



Forklift Pedestrian Accidents

A Comprehensive Study of Accidents in the Workplace

Yale

Causes and Prevention

Yale Materials Handling Corporation (Yale) has conducted a comprehensive study of forklift/pedestrian accidents. These accidents are among the most frequently reported accidents and often involve serious or fatal injuries.

This brochure contains the most comprehensive information available concerning forklift/pedestrian accidents. This information will assist users in deciding how to equip forklifts for their particular needs, how to establish workplace rules for safe forklift/pedestrian interaction, and how to organize the physical workplace to reduce the potential for forklift/pedestrian accidents.

Yale Study

Our study included the evaluation of 369 accidents reported to Yale, a survey of forklift users to identify the usage of optional audible and visible warning devices and follow-up contact with manufacturers of these devices concerning the effectiveness of their products. A comprehensive search was then conducted to identify articles and studies concerning a means to prevent forklift/pedestrian accidents. Field evaluations of pedestrian warning devices were also performed.

Accident Data

Forklift accident data is published periodically by various sources, including state and federal governmental organizations. However, specific factual information concerning individual accidents is frequently sketchy, and the factors that contribute to these accidents are difficult to identify.

Yale's evaluation of its own accident reports indicates that approximately as many of these accidents occurred while the forklift was traveling forward, including tail-swing accidents, as in reverse. Most reverse travel accidents occurred within the first ten feet of travel, whereas most of the forward travel accidents occurred after the first twenty-five feet of travel. Many of the accidents involved injury to pedestrians who were aware of the presence of the forklift, and who were in fact working as a team with the operator of the forklift that struck them.



Causes of Forklift/Pedestrian Accidents

The lack of detailed information concerning specific accidents makes it impossible to isolate a common or predominant cause of forklift/pedestrian accidents. However, some of the factors that may contribute to forklift/pedestrian accidents include:

- Ambient noise levels;
- Ambient light levels;
- Number of forklifts and pedestrians present;
- Level of training of forklift operators;
- Level of education of pedestrians concerning forklift operating characteristics and how to work around forklifts;
- Physical workplace layout, including separate travel zones for pedestrians and forklifts;
- Presence of audible or visible warning devices on forklifts and other mobile equipment in the workplace;
- Presence of audible or visible warning devices on cranes, conveyors, or other stationary industrial equipment;
- Specific operating rules for forklift travel, such as sounding the steering wheel horn at intersections or when changing directions;
- Enforcement by management of safe work procedures for forklift operators and pedestrians.



Operator and Pedestrian Training

OSHA regulations require specialized training and regular re-training for forklift operators, and remedial training for operators involved in accidents or near accidents. OSHA estimates that its current operator training requirements will prevent 11 deaths and 9,422 injuries per year.

Pedestrians should understand operating characteristics of forklift trucks when working in their proximity and should understand and follow pedestrian rules that are established for their specific environment by their employers.

Separation of Forklift and Pedestrian Traffic

Unlike automobile/pedestrian traffic, there are no universal “rules of the road” for the manner in which forklifts and pedestrians interact. Many of the largest and most sophisticated forklift users have concluded that the most effective way to reduce forklift/pedestrian accidents is to separate forklift and pedestrian traffic to the extent possible, using travel lanes dedicated to forklifts and separate travel lanes dedicated to pedestrian traffic. Travel lanes may be marked with paint on the floor, or separated by physical barriers. Limitations may also be placed on travel areas for forklifts to keep them away from high-density pedestrian traffic, such as near bathrooms, break rooms or time clocks.

Workplace Rules For Pedestrian Safety

Every forklift operating environment is unique. However, you and your employees, independent safety consultants, and your workers compensation insurance company's loss control specialists are all resources that can assist in developing appropriate rules that may help reduce or prevent the incidence of forklift/pedestrian accidents in your particular workplace.

Following are some examples of workplace rules that are suitable in some applications and may help to reduce or prevent the incidence of forklift/pedestrian accidents:

- Require forklift operators to stop and sound the steering wheel horn at intersections or before passing through plastic strip curtains.
- Restrict customers and non-employees from areas where forklifts may be operating
- Limit forklift travel speed
- Use of hi-visibility work clothes or vests for pedestrians
- Require pedestrians not to come closer than a predetermined distance from the forklift, even when speaking to the operator.

Optional Audible and Visible Alarms

Yale makes available as optional equipment a range of different audible and visible warning devices which users may select for their forklifts. OSHA regulations and ASME B56.1 safety standard for forklifts do not require the presence of an audible or visible warning device on a forklift, other than the steering wheel horn which is standard equipment on all forklifts. The basic Yale forklift is safe as designed even without optional warning devices.

Yale's study of optional warning devices indicates that approximately 70% of current forklift users equip their forklifts with some form of audible or visible warning device.

However, the available accident data does not show that forklifts equipped with optional warning devices are involved in a lower incidence of forklift/pedestrian accidents than those without such devices.

Many of the largest and most sophisticated users choose not to equip their forklifts with such devices.

No manufacturer of audible or visible warning devices has undertaken a study on the effectiveness of their devices in reducing accidents; and no manufacturer could provide Yale with any data concerning the effectiveness of their devices. The operating instructions which accompany such devices instruct the user to always look in the direction of travel regardless of the presence of the device.



Considerations in Selecting Audible & Visible Devices

In determining whether an audible or visible device may be beneficial in a particular work environment, several factors, including the following, should be considered:

Visible Devices - Flashing, Rotating, and Strobe Lights

- Placement of visual devices must be considered based on use of the lift truck and workplace conditions.
- Lights must clear low overhead obstructions and must not shine or reflect excessively into the operator's eyes.
- Shielding may limit the light's visibility to pedestrians.
- Light color should be different from lights used on stationary equipment or background colors in the workplace.
- Workplace lighting conditions and reflective surfaces should be considered when selecting the type of light.

Whether an optional warning device may be beneficial overall is dependent on factors specific to each individual workplace, and may require the assistance of a qualified safety professional to evaluate.

Audible Devices – Back-up or Motion Alarms

- Sound produced must be loud enough to be heard over other noise in the forklift operating area.
- Sound should be readily distinguishable from other noise or audible devices in the work area.
- Audible device may contribute to employee noise exposure and exceed OSHA noise limitation.
- Hearing protection makes it more difficult to hear the audible device and to determine the direction and distance from which the sound is coming.
- Audible devices can be annoying to operators and workers, and may be deactivated.
- Audible devices may also be objectionable to nearby residents.



Other Considerations

Employers should also consider the following when using audible and visible warning devices:

- Operators and pedestrians can become accustomed to, and may ignore, visual and audible signaling devices.
- Operators and pedestrians can become dependent on these devices and be less likely to watch for pedestrians and moving equipment.
- Multiple signaling devices in the same area can create confusion or indifference for operators and pedestrians.
- Operations and training should be adjusted to counter these and any other potential negative effects.
- Constant exposure to these devices can be fatiguing to operators and workers.
- Forklift users consider the steering wheel horn to be an effective means of warning pedestrians of the presence of a forklift.

Safety Professional and Workplace Consultants

Each forklift user must assess his own workplace to evaluate whether it would be desirable to equip forklifts with optional warning devices, and whether it would be desirable to change the layout of the physical workplace. Yale is an expert in designing forklifts to perform specific tasks in moving, stacking, and handling materials, but is not an expert in deciding how a particular user should conduct his own business. A user must decide how to run his own business, including how to equip forklifts, based on factors unique to his own operation.

Safety professionals and workplace safety consultants are available to assist users in making decisions concerning workplace layout and the configuration of forklifts and other equipment. Insurance companies, industrial safety consultants, workplace safety engineers, and similar safety professionals should be consulted by users who desire assistance in determining how best to meet their specific workplace safety requirements.



Other Resources:

- Guide For Users of Industrial Lift Trucks
- Guide to Special Equipment
- Yale Operator Training Program
- ASME B56.1, Safety Standard for Low Lift and High Lift Trucks
- OSHA, 29 CFR 1910.178
- YALE Engineering Test Reports:
 - Applicability of Audible and Visible Alarms for Industrial Lift Trucks (Report No. B-85-46)
 - Applicability of Audible and Visible Alarms for Industrial Lift Trucks Phase II (Report No. C-02P-001)

COPIES OF YALE'S ENGINEERING TEST REPORTS ON THE APPLICABILITY OF AUDIBLE AND VISIBLE ALARMS FOR INDUSTRIAL LIFT TRUCKS MAY BE OBTAINED BY DIRECTING YOUR REQUEST TO:
YALE MATERIALS HANDLING CORPORATION
RISK MANAGEMENT DEPARTMENT
4000 N.E. BLUE LAKE ROAD
FAIRVIEW, OREGON 97024





Yale®

Yale Materials Handling Corporation

1400 Sullivan Drive • Greenville, NC 27834

1.800.233.YALE

www.yale.com

©2003, Yale Materials Handling Corporation

