attachments to secure the skid-steer when transporting on a trailer.
- When finished with the skid-steer lower the bucket to the ground to park safely.
- Avoid operating on slopes, ditches, and embankments when possible.
- Scope out the work area for obstacles to smooth operation.
- Observe whether overhead utility wires are near the work area.
- Know the location of underground utilities if you are digging into the ground.



- Avoid working with any type of pile or embankment that is higher than the operator's station or that could result in being buried in place should the pile or embankment collapse. Undercutting large silage piles or high embankments are examples of this hazard.