CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

April 27, 2001 / Vol. 50 / No. 16

MMWR™
MORBIDITY AND MORTALITY
WEEKLY REPORT

Workers' Memorial Day — April 28, 2001

Workers' Memorial Day, April 28, 2001, is a designated time to remember workers who have died from work-related injuries or illnesses. Although there have been substantial improvements in occupational health and safety (*1*), work-related injuries and deaths continue to be a major public health concern. During 1980–1997, 103,945 workers died from work-related injuries, an average of 16 deaths per day. In 1999, the most recent year for which data are available, economic costs of fatal and nonfatal unintentional work-related injuries were an estimated $122.6 billion (*2*).

This year, the date also marks the 30th anniversary of the Occupational Safety and Health Act and the establishment of the Occupational Safety and Health Administration and CDC's National Institute for Occupational Safety and Health (NIOSH). NIOSH was established to conduct research and make recommendations to prevent work-related injuries, illnesses, and deaths.

Additional information on causes and prevention of work-related injury and illness is available from CDC, telephone (800) 356-4674 or at http://www.cdc.gov/niosh/homepage.html.

References

1. CDC. Improvements in workplace safety—United States, 1900–1999. MMWR 1999;48:461–9.
2. National Safety Council. Injury facts, 2000 edition. Itasca, Illinois: National Safety Council, 2000.

Baler and Compactor-Related Deaths in the Workplace — United States, 1992–2000

Equipment that compacts and bales loose solid waste materials into denser, more easily transported units is common in refuse disposal and recycling and is used routinely at recycling centers, manufacturing facilities, and retail and wholesale stores to compress paper, textiles, metals, plastic, and other material*. Persons operating balers and compactors can become caught by the powered rams of the compression chambers while using these machines. Risk factors resulting from these incidents have been identified through surveillance findings and results of investigations conducted by CDC's National Institute for Occupational Safety and Health (NIOSH) Fatality Assessment and

*This report considers only stationary machines.

Baler and Compactor — Continued

Control Evaluation (FACE) program[†] and the Bureau of Labor Statistics Census of Fatal Occupational Injuries (CFOI)[§], a nationwide multisource reporting system for occupational deaths. This report describes the results of two baler and compactor-related investigations conducted during 1992–2000, summarizes surveillance data from 1992 through 1998, which indicated that some employers and workers may have been unaware of the hazards of operating or working near compacting and baling equipment, and suggests safety recommendations for preventing future incidents.

Case Reports

Case 1. In July 2000, a 16-year-old produce market worker died from crushing injuries when he was caught in the vertical downstroke baler (Figure 1) he was operating. He was working alone in the market's basement and was using the baler to crush cardboard boxes when he was caught by the machine's ram. Investigations determined that the machine's safety interlock[¶] had been bypassed, allowing the machine to operate with the loading door open. The worker may have reached into the compression chamber while the machine was operating and was caught by the ram during its downstroke.

Case 2. In May 1997, a 34-year-old paper products worker died after falling into an operating baler. The worker and a co-worker were loading scrap paper into the baler through a belt conveyor when the material jammed in the baler's feed chute (Figure 1). The co-worker shut down the conveyor but not the baler's automatic controls, and the worker ascended to a platform between the end of the conveyor and the feed chute. When he leaned over the platform rail to clear the jam, he fell through the feed chute and into the compression chamber. His presence tripped the automatic control sensor, and the baler's ram was activated.

Surveillance Data

CFOI identified 34 deaths related to compactors and balers during 1992–1998; 29 (85%) occurred when a worker was caught or crushed by the compacting ram of the machine. Decedents were age 17–72 years (median: 37 years): six were <25 years, 10 were 25–34 years, nine were 35–44 years, and nine were ≥45 years. Twelve worked in the wholesale trade industry; nine in manufacturing; eight in transportation/communications/public utilities; and the remainder in retail and services industries. Six deaths occurred during the processing of cardboard; five workers were processing paper; five were processing trash; and five were processing cans, scrap metal, cotton, or plastic wrap. For eight deaths, the material being processed was not specified.

During 1992–2000, FACE received 19 reports of baler and compactor-related deaths from 13 states (four in Missouri, three in New Jersey, two in Massachusetts, and one each in California, Colorado, Iowa, Nebraska, New York, North Carolina, South Carolina,

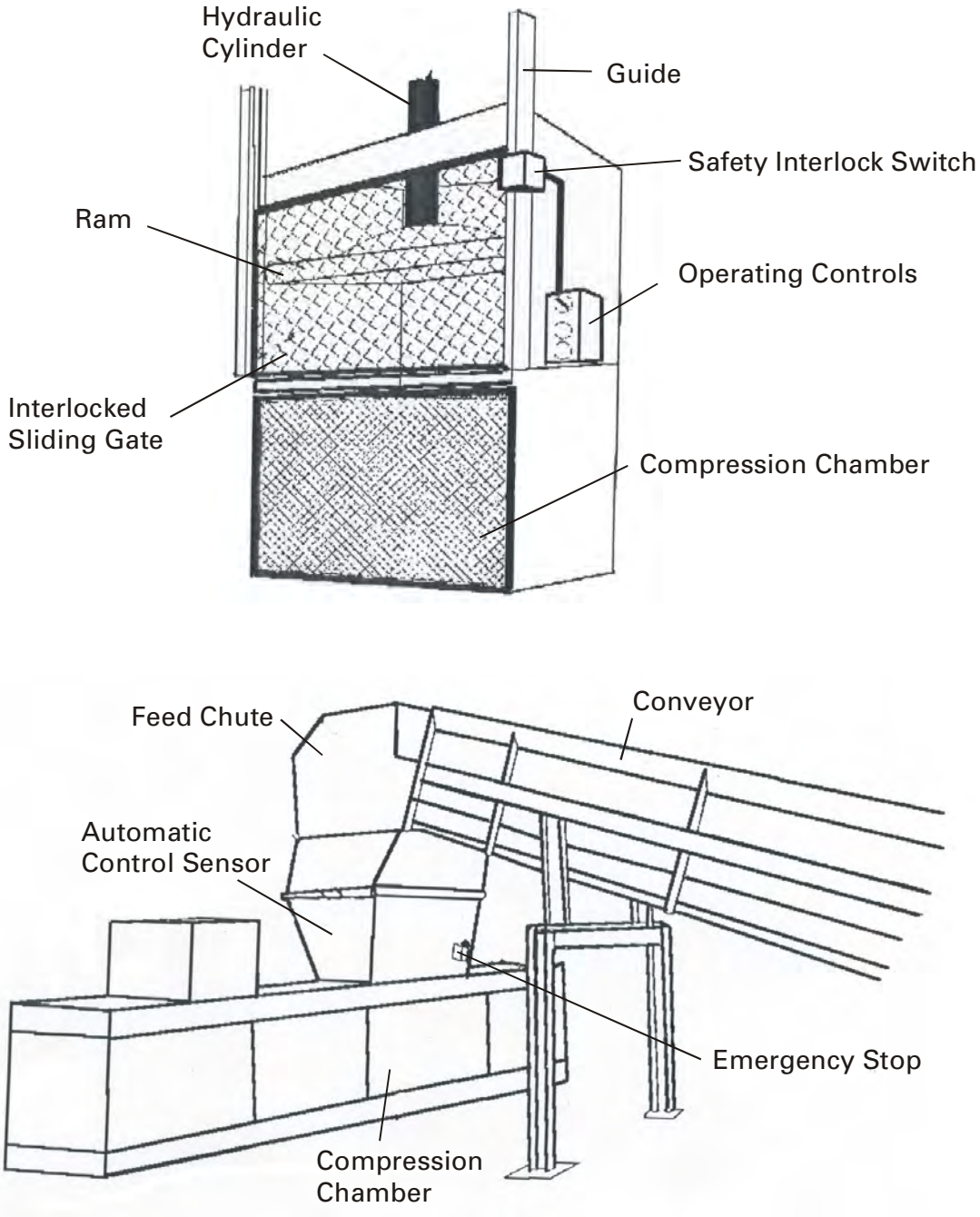
[†] FACE conducts fatality investigations of selected categories of cases, including machinery-related incidents, and disseminates injury prevention information. Through a series of cooperative agreements with NIOSH, 15 states maintain multisource surveillance networks to identify all traumatic occupational deaths, conduct site investigations, and disseminate prevention information.

[§] CFOI is a multisource (e.g., death certificates, medical examiner/coroner reports, workers' compensation reports, and police reports) reporting system for occupational deaths implemented nationwide by the Bureau of Labor Statistics in 1992.

[¶] 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 (*1,2*); in general, the purpose of an interlock is to prevent or interrupt the operation of machine components under specified conditions, usually when a hazard is present. As applied to balers and compactors, the interlock prevents or interrupts movement of the compacting ram if the machine's access doors are opened while the machine is energized or in motion.

Baler and Compactor — Continued

FIGURE 1. Diagram of a stationary vertical downstroke compactor/baler and a horizontal baler and conveyor



Baler and Compactor — Continued

Tennessee, Texas, and Washington). All 19 were men, aged 16–52 years (median: 36 years), who sustained crushing or amputation injuries from the compacting ram after they reached into or entered the compression chamber of an operating machine. Injury-related activities were identified through case reports; reaching or falling into the compression chamber injured 12 persons, the presence of the worker in the compression chamber automatically activating the ram injured six, clearing jammed material from an operating machine injured five, co-workers activating the ram without knowing that the worker was inside the compression chamber injured three, and attempting to retrieve unbalable material from an operating machine injured two; some incidents involved more than one factor.

Field investigations that identified injury risks were conducted for 11 incidents. Nine involved failure to implement effective power supply shutdown and ram pressure dissipation procedures, six involved failure to follow standard procedures for clearing material jams, six involved attempting to clear material jams without shutting down the machine's automatic controls, five involved operating machines with bypassed or defective safety interlocks, and three involved workers' operating a machine without determining the location of co-workers.

Reported by: Fatality Assessment and Control Evaluation Program, Div of Safety Research, National Institute for Occupational Safety and Health, CDC.

Editorial Note: Baling and compacting equipment is built in various sizes and configurations; however, whether the machine is a compactor or a baler, workers are exposed to similar injury risks. Both types of machines compress refuse material through the action of a powered ram that moves vertically or horizontally into and through a compression chamber. Using tons of pressure, the ram compresses the chamber contents into a small, dense unit. Balers compress and bind the material using wire or twine, and compactors compress the material into a container that is stored for later transport. Recently manufactured machines conform to American National Standards Institute specifications such as point-of-operation guards to prevent injury associated with reaching into an operating machine and interlocked control systems to interrupt or reverse the ram's motion when the compression chamber doors are opened (*1,2*). However, some older machines may not have guards and interlocks.

Automatically controlled machines operate when the control system senses the presence of sufficient material to be compressed. Because ram motion may not have started or may have ceased during a jam, workers may not recognize that the machine is operational and the ram could activate inadvertently unless the power supply is disconnected and the ram pressure is dissipated. Employers may not recognize the need to standardize jam clearing procedures to include both power supply shutdown and ram pressure dissipation procedures.

The findings in this report are subject to at least five limitations. First, because of the variety of industries and circumstances in which these machines were used and the limits of surveillance for fatal injuries, this report may underestimate the number of compactor- and baler-related deaths. Second, the FACE state component receives reports of work-related deaths from only 15 states. Third, because of limited injury descriptions in CFOI compared with FACE descriptions, the exact circumstances of injury often cannot be determined. Fourth, deaths identified by FACE from 1992 through 1998 probably were included in CFOI although not necessarily identified as baler- or compactor-related; therefore, FACE and CFOI cases overlap. Finally, the number of reported cases was small, thus limiting generalizability.

Baler and Compactor — Continued

On the basis of information collected from FACE investigations, the following measures are recommended to reduce the risk for worker injury in compactors and balers: 1) employers should train workers to recognize the hazards of operating or working near balers and compactors; 2) before jams are cleared, authorized employees should verify that the machine's electrical power has been disconnected, the disconnecting device has been locked and tagged, and the ram pressure has been dissipated (*3*); employers should implement appropriate power supply shutdown procedures whenever repair or maintenance is needed (*4*); 3) employers should implement standard procedures for managing common events such as material jams; 4) balers and compactors should be equipped with machine guards and safety interlocks to prevent worker injury and interlocks should be designed so that they cannot be bypassed; and 5) employers should require machine operators to account for the location of co-workers before activating compactor or baler rams.

References

1. American National Standards Institute. American national standard for equipment technology and operations for wastes and recyclable materials: baling equipment safety requirements. New York, New York: American National Standards Institute, 1997; publication no. ANSI Z245.5.
2. American National Standards Institute. American national standard for equipment technology and operations for wastes and recyclable materials: stationary compactors safety requirements. New York, New York: American National Standards Institute, 1997; publication no. ANSI Z245.2.
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4. National Institute for Occupational Safety and Health. Preventing worker deaths from uncontrolled release of electrical, mechanical, and other types of hazardous energy. Cincinnati, Ohio: US Department of Health and Human Services, Public Health Service, CDC, 1999; DHHS publication no. (NIOSH)99-110.

Nonfatal Occupational Injuries and Illnesses Treated in Hospital Emergency Departments — United States, 1998

The National Electronic Injury Surveillance System (NEISS) includes data about nonfatal occupational injuries and illnesses treated in U.S. hospital emergency departments (EDs). This report summarizes 1998 injury and illness estimates based on NEISS, which indicate that the magnitude and patterns of nonfatal occupational injuries and illnesses were comparable to estimates reported for 1996 (*1*). Younger workers continue to have the highest rates of work-related injuries and illnesses; therefore, interventions should address the health and safety needs of young workers, most of whom lack substantial experience in the work place.

In 1998, NEISS identified approximately 47,000 work-related injuries and illnesses treated in 67 EDs derived from a national stratified probability sample of all U.S. hospitals with a minimum of six beds and a 24-hour ED.* The NEISS sampling frame for work-related ED visits was updated in October 1997 based on the 1995 listing of U.S. hospitals with EDs. As a result, compared with earlier reports, the updated hospital sample had

* Through a collaboration between NIOSH and the U.S. Consumer Product Safety Commission (CPSC), work-related injury and illness information was collected without limitations by age, consumer product involvement, or type of injury event at two thirds of the 101 NEISS hospitals used by CPSC for the collection of product-related injuries.