Vibrio vulnificus *Infection — Continued*

addition, providers should ask about a history of raw oyster ingestion or sea water contact when persons with preexisting liver disease or immunocompromising conditions present with fever (especially when bullae, cellulitis, or wound infection is also present) and should promptly administer appropriate antibiotic therapy (tetracycline or a third-generation cephalosporin [e.g., ceftazidime or cefotaxime]) when indicated.

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Skid-Steer Loader-Related Fatalities in the Workplace — United States, 1992–1995

The skid-steer loader is a specialized type of wheel loader that is small, compact, and versatile and is readily adaptable to a variety of work settings (Figure 1); it is commonly used in agriculture, construction, and general industry. Recent injury surveillance findings of and investigations by the state component of CDC's National Institute for Occupational Safety and Health (NIOSH) Fatality Assessment and Control Evaluation (FACE) program* underscore the potential for preventing incidents in which workers are pinned between the bucket and frame or the lift arms and frame of skid-steer loaders. This report describes the results of FACE program investigations of four skid-steer loader-related fatalities, summarizes surveillance data for 1980–1995, and provides recommendations for the prevention of such incidents.

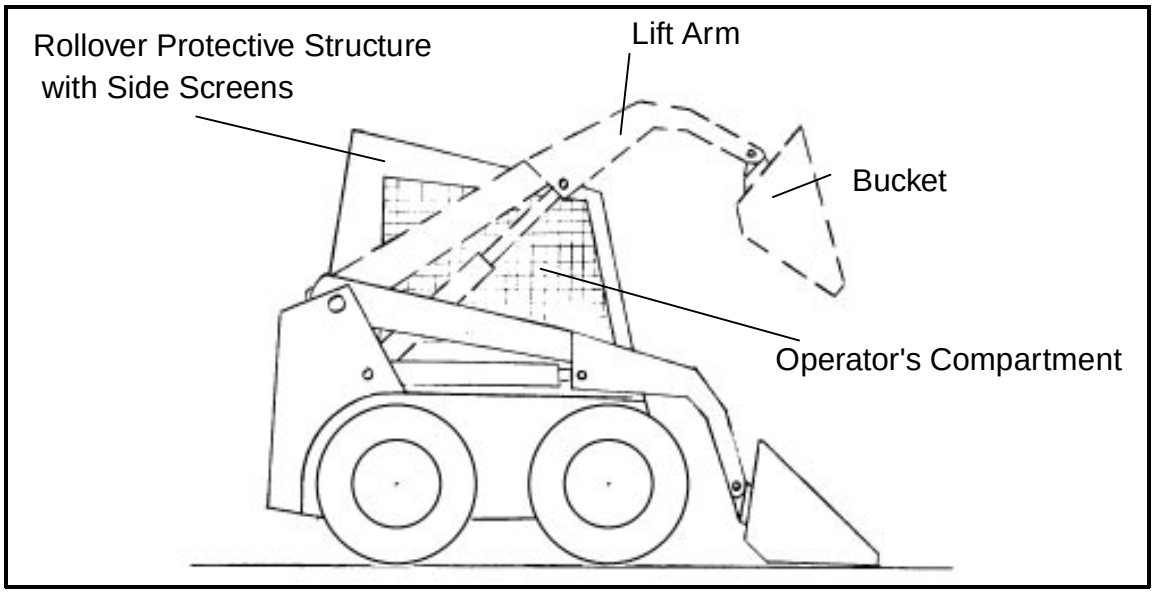
Case Reports

Incident 1. On October 16, 1993, a 26-year-old hog farmer in Minnesota was using a skid-steer loader to pile manure inside a hog containment building. The protective cage enclosing the operator's compartment had been removed to allow operating clearance inside the building. The machine stalled while the bucket was raised, and the farmer attempted to dismount by climbing over the left side of the loader. While

*Through cooperative agreements with NIOSH, 14 states maintain multiple-source surveillance networks for identification of all traumatic occupational fatalities; conduct site investigations of selected categories of cases (including fatal falls from elevations and machinery-related incidents); and disseminate injury-prevention information.

Skid-Steer Loader-Related Fatalities — Continued

FIGURE 1. Typical configurations of a skid-steer loader, shown with lift arms and bucket in lowered position (solid lines) and in raised position (dashed lines)



dismounting, he inadvertently struck the lift control lever; as a result, the lift arms lowered on him. He died from respiratory arrest caused by crush injury to the chest wall.

Incident 2. On March 1, 1994, a 26-year-old sawmill operator in Wyoming was transporting stockpiled logs to a bin area of the mill. He was using a reconditioned skid-steer loader on which the safety belt and protective screens on the sides of the cab had been removed. While operating the machine, he leaned out of the cab and was pinned between the moving lift arms and the side of the cab. The cause of death was listed as massive crush injuries to the head.

Incident 3. On February 7, 1995, a 37-year-old farmer in Iowa was cleaning the foot-pedal control linkage of a skid-steer loader while the bucket was raised. The loader's safety-belt interlock control system[†] had been bypassed by jamming a glove in the linkage. Because the loader controls had frozen in the lift position, the bucket rose when the farmer started the engine. The farmer shut down the engine and dismounted; however, because there was insufficient clearance to completely raise the bucket, the manufacturer-provided lift-arm support device[§] was not set in place. While the farmer was beneath the bucket cleaning the pedals, he inadvertently activated the foot-operated lift control and caused the bucket to descend. He sustained fatal crush injuries to the chest.

[†]An interlock is a device or mechanism used to connect individual components so that the action of one part of the equipment is constrained by, or dependent on, another (*1*); in general, its purpose is to prevent the operation of machine components under specified conditions, usually when a hazard is present. As applied to skid-steer loaders, the interlock prevents movement of the lift-arm controls unless safety belts or safety bars are correctly engaged.

[§]A lift-arm support device is a mechanical device used to prevent inadvertent lowering of the lift arms when the bucket is required to be in the elevated position for maintenance, service, or similar purpose other than loader operation (*2*).

Skid-Steer Loader-Related Fatalities — Continued

Incident 4. On May 25, 1995, a 30-year-old carpenter in Nebraska was preparing to use a skid-steer loader to back-fill dirt around a newly constructed house. While standing in front of the machine under the raised bucket, he activated the foot-operated lift control and the bucket dropped on him. He died from internal injuries. FACE investigators determined that the safety-belt interlock had been deactivated.

Surveillance for Skid-Steer Loader-Related Fatalities

During 1992–1995, FACE received 22 reports of skid-steer loader-related fatalities from eight states (Wisconsin [six], Iowa [four], Minnesota [four], Nebraska [three], Colorado [two], California [one], Massachusetts [one], and Wyoming [one]). All the decedents were males; ages ranged from 21 to 68 years (mean: 40 years). The decedents were employed in agriculture (13), construction (four), services (two), retail trade (one), manufacturing (one), and wholesale trade (one); their occupations were classified as farmer (10), laborer (four), business owner (three), machine operator (two), landscaper (two), and carpenter (one).

In 10 of the 22 cases, the decedent had been working or standing under a raised bucket. Five incidents occurred because the decedent had leaned out of the operator's compartment into the path of ascending or descending lift arms and was crushed against the frame by the lift arm. In the other incidents, the decedents were crushed between the bucket and machine frame while dismounting or mounting (four) or were caught between the bucket and frame (three).

Additional cases were identified through two other surveillance systems for work-related fatal injuries: the NIOSH National Traumatic Occupational Fatalities (NTOF) surveillance system[¶] and the Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI).** During 1980–1992, NTOF identified 25 work-related fatalities that resulted when the worker was pinned between the bucket and frame or the lift arms and frame of a skid-steer loader; 15 (60%) occurred during 1988–1992. NTOF data include 65 additional case narratives describing similar injuries but do not specify the loader type; some of these deaths may have been skid-steer loader related. CFOI identified 20 such incidents during 1992–1994. Overlap in the identification of cases was limited: one fatality in 1992 was recorded by NTOF and by FACE, and two fatalities (one each in 1992 and 1993) were reported in both FACE and CFOI. Incidence rates were not calculated because denominator data for exposure to skid-steer loaders were not available.

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Editorial Note: Skid-steer loaders are particularly adaptable to use in agriculture and construction because their small size and method of steering[††] permit exceptional maneuverability. The machine is compact, in part because the operator's seat and controls are placed in front of the engine between the loader lift arms and in front of the

[¶]Based on death certificates obtained from the 50 states, the District of Columbia, and New York City, NTOF contains data for persons aged ≥16 years for whom there was a work-related external cause of death. Data are available for 1980–1992.

**CFOI is a multiple-source reporting system for occupational fatalities implemented nationwide by BLS in 1992.

[††]Vehicles steer by varying the speed and/or direction of the wheel rotation on opposite sides of the machine (i.e., skidding).

Skid-Steer Loader-Related Fatalities — Continued

lift-arm pivot points, which requires the operator to mount and dismount the machine from the front by climbing over the bucket. Skid-steer loaders incorporate hand-lever controls or foot-pedal controls for the lift arms and bucket tilt functions; the operator can inadvertently activate these controls by failing to follow proper safety procedures during mounting and dismounting.

Specifications of currently manufactured skid-steer loaders conform to recommendations issued in June 1985 by the Society of Automotive Engineers (*2*). To protect against inadvertent activation, manufacturers have equipped the loaders with skid-resistant steps, grab handles, and specific warning and instructional signs. In the early 1980s, manufacturers introduced interlock control systems that require the safety belt and/or safety bar to be engaged before the loader's controls can be activated. However, these interlock control systems can be bypassed by operators and rendered inoperative. Rollover protective structures (ROPSs) with side screens and use of safety belts provide additional protection by preventing the operator from leaning into the path of moving lift arms. Finally, an approved lift-arm support device can prevent serious injury from inadvertent lowering of the lift arms when the lift arms are raised for service procedures. The risk for inadvertent lowering is increased if the loader's interlock control systems are bypassed or inoperative.

Because of the variety of industries and circumstances in which skid-steer loaders are used (estimates of the number of these machines in use during 1991 ranged from 140,000 to 178,000 [*3*]) and the limitations inherent in current surveillance for fatal occupational injuries, the data in this report probably underestimate the number of fatal injuries associated with skid-steer loaders. The state component of FACE receives reports of work-related fatalities from only 14 states. In addition, death certificate-based systems like NTOF identify approximately 80% of work-related fatalities (*4,5*). Finally, because of the limited nature of injury descriptions in NTOF and CFOI when compared with FACE, these systems are less likely to specify the exact type of loader associated with a fatality, constraining ascertainment of specific circumstances. Despite these underestimates, the cases in this report suggest a recurrent pattern of preventable injuries.

To protect against lift arm- or bucket-related injuries while using skid-steer loaders, NIOSH and equipment manufacturers recommend the following precautions:

- Operators should follow the manufacturer's warnings and instructions for safe mounting and dismounting. In particular, they should mount the loader only when the lift arms and bucket are flat on the ground; before leaving the loader seat, they should 1) lower the lift arms and bucket flat on the ground; 2) turn the engine off; and 3) engage the parking brake.
- Operators should use the loader's controls only from the operator's position.
- Operators should not use controls as grab handles.
- Owners and operators should inspect and maintain skid-steer loaders in accordance with manufacturers' instructions. Control interlocks, safety belts, safety bars, ROPSs, and side screens always should be properly inspected and maintained and never should be modified or bypassed.
- Service personnel should not perform maintenance or service under a raised lift arm or bucket unless an approved lift-arm support is used. When lift-arm supports

Skid-Steer Loader-Related Fatalities — Continued

cannot be engaged directly from the operator's seat, they should be engaged by a second person who can stay clear of the raised lift arms and bucket while doing so.

- Operators and service personnel should read and understand the manufacturer's operating and service procedures specified in the operator's manuals and on the machine's safety signs. Manuals and other operator training materials (e.g., instructional videos and/or operator training courses) can be obtained from the equipment dealer or manufacturer.

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Adult Blood Lead Epidemiology and Surveillance — United States, First Quarter 1996, and Annual 1995

CDC's National Institute for Occupational Safety and Health Adult Blood Lead Epidemiology and Surveillance program (ABLES) monitors laboratory-reported elevated blood lead levels (BLLs) among adults in the United States (*1*). Twenty-three states reported surveillance results to the ABLES program in 1995. Ohio and Minnesota joined ABLES in 1996; their data are included for the first quarter of 1996. This report presents ABLES data for the first quarter of 1996 compared with the first quarter of 1995 and annual data for 1995 compared with 1994.

First Quarter Reports, 1996

During January 1–March 31, 1996, the number of reports of BLLs ≥25 μg/dL decreased by 8% compared with the number reported for the same period in 1995 (*2*), which has been revised to include previously unpublished 1995 data for Minnesota and Ohio (Table 1). The number of reports for 1996 decreased in all reporting categories. This overall trend of decreasing reports is consistent with the fourth quarter report for 1995 (*3*).

Annual Reports, 1995

Overall reports of BLLs ≥25 μg/dL decreased from 26,832 in 1994 to 26,459 in 1995 (Table 2); this represents a 1% decrease, with the same 23 states reporting in each year. In comparison, the number of reports increased by 4% from 1993 to 1994; however, three additional states had initiated reporting in 1994 (*2*). Although total reports decreased in 1995, the number of reported persons with BLLs ≥25 μg/dL increased

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Vibrio vulnificus Infections Associated with Eating Raw Oysters — Los Angeles, 1996

Of all foodborne infectious diseases, infection with *Vibrio vulnificus* is one of the most severe; the case-fatality rate for *V. vulnificus* septicemia exceeds 50% (*1,2*). In immunocompromised hosts, *V. vulnificus* infection can cause fever, nausea, myalgia, and abdominal cramps 24–48 hours after eating contaminated food; because the organism can cross the intestinal mucosa rapidly, sepsis and cutaneous bullae can occur within 36 hours of the initial onset of symptoms. Cases are most commonly reported during warm-weather months (April–November), and often are associated with eating raw oysters. During April 1993–May 1996, a total of 16 cases of *V. vulnificus* infection were reported in Los Angeles County. Fifteen (94%) of these patients were primarily Spanish-speaking, 12 (75%) had preexisting liver disease (associated with alcohol use or viral hepatitis), all were septicemic, and all had eaten raw oysters 1–2 days before onset of symptoms. In May 1996, three deaths related to *V. vulnificus* infection among primarily Spanish-speaking persons were reported to the Los Angeles County Department of Health Services (LACDHS). This report summarizes the findings of the investigations of these fatal cases and illustrates the importance of prevention strategies for persons with preexisting liver disease.

Case Investigations

Case 1. On May 1, 1996, a 38-year-old man had onset of fever, chills, nausea, and myalgia. On April 29, he had eaten at home raw oysters purchased from a retail store. On May 2, he was admitted to a hospital because of a fever of 102 F (39 C) and two circular necrotic lesions on the left leg. He reported a history of regular beer consumption (36–72 oz per day) and insulin-dependent diabetes. Sepsis and possible deep-vein thrombosis were diagnosed, and the patient was transferred to the intensive-care unit (ICU). In the ICU, therapy was initiated with ticarcillin/clavulanic acid, gentamicin, vancomycin, and ceftazidime. On May 3, *V. vulnificus* was isolated from the blood sample obtained from the patient on admission, and ciprofloxacin was added to his therapy. On May 4, he died. Traceback of the oysters by environmental health inspectors indicated they originated from a lot harvested in Galveston Bay, Texas, on April 27.

Case 2. On May 10, a 46-year-old man had onset of fever, sweats, and nausea. On May 9, he had eaten at home raw oysters purchased from a retail store. On May 11, he