

# AgriLIFE EXTENSION

Texas A&M System

## SKID-STEER LOADER SAFETY

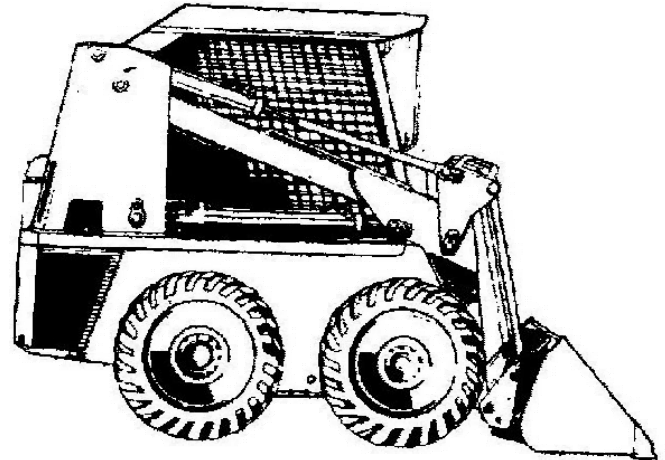
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Skid-steer loaders have been used in the construction and landscaping industry for years. They are also common on dairy, beef, and swine confinement operations. Their small, compact size and maneuverability allow farmers to negotiate narrow alleyways, and to operate under short vertical clearances. This is not possible with most conventional tractors. Skid-steer loaders are especially useful for removing manure, feed, and other materials from animal confinement areas.

### CRUSHING HAZARD

Skid-steer loaders account for numerous serious injuries and deaths each year. Accident factors include the physical design and construction as well as operator error. Typically, the control levers are positioned between the lift arms and in front of the lift arm pivot points. Operators must enter and exit the loader through the front of the machine and over the bucket. Many accidents occur when a foot or hand inadvertently activates the lift arms, loader bucket, or other attachment, pinning or crushing the operator. This is what led to the fatal accident described below.

**October 29, 1993.** A 26-year-old hog farmer was fatally injured when he was caught between the frame of a skid-steer loader and the lift-arm hydraulic cylinder. The victim was alone, using the loader to pile manure in one corner of a hog confinement building. The loader's rollover protective structure (ROPS) had been removed to permit operation under the 6 to 6 ½ foot ceiling of the building. The lift-arm support could be used only when the lift arms were fully raised. The loader stalled in front of and facing the manure pile with the bucket raised, preventing the victim from dismounting through the front of the machine. As he attempted to climb over the side of the machine, he unintentionally hit the lift-arm control lever, causing the lift arms to drop and crush him against the frame. *Source: Minnesota Department of Health.*



### OVERTURN HAZARD

Any self-propelled machine is most stable when its center of gravity is kept within its base of stability. Operating the machine on steep terrain, hauling unbalanced loads that extend beyond the base of stability, and making abrupt turns at high speeds can upset the machine, causing it to turn over. Serious skid-loader injuries and fatalities result from overturns.

**September 20, 1996.** A 43-year-old worker died after he backed a skid-steer loader over a 6-foot concrete retaining wall. The victim was spreading topsoil by driving toward the wall with a fresh load in the bucket, depositing the soil near the wall, then backing up and dragging the bucket to spread the soil. At the time of the incident, he approached the edge of the work area, turned the loader around and backed toward the wall, dragging the bucket on the ground. The left rear tire went over the wall followed by the right rear tire. The machine struck the ground rear end first, coming to rest on its left side. The victim, who was not wearing a seat belt, remained inside the cab but came out of the operator's seat. *Source: Missouri Department of Health.*

## MAINTENANCE HAZARD

The skid-loader is basically a power source which operates a front-end loader implement. Several accidents have occurred from falling loader arms and buckets, while the operator is performing maintenance in or around the loader bucket. Operator negligence, failure to block up or secure lift arms, and bypassing automatic safety switches are significant safety hazards which lead to numerous injuries.

**February 7, 1995.** A 37-year-old farmer died after he was struck by a falling skid-steer loader bucket. The victim had used the loader for chores and parked it in an open garage without cleaning accumulated mud, snow, and manure from the foot-operated lift-arm and bucket controls. When the victim shut down the machine and exited from it, he stepped on the lift-arm control, moving it to the lift position. The debris then froze, locking it in place. After about an hour, the victim returned, entered the loader and started the engine. The lift arms rose until the bucket contacted the header over the garage door. The victim shut down the machine, dismounted, knelt on the ground under the raised bucket in front of the machine, and began cleaning the frozen controls with a pry bar. While cleaning, he unintentionally moved the lift-arm foot pedal control to the down position. The lift arms suddenly moved down, pinning the victim between the bucket and frame of the machine. The interlock system for the lift-arm control had been defeated by a glove that was jammed into the linkage connected to the seat belt. *Source: University of Iowa.*

## MACHINE SAFEGUARDS

Using and maintaining manufacturer-installed safety devices will eliminate many skid-loader injuries and fatalities. Occupational Safety and Health Administration (OSHA) regulations and industry standards encourage installation and use of these safety devices. Common skid-steer loader safety features include lift arm supports, interlocked controls, seat belts, and ROPS.

### Lift Arm Supports

Lift arm supports are provided or recommended by the manufacturer when it is necessary to work or move around the machine with the bucket in a

raised position while the controls are unattended. Newer skid-steer loaders are equipped with pin-type supports or strut-type supports that can be engaged while sitting in the operator's cab.

### Interlocked Controls

These systems require the operator to be properly positioned and restrained before the skid-steer loader can be used. Some devices require that the seat belt be connected. Other interlock controls detect when the operator leaves the seat and shuts down the machine, much like modern riding lawn mowers. Other models include a safety restraint bar that must be lowered in front of the operator before the skid-steer loader will start, much like the safety restraint systems on roller coasters.

### Seat Belts

Seat belts protect the operator in several ways. When worn on skid-steer loaders equipped with ROPS, seat belts restrain the operator within the zone of protection in case of a rollover. If seat belts are part of the safety interlock system, they protect operators from being caught and crushed between the lift arms and frame. The seat belt will also keep the operator from reaching out of the cab or from being jostled out of the cab in rough terrain.

### ROPS and Side Screens

Roll-over protection structures and screens protect the operator from being thrown from and crushed by the skid-steer loader during a rollover. Usually, the ROPS is part of the enclosed cab design, and contains side and rear metal grate screens to prevent the operator's hands, head and other body parts from extending into the area between the lift arms and frame.

## SAFETY TIPS

### Pre-operation Check

You actually reduce the risk of injury by maintaining the skid-steer loader in good working condition, thereby limiting the number of times you enter and exit the machine. Before you start a skid-steer loader, you should check:

- Fuel and oil
- Hydraulic fluid
- Cooling system fluid
- Operator cab, seat belt, and seat bar
- Lift arm and cylinder pivot points

- Safety interlock systems
- Tires

Repair any hydraulic system leak immediately. A leaking hydraulic system may cause the lift arm to lower rapidly, causing injury to you or other workers, and can damage property.

Read, understand, and follow the operator's manual and understand the meaning of all warning decals on the machine.

### Operation

Skid-steer loader operation should be restricted to those who have read the instructor's manual carefully, and who understand machine safety features. Children should never be allowed to operate skid-steer loaders. Operators should:

- Know how to operate the machine safely and be familiar with the location and purpose of all controls
- Know how to load, tie-down, transport, and unload the loader safely
- Enter the loader with the bucket in the lowered position
- Wear ear and head protection
- Use the safety treads and grab handles to get on and off the loader
- Use seat bar and fasten seat belt
- Carry the bucket or other attachments as low as possible
- Load, unload, and turn on level ground
- Drive straight up and down slopes with the heavy end of the loader facing uphill
- Do not carry passengers in or on the skid-steer loader
- Do not use the bucket to lift people or use it as a work platform
- Watch for overhead power lines when raising the bucket
- Set the parking brakes and lower the bucket before dismounting
- **NEVER LET CHILDREN OPERATE A SKID-STEER LOADER**

### Maintenance

Read the operator's manual carefully for instructions on when and how to maintain the skid-steer loader. Heed all safety warnings, utilize safety interlocks, and chock or block all equipment and parts that contains stored energy that could be released during maintenance.

Never disable or remove guards, shields, or other safety devices unless specified to do so in the operator's manual. Make sure to set the parking brake and lower bucket when working around the skid-steer loader. If the machine cannot be serviced with the bucket on the ground, use the lift arm supports.

Inform all workers of any ongoing maintenance and keep children away from the work area. Never allow a child to sit in the cab while you are working on the skid-steer loader.

### **OSHA REGULATIONS**

The following OSHA regulations apply to motor vehicles, mechanized equipment, and marine operations, including skid-steer loaders. These regulations are designed to protect employees from workplace hazards.

- Seat belts shall be provided, and they shall meet requirements of the Society of Automotive Engineers (SAE) standard, Seat Belts for Construction Equipment (J386-1969) [29 CFR\* 1926.602(a)(2)].
- All bidirectional machines shall be equipped with a horn, distinguishable from the surrounding noise level, which shall be operated as needed when the machine is moving in either direction [29 CFR 1926.602(a)(9)(i)].
- Scissor points on all front-end loaders, which constitute a hazard to the operator during normal operation, shall be guarded [29 CFR 1926.602(a)(10)].
- End-loader buckets and similar equipment shall be either fully lowered or blocked when being repaired or when not in use. All controls shall be in a neutral position, with the motor stopped and the brakes set, unless work being performed requires otherwise [29 CFR 1926.600(a)(3)(i)].
- Equipment manufactured on or after September 1, 1972, shall be equipped with ROPS which meet the minimum performance standards prescribed in 29 CFR 1926.1001 and 1926.1002 or shall be designed, fabricated, and installed in a manner which will support, based on the ultimate strength of the metal, at least two times the weight of the equipment applied to

the point of impact [29 CFR 1926.1000(b) and 1926.1000(c)(2)].

- No modifications or additions which affect the capacity or safe operation of the equipment shall be made without the manufacturer's written approval. If such modifications or changes are made, the capacity, operation, and maintenance instruction plates, tags, or decals shall be changed accordingly [29 CFR 1926.602(c)(ii)].

*\*Code of Federal Regulations.*

## **SAE STANDARD FOR SKID-STEER LOADERS**

In 1985, the Society of Automotive Engineers (SAE) developed a manufacturers' standard for skid-steer loaders for the American National Standards Institute [SAE J1388 (June 1985)]. The standard requires manufacturer's of skid-steer loaders to:

- Provide warnings, operator instructions, and maintenance procedures
- Equip the machine with a seat belt and ROPS, and side screens
- Provide a means to prevent the lift arm from lowering when the operator is entering or exiting from the machine
- Provide handholds and steps to facilitate entry and exit from the loader
- Provide two openings for emergency exit
- Provide safety signs and instructions to warn of hazards during normal operation and maintenance

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