

DIVISION OF
SAFETY AND HEALTH

PUBLIC EMPLOYEE
SAFETY AND HEALTH BUREAU

**PESH
STAFF DIRECTIVE
July 14, 2006**

TO: PESH All Staff Directive A06-2
FROM: Maureen Cox
SUBJECT: Surveys involving refuse collection vehicles

The information in this directive should be used for inspections and consultations and should also be made available during compliance assistance activity involving refuse collection vehicles.

BACKGROUND

The National Institute of Occupational Safety and Health (NIOSH) has identified hazards associated with working around and with Refuse Collection and Compacting vehicles and machinery. They brought their concerns to the attention of the Safety and Health industry in their May 1997 NIOSH Alert Notice 97-110. This document addresses the serious hazards associated with refuse (trash) collection and handling equipment.

The NIOSH National Traumatic Occupational Fatalities (NTOF) Surveillance System indicates that between 1980 and 1992, 450 workers aged 16 or older died in incidents related to refuse collection; 303 (67%) of these incidents were vehicle related.

Of the vehicle related deaths, 110 (36%) occurred when the worker slipped or fell from a refuse collection vehicle, was struck or run over by the vehicle, or fell and was struck or run over by the refuse collection vehicle. Twenty (18%) of the 110 fatalities occurred when the refuse collection truck was backing up.

REGULATIONS AND STANDARDS

Current OSHA regulations do not specifically address refuse collection vehicles. However, the American National Standards Institute (ANSI) has published Safety Standards for Mobile Refuse Collection and Compaction Equipment, which addresses safe operation and construction of the equipment and includes recommendations for rider and pedestrian safety.

These standards recommend that workers:

- (1) ride only in the vehicle cab or on steps specifically designed for riding,
- (2) remain inside the vehicle cab until the vehicle is completely stopped,
- (3) ensure that no riders are using the riding steps when the vehicle is:
 - (a) backing,
 - (b) exceeding 10 miles per hour,
 - (c) or traveling more than 0.2 miles, and
- (4) ensure that no one rides on the loading sills or in hoppers.

The ANSI standards also address the design and construction of the vehicle in relation to rider and pedestrian safety by recommending the following:

Riding steps should provide a self cleaning, slip resistant surface that is at least 220 square inches and capable of supporting 500 pounds. The steps should be at least 8 inches deep, mounted behind the rearmost axle of the vehicle, and not more than 24 inches above the road surface. Grab handles capable of withstanding a 500 pound pull should be provided along with the riding steps. Warning signs should be posted above the riding steps to prohibit their use when traveling at speeds above ten (10) miles per hour or when backing. The vehicle should be equipped with an audible warning device that activates when the vehicle is operated in reverse.

Note: The American National Standards Institute has four versions of the ANSI 245.1 standard. Based on when the vehicle involved was manufactured, the correct document must be used for the investigation. The applicable ANSI standard based on the date of manufacture is provided in the table below.

Manufacture Date	ANSI Standard
12/9/2001 and later	Z245.1-1999
1/3/1994 to 12/8/2001	Z245.1-1992
5/2/1986 to 1/2/1994	Z245.1-1984
3/16/1978 to 5/1/1986	Z245.1-1975

For all existing mobile equipment, without regard to the date of manufacture, provisions 4.2, 4.3, 5.2, and Clauses 6 and 9 of the current ANSI Z245.1-1999 standard are in effect. Provisions 4.2, 4.3, and 5.2 address reconstructions and modifications so that they meet the current standard. Clause 6 addresses operating requirements and Clause 9 addresses the safety program and training.

The National Solid Waste Management Association (NSWMA) has developed comprehensive

safety practices for workers engaged in solid waste collection. The NSWMA Manual of Recommended Safety Practices contains detailed procedures for backing safely, acting as a spotter during backing, and working around mobile equipment [NSWMA 1988]. These procedures include the following:

Maintaining visual contact between the driver and workers on foot when working close to the vehicle and when backing,

Checking both side mirrors repeatedly when backing,

Using a reliable spotter positioned to see both the driver and any blind spots behind the vehicle when backing,

Using standard hand signals when backing,

Stopping the truck if the spotter must change positions,

Immediately stopping the maneuver if visual contact with the spotter is lost, and

Remaining clear of the rear of the vehicle when the backup lights are on or the alarm is sounding.

NIOSH Alert

Preventing Worker Injuries and Deaths From Moving Refuse Collection Vehicles

NIOSH recommends that employers (1) develop and implement safe work procedures for riding on and working near moving refuse collection vehicles, and (2) train workers in these procedures. In addition, NIOSH recommends that employers and manufacturers of refuse collection vehicles carefully evaluate the design, selection and equipment of these vehicles.

Workers should be trained to adopt the procedures described in the following subsections.

Hazardous Area

Drivers and collectors should be trained to recognize the hazardous area around a refuse collection vehicle. The size of this hazardous area depends on the boundaries of the driver's blind spot and the distance needed to stop the vehicle gradually, without throwing a step rider from the steps.

Safe Riding Procedures

Riding Position

- Collectors should ride in the vehicle cab when traveling to or between collection routes. When adequate seating is not available inside the cab, collectors should be transported to and from the collection route by a separate vehicle.
- Riding steps should be used only when moving forward for short distances (0.2 mile or less) at slow speeds (10 miles per hour or less).
- When the riding steps are in use, drivers and crew members should be alert for obstructions such as poles and tree limbs, parked vehicles, and tight clearances that could injure step riders.
- Collectors should not ride the steps when the vehicle is backing.

Boarding and Dismounting from the Riding Steps

- Collectors should step, not jump, on or off riding steps.
- Collectors should board or dismount from these steps only when the vehicle is completely stopped and the driver is aware of the collector's location.
- Drivers should wait for the collector to signal before moving. The collector can signal the driver by hand or with a buzzer mounted for easy activation by step riders.
- Signals should be uniform throughout the department or firm to avoid confusion [NIOSH 1982].

Sudden Stops

Drivers should avoid sudden stops that could cause step riders to be thrown from the vehicle.

Safe Backing Procedures

Workers should be trained to follow NSWMA practices [NSWMA 1988]:

- Before backing, drivers should
 - turn on the vehicle's hazard lights,
 - roll down the window,
 - turn off all but two way radios,
 - make sure that no one is on the riding steps, and
 - visually locate workers on foot to make sure that they are clear of the vehicle's path.
- When backing, drivers should
 - stop backing immediately if visual contact is lost with workers on foot,
 - resume backing only after visual contact is restored with workers on foot,
 - use a coworker as a spotter, and
 - use agreed upon hand signals to communicate with the spotter.
- Other crew members should

- step off the riding steps before the driver begins to back,
- remain inside the vehicle cab unless needed to act as a spotter, and
- never cross or step behind the vehicle when it is backing or when its backup lights are on.
- Spotters should
 - remain visible in the driver’s mirrors,
 - maintain a clear view of the hazard area (driver’s blind spot) behind the vehicle,
 - stay clear of the vehicle’s path,
 - avoid walking backward,
 - use agreed upon hand signals to communicate with the driver,
 - be sure that no one is on the riding steps or behind the vehicle before signaling the driver to start backing,
 - immediately signal the driver to stop if any person or object enters the area behind the truck, and
 - signal the driver to stop if the spotter must change positions when the vehicle is backing; the spotter should then move to the new position and signal the driver to continue.

Safety Equipment

Clothing

Refuse collectors should wear highly visible colors (ANSI compliant) to help vehicle operators visually locate the collectors’ positions during backing. If collectors are required to work during non-daylight hours, they should be issued and required to wear light reflective clothing.

Footwear

Refuse collectors should wear slip resistant footwear (Mark II ASTM) to protect against slips and falls from riding steps. Shoes with cleated, self cleaning soles are appropriate for muddy conditions often found at landfills. However, collectors should avoid shoes with very narrow cleats or spikes that might get caught in open mesh riding steps or make walking on pavement difficult.

Audible Alarms

To warn workers and pedestrians of backing, refuse collection vehicles should be equipped with audible alarms that can be distinguished from the surrounding noise level. ANSI [1992] requires such alarms to have a minimum output of 87 decibels. Because the effectiveness of a backup alarm depends on the worker’s ability to hear it and remove himself from the danger zone, these alarms should be designed and installed so that they are activated before the vehicle moves, when the transmission is shifted to reverse.

Riding Facilities

Refuse collection vehicles should be equipped with enough seating space inside the cab for all members of a collection crew.

If refuse collectors are permitted to ride the riding steps while on the collection route, the steps should be as follows:

- Constructed of perforated floor materials to prevent accumulation of debris
- Constructed of slip resistant materials and large enough to accommodate the worker comfortably
- Located so that workers can easily board and dismount from them
- Located behind the rearmost axle of the vehicle

In addition, slip resistant handholds should be readily accessible.

Existing Technology

Though technology is not a substitute for safe work practices, it can improve the safety of workers near moving vehicles. Employers, equipment manufacturers, and suppliers of refuse collection equipment should evaluate the applicability of the following equipment and devices for improving worker safety.

Personal Warning Devices

Small compressed gas horns worn on the belt can be sounded if the worker trips or falls in the path of backing vehicles.

Radio Communications

Refuse collectors can use two way radios to communicate with vehicle drivers. Radio communication should not replace visual contact between drivers and spotters, but it can improve safety by maintaining communication if visual contact is momentarily lost.

Rear View Mirrors

Additional convex mirrors can be mounted at the rear corners of some vehicles to provide vision across the back. These devices supplement the rearview mirrors traditionally mounted on each side of the vehicle at the cab windows.

Closed-Circuit Television

Closed-circuit television systems are currently used on some vehicles to monitor the blind spot behind the vehicle.

Sensor Technology

Infrared or ultrasonic sensing units can detect persons or other objects in the path of a backing vehicle and activate an alarm inside the cab. These devices are being used successfully on school buses to alert drivers to children who enter the blind spots in front of the buses; the devices have already been installed on refuse collection vehicles in some areas [Hubbard 1996]. Although

sensor technology is not applicable to all vehicle designs, it is improving and should be considered when buying new equipment.

Guarding of Equipment

Refuse collection vehicles should be equipped with strategically placed guards or extended bodywork to prevent workers from falling into the path of the wheels. These guards might not prevent the actual fall, but they could significantly reduce the injury by deflecting the victim from the path of the wheels. Figure 1 shows a typical side loading refuse collection vehicle with an open area between the loading step and the rear wheels (loading steps are not intended or recommended for riding). Figure 2 shows the same vehicle with extended bodywork to guard the open area between the step and rear wheel.

This concept may have limited application if the vehicle is required to travel over uneven terrain. However, this type of bodywork could be put in place at the time of manufacture or retrofitted to vehicles operating over fairly even terrain.

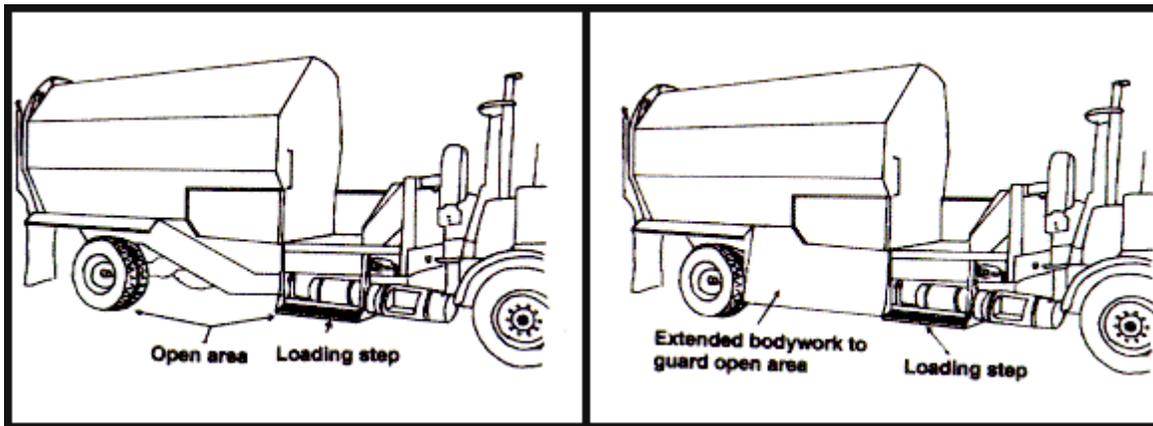


Figure 1. Typical side-loading refuse collection vehicle with an open area between the loading step and the rear wheels.

Figure 2. Typical side-loading refuse collection vehicle with extended bodywork to guard the open area between the loading step and the rear wheels.

INSPECTIONS and INVESTIGATIONS

This directive will be used to conduct inspections involving trash collection vehicles so that all inspections/investigations are performed in the same systematic manner.

INSPECTION PROCEDURES

In addition to the normal information obtained for any investigation/inspection, and due to the lack of an OSHA standard, the CSHO must obtain the following information and documentation:

- The CSHO will ensure the manufacture date of the equipment involved. Sometimes the compacting equipment and truck have separate manufacture dates; the CSHO must obtain both dates.
- CSHO must review the training records related to the refuse collection equipment.
- Manufacturer operating manuals usually have specific training, use, and maintenance requirements. The CSHO must review a copy of the manual to determine the manufacturer's instructions for operation, maintenance, and use. The equipment/vehicle maintenance records should also be reviewed.
- Review and document the employer's procedures for working on or around the refuse collection equipment. These procedures should address at a minimum:
 - The speed at which riding is permitted on the steps (must be less than 10 mph)
 - Distances that riding on steps is permitted
 - less than 0.2 miles
 - never in reverse
 - No one rides on the loading sills or in hoppers
 - Backing up procedures
 - Maintaining visual contact between the driver and workers on foot when working close to the vehicle and when backing
 - Checking both side mirrors repeatedly
 - Using a reliable spotter positioned to see both the driver and any blind spots
 - Using standard hand signals
 - Stopping the truck if the spotter must change position
 - Stopping the maneuver if visual contact with the spotter is lost
 - Remaining clear of the rear of the vehicle when in reverse
 - Proper personal protective equipment (as part of the required hazard assessment)
 - Visibility clothing (meeting ANSI/ISEA 107-1999)
 - Employees using riding steps should wear slip resistant footwear (Mark II ASTM)
- The design requirements of the vehicle:
 - Any riding steps should provide a self cleaning slip resistant surface that is at least 220 square inches and capable of supporting 500 pounds.
 - Grab handles capable of withstanding a 500 pound pull should be provided along with the riding steps
 - Warning signs posted above the riding steps to prohibit their use when traveling greater than 10 mph or when backing
 - Audible warning device when the vehicle is operated in reverse

CITATION POLICY

As no OSHA standard covers the hazards associated with Refuse collection equipment or vehicles, a **GENERAL DUTY CLAUSE** (Section 27a) citation will have to be justified and issued. All such citations must be based on a consensus standard. As noted above, the CSHO has the ANSI standard(s), the NSWMA guidelines, the NIOSH Alert, and the manufacturer's operating/use/maintenance instructions. In the past we have issued and sustained citations for lack of training, allowing employees to ride steps while moving at greater than 10 mph, riding the steps for more than 0.2 miles, and riding the steps while the vehicle was backing. Citations have also been issued when an employer modifies the equipment/vehicle without the manufacturer's permission.

CITATION EXAMPLE:

Citation 1 Item 1 Type of Violation: Serious

Section 27-a(3)(a)(1): The employer did not furnish to each of its employees, employment, and a place of employment which is free from recognized hazards that are causing or are likely to cause death or serious physical harm to its employees and which will provide reasonable and adequate protection to the lives, safety, or health of its employees. In applying this paragraph, fundamental distinctions between private and public employment have been recognized.

(a) _____ Sanitation Department; (vehicle information). The employer had modified and/or replaced both rear, side riding steps, without the manufacturer's permission, which was required by the manufacturer's operating manual. The employer had replaced the manufacturer's self-cleaning, slip-resistant grating material, with smooth steel plates which do not provide a self-cleaning, slip-resistant surface and which does present a fall hazard and is not compliant with ANSI Z245.1-1984. A feasible and acceptable abatement method, among others, would be for the employer to provide riding steps on the refuse vehicle which meet the manufacturer's and ANSI requirements.

(b) _____ Sanitation Department; The employer had not provided training and education for employees who operate and work around refuse collection equipment, as required by ANSI Z245.1-1999, and the manufacturer's operating manuals. The lack of training and hazard awareness related to refuse collection equipment can result in falls and crushing injuries. A feasible abatement method, among others, would be for the employer to provide a training and education program for employees prior to assignment to working with this type of equipment, and to routinely re-enforce the training by tail gate training sessions, so that employees are familiar with safety hazards and safe work practices related to refuse collection equipment.

(c) _____ Sanitation Department; The employer had not provided a safety and health program to ensure employees are operating the equipment properly, as required by ANSI Z245.1-1999, and the manufacturer's operating manuals. A feasible abatement method, among others, would be for the employer to provide procedures for ensuring that employees are practicing safe work practices and for employer monitoring of equipment use.

(d)_____Sanitation Department; (vehicle information); The employer allowed employees to ride the steps (**choose one or more:** while moving at greater than 10 mph / for more than 0.2 miles / while the vehicle was backing). This is not compliant with ANSI Z245.1-1999 and the NIOSH Alert for Preventing Worker Injuries and Deaths from Moving Refuse Collection Vehicles. A feasible and acceptable abatement method, among others, would be for the employer to develop and enforce a policy that prohibits employees from riding the steps (**choose one or more:** while moving at greater than 10 mph / for more than 0.2 miles / while the vehicle was backing).