U. S. Department of Labor
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Hazards Associated with Operating Skid-Steer Loaders with Bypassed and/or Improperly Maintained Safety Devices

Safety and Health Information Bulletin

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This Safety and Health Information Bulletin is not a standard or regulation, and it creates no new legal obligations. The Bulletin contains recommendations as well as descriptions of mandatory safety and health standards. The recommendations are advisory in nature, informational in content, and are intended to assist employers in providing a safe and healthful workplace. The Occupational Safety and Health Act requires employers to comply with safety and health standards promulgated by OSHA or by a state with an OSHA-approved state plan. In addition, pursuant to Section 5(a)(1), the General Duty Clause of the Act, employers must provide their employees with a workplace free from recognized hazards likely to cause death or serious physical harm. Employers can be cited for violating the General Duty Clause if there is a recognized hazard and they do not take reasonable steps to prevent or abate the hazard. However, failure to implement any recommendations in this SHIB is not, in itself, a violation of the General Duty Clause. Citations can only be based on standards, regulations, and the General Duty Clause.

Introduction

Skid-steer loaders (Figure 1) are manufactured with safety features to prevent unexpected or inadvertent movement of the loader arm and hydraulics when the operator is not in the cab. However, these safety features can be bypassed, defeated or improperly maintained which can result in serious injury or death to the operator and/or other employees working on or around the equipment.

Figure 1: Typical Skid-Steer Loader

Purpose

The purpose of this Safety and Health Information Bulletin is to:

- raise public awareness about recent fatalities that have occurred with skid-steer loaders due to bypassed safety devices;
- alert employers and employees about the need to review and follow manufacturer instructions regarding the installation, use, testing, inspection, and maintenance of safety devices on skid-steer loaders; and
- emphasize the importance of conducting training on the proper use of skid-steer loaders.

Scope

This SHIB focuses on the seatbelts and safety interlock systems typically found on skid-steer loaders intended primarily for earth moving. Such vehicles are not covered by the requirements of OSHA's Powered Industrial Truck standard, 29 CFR 1910.178.

Background

Common safety features of a skid-steer loader include the seatbelt for operator restraint, Falling Object Protective Structure (FOPS), Roll-Over Protective Structure (ROPS), and a Control Interlock System. Some of these machines are equipped with a pull-down armrest (seat bar) that may be used to interlock the machine control systems (as shown in Figure 2). The seatbelt helps prevent the operator from being thrown about inside or falling out of the skid-steer loader. The FOPS and ROPS protect the operator from falling objects and injury due to accidental rollovers. Control Interlock Systems and/or operator seats used on some machines typically activate a safety interlock system that is intended to prevent inadvertent movement of the machine's controls when the operator is not in the proper operating position (i.e., seated).

Figure 2: Typical Control Interlock System (seat bar, shown in raised position)

Review of OSHA's Integrated Management Information System (IMIS) reveals that between 1997 and 2007, 100 accidents were recorded specifically involving skid-steer loaders. The deliberate bypassing of safety features (such as seatbelts and control interlock systems) was identified as the direct cause of 20% of these incidents, with all but one resulting in a fatality. Three cases are described below:

Case 1:

An employee was working alone, operating a skid-steer loader for "fine grading" or smoothing out dirt to provide the final contouring around a new home that was nearing completion. While operating the skid-steer loader, one of the bucket bolt pins, which connects the loader arm to the bucket, fell out. The employee dismounted the vehicle with the engine still running, manually lowered the lap bar safety device, and operated the hydraulic controls from outside the vehicle. The employee was attempting to realign the loader arm hole with the bucket hole and reinsert the bucket bolt pin. In the process, he was trapped between the bucket and the body of the skid-steer loader and was crushed. The employee was found in a position that allowed him to operate the controls from outside the vehicle with the bucket bolt pin and a large hammer nearby.

Upon inspecting the skid-steer loaders on this job site, the following conditions were noted:

- The interlock control system was disabled on the unit involved in the accident. This system was intended to prevent the loader's controls from operating unless the operator was in the proper operating position. The absence of the operator's weight should have deactivated an electronic switch under the seat that allows the loader controls to function when the lap bar is also in a lowered position. The system ensures that the engine stops when the operator leaves the seat of the skid-steer loader or attempts to lower the lap bar to operate the loader controls from outside of the skid-steer loader.
- Interlock control systems on other skid-steer loaders on site had also been disabled or were not functioning properly. This condition allowed the operator to activate the loader's controls with the seat bar in the raised position.

- Backup alarms did not work on some units.
- Seatbelts had been removed from the skid-steer loaders.

The employer received a citation for a serious violation under the General Duty Clause of the Occupational Safety and Health Act (OSH Act) (Section 5(a)(1)).

Case 2:
An employee was ordered by his company to repair a leak in the hydraulic slave cylinder of a skid-steer loader. He drove the skid-steer loader into the warehouse and began the repair. He bypassed the safety bar by jamming it into the interlocks without being seated in the cab. He then started the skid-steer loader and raised the bucket over the cab. Upon exiting the cab, his foot inadvertently pressed the down pedal for the bucket. The bucket came down and trapped him between the lift and the cab. He then hit the left side lever, causing the skid-steer loader to move in reverse. It crashed into a parked forklift and he was killed.

Upon investigation, the three causes of the accident were identified as:

- Employee's intentional bypassing of the safety features of the skid-steer loader to perform maintenance,
- Failure to use an approved lift arm support device, and
- Improper employee training on operating, servicing, or maintaining the skid-steer loader according to the manufacturer's instructions.

The employer received a citation for a serious violation under the General Duty Clause of the OSH Act (Section 5(a)(1)).
Case 3:

An employee at a tractor implement dealership was cleaning debris from a wash bay using a skid-steer loader. This particular skid-steer loader was equipped with a manual seat bar as well as a pressure switch in the seat to detect the presence of an operator. The operator was able to leave the cab to wash the skid-steer loader bucket while it was still operational. The bucket was left sitting on its nose which prevented the loader arms from resting against the body of the vehicle as it was designed to do. This position made it difficult to enter and exit the cab. As the employee attempted to get back into the cab, he slipped and fell face-first into the cab seat. The loader arms dropped and caught him between the body of the skid-steer loader and the loader arms, and he was killed.

The two major contributing factors to this accident were:

- Employee's intentional bypassing of the safety systems of the skid-steer loader, and
- Improper employee training on the safety features associated with the skid-steer loader. "On-the-job" training did not include a review of the operator's manual.

The employer received a citation for a serious violation under the General Duty Clause of the OSH Act (Section 5(a)(1)).

Conclusion

Properly maintained and functioning seatbelts and control interlock systems are critical to the safe operation of skid-steer loaders. Field reports have shown injuries and fatalities can occur by operating skid-steer loaders with one or both of these safety systems bypassed, disabled, or improperly maintained.

OSHA Requirements

While OSHA does not have a standard requiring employers to use control interlock systems or seatbelts on skid-steer loaders, it is important for employers to understand that under the General Duty Clause of the OSH Act (section 5(a)(1)), employers must provide their employees with a workplace free from recognized hazards likely to cause death or serious physical harm. OSHA may cite an employer for a violation under the General Duty Clause if recognized hazards exist and the employer does not take feasible, effective measures to abate such hazards.

OSHA takes the position that an employee who moves from the proper position on a skid-steer loader while it is energized, by doing such activities as performing maintenance or repair operations, creates the recognized hazards of crushed-by and/or caught in-between. The failure to use seatbelts also increases the risk of employee injury in the event of rollover. [1, 2]

Employers may abate these hazards by, among other things, communicating and effectively enforcing work rules prohibiting employees from disabling or bypassing safety equipment, including safety interlock systems, and requiring employees to use seatbelts at all times when operating a skid-steer loader.

When equipment such as a skid-steer loader is used in construction activities, 29 CFR 1926.20(b)(2) requires construction employers to develop safety and health programs that provide for frequent and regular inspections by competent persons designated by the employee of 1) the job sites, 2) materials, and 3) equipment. In addition, 29 CFR 1926.21(b)(2) requires construction employers to instruct employees in the recognition and avoidance of unsafe conditions and the regulations applicable in their work environment to control or eliminate hazards or other exposures to prevent illness and injury.

If skid-steer loaders are used in situations covered by 29 CFR Part 1910, then the requirements of OSHA's Control of Hazardous Energy (lockout/tagout) standard, 29 CFR 1910.147, may be applicable. Such situations may include, but are not limited to, use of skid-steer loaders in warehousing operations or servicing and maintenance performed on skid-steer loaders in maintenance facilities.

Safety Practices

The following practices will minimize hazardous situations associated with operating and maintaining skid-steer loaders:

- Always read and understand the operator's manual before using the piece of equipment. Always follow the manufacturer's recommendations and specifications when operating it.
- Always lower the bucket or attachment so that it is flat on the ground. Do not attempt to activate the skid-steer loader's controls from outside the operator's compartment.
- Do not leave the operator's seat while the engine is on. Never attempt to activate the controls unless properly seated with the seatbelt fastened and the seat bar (if equipped) lowered. Keep all body parts inside the cab while operating a skid-steer loader.
- Never modify, bypass, disable, or override safety systems. Similarly, never operate equipment in which safety systems have been modified or are not working properly. Equipment with modified or malfunctioning safety systems should be taken out of service until repaired or replaced.

- Never permit riders on the skid-steer loader, in the bucket or attachment, or in the operator's compartment unless the compartment is designed to accommodate a second rider.

- Always keep bystanders a safe distance away from the work area.

- Establish a routine maintenance and inspection program in accordance with the manufacturer's recommendations. Inspect the skid-steer loader to ensure that all safety systems are functioning properly prior to operating the equipment.

- Follow the manufacturer's instructions for maintaining the skid-steer loader. Never attempt maintenance or other work while lift arms or attachments are raised without using an approved lift arm support device. Replace protective guards and shields after repairs or service.

- Train personnel on the proper inspection, use, maintenance, and repair of skid-steer loaders according to the manufacturer's instructions. Train supervisory personnel to identify hazards, such as safety systems that have been bypassed, disabled, or that require maintenance.

References and additional information

1. OSHA-Beisel. 1998. Letter of Interpretation addressed to Robert Beisel, Hazard Recognition Services, Inc. Guidelines for ROPS on pneumatic compactors and "skid steer" equipment. (March 16) http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=22546

2. OSHA-McQuade. 1998. Letter of Interpretation addressed to Brian McQuade, Laborer's Health and Safety Fund of North America. ROPs/seatbelts for roller compactors; lockout/tagout in construction. (March 16) http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=22547

3. OSHA-Roth. 2003. Letter of Interpretation addressed to Joel Roth, Southfield, MI. Requirements to use seatbelts during the operation of earthmoving equipment. (December 15) http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=INTERPRETATIONS&p_id=24902

4. The *Morbidity and Mortality Weekly Report* (*MMWR*) is prepared by the Centers for Disease Control and Prevention (CDC). The data in the weekly *MMWR* are provisional, based on weekly reports to CDC by state health departments. http://www.cdc.gov/mmwr/preview/mmwrhtml/00043153.htm

5. NIOSH Fatality Assessment and Control Evaluation (FACE) Program. The FACE program concentrates on investigations of fatal occupational injuries. The primary intent of this program is to provide interested users with access to the full text of hundreds of fatality investigation reports. http://www.cdc.gov/niosh/face/stateface/mi/04mi176.html

6. NIOSH Alert, Preventing Injuries and Deaths from Skid Steer Loaders. http://www.cdc.gov/niosh/skidalt.html

7. OR-FACE is the Oregon Occupational Fatality Assessment and Control Evaluation program. It is a National Institute of Occupational Safety and Health (NIOSH) sponsored research program designed to identify and study fatal occupational injuries. http://www.ohsu.edu/croet/face/reports/2003-15-01.pdf

8. Texas Cooperative Extension publishes research-based information to help people improve their lives, businesses and communities. http://tcebookstore.org/pubinfo.cfm?pubid=2103