

**FACE**

Fatality Assessment and Control Evaluation Program

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FACE Report Number: 2004-01

May 14, 2004

Hispanic Laborer Dies After Being Crushed Between the Frame of a Skid Steer Loader and the Scraper Attachment on the Loader Lift Arms - Ohio

SUMMARY

On October 18, 2003, a 23-year-old Hispanic laborer (the victim) leaned outside a skid steer loader's operator compartment and was crushed between the frame of the skid steer loader and a scraper attachment. The victim and three other Hispanic coworkers were assigned to routine cleanup at a rendering plant. The victim was operating a skid steer loader equipped with a metal/rubber scraper attached to the loader lift arms. After completing his cleaning task, the victim drove the skid steer loader behind the plant. Approximately 10 minutes later, the



Skid steer involved in the incident

plant manager went to look for him and discovered the victim crushed between the frame of the skid steer loader and the scraper attachment. The plant manager used the controls to release the victim, and he and a coworker carried the victim to the parking lot where they placed him on the ground. Meanwhile, another coworker called emergency medical services (EMS) from a telephone in the company's lunch room. EMS responded within 7 minutes. They examined the victim and determined that he had sustained fatal head injuries. They contacted the county coroner who pronounced the victim dead at the scene.

Fatality Assessment and Control Evaluation (FACE) Program

The National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR), performs Fatality Assessment and Control Evaluation (FACE) investigations when notified by participating states (North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, and Virginia); by the Wage and Hour Division, Department of Labor; or when a request for technical assistance is received from NIOSH-funded state-level FACE programs in Alaska, California, Iowa, Kentucky, Massachusetts, Michigan, Minnesota, Nebraska, New Jersey, New York, Oklahoma, Oregon, Washington, West Virginia, and Wisconsin. The goal of FACE is to prevent fatal work injuries by studying the work environment, the worker, the task the worker was performing, the tools the worker was using, the energy exchange resulting in fatal injury, and the role of management in controlling how these factors interact. FACE investigators evaluate information from multiple sources that may include: interviews of employers, workers, and other investigators; examination and measurement of the fatality site, and related equipment; and review of records such as OSHA, police, medical examiner reports, and employer safety procedures and training records. The FACE program does not seek to determine fault or place blame on companies or individual workers. Findings are summarized in narrative reports that include recommendations for preventing similar events in the future. For further information visit the FACE website at www.cdc.gov/niosh/face/faceweb.html or call toll free 1-800-35-NIOSH.



NIOSH investigators concluded that, to help prevent similar occurrences, employers should

- *ensure, through periodic inspections and reminders, that equipment operators use seat belts provided on equipment they are assigned to operate*
- *develop, implement, and enforce a comprehensive written safety program which includes training in hazard recognition and the avoidance of unsafe conditions. A written training program should require training for all equipment operators that includes a requirement that they follow the equipment manufacturers' recommendations for safe equipment operation.*
- *ensure that equipment is inspected daily before work begins and that equipment with defective safety features, for example, a seat bar that fails to prevent movement of controls when lifted, is removed from service until needed repairs have been made*
- *purchase the manufacturer's operator manuals and safety decals in the primary languages used by their workforce*
- *ensure that the nearest area office of the Occupational Safety and Health Administration is notified within 8 hours of a fatality or in-patient hospitalizations of three or more workers as a result of a work-related incident at their company.*

INTRODUCTION

On October 18, 2003, a 23-year-old Hispanic laborer (the victim) leaned outside a skid steer loader's operator compartment after lifting the seat bar and was crushed between the frame of the skid steer loader and the scraper attachment. The county sheriff's department notified officials of the Occupational Safety and Health Administration (OSHA) of the fatal incident several days after the incident. The company had not notified OSHA. On October 28, 2003, OSHA notified the National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR) of the incident. On November 19, 2003, a DSR safety and occupational health specialist interviewed the company's general manager and observed as one of the company's mechanics demonstrated the operation of the skid steer loader. The plant manager, who was the victim's brother, had not returned to work after the incident and was not available for interview. The DSR investigator met with a county sheriff's department officer assigned to the case. Official reports and photographs from the county sheriff's department and the county coroner's office were reviewed. The DSR investigator spoke with the OSHA compliance officer who had investigated the case and reviewed OSHA findings. A distributor for the manufacturer of the skid steer loader was interviewed by telephone and a copy of the manufacturer's operator's manual for the equipment was reviewed.

Employer. The victim's employer was a rendering company that had been in operation for 59 years and employed 43 full-time employees. Six of the 43 employees were Hispanic. Four Hispanic employees, including the victim, worked as laborers and performed cleanup functions and other duties.

Victim. The victim worked for the company as a laborer for three months and spoke primarily Spanish. He had emigrated to the United States from Honduras approximately 5 months before the incident.

Training: The employer had no written safety program. According to the company's general manager, verbal hazard communication and lock out tag out training was provided to employees in English and Spanish. The bilingual plant manager communicated safety-related information verbally to the Hispanic workers. The only training provided to the victim, including skid steer loader operator training, was given on-the-job by the victim's brother, the bilingual plant manager. According to the company manager, the bilingual plant manager showed other Hispanic workers how to do their jobs by providing on-the-job training. The company had no documentation of employee training.

Equipment: The skid steer loader had been purchased new by the owner and was approximately 2 years old. It had a gasoline powered engine and was operated completely through the use of hand controls. It was equipped with a rollover protective structure, side screens, a seat belt, a seat bar (control interlock), hand rails, and lift arm support struts (Figure 1). According to the operator's manual, when the seat bar is functioning correctly and is in the "up" position, it prevents forward/rearward movement of the machine and also prevents movement of the loader arms and bucket.

This was the company's first workplace fatality.

INVESTIGATION

The rendering company involved in this incident operated 24 hours per day 6 days per week. The company rendered (cooked) animal parts and sold animal by-products, grease and protein, to companies that manufacture pet and domestic animal food. On Saturdays, the rendering plant was shut down for cleaning. The victim and three other Hispanic coworkers worked as laborers and were cleaning the plant on the day of the incident. A plant manager, maintenance

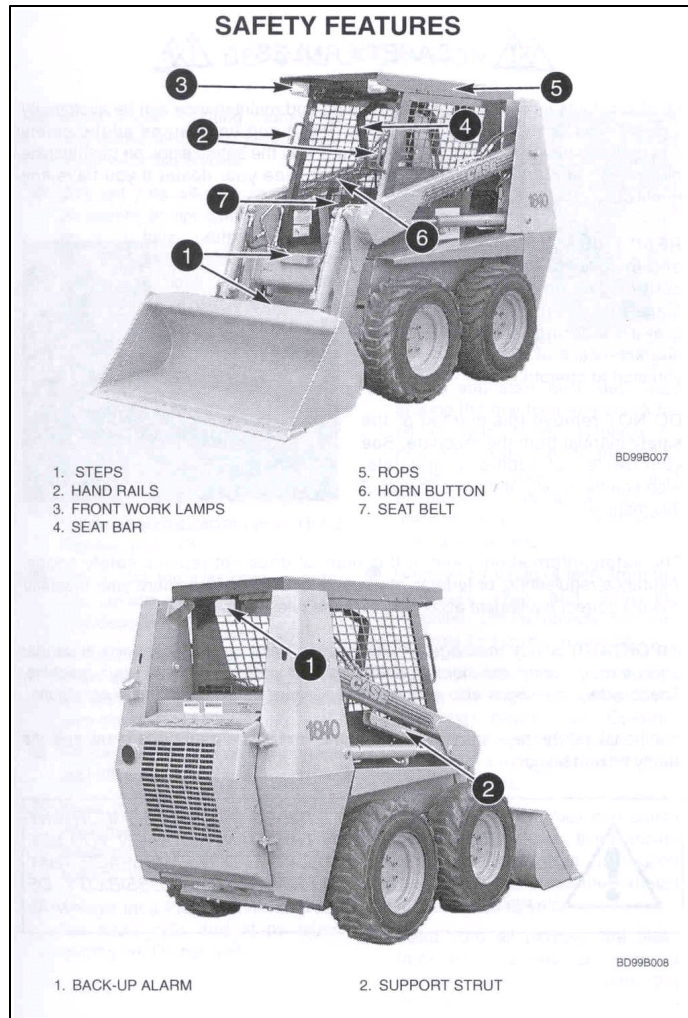


Figure 1. Safety features on the loader [used with permission of manufacturer]

worker, and a truck driver also worked that day performing other duties. The shift started at 8:00 a.m. and ended at approximately 2:00 p.m.

According to information obtained from the general manager, the victim and three Hispanic coworkers had spent the day of the incident cleaning the cookers and the floor of the plant. After stopping for lunch at around noon, coworkers used hoses to spray the plant floor with water while the victim operated a skid steer loader with a metal and rubber scraper attachment to scrape water and animal debris into a pit for disposal.



Photo 1. This photo illustrates the skid steer loader used on the day of the incident. An “X” marks the approximate location on the horizontal bar of the scraper attachment which came down and crushed the victim’s head between it and the frame of the skid steer loader marked with a “Y” on photo 2. Photograph courtesy of the County Sheriff’s Department.

At approximately 1:45 p.m., the victim spoke with the plant manager who reminded him that it was time to go to the shower room to get cleaned up before ending the shift. The victim told the plant manager that he had one more thing he wanted to do and drove the skid steer loader behind the plant. At approximately 2:00 p.m., the plant manager went to look for him and found the victim still partially in the skid steer loader with his upper body leaning forward and his head crushed between the frame of the skid steer loader and the scraper attachment (Photos 1 and 2). Coworkers had seen the skid steer loader with the scraper attachment raised and engine running minutes before the incident, but did not witness the fatal incident. The plant manager reached into the operator’s compartment and used hand controls to lift the attachment up and off of the victim’s head. He later reported to the general manager that the victim was not wearing a seat belt, that he lifted the seat bar and pushed the victim, who was leaning forward, back toward the operator’s seat so that he could grasp his body and pull him out of the machine. He and a coworker carried the victim to a parking lot near the lunch room where they placed him on the ground. Meanwhile, one of the other coworkers called emergency medical services (EMS) from a telephone in the company’s lunch room. EMS responded within 7 minutes and examined the victim. They determined that he had sustained fatal head injuries and contacted the county coroner. The county coroner pronounced the victim dead at the scene.

County sheriff’s department officers requested a demonstration of the skid steer loader. They noted that when the seat bar was lifted, the loader lift arms dropped rapidly without any movement of the hand controls. According to the police findings, it appeared that the victim’s head was pinned between the cross member of the scraper attached to the loader arms and the frame on the right entry-exit area of the skid

steer loader. They surmised that the victim lifted the seat bar while sitting in the operator's seat and leaned over and/or attempted to exit the vehicle and was fatally injured when the lift arms holding the scraper attachment dropped. The report indicated that the results of the tests they conducted were contrary to a coworker statement about the safety bar being down on the operator when he was found.

The OSHA inspection revealed that the seat bar on the skid steer loader was not functioning properly and that bulbs were missing in the head and tail lamps. There were no maintenance records for the skid steer loader.

Following the incident, the company mechanic examined the seat bar on the skid steer loader used by the victim and determined that it was not adjusted properly. The company manager removed it from service until repairs were made.

CAUSE OF DEATH

The coroners report indicated that the cause of death was severe head trauma.

RECOMMENDATIONS/DISCUSSION

Recommendation #1: *Employers should ensure, through periodic inspections and reminders, that equipment operators use seat belts provided on equipment they are assigned to operate.*

Discussion: The skid steer loader used in this incident was equipped with a seat belt. When used correctly, the seat belt can help ensure the safety of the operator by holding the operator in place in the operator's seat. Operators should not take their seat belt off until after the equipment has been properly shut down. Proper shut down would include lowering lift arms to the ground before stopping the engine. The plant manager reported to the general manager that he found the victim without his seat belt secured, in an



Photo 2. This photo illustrates the skid steer loader used on the day of the incident. A "Y" marks the area on the frame where the head injury occurred. A "Z" marks the seat bar. Photograph courtesy of the County Sheriff's Department.

extreme forward leaning position with his head beyond the operator compartment and with the skid steer loader's engine running.

Recommendation #2: Employers should develop, implement, and enforce a comprehensive written safety program which includes training in hazard recognition and the avoidance of unsafe conditions. A written training program should require training for all equipment operators that includes a requirement that they follow the equipment manufacturers' recommendations for safe equipment operation.

Discussion: A comprehensive safety program should be developed that includes training in hazard recognition and the avoidance of unsafe conditions. The training plan should address the proper use of equipment and ensure that the equipment manufacturers' safety recommendations are incorporated into the training. The training should reinforce the requirement that the operator's manual be kept on the machine at all times to serve as a ready resource for safety questions. The content of the training program and the names of those completing the training should be documented and retained with other company safety records. Training workers using the operator's manual for the specific piece of equipment assigned helps workers identify safety recommendations and features unique to the machine in use.

Employers should ensure that the trainer who provides training is qualified through education or experience to conduct training and ensure that the trainer has been provided with training materials that are at a literacy level and in a language that workers can comprehend. Employers should document the trainer's experience and training, and all training provided to other workers.

The Manufacturer's Operator's Manual¹ for the skid steer loader used in the incident provided many instructions for safe operation of the equipment. Among warnings relevant to this incident, were:

- **“Warning:** When you operate, always keep all parts of your body inside the operator compartment. Then, before you leave the operators seat, always lower the loader bucket or attachment to the ground and stop the engine. You can be injured or killed if you do not follow these instructions.” Leaning outside the safety of the operator compartment was a likely contributor to this fatal incident.
- **“Warning:** Raised equipment on the machine without an operator can cause injury or death. Before you leave the operators compartment, always support or lower the equipment (backhoe, blade, boom, bucket, etc.) to the ground and stop the engine.”

The Operator's Manual also includes warnings regarding parking:

- “When you park the machine and before you leave the operator's seat, check the seat bar for correct operation (the seat bar, when raised, engages the parking latch and locks the loader controls). Lower the lift arms and stop the engine.
- If the loader lift arms are raised, always install the support strut before you service the machine.
- Always face the machine and use the hand rails and steps when getting off. Do not rush and do not jump from the machine.”

The operator's manual includes a copy of safety warning labels on the machine (Figure 2), including the label which is placed on the skid steer loader next to handrails designed for use during exit and entry.

Training should reinforce the importance of testing safety features. Training should also remind workers that safety features can fail and that they must heed the manufacturer's warning "when you operate, always keep all parts of your body inside the operator's compartment."

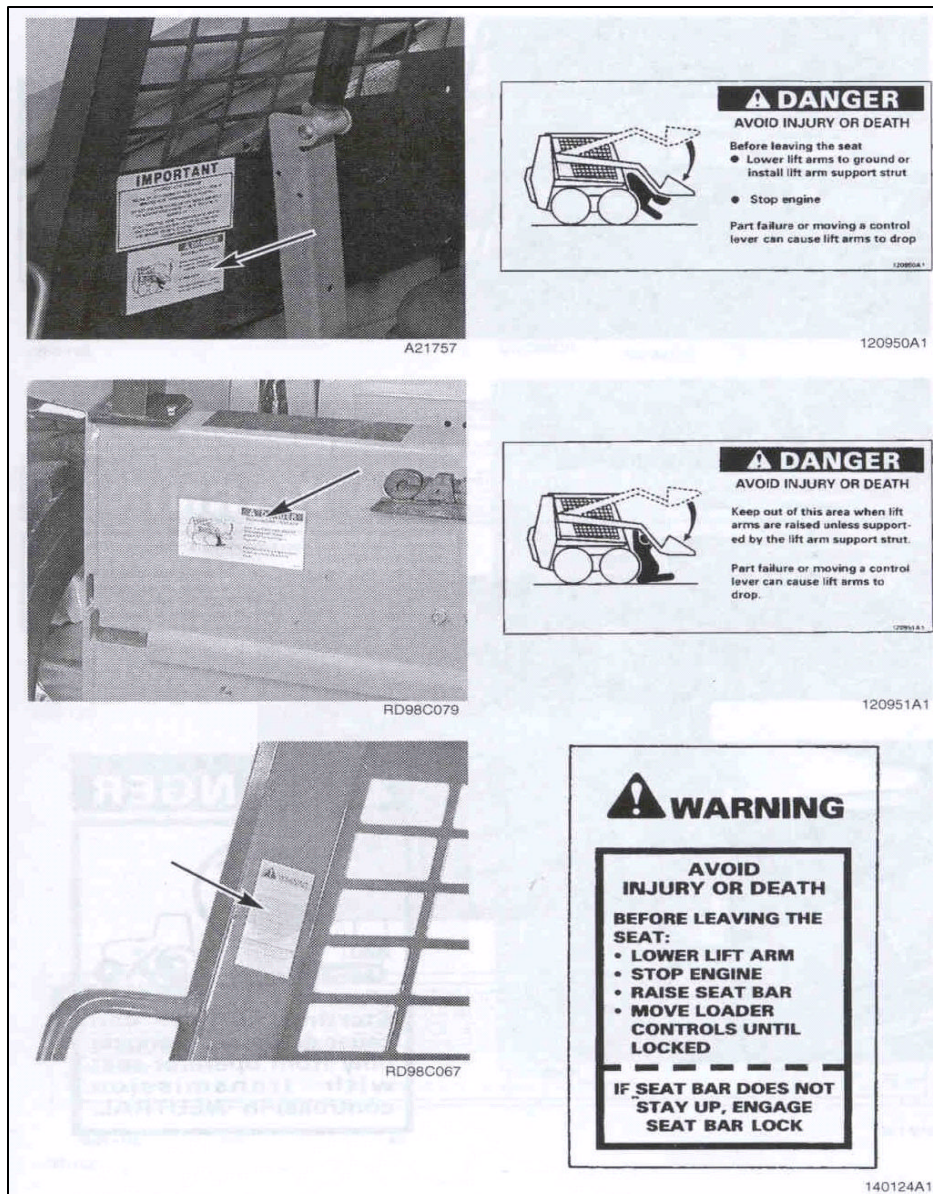


Figure 2. Safety warning labels on the skid steer loader, including the label next to the hand holds regarding exiting the machine [used with permission of manufacturer].



The manufacturer's safety instructions include the following: "Most accidents involving machine operation and maintenance can be avoided by following basic rules and precautions. Read and understand all the safety messages in this manual and the safety signs on the machine before you operate or service the machine. See your dealer if you have any questions."

Additional information useful for training workers about skid steer loader safety can be found in a NIOSH Alert: *Preventing Injuries and Deaths from Skid Steer Loaders*² available through the NIOSH website at <http://www.cdc.gov/niosh> or by calling 1-800-356-4674. The Alert is available in both English and Spanish (<http://www.cdc.gov/spanish/niosh/docs/98-117sp.html>). The Alert contains a tear-out sheet (reprinted in English and Spanish in the Appendix) that summarizes safety precautions for operators of skid steer loaders. Posting this tear-out sheet at the worksite may serve as an additional means of communicating safe work procedures to workers.

OSHA has developed a standard for performance based training for powered industrial truck operators. In addition to using equipment specific operator's manuals for training, employers are encouraged to use this standard as a model for operator training for other types of equipment, such as skid steer loaders, which are not covered by the standard. The requirements applicable to powered industrial truck operator training are available at www.osha.gov and are located in 29 CFR 1910.178(l)(1).³

Recommendations #3: Employers should ensure that equipment is inspected daily before work begins and that equipment with defective safety features, for example, a seat bar that fails to prevent movement of controls when lifted, is removed from service until needed repairs have been made.

Discussion: Employers should designate a supervisor to be responsible for daily pre-shift equipment checks and for verifying that any problems are corrected. Although equipment may also be inspected by other workers, for example, an equipment operator, the supervisor must be responsible for ensuring that inspections are performed daily by a qualified person, that necessary repairs have been made, that scheduled maintenance is performed, and that records of all inspections are maintained.

The inspection should include testing the function of all safety equipment installed on the equipment. When an inspection reveals, for example, that the seat bar is not operating correctly, equipment should be removed from service until repairs are made. When operating and used correctly, the seat bar protects workers from injury by locking controls. The controls that move the lift arms and that move the equipment back and forth are locked in place when the seat bar is lifted.

The company's general manager told the DSR investigator that the seat bar was tested and adjusted to ensure proper function, and that missing bulbs were replaced in both head and tail lamps following the incident before the skid steer loader was returned to service. The operator's manual provides the following instructions regarding testing the seat bar: "After each work day and after servicing the seat bar, test the seat bar and loader controls for correct operation." Page 128 of the operator's manual goes through steps for checking the seat bar for effectiveness in locking the loader controls and locking against machine movement.

To ensure safe operation, these adjustments should be made by a mechanic who is qualified through experience and training, or equipment should be taken to an equipment dealer for adjustment and repair.

Recommendations #4: Employers should purchase the manufacturer's operator manuals and safety decals in the primary languages used by their workforce.

Discussion: Employers should purchase the manufacturer's operator manuals and safety decals in the primary languages used by their workforce. The distributor for the skid steer loader informed the DSR investigator that the operator manuals and safety decals for the skid steer loader used in the incident are produced in several languages, including Spanish. An operator manual and hazard warning decals written in English are provided with the equipment when it is delivered from the manufacturer. There is a charge for these items when written in other languages.

Operator manuals, hazard warnings, and illustrations written by manufacturers for safe use of their products should be available in the primary languages spoken by workers in the workplace. In this incident, six employees were Hispanic and spoke primarily Spanish, but the hazard warnings and operator manual provided with the skid steer loader were written in English. Many employers employ Hispanic workers and their understanding of English may be limited. The Bureau of Labor Statistics estimated 15.4 million employed Hispanics in 2000, making up 10.9% of the U.S. workforce. The Hispanic workforce increased 43% between 1990 and 2000, and is expected to increase another 36% by 2010 to nearly 21 million employed Hispanic workers.⁴

When employers purchase and ensure the use of written information about safe equipment use in the primary languages used by their employees, they increase the likelihood that workers will be able to comprehend the safe procedures they are to follow when operating equipment.

Recommendation #5: Employers should ensure that the nearest area office of the Occupational Safety and Health Administration is notified within 8 hours of a fatality or in-patient hospitalizations of three or more workers as a result of a work-related incident at their company.

Discussion: Within eight hours after the death of any employee from a work-related incident or the in-patient hospitalization of three or more employees as a result of a work-related incident, employers must report the fatality/multiple hospitalizations by telephone or in person to the area office of the Occupational Health and Safety Administration (OSHA), U.S. Department of Labor, that is nearest to the site of the incident. Employers may also use the OSHA toll free central telephone number, 1-800-321-OSHA (1-800-321-6742) [29 CFR 1904.39(a)].⁵

This early reporting allows OSHA investigators to accurately assess the hazards present and to remove other workers from potential hazardous situations. In this incident, the employer was unaware of this reporting requirement.



REFERENCES

1. Case Corporation (1999). Operators Manual for 1840 Uni-Loader P.I.N. JAF0223014 and After. Racine WI: Case Corporation.
2. NIOSH [1998]. Alert: Preventing Injuries and Deaths from Skid Steer Loaders. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 98-117.
3. Code of Federal Regulations [2003]. 29 CFR 1910.178(l)(1). Powered industrial truck operator training. Washington, DC: U.S. Government Printing Office, Office of the Federal Register.
4. BLS [2001]. BLS Releases 2000-2010 Employment Projections. [<ftp://ftp.bls.gov/pub/news.release/History/ecopro.12032001.news>]. Date accessed: March 26.
5. Code of Federal Regulations [2003]. 29 CFR 1904.39(a). Reporting fatalities and multiple hospitalization incidents to OSHA. Washington, DC: U.S. Government Printing Office, Office of the Federal Register.

INVESTIGATOR INFORMATION

This investigation was conducted by Doloris N. Higgins, Safety and Occupational Health Specialist, Fatality Investigations Team, Surveillance and Field Investigations Branch, Division of Safety Research.



Appendix

Source: NIOSH [1998]. *Alert: Preventing Injuries and Deaths from Skid Steer Loaders*. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 98-117.



Preventing Injuries and Deaths from Skid Steer Loaders

WARNING!

Workers who operate or work near skid-steer loaders may be crushed or caught by the machine or its parts.

If you operate or work near skid steer loaders, take these steps to protect yourself.

1. Follow safe operating procedures:

- Operate the loader from the operator's compartment—never from the outside.
- Stay seated when operating the loader controls.
- Work with the seat belt fastened and the restraint bar in place.
- Keep your arms, legs, and head inside the cab while operating the loader.
- Load, unload, and turn on level ground when possible.
- Travel and turn with the bucket in the lowest position possible.
- Operate on stable surfaces only.
- Do not travel across slopes. Travel straight up or down, with the heavy end of the machine pointed uphill.
- Keep bystanders away from the work area.
- Never disable safety devices.

2. Enter and exit from the loader safely:

- Enter the loader only when the bucket is flat on the ground—or when the lift arm supports are in place.
- When entering the loader, face the seat and keep a threepoint contact with handholds and steps.
- Never use foot or hand controls for steps or handholds.
- Keep all walking and working surfaces clean and clear.
- Before leaving the operator's seat,
 - lower the bucket flat to the ground,
 - set the parking brake, and
 - turn off the engine.

3. Maintain the machine in safe operating condition:

- Follow the manufacturer's instructions.
- Keep the foot controls free of mud, ice, snow, and debris.
- Regularly inspect and maintain
 - Interlocked controls
 - Safety belts
 - Restraint bars
 - Side screens
 - Rollover protective structures (ROPS)
- **NEVER** modify or bypass safety devices.
- If you must perform service under a raised bucket, use the lift arm supports.

Please tear out and post.

**Prevención de lesiones y muertes causadas por
los minicargadores**

¡ADVERTENCIA!

Los trabajadores que operan o trabajan cerca de minicargadores pueden ser aplastados o quedar atrapados por la máquina o sus piezas.

Si usted opera o trabaja cerca de minicargadores, siga los pasos siguientes para protegerse.

1. Observe procedimientos de seguridad al operar la máquina:

- Haga funcionar el cargador desde el compartimiento del operador, nunca desde fuera.
- Esté sentado cuando haga funcionar los controles del cargador.
- Trabaje con el cinturón de seguridad puesto y la barra de sujeción en la posición correcta.
- Mantenga los brazos, piernas y cabeza dentro de la cabina mientras esté operando el cargador.
- Cuando sea posible, cargue, descargue y gire en terrenos llanos.
- Haga el recorrido y gire con el cucharón en la posición más baja posible.
- Opere la máquina únicamente en superficies estables.
- No atraviese terrenos inclinados. Vaya derecho hacia arriba o hacia abajo con la parte pesada de la máquina apuntando hacia la parte elevada del terreno.
- Mantenga a los espectadores alejados del área de trabajo.
- Nunca desactive los dispositivos de seguridad.

2. Entre y salga del cargador de manera segura:

- Entre al cargador únicamente cuando el cucharón descansa sobre el suelo o cuando se encuentren en posición los soportes de los brazos de elevación.
- A entrar al cargador, hágalo mirando de frente el asiento y utilice asideros y peldaños para mantener tres puntos de contacto.
- Nunca utilice los controles de mano o de pie como asideros o peldaños.
- Mantenga todas las superficies de trabajo y para caminar limpias y despejadas.
- Antes de abandonar el asiento del operador,
 - haga descender el cucharón hasta que descansa en el suelo,
 - accione el freno de estacionamiento, y
 - apague el motor.

3. Mantenga la máquina en condiciones de funcionamiento seguras:

- Observe las instrucciones del fabricante.
- Mantenga los controles de pie libres de lodo, hielo, nieve y residuos.
- Inspeccione y dé mantenimiento con regularidad
 - Controles entrelazados
 - Cinturones de seguridad
 - Barras de sujeción
 - Rejillas laterales
 - Estructuras de protección contra volcamientos (ROPS)
- **NUNCA** modifique o pase por alto los dispositivos de seguridad.
- Si se debe realizar servicio de reparaciones debajo de un cucharón alzado, utilice los soportes de los brazos de elevación.