

TRAFFIC SAFETY IN MARINE TERMINALS

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This guidance document is not a standard or regulation, and it creates no new legal obligations. It 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 and regulations promulgated by OSHA or by a state with an OSHA-approved state plan. In addition, the Act’s General Duty Clause, Section 5(a)(1), requires employers to provide their workers with a workplace free from recognized hazards likely to cause death or serious physical harm.

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TRAFFIC SAFETY IN MARINE TERMINALS

Executive Summary

This OSHA guidance document will help improve traffic safety in marine terminals. Traffic incidents are a serious problem at marine terminals, where heavy equipment is used to load and unload ships and move freight from place to place in the terminal. The work is fast-paced, conducted at any time of the day or year, and often performed in inclement weather. Vehicular traffic endangers any worker walking in a marine terminal.

In addition to complying with OSHA standards for powered industrial trucks (PITs) (29 CFR [1910.178\(l\)](#) and [1917.43](#)¹), and vehicle operation in marine terminals (29 CFR [1917.44](#)), OSHA recommends that marine terminal employers design and implement a traffic-safety program for vehicle and pedestrian safety. Vehicle and pedestrian safety includes providing safe equipment, establishing safe traffic controls in all areas of the terminal, and training workers to operate vehicles safely.

Traffic-safety controls can help individuals avoid traffic incidents and prevent or reduce work-related fatalities and injuries. Reducing traffic incidents can also increase the productivity of the marine terminal.

These guidelines are for use by marine-terminal operators and stevedoring firms and their workers. However, other employers and workers in the maritime or transportation industries involved in similar operations may find the information useful.

This publication provides a general overview of a particular standards-related topic. This

¹Section 29 CFR [1917.43](#) does not apply to over-the-road vehicles or cranes. Cranes and derricks are covered by 29 CFR [1917.45](#).

publication does not alter or determine compliance responsibilities set forth in OSHA standards, and the Occupational Safety and Health Act of 1970. Moreover, because interpretations and enforcement policy may change over time, for additional guidance on OSHA compliance requirements, the reader should consult current administrative interpretations and decisions by the Occupational Safety and Health Review Commission and the courts. Material contained in this publication is in the public domain and may be reproduced, fully or partially, without permission. OSHA requests, but does not require, source credit.

Introduction

Traffic incidents are a serious problem in marine terminals, with their fast-paced operations and large, heavy equipment. This “Traffic Safety in Marine Terminals” guidance document provides practical recommendations to help marine terminal employers reduce the number and severity of traffic-related injuries in their workplaces.

Many work-related injuries and fatalities occurring in marine terminals result from traffic incidents. From 2005 through 2012 the Bureau of Labor Statistics reported 88 fatalities in the marine-cargo-handling industry; 52 of these fatalities were the result of transportation incidents. The following examples describe several marine-terminal traffic incidents that resulted in fatalities:

- ☒ A forklift struck and killed a clerk as he exited a warehouse and walked around a large container. The forklift operator was transporting a load of paper rolls that obstructed his view.
- ☒ A forklift struck two workers, killing one, when the operator was backing away from a flatbed trailer. The operator did not see the workers standing with their backs to the rear of the forklift. The survivor said that although he heard the forklift’s backup alarm, he did not heed it because he had been hearing those alarms all day.
- ☒ A forklift operator died when he fell out of a tipping forklift and was crushed by the rollover bar. The operator, who was not wearing a seatbelt at the time of the incident, apparently made a sharp turn at excessive speed, causing the forklift to tip over.
- ☒ A forklift struck and killed a longshoreman after handing paperwork to the operator. As the worker walked away from the forklift, the operator made a U-turn and struck the worker with the right front wheel of the forklift.
- ☒ A straddle carrier operator died when the vehicle tipped over and crushed him. The operator, who was using the carrier to transfer containers, was traveling at a high rate of speed with a loaded container raised at or near the top position. When the carrier started crossing railroad tracks located in the middle of a curve in the road, the vehicle rolled over.

To help prevent these types of incidents and fatalities, OSHA recommends that employers design and implement a traffic-safety program for vehicle and pedestrian safety that raises awareness of traffic hazards. This program should address every worker at marine terminals who is at risk for traffic-related injuries and fatalities, including operators of vehicles and cargo-handling equipment, mechanics, repair crews, port-authority personnel, ship’s crews, and over-the-road (OTR) truck drivers.

OSHA recommends that marine-terminal employers focus their traffic-safety programs on the vehicles and equipment that travel throughout marine terminals, including: container-handling equipment (e.g., forklifts, top picks, side picks, reach stackers, straddle carriers); forklifts used for non-containerized cargo; yard tractors, utility tractors, hustlers, “yard dogs,” and semi-tractors; automobiles, vans, and pickup trucks that transport workers, equipment, and materials in marine terminals; and OTR trucks.

Factors that Contribute to Traffic-Related Injuries and Fatalities in Marine Terminals

There are many factors that can contribute to traffic incidents in marine terminals. Often, these incidents result from a combination of factors. The following points illustrate common traffic-safety problems:

Unsafe equipment: Broken, improperly maintained, or missing safety equipment, such as lights, seat belts, brakes, and horns, can lead to injuries and fatalities.

Inadequate traffic controls: Lack of proper signage and lane markings may lead to injuries and fatalities.

Condition of terminal driving surfaces: Many marine terminals, particularly larger ones, have paved terminal driving surfaces. Paved surfaces, which are smooth, are desirable because they reduce the potential for vehicle tip-overs, cargo and equipment shifting, and operator bouncing, and allow for improved road markings (e.g., lane markings). However, smooth driving



surfaces also require heightened awareness because they can become slippery when wet and contribute to excessive vehicle speed. Employers must ensure proper maintenance of road surfaces because, over time, paving material can settle and result in uneven surfaces, potholes, and sinkholes that can lead to tip-overs or other vehicle incidents which could result in injuries or fatalities.

Driving obstacles: Vessel equipment, stacked materials, containers, and repair crews are some of the driving obstacles that increase the risk of traffic-related incidents at marine terminals.

Weather: Inclement weather such as snow, ice, fog, and rain can create hazardous conditions (e.g., slippery surfaces and poor visibility) in marine terminals. Also, the sun may cause glare on certain types of driving surfaces and vehicle windshields.

Inadequate illumination: Poor lighting, particularly at night, and shadows can make it difficult for drivers to see and avoid pedestrians, hazardous driving surfaces, and other obstacles.

Welding: Welding flashes can distract vehicle and crane operators.

Unsafe vehicle operation: Factors such as improperly loaded equipment and speed can contribute to traffic-related incidents.

Distracted driving: Distractions, such as talking on cell phones, texting, using other electronic devices, or completing paperwork can contribute to traffic incidents. Employers should prohibit the use of electronic and audio/video devices such as radios (other than used for communication purposes), cell phones, video games, and laptops while workers are operating equipment or vehicles. Employers should allow workers to use hands-free communication devices only if such use is work-related.

Improper parking: Improperly parked personal or company-provided vehicles and PITs can create hazards. Employers should not allow workers to park vehicles in areas where cargo is being worked or heavy machinery operated.

Lack of communication: Traffic-related incidents often occur because of poor communication. Technicians, mechanics, and other workers may fail to alert vehicle operators of their location, and employers may fail to notify workers of changes to traffic routes. In addition, noisy terminal environments can hinder effective communications. In some cases, employers may not adequately address the needs of workers with hearing impairment or who communicate in a foreign language.

Lack of training and awareness: Traffic-related incidents can occur when drivers and equipment operators do not have adequate training in the safe operation and maintenance of equipment and vehicles. Likewise, pedestrians walking in marine terminals are at risk of injury or death if they do not receive training on the potential for traffic incidents and how to avoid them.

Shift changes: Marine-terminal employers report that incidents often occur just before the end of a work shift or while workers are parking equipment at the end of the work shift.

Fatigue²: Marine-terminal workers often work long and irregular hours, which can lead to fatigue and sleepiness. Fatigue and sleepiness can impair operator performance and contribute to traffic-related injuries and fatalities. The Network of Employers for Traffic Safety Workers (NETS) offers an online driver fatigue quiz. The quiz is available online at: <http://trafficsafety.org/safety/risk/driver-fatigue-quiz>.

Substance abuse: Substance abuse may contribute to vehicle incidents in marine terminals.

How to Prevent Traffic-Related Injuries and Fatalities

Traffic-safety programs can reduce the risk of traffic incidents in marine terminals by eliminating or reducing potential hazards and increasing awareness of traffic-safety issues among marine-terminal workers. Employers should develop a traffic-safety program that includes the following elements: safe operation of vehicles, PIT training, traffic controls, parking, and safety awareness for pedestrians in the terminal. The following traffic-safety controls can help prevent or reduce traffic-related fatalities and injuries.

Safety checks: Employers should train workers to recognize and report transport vehicle and PIT damage and deficiencies to their supervisor. Employers shall ensure that workers check vehicles before use. If a transport vehicle or PIT is not working properly, the employer shall take it out of service until the needed repairs are made.

Powered industrial trucks: OSHA requires employers to maintain PITs used within marine terminals in safe working order. In addition, employers shall ensure that safety devices shall remain on the PITs and are operative (29 CFR [1917.43\(c\)\(5\)](#)). Before lifting workers with a fork lift truck (i.e., PIT), employers also must secure a platform to the lifting carriage or forks, and meet additional specific requirements found in 29 CFR [1917.43\(e\)\(6\)](#).

Transport vehicles: OSHA requires that employers maintain vehicles used to transport workers within marine terminals in safe working order, and ensure that safety devices remain on the vehicles and are operative (29 CFR [1917.44\(n\)](#)).

At a minimum, PIT and transport-vehicle safety checks should include the following items as applicable:

- Overhead guard
- Mast and forks;
- Tires;

²Fatigue and sleepiness impair reaction time, judgment, and vision, cause problems with information processing and short-term memory, and decrease performance, vigilance and motivation. Source: National Sleep Foundation <http://www.sleepfoundation.org/article/white-papers/national-sleep-foundation-white-paper>.

- Fluids (levels and leaks);
- Horn;
- Backup alarm (if equipped);
- Lights;
- Mirrors;
- Seat belts (if equipped);
- Brakes (service/emergency and parking);
- Gauges and warning lights;
- Speedometer;
- Steering;
- Windshield wipers; and
- Windows.

Many companies, as well as OSHA, have sample daily checklists for PITs. OSHA's checklist is available at: https://www.osha.gov/dte/library/pit/daily_pit_checklist.html.

Vehicle selection and maintenance: Selecting safe vehicles and maintaining them in proper condition are critical components to effectively minimize traffic-related incidents in marine terminals. Employers should ensure proper maintenance and operation of vehicle-safety equipment such as horns, backup alarms, seatbelts, brakes, mirrors, and warning devices. Employers should ensure that vehicle operators follow the manufacturer's operating instructions. Employers must modify equipment only in accordance with the manufacturer's prior written approval, or with the written approval of a professional engineer experienced with the equipment who consulted with the manufacturer, if available ([29 CFR 1917.43\(b\)\(1\)](#)). Employers must maintain vehicles used to transport workers in safe working order and ensure that safety devices remain on the vehicles and are operative ([29 CFR 1917.44\(n\)](#)).

Traffic controls: OSHA requires employers to comply with the following traffic controls in marine terminals:

- Ensure that vehicle operators comply with any posted speed limits and other traffic control signs or signals, and written traffic instructions ([29 CFR 1917.44\(d\)](#));
- Stop signs shall be posted at main entrances and exits of structures where visibility is impaired ([29 CFR 1917.44\(e\)](#));
- Stop signs shall be posted at blind intersections, unless direct traffic control or warning mirror systems or other systems of equivalent safety are provided ([29 CFR 1917.44\(e\)](#));
- Vehicular routes, parking areas, and traffic rules shall be established, identified, and used ([29 CFR 1917.44\(f\)](#)); and
- Clearly post signs indicating pedestrian traffic at vehicle check-in and check-out lines and similar locations where workers may be working ([29 CFR 1917.44\(h\)](#)).

OSHA also requires that employers direct vehicle operators to comply with posted speed limits or signals, and written traffic instructions ([29 CFR 1917.44\(d\)](#)). Other traffic controls that employers can implement include:

- Speed-limit signs at appropriate locations;
- Stop lines and lane markings on pavement;
- Rumble strips/surface indentations at intersections and other critical areas to reduce speeding;
- Utility vans parked to guard terminal mechanics working in a container yard, traffic cones to alert vehicle operators of the location of workers, and alerts to warn drivers about the work;
- K-rails (Jersey barriers) or other barriers used for directional traffic controls and to separate pedestrians from motor-vehicle traffic;
- Signs and barriers to alert drivers of construction projects and other changes to traffic routes;
- Traffic-control information for OTR trucks entering terminals, including terminal maps and driving rules; and
- Supervisors or traffic guards to direct traffic in the terminal at busy intersections and work areas.

Controlling speed: Speeding is an issue that employers should address within marine terminals. A variety of haulage, lifting, and transportation equipment are present within marine terminals. Each piece of equipment has its own operational characteristics and speed limitations. Employers must ensure that equipment and vehicle operators comply with posted speed limit signs as required in 29 CFR [1917.44\(d\)](#). Employers should provide equipment and vehicle operators with the proper tools and equipment to control their speed. Employers should incorporate some or all of the following elements into their traffic-safety plan to prevent speeding in the marine terminal:

- Install speedometers in vehicles;
- Install radar and signs;
- Limit speeds to manufacturer’s recommendations by:
 - ✓ Governing engines to limit speed;
 - ✓ Changing or limiting gearing to limit speeds;
 - ✓ Providing cautionary instructions when lifting specific cargo;
- Install speed bumps or rumble strips at locations where speed is an issue;
- Groove pavement areas on aprons and before intersections;
- Install a warning device that warns the operator (and others) that the vehicle is speeding;
- Set traffic patterns in marine terminals to reduce speed; and
- Post dual speed-limit signs, with a lower limit for haulage equipment (i.e., 10 mph for haulage equipment and 15 mph for all other vehicles).

Employers should check devices, policies, and procedures frequently to ensure they are effective and suited to the terminal layout and operations. Enforcement of speed restrictions

should be continuous and consistent. Employers must ensure that safety devices on PITs remain in place and are operational (29 CFR [1917.43\(c\)\(5\)](#)).

Safe operation of vehicles: Employers must ensure that workers know and follow applicable OSHA vehicle requirements (e.g., 29 CFR [1917.43](#), [1917.44](#), and [1910.178\(l\)](#)). Employers must ensure that only trained and authorized workers operate vehicles in marine terminals as required in 29 CFR [1917.27\(a\)](#). They must also train workers on any vehicle operation procedures the terminal developed, including proper loading of vehicles and safe driving techniques (discussed below). For example, employers should ensure that workers know that vehicles must stop a safe distance apart to prevent striking or crushing workers between vehicles. OSHA’s Marine Terminal standards require that a distance of at least 20 feet between the first two vehicles in a line (i.e., vessel loading/unloading, check-in, check-out); subsequent vehicles also must maintain a 20-foot distance if workers work behind the vehicle in front of them (29 CFR [1917.44\(i\)](#)).



Safe driving techniques: Training in safe driving techniques should emphasize the need for operators to follow manufacturers’ operating instructions, terminal traffic-control signs, and terminal driving procedures; use good judgment while operating vehicles; and remain alert to the presence of pedestrians and other operations in the area. Employers should observe operator performance on a random basis and set an example with their own driving. The following list provides examples of safe driving techniques that vehicle operators should recognize and adopt:

- Keep intersections clear;
- Do not take shortcuts against the flow of traffic;
- Be aware of activities in the terminal and possible changes of traffic routes;
- Be aware of everyone walking and working in the area;
- Avoid distractions such as cell phones, two-way radios, eating, or other non-driving activities while operating equipment;
- Use seat belts when appropriate;

- Do not carry loads too high on a yard tractor or PIT;
- Use care when backing up a semi or yard tractor with a load. (See [Safe Operation of Semi-tractors in Marine Terminals](#) Quick Card); and
- Do not operate when impaired due to fatigue, medications (prescription or non-prescription), alcohol, or illegal drugs.

Designated fueling areas: Mobile fuel trucks used to refuel vehicles can create roadway obstacles and fire hazards. OSHA requires employers to fuel vehicles in designated, no-smoking areas located a safe distance from possible ignition sources (29 CFR [1917.156\(a\)\(5\)](#); [1917.156\(b\)\(5\)\(iii\)](#)).

Parking: Employers shall allow private vehicle parking only in designated areas in marine terminals (29 CFR [1917.44\(b\)](#)). In addition, employers should ensure that workers:

- Do not park vehicles in traffic lanes;
- Do not park vehicles in the “blind spot” of equipment operators;
- Do not park vehicles in the path of cranes or other motorized equipment;
- Do not park chassis so that the chassis tongue will protrude into traffic lanes; and
- Always place the vehicle in park, set the parking brake, and shut off the engine before exiting vehicles.

Repair work and welding: Employers must separate arc-welding and cutting operations from other operations to protect workers in the vicinity of the arc’s rays (arc flash) and sparks (29 CFR [1917.152\(e\)\(8\)\(i\)](#)). In addition, employers should ensure that vehicle operators are not distracted while driving in the vicinity of welding operations. Employers should communicate with site personnel about the location of welding and repair operations so that workers do not enter the area unprotected. OSHA standards also require employers not to perform cargo-handling operations when noise-producing maintenance, construction, or repair work interferes with the communication of warnings or instructions (29 CFR [1917.20](#)).³

Fatigue: Employers should learn about, and train workers about, the hazards of driving when fatigued or drowsy, and how to detect those conditions. Employers should also help workers learn how to deal with fatigue and how to know if they are too fatigued to operate a vehicle. The following are some useful resources on fatigue:

National Institute for Occupational Safety and Health

<http://www.cdc.gov/niosh/docs/2004-136>

National Highway Transportation Safety Association (NHTSA)

<http://www.nhtsa.dot.gov/>

Network of Employers for Traffic Safety (NETS)

³Paragraph (e)(8)(i) of 29 CFR [1917.152](#) reads: “Arc welding and cutting operations shall be separated from other operations by shields, screens, or curtains to protect employees in the vicinity from the direct rays and sparks of the arc.”

<http://www.trafficsafety.org/index2.asp>

National Sleep Foundation

<http://www.sleepfoundation.org>

Federal Motor Carrier Safety Administration

<http://www.fmcsa.dot.gov/facts-research/research-technology/publications/cmvmfatiguestudy.htm>.

Substance abuse programs: To help create a safer work environment, employers should implement, and workers should support, measures that contribute to a drug- and alcohol-free work environment. In addition, employers should establish drug-free workplace programs for workers. A drug-free workplace program generally includes five components: a drug-free workplace policy, supervisor training, worker education, worker assistance and drug testing. More information on substance abuse programs is available on the OSHA home page at www.osha.gov (click on “substance abuse” in the alphabetized index).

Walking safely in marine terminals: Employers should inform pedestrians about traffic hazards and provide instructions and directions as how to protect themselves from injuries. Employers should point out the following safety recommendations to pedestrians in the marine terminal:

- OSHA requires workers to wear high visibility vests (or equivalent protection) while working in the immediate area of container handling equipment or in the terminal’s traffic lanes (29 CFR [1917.71\(e\)](#));
- Pedestrians should stay in designated walkways. OSHA requires that employers must provide marked or designated areas within a container or roll-on/roll-off terminal for passage of active cargo transfer points, except where the employer provides transportation to and from these points (29 CFR [1917.71\(d\)\(1\)](#));
- Pedestrians should be aware that drivers cannot see them when they are in a vehicle’s “blind spot”;
- Pedestrians should avoid these blind spots whenever possible. When approaching or walking near vehicles, it is essential to make eye contact with the operator and be sure that the operator acknowledges their presence;
- Pedestrians should make sure that their movements are predictable (not darting out suddenly from behind or between containers, and not suddenly changing directions);
- Pedestrians should avoid placing items (including personal items) on rolling or moving equipment. Pedestrians may be in the driver’s blind spot as they attempt to approach the equipment and retrieve the item; and
- Pedestrians should be aware of the swing radius on forklifts and other similar vehicles. The rear wheels of forklifts enable these machines to turn sharply and quickly.

Working safely on the apron or highline: The following items apply when workers are on foot on the highline or apron (see [Working Safely on the Apron or Highline during Marine Terminal Operations](#) Quick Card):

- Workers should be aware of safety zones provided for the protection of workers on foot while on the highline or apron. The workers should always be aware of the safety zone boundaries and stay within the safety zones at all times while haulage equipment is

operating. Marine-terminal employers provide traffic lanes to guide and align container-haulage equipment operating under cranes. Traffic lanes should be wide enough so that the haulage equipment never enters the safety zone (see [Traffic Lanes and Personnel Safety Zones](#) Quick Card).

- Drivers should control their speed while passing these workers in safety zones.
- Employers should place cone bins in the safety zones, allowing enough space for workers to walk around them without stepping outside of the safety zone into moving traffic.
- Forklift drivers should ensure that all workers on foot are clear of the forklift and its load while moving cone bins.
- The workers must wear proper PPE at all times while working on foot on the apron or highline area. Such equipment includes hard hats (29 CFR [1917.93](#)), safety toe footwear (29 CFR [1917.94](#)), and high-visibility vests (29 CFR [1917.95](#)).
- The workers should be aware of haulage equipment and forklift positions, and make eye contact with operators to ensure that the operators see them.
- The workers should be aware of the traffic patterns and turn-out points in use. Workers should stay well clear of the bight created by chassis bolsters, bomb-cart flanges, wheels, and spreader beams, and must stay clear of the area beneath a suspended container.

Gangway safety meetings and toolbox talks: Frequent safety meetings (e.g., at the start of work shifts) help reinforce safety awareness and facilitate the communication that is critical for traffic safety in the terminal. Topics can include:

- Cargo operations;
- Safe vehicle operation;
- Activities that may affect traffic or change traffic routes in the terminal;
- Oil transfers and bunkering operations;
- Ship's stores transfers;
- High-hazard cargo operations (e.g., explosives, radioactives); and
- Location of repair crews, mechanics and construction work.

Commercial driver safety: Commercial drivers such as OTR drivers, messengers, and vendors account for much of the traffic in marine terminals. Commercial drivers may not be familiar with the terminal and its traffic patterns and rules, and marine-terminal employers may not supervise these drivers. Marine-terminal employers can help these drivers operate safely by providing them with information about terminal driving rules and traffic patterns, providing clear traffic lane designations and signs, establishing rules for when drivers and passengers can get into and out of their vehicles, and by reminding all drivers about driving hazards at the facility.

OSHA Standards for Operating Powered Industrial Trucks (PITs) in Marine Terminals

As mentioned, OSHA standards for PITs used for material handling or equipment handling at a marine terminal are at 29 CFR [1917.43](#) and [1910.178\(l\)](#). These rules apply to every type of PIT used for material handling or equipment handling within a marine terminal (e.g., straddle

carriers, hustlers, top loaders, and container reachstackers). The following are some of the provisions in 29 CFR [1917.43](#) that pertain to safe operation of PITs:

Paragraph (b)(1) of 29 CFR [1917.43](#) states, “[M]odifications...that might affect the vehicle's capacity or safety shall not be performed without either the manufacturer's prior written approval or the written approval of a professional engineer experienced with the equipment who has consulted with the manufacturer, if available,” while paragraph (b)(2) of that section specifies: “Unauthorized personnel shall not ride on PITs. A safe place to ride shall be provided when riding is authorized.” Other provisions of 29 CFR [1917.43\(b\) and \(c\)](#), notably 29 CFR [1917.43\(b\)\(3\)-\(b\)\(10\), \(b\)\(12\), \(c\)\(1\), and \(c\)\(3\)-\(c\)\(5\)](#), respectively, specify that employers must ensure that:

- When a PIT is unattended, the load-engaging means fully lowered, controls neutralized, and brakes set. The power is off unless the PIT is in view, and within 25 feet (7.62 m), of the operator. If the PIT is on an incline, its wheels are blocked or curbed;
- PITs are not operated inside damaged highway vehicles or railcars if the vehicle or railcar could affect operational safety;
- PITs are marked with their rated capacities, which shall be visible to the operator;
- PITs handle only stable and safely arranged loads that are within their rated capacity;
- PIT operators ascend and descend grades slowly;
- PIT operators slow down and sound the horn at cross-aisles and other locations where visibility is obstructed;
- If the load obstructs the forward view, PIT operators travel with the load trailing;
- PIT operators do not use steering knobs unless the PIT is equipped with power steering;
- When pipe trucks or similar equipment are towing cargo, a safe means protects the PIT operator from sliding loads;
- Only designated persons perform maintenance and repair on PITs;
- Replacement parts for PITs with a function that may affect operational safety are equivalent in strength and performance capability to the original parts they replace;
- Braking systems or other mechanisms on PITs used for braking are in safe and operable condition;
- PITs are maintained in safe working order, and that safety devices remain in place and are operational except as otherwise provided in 29 CFR [1917.43](#); and
- PITs with a fuel-system leak or any other safety defect are removed from service until properly repaired.

29 CFR [1910.178\(l\)](#) establishes training requirements for PIT operators,⁴ including those working at marine terminals. For example, if an operator received prior training in the topics

⁴Under 29 CFR [1910.178\(l\)\(3\)\(i\)\(M\)](#), PIT operator training programs must cover equipment manufacturers’ instructions, warnings, or precautions (including the use of seatbelts if applicable). Such programs may also address the hazards, if any, the training provider believes seat-belt use could cause in a particular work situation in the marine cargo-handling industry ([OSHA Compliance Directive CPL 02-01-028](#)).

listed below and an evaluation finds the operator to be competent to operate a PIT safely in the working conditions encountered, then the employer does not have to repeat initial training (see 29 CFR [1910.178\(l\)\(5\)](#)). When initial training is necessary, it must cover the following PIT-related and work-related topics that are applicable to safe operation of the PIT:

PIT-related training topics:

- Operating instructions, warnings, precautions, and limitations, including those listed in the operator's manual;
- Differences between PITs and automobiles;
- PIT controls and instrumentation;
- Engine or motor operation;
- Steering and maneuvering;
- Visibility;
- Fork and attachment adaptation, operation, and limitations;
- Vehicle capacity and stability;
- Vehicle inspection and maintenance the operator will perform; and
- Refueling or recharging.

Work-related training topics:

- Surface conditions where the PIT will be operated;
- Load composition, stability, manipulation, stacking, and unstacking;
- Pedestrian traffic in areas where the PIT will be operated;
- Narrow aisles and other restricted places where the PIT will be operated;
- Hazardous (classified) conditions and closed environments where the PIT will be operated;
- Ramps and other sloped surfaces that could affect the vehicle's stability;
- Closed environments and other areas where insufficient ventilation or poor vehicle maintenance could cause a buildup of carbon monoxide or diesel exhaust; and
- Other unique or potentially hazardous environmental conditions in the workplace that could affect safe operation.

Training must be a combination of formal instruction (e.g., lecture/discussion, interactive computer learning, videotape, written material), practical training (e.g., demonstrations performed by trainer, training exercises by trainee), and evaluation of the operator's performance in the workplace (see 29 CFR [1910.178\(l\)\(2\)\(ii\)](#)).

Operators must also receive refresher training when they are observed to operate the vehicle in an unsafe manner, have a near-miss incident, receive an evaluation for unsafe operation, are assigned to operate a different type of PIT, or when changes in workplace conditions could affect safe PIT operation. In addition, the employer must evaluate every operator's performance at least once every three years (see 29 CFR [1910.178\(l\)\(4\)](#)).

OSHA entered into a settlement agreement concerning operator training for PITs used in marine terminals. OSHA Directive [CPL 02-01-028](#) at www.osha.gov (click on the

“Directives” link) addresses this agreement.

Resources for Additional Information

The following sources may be useful to those seeking further information about motor vehicle safety:

The National Highway Traffic Safety Administration (NHTSA) provides a number of resources on motor-vehicle safety, including a brochure to help employers establish a motor-vehicle safety program. <http://www.nhtsa.dot.gov>

The Network of Employers for Traffic Safety (NETS) is an employer-led public/private partnership dedicated to improving the safety and health of employees, their families, and members of the communities in which they live and work by preventing traffic crashes that occur both on-and off-the-job. The NETS Internet site includes resources and information on traffic safety. <http://www.trafficsafety.org>

The National Institute for Occupational Safety and Health (NIOSH) produces a number of fact sheets, hazard alerts, studies, and links to other Internet resources. <http://www.cdc.gov/niosh/homepage.html>

The National Safety Council offers a number of articles, studies, advice, and links to other Internet resources on its driver safety training. <http://www.nsc.org>

The National Sleep Foundation offers information to improve public health and safety by achieving an understanding of sleep and sleep disorders, and by supporting sleep-related education research, and advocacy. <http://www.sleepfoundation.org>

The Department of Transportation motor-carrier web page contains information on the Driver Fatigue and Alertness Study, a comprehensive over-the-road study on driver fatigue and alertness in North America. <http://www.dot.gov/>

The OSHA Consultation Program offers, at no cost, a confidential and comprehensive safety and health consultation service for employers. State agencies administer the Consultation Program, and the program is available in all 50 states, the District of Columbia, and U.S. territories. Using the expertise of highly qualified occupational safety and health professionals, the program offers employers a variety of services to help them establish and maintain a safe and healthful workplace. These services include: identification of workplace hazards, training and education, and assistance in the development and implementation of an effective safety and health management system. Small and medium-sized businesses in high-hazard industries or involved in hazardous operations receive scheduling priority for consultation visits. Consultants work in a non-enforcement capacity, and employers are not subject to enforcement penalties or citations upon proper abatement of workplace hazards. More information on the OSHA Consultation Program is available at <http://www.osha.gov/consultation> or by requesting the Consultation Kit (OSHA 3184) from OSHA’s Publications Office at (202) 693-1888.

OSHA will make the information in this guidance document available to sensory-impaired

individuals upon request. Voice phone: (202) 693-1999; teletypewriter (TTY) number: 1-877-889-5627.

For more information:



Occupational Safety and Health Administration
U.S. Department of Labor www.osha.gov or (800) 321-OSHA