Filing of Testimony and Evidence Before the Hearing

Any party requesting more than 10 minutes for a presentation at the hearing, or who will submit documentary evidence, must provide in quadruplicate, the complete text of the testimony, including any documentary evidence to be presented at the hearing. One copy shall not be stapled or bound and be suitable for copying. These materials must be provided to Mr. Thomas Hall, OSHA Division of Consumer Affairs at the address above and be postmarked no later than April 15, 1996.

Each such submission will be reviewed in light of the amount of time requested in the notice of intention to appear. In those instances when the information contained in the submission does not justify the amount of time requested, a more appropriate amount of time will be allocated and the participant will be notified of that fact prior to the informal public hearing.

Any party who has not substantially complied with this requirement may be limited to a 10-minute presentation, and may be requested to return for questioning at a later time.

Any party who has not filed a notice of intention to appear may be allowed to testify for no more than 10 minutes as time permits, at the discretion of the Administrative Law Judge, but will not be allowed to question witnesses.

Notice of intention to appear, testimony and evidence will be available for copying at the Docket Office at the address above.

Conduct and Nature of the Hearing

The hearing will commence at 9:30 a.m. on April 30, 1996. At that time, any procedural matters relating to the proceeding will be resolved.

The nature of an informal rulemaking hearing is established in the legislative history of section 6 of the Occupational Safety and Health Act and is reflected by OSHA's rules of procedure for hearings (29 CFR 1911.15(a)). Although the presiding officer is an Administrative Law Judge and limited questioning by persons who have filed notices of intention to appear is allowed on crucial issues, the proceeding is informal and legislative in type. The Agency's intent, in essence, is to provide interested persons with an opportunity to make effective oral presentations that can proceed expeditiously in the absence of procedural restraints that impede or protract the rulemaking process.

Additionally, since the hearing is primarily for information gathering and clarification, it is an informal administrative proceeding rather than an adjudicative one.

The technical rules of evidence, for example, do not apply. The regulations that govern hearings and the pre-hearing guidelines to be issued for this hearing will ensure fairness and due process and also facilitate the development of a clear, accurate and complete record. Those rules and guidelines will be interpreted in a manner that furthers that development. Thus, questions of relevance, procedure and participation generally will be decided so as to favor development of the record.

The hearing will be conducted in accordance with 29 CFR part 1911. It should be noted that § 1911.4 specifies that the Assistant Secretary may, upon reasonable notice, issue alternative procedures to expedite proceedings or for other good cause.

The hearing will be presided over by an Administrative Law Judge who makes no decision or recommendation on the merits of OSHA's proposal. The responsibility of the Administrative Law Judge is to ensure that the hearing proceeds at a reasonable pace and in an orderly manner. The Administrative Law Judge, therefore, will have all the powers necessary and appropriate to conduct a full and fair informal hearing as provided in 29 CFR 1911, including the powers:

1. To regulate the course of the proceedings;

2. To dispose of procedural requests, objections and comparable matters;

3. To confine the presentations to the matters pertinent to the issues raised;

4. To regulate the conduct of those present at the hearing by appropriate means;

5. At the Judge's discretion, to question and permit the questioning of any witness and to limit the time for questioning; and

6. At the Judge's discretion, to keep the record open for a reasonable, stated time (known as the post-hearing comment period) to receive written information and additional data, views and arguments from any person who has participated in the oral proceedings.

OSHA recognizes that there may be interested persons who, through their knowledge of safety or their experience in the operations involved, would wish to endorse or support certain provisions in the standard. OSHA welcomes such supportive comments, including any pertinent accident data or cost information that may be available, in order that the record of this rulemaking will present a balanced picture of the public response on the issues involved.

Signed at Washington, DC, this 22nd day of January, 1996.

Joseph A. Dear,

Assistant Secretary of Labor.

[FR Doc. 96–1215 Filed 1–29–96; 8:45 am]

BILLING CODE 4510–26–P

DEPARTMENT OF LABOR

Occupational Safety and Health Administration

29 CFR Part 1926

[Docket No. S–008]

Powered Industrial Truck Operator Training

AGENCY: Occupational Safety and Health Administration, Labor.

ACTION: Proposed rule.

SUMMARY: The Occupational Safety and Health Administration (OSHA) is proposing to revise the Agency's construction safety standard that mandates the training of powered industrial truck operators. These revisions are being proposed to reduce the number of injuries and deaths that have continued to occur as a result of inadequate truck operator training. The proposal is a follow-up to a parallel proposal to improve truck operator training in the general and maritime industries that was published in the Federal Register on March 14, 1995.

The proposed operator training requirements would mandate the development of a training program that bases the amount and type of training on the prior knowledge of the trainee and the ability of that trainee to acquire, retain, and use the knowledge and skills that are necessary to safely operate a powered industrial truck. A periodic evaluation of each operator's performance would also be required. Refresher or remedial training would be required, if unsafe vehicle operation, an accident or near miss, or other deficiencies were identified in this periodic evaluation.

Today, OSHA also is publishing a Federal Register notice reopening the comment period for the general industry and maritime industry truck operator training proposal. OSHA is scheduling a joint informal hearing to revise comments and testimony on both proposals, i.e., the proposal published in March and the one being published today.

DATES: Written comments on the proposed standards and notices of intention to appear at the informal public hearings on the proposed standards must be postmarked by April

1, 1996. Parties who request more than 10 minutes for their presentations at the informal public hearing and parties who will submit documentary evidence at the hearing must submit the full text of their testimony and all documentary evidence postmarked no later than April 15, 1996. The hearing will take place in Washington, DC and is scheduled to begin on April 30, 1996. OSHA also is reopening the comment period for the proposed revision of the training requirements for powered industrial truck operators in general industry and the maritime industries to April 1, 1996 as announced in a separate document published today and is scheduling a joint hearing for those sectors along with the construction industry hearing.

ADDRESSES: Comments and information should be sent in quadruplicate to: Docket Office, Docket No. S–008; Room N2624; U.S. Department of Labor, Occupational Safety and Health Administration; 200 Constitution Ave., NW., Washington, DC 20210 (202–219–7894).

Notices of intention to appear at the informal rulemaking hearing, testimony, and documentary evidence are to be submitted in quadruplicate to: Mr. Thomas Hall, OSHA Division of Consumer Affairs, Occupational Safety and Health Administration, 200 Constitution Ave., NW., Room N3647, Washington, DC 20210 (202–219–8615). Written comments received, notices of intention to appear, and all other material related to the development of these proposed standards will be available for inspection and copying in the public record in the Docket Office, Room N2624, at the above address.

The hearing will be held in the auditorium of the U.S. Department of Labor, 200 Constitution Avenue, NW., Washington, DC.

FOR FURTHER INFORMATION CONTACT: Ms. Ann Cyr, Office of Information and Consumer Affairs, U.S. Department of Labor, Occupational Safety and Health Administration, Room N3647; 200 Constitution Ave., NW., Washington, DC 20210 (202–219–8148, FAX 202–219–5986).

SUPPLEMENTARY INFORMATION:

I. Background

a. The Construction Safety Standard

Congress amended the Contract Work Hours and Safety Standards Act (CWHSA) (40 U.S.C. 327 *et seq.*) in 1969 by adding a new section 107 (40 U.S.C. 333) to provide employees in the construction industry with a safer work environment and to reduce the frequency and severity of construction accidents and injuries. The amendment, commonly known as the Construction Safety Act (CSA) (Pub. L. 91–54, August 9, 1969), significantly strengthened employee protection by providing for the adoption of occupational safety and health standards for employees of the building trades and construction industry working on federally financed or federally assisted construction projects. Accordingly, the Secretary of Labor issued Safety and Health Regulations for Construction at 29 CFR part 1518 (36 FR 7340, April 17, 1971) pursuant to section 107 of the Contract Work Hours and Safety Standards Act.

The Occupational Safety and Health Act allowed the Secretary of Labor to adopt established Federal standards issued under other statutes as occupational safety and health standards that are enforceable under the OSH Act. Accordingly, the Secretary of Labor adopted the Construction Standards that had been issued under the CSA at 29 CFR part 1518 as OSHA standards. These standards were redesignated as part 1926 later in 1971 (36 FR 25232, Dec. 30, 1971). The provisions pertaining to powered industrial trucks are contained at § 1926.602(c). Section 1926.602(c)(1)(vi) states:

> (vi) All industrial trucks in use shall meet the applicable requirements of design, construction, stability, inspection, testing, maintenance, and operation, as defined in American National Standards Institute B56.1–1969, Safety Standards for Powered Industrial Trucks.

Thus, the construction standard relating to the training of industrial truck operators is an adoption by reference of the training provision of the consensus standard which is identical to the corresponding general industry standard, which contains the full text of the American National Standards Institute (ANSI) standard.

The present training provision that is applicable to construction through cross reference to the ANSI B56.1–1969 (and is directly incorporated into general industry as § 1910.178(l)) reads, ''Only trained and authorized operators shall be permitted to operate a powered industrial truck. Methods of training shall be devised to train operators in the safe operation of powered industrial trucks.''

b. Action on Other Powered Industrial Truck Operator Training Requirements

In the Federal Register of March 14, 1995 (60 FR 13782), OSHA published a proposal to revise the general industry standard for training powered industrial truck operators (§ 1910.178(l)) and to adopt the same requirements for the maritime industries (§§ 1915.120(a), 1917.43(I), and 1918.77(a)). Copies of a draft of that Federal Register document had been provided to OSHA's Advisory Committee on Construction Safety and Health (ACCSH) at the Committee's meeting on Feb. 28 and March 1, 1995. The Committee advised OSHA that it would like additional time to study the proposal and would finalize its recommendations by its next meeting on May 25–26, 1995. Because OSHA had received no recommendations or other information from the ACCSH, the Agency decided to delay proposing the adoption of training requirements for powered industrial truck operators in the construction industry until the Committee had concluded its deliberations.

ACCSH met on May 25–26, at which time the Committee prepared its comments and recommendations. The Committee recommended that OSHA propose improved powered industrial truck training for construction employees. The Committee also suggested some changes from the general industry proposed standard that OSHA is considering incorporating in the construction standard. Some of these suggestions may be of value to employees in the general and maritime industries as well.

OSHA has decided that the most effective way to fully consider the Committee's suggestions in the proposal is to raise them in the preamble discussion as a series of issues and to invite public comment on them. OSHA also is asking in a companion Federal Register document published today whether some of these changes also should be made to the general and maritime industries' powered industrial truck operator training regulations. In the final rule, OSHA will consider the suggestions of the committee and changes for the construction, general and maritime industries based on the comments and evidence received.

In Section VIII below, OSHA discusses the specific recommendations of the ACCSH. It also poses to the public various questions to focus comments on these recommendations.

c. Updated Consensus Standard

Since promulgation of the OSHA safety and health standards for construction in 1971, the consensus standard on which the powered industrial truck standard was based (ANSI B56.1) has undergone four complete revisions (dated 1975, 1983, 1988 and 1993). The current consensus standard (Ex. 3–1) addresses retraining of truck operators as follows:

4.18 Operator qualifications.

Only trained and authorized persons shall be permitted to operate a powered industrial truck. Operators of powered industrial trucks shall be qualified as to visual, auditory, physical, and mental ability to operate the equipment safely according to 4.19 and all other applicable parts of Section 4.

4.19 Operator training.

4.19.1 Personnel who have not been trained to operate powered industrial trucks may operate a truck for the purposes of training only, and only under the direct supervision of the trainer. This training should be conducted in an area away from other trucks, obstacles, and pedestrians.

4.19.2 The operator training program should include the user's policies for the site where the trainee will operate the truck, the operating conditions for that location, and the specific truck the trainee will operate. The training program shall be presented to all new operators regardless of previous experience.

4.19.3 The training program shall inform the trainee that:

(a) The primary responsibility of the operator is to use the powered industrial truck safely following the instructions given in the training program.

(b) Unsafe or improper operation of a powered industrial truck can result in: Death or serious injury to the operator or others; damage to the powered industrial truck or other property.

4.19.4 The training program shall emphasize safe and proper operation to avoid injury to the operator and others and prevent property damage, and shall cover the following areas:

(a) Fundamentals of the powered industrial truck(s) the trainee will operate, including:

(1) Characteristics of the powered industrial truck(s), including variations between trucks in the workplace;

(2) Similarities to and differences from automobiles:

(3) Significance of nameplate data, including rated capacity, warnings, and instructions affixed to the truck;

(4) Operating instructions and warnings in the operating manual for the truck, and instructions for inspection and maintenance to be performed by the operator;

(5) Type of motive power and its characteristics;

(6) Method of steering;

(7) Braking method and characteristics, with and without load;

(8) Visibility, with and without load, forward and reverse;

(9) Load handling capacity, weight and load center.

(10) Stability characteristics with and without load, with and without attachments;

(11) Controls—location, function, method of operation, identification of symbols;

(12) Load handling capabilities; forks, attachments;

(13) Fueling and battery charging;

(14) Guards and protective devices for the specific type of truck;

(15) Other characteristics of the specific industrial truck.

(b) Operating environment and its effect on truck operation, including:

(1) Floor or ground conditions including temporary conditions;

(2) Ramps and inclines, with and without load;

(3) Trailers, railcars, and dockboards (including the use of wheel chocks, jacks, and other securing devices);

(4) Fueling and battery charging facilities;

(5) The use of ''classified'' trucks in areas classified as hazardous due to risk of fire or explosion, as defined in ANSI/NFPA 505;

(6) Narrow aisles, doorways, overhead wires and piping, and other areas of limited clearance;

(7) Areas where the truck may be operated near other powered industrial trucks, other vehicles, or pedestrians;

(8) Use and capacity of elevators;

(9) Operation near edge of dock or edge of improved surface;

(10) Other special operating conditions and hazards which may be encountered.

(c) Operation of the powered industrial truck, including:

(1) Proper preshift inspection and approved method for removing from service a truck which is in need of repair;

(2) Load handling techniques, lifting, lowering, picking up, placing, tilting;

(3) Traveling, with and without loads; turning corners;

(4) Parking and shutdown procedures;

(5) Other special operating conditions for the specific application.

(d) Operating safety rules and practices, including:

(1) Provisions of this Standard in Sections 5.1 to 5.4 addressing operating safety rules and practices;

(2) Provisions of this Standard in Section 5.5 addressing care of the truck;

(3) Other rules, regulations, or practices specified by the employer at the location where the powered industrial truck will be used.

(e) Operational training practice, including;

(1) If feasible, practice in the operation of powered industrial trucks shall be conducted in an area separate from other workplace activities and personnel;

(2) Training practice shall be conducted under the supervision of the trainer;

(3) Training practice shall include the actual operation or simulated performance of all operating tasks such as load handling, maneuvering, traveling, stopping, starting, and other activities under the conditions which will be encountered in the use of the truck.

4.19.5 Testing, Retraining, and Enforcement

(a) During training, performance and oral and/or written tests shall be given by the employer to measure the skill and knowledge of the operator in meeting the requirements of the Standard. Employers shall establish a pass/fail requirement for such tests. Employers may delegate such testing to others but shall remain responsible for the testing. Appropriate records shall be kept.

(b) Operators shall be retrained when new equipment is introduced, existing equipment is modified, operating conditions change, or an operator's performance is unsatisfactory.

(c) The user shall be responsible for enforcing the safe use of the powered industrial truck according to the provisions of this Standard.

Note: Information on operator training is available from such sources as powered industrial truck manufacturers, government agencies dealing with employee safety, trade organizations of users of powered industrial trucks, public and private organizations, and safety consultants.

(For an explanation of why OSHA decided to propose a standard that is somewhat different from the consensus standard, see section entitled Summary and Explanation of the Proposed Standard, below.)

Since 1971, the ANSI consensus committee has adopted other volumes [1] for additional types of vehicles that fall within the broad definition of a powered industrial truck. Specifically, volumes have been developed and adopted for guided industrial vehicles, rough terrain forklift trucks, industrial crane trucks, personnel and burden carriers, operator controlled industrial tow tractors, and manually propelled high lift industrial trucks. The training provisions OSHA is proposing are performance oriented and are applicable to all types of industrial trucks. Accordingly, OSHA is proposing the same training standards language for all types of industrial trucks. Comments are requested on this issue.

d. Petitions and Requests

Since the promulgation of the OSHA standard in 1971, interested persons have requested that OSHA improve its training requirements for powered industrial truck operators. ANSI (now the American Society of Mechanical Engineers (ASME)) has substantially upgraded its training provisions for powered industrial truck operators.

On March 15, 1988, the Industrial Truck Association (ITA) petitioned OSHA to revise its standard requiring the training of powered industrial truck operators (Ex. 3–2). The petition contained suggested language for a proposed requirement along with a model operator training program by which compliance with the recommended requirement could be met. OSHA responded to the petition on April 8, 1988, stating that work on the revision of the OSHA powered industrial truck operator training requirement would begin as soon as other priority projects were completed.

Congress, in particular, has expressed a special interest in this standard. A resolution urging OSHA to revise its regulations on forklift operator safety

[1] The consensus committees call the standards for different pieces of equipment ''volumes'' and all of the volumes produced by the committee the ''standard''. OSHA has decided to use the same nomenclature.

training was passed by the Senate in the 103rd Congress. Senate Concurrent Resolution 17 was approved by voice vote with 55 cosponsors and broad bipartisan support. Its companion measure in the House of Representatives, H. Con. Res. 92, had 236 cosponsors from both parties, although no formal vote was taken.

OSHA preliminarily concludes that upgrading the training requirements for powered industrial truck operators will substantially reduce a significant risk of death and injury caused by the unsafe operation of powered industrial trucks driven by untrained or inadequately trained operators.

II. The Powered Industrial Truck

The term ''powered industrial truck'' is defined in the ASME B56.1 (formerly the ANSI B56.1) standard as a ''mobile, power propelled truck used to carry, push, pull, lift, stack, or tier material.'' Powered industrial trucks are particularly useful when handling palletized materials.

There are presently approximately 855,900 powered industrial trucks in use in American industry. Of this number, OSHA estimates that there are about 8300 powered industrial trucks in use in the construction industry.

Powered industrial trucks are classified by manufacturers according to their individual characteristics. There are seven classes of powered industrial trucks:

Class 1—Electric Motor, Sit-down Rider, Counter-Balanced Trucks (Solid and Pneumatic Tires).

Class 2—Electric Motor Narrow Aisle Trucks (Solid Tires).

Class 3—Electric Motor Hand Trucks or Hand/Rider Trucks (Solid Tires).

Class 4—Internal Combustion Engine Trucks (Solid Tires).

Class 5—Internal Combustion Engine Trucks (Pneumatic Tires).

Class 6—Electric and Internal Combustion Engine Tractors (Solid and Pneumatic Tires).

Class 7—Rough Terrain Forklift Trucks (Pneumatic Tires).

Each of the different types of powered industrial trucks has its own unique characteristics and inherent hazards. To maximize effectiveness, training must address the unique characteristics of the type vehicle(s) the employee is being trained to operate.

These trucks may operate on almost any type surface, from smooth and level floors to rocky, uneven ground, provided they were manufactured to operate on that type floor or ground and the surface does not have an excessive slope. Construction forklift trucks are more frequently operated on rough terrain than trucks used in other industry sectors.

Trucks of different types are designed and manufactured to operate in various work environments. Powered industrial trucks can be used for moving material about the workplace. High lift trucks can be used to raise loads up to 30 or 40 feet above the ground, to deposit the material on a roof under construction, a mezzanine or another elevated location, and subsequently to retrieve and lower the material.

Powered industrial trucks also may be equipped with, or can be modified to accept, attachments that allow movement of odd-shaped materials or permit the truck to carry out tasks that may not have been envisioned when the truck was designed and manufactured. Many of these attachments may be added to or installed on the vehicle by the dealer or by the employer. For example, there are powered industrial truck attachments for grasping barrels or drums of material. Some of these attachments not only grasp a barrel or drum but allow the vehicle operator to rotate the barrel or drum to empty the vessel or lay it on its side. OSHA recognizes that certain attachments may limit the safe use of the vehicle. To ensure that modifications or additions do not adversely affect the safe use of the vehicle, OSHA requires at § 1926.602(c)(1)(ii) that:

> (ii) No modifications and additions which affect capacity and safe operation of the equipment shall be made without the manufacturer's written approval. If such modifications or changes are made, the capacity, operation, and maintenance instruction plates, tags, or decals shall be changed accordingly. In no case shall the original safety factor of the equipment be reduced.

When the use of specialized attachments restricts the use of the powered industrial truck or when the truck is used to lift people, it is essential that operator training include instruction on the safe use of the vehicle so that the operator knows and understands the restrictions or limitations that are imposed upon the operation of the vehicle by the use of those attachments or the conduct of those operations.

III. Powered Industrial Truck Hazards

Powered industrial trucks are used in many construction activities. Their principal utility lies in the fact that either a large number of objects on a pallet or confined in a large box, crate or other container or large objects may be moved about the workplace and raised and placed on elevated surfaces with relative ease. Since powered industrial truck movement is controlled by the operator and is not restricted by the frame of the machine or other impediments, virtually unrestricted movement of the vehicle about the workplace is possible.

The hazards that are commonly associated with powered industrial trucks may not exist or be as pronounced for every type, make or model of vehicle. Each type of truck presents different operating hazards. For example, the chance of a falling load accident occurring when the truck is a sitdown, counterbalanced high lift rider truck is much greater than when the vehicle is a motorized hand truck, because the height to which the load can be raised by a sitdown rider truck is much greater than that for the hand truck.

Correspondingly, the method or means to prevent an accident or to protect employees from injury may be different with different types of trucks. For example, when a rider truck is involved in a tipover accident, the operator has the opportunity to remain in the operator's position in the vehicle during the tipover, thereby minimizing the potential for injury. In most cases, the operator of a rider truck is injured in a tipover accident when he or she attempts to jump clear of the vehicle when it begins to tip over. Because the natural tendency of the operator is to jump downward, he or she lands on the floor or ground and is then crushed by the overhead guard of the vehicle. Consequently, the operator of a rider truck should be trained to stay with the vehicle during a lateral tipover. On the other hand, when an order picker tips over with the platform in a raised position, the operator usually should attempt to jump clear of the vehicle, and should be trained accordingly.

Because a powered industrial truck is a motor vehicle, its operation is similar in some respects to that of an automobile, and some of its hazards are the same as those experienced during the operation of an automobile. Automobile and powered industrial truck are both subject to a number of common hazards, such as contacting fixed or movable objects (including employees) and tipping over.

Additionally, operating a car or an industrial truck at excessive speed or skidding on a wet or otherwise slippery ground or floor can be dangerous to the operator or nearby employees. Driving a powered industrial truck at excessive speed may result in loss of control, causing the vehicle to skid, tip over, or fall off a loading dock or other elevated walking or working surface. Failure to maintain control of the vehicle also may

cause the vehicle to strike an employee or to strike stored material, causing the material to topple and possibly injure an employee. Driver training is necessary so that the operator will act properly to minimize the hazard to himself or herself and to other employees.

Although there are many similarities between the automobile and the powered industrial truck, there are also many differences. Another reason for training industrial truck operators is to make operators aware of these differences. Some of the characteristics of a powered industrial truck that have a pronounced effect upon truck operation and safety that are outside auto driving experience are the truck's ability to change its stability, to raise, lower and tilt loads, and to steer with the rear wheels while being powered by the front wheels. In addition, vision is sometimes partially obscured by the load. Moving loads upwards, downwards, forwards and backwards causes a shift of the center of gravity and can adversely affect the overall stability of the vehicle. When a load is raised or moved away from the vehicle, the vehicle's longitudinal stability is decreased. When the load is lowered or moved closer to the vehicle, its longitudinal stability is increased.

To mitigate the hazards posed to the stability of the truck by the movement of the material being handled, the ANSI B56.1–1969 has seven provisions that address proper operation of a powered industrial truck. These provisions specify:

604 Q. While negotiating turns, speed shall be reduced to a safe level by means of turning the hand steering wheel in a smooth, sweeping motion. Except when maneuvering at a very low speed, the hand steering wheel shall be turned at a moderate, even rate.

605 A. Only stable or safely arranged loads shall be handled. Caution shall be exercised when handling off-center loads which cannot be centered.

605 B. Only loads within the rated capacity of the truck shall be handled.

605 C. The long or high (including multiple-tiered) loads which may affect capacity shall be adjusted.

605 D. Trucks equipped with attachments shall be operated as partially loaded trucks when not handling a load.

605 E. A load engaging means shall be placed under the load as far as possible; the mast shall be carefully tilted backward to stabilize the load.

605 F. Extreme care shall be used when tilting the load forward or backward, particularly when high tiering. Tilting forward with load engaging means elevated shall be prohibited except to pick up a load. An elevated load shall not be tilted forward except when the load is in a deposit position over a rack or stack. When stacking or tiering, only enough backward tilt to stabilize the load shall be used.

Knowledge of and adherence to these principles, as well as the other requirements of the OSHA standard, are essential for safe load handling and vehicle operation. Operators of vehicles used in construction need to be trained about the requirements of the consensus standard because failure to adhere to the techniques emphasized in these provisions are major causes of accidents.

The hazards addressed in this proposed rule are those associated with industrial trucks in general, as well as those posed by specific makes or models of trucks. Each powered industrial truck has a different feel that makes its operation slightly different from the operation of other trucks, and operators must therefore be aware of the effects of these differences on safe truck operation. The workplaces where these trucks are being used may also present particular hazards. For these reasons, a uniform and all-inclusive set of hazards that applies to all industrial trucks and workplaces cannot be delineated. For the same reason, the development of a single ''generic'' training program that fits all powered industrial trucks and all workplaces is impractical. In developing an effective powered industrial truck training program, there are however three major areas of concern that should be kept in mind. These are the hazards associated with the particular make and model of truck, the hazards of the workplace (which are particularly important on construction sites), and the general hazards that apply to the operation of all or most powered industrial trucks.

In addition, some hazards are related to the improper operation of a powered industrial truck. Among these hazards are: Falling loads caused by overloading, unbalanced loading or other improper loading; the vehicle falling from a platform, curb, trailer or other surface on which the vehicle is operating; the vehicle being driven while the operator has an obstructed view in the direction of travel; and the vehicle being operated at an excessive rate of speed.

OSHA has identified several accidents that have occurred when an employee other than the operator is ''given a ride'' on a powered industrial truck. Most trucks were designed and are intended to allow only the operator to ride on the vehicle. The carrying of other persons may result in an accident when that other person either falls from the vehicle or hits an obstruction when the vehicle comes too close to that obstruction. Finally, powered industrial truck accidents occur because the vehicle is not properly maintained (These accidents most commonly involve employees being overcome by excessive carbon monoxide emissions or vehicle component failure).

The seriousness of the consequences associated with these accidents depends on such factors as the method of operation of the powered industrial truck, the load being carried, and the characteristics of the workplace in which the vehicle is being operated. Accordingly, truck operators must be trained to recognize unsafe conditions and how to react to them when they occur.

Several features of powered industrial trucks contribute either directly or indirectly to the hazards posed by these vehicles. Some of the factors that influence the extent of the hazards presented by a particular truck are the placement of the critical components of the vehicle, the age of the vehicle, and the manner in which the vehicle is operated and maintained.

There are other hazards related to the use of powered industrial trucks that are caused or enhanced by the characteristics of the workplace. These hazards include the following: Operating powered industrial trucks on rough, uneven or sloped surfaces; operating powered industrial trucks with unusual loads; operating in hazardous (classified) areas; operating in areas where there are narrow aisles; and operating where there is pedestrian traffic or where employees are working in or adjacent to the path of travel of the powered industrial truck. The first hazard is particularly pronounced on construction sites.

The operation of a powered industrial truck presents hazards not only to the operator, but also to other employees working with or around the vehicle. As explained in the section entitled ''Studies and Accident, Injury and Other Data,'' below, employees other than operators have been injured or killed in accidents involving powered industrial trucks. Proper training can reduce accidents resulting from the causes described above.

IV. Studies and Accident, Injury and Other Data

A detailed analysis of powered industrial truck studies and accident and injury data appears in the NPRM for truck training for general industry and the maritime industry, which was published in the Federal Register on March 14, 1995 (60 FR 13787). The section presented here briefly summarizes the data relevant to the construction industry.

a. Studies Measuring the Effectiveness of an Industrial Lift Truck Safety Training Program

In 1984, H. Harvey Cohen and Roger C. Jensen, working under contract with the National Institute for Occupational Safety and Health (NIOSH), published an article in the Journal of Safety Research (Fall 1984, Vol. 15, No. 3, pp. 125–135) entitled ''*Measuring the Effectiveness of an Industrial Lift Truck Safety Training Program*'' (Ex. 4). The article contained an analysis of two studies that were undertaken to measure objectively the effects of safety training on the driving performance and safety practices of powered industrial truck operators.

This article detailed the results of an experiment that was conducted to evaluate training of powered industrial truck operators using a behavioral (work) sampling procedure to obtain objective data about work practices that correlate with injury risk. There were two separate studies conducted in this experiment, one at each of two similar warehouses. The studies that comprised the experiment were conducted to assess the value of training and the influence of post- training actions on the safety performance of workers. These studies demonstrate that training powered industrial truck operators reduced the operators' error rates (number of unsuccessful operations divided by the total number of operations) and that training combined with feedback reduced error rates even more.

The studies were conducted at different warehouses using similar training techniques. The training was conducted to emphasize those operator behaviors that were measurable, frequently observed, capable of being reliably observed, related to frequent accident occurrence and amenable to corrective action through training. There were 14 behaviors evaluated in these studies. Positive reinforcement of the training was used with some trainees to measure its effectiveness. The experiment was conducted in four phases:

(1) The pre-training phase, during which none of the operators had been trained;

(2) The post-training 1 phase, during which the control group remained untrained, the treatment group had received training, and the treatment-plus-feedback group had received training and also was receiving performance feedback;

(3) The post-training 2 phase, during which all three groups had received training but only the training-plus-feedback group received performance feedback; and

(4) The retention phase, which started 3 months after the end of the post-training 2 phase (and the end of the feedback program).

Following the initial training (post-training 1), all three groups showed a decrease in their mean error rates with the training-plus-feedback group showing the largest decrease (from .35 to .27, a 23 percent decrease) followed by the training-only (from .33 to .27, an 18 percent decrease) and the control group (from .34 to .32, a 6 percent decrease). The reduction in the error rate of the control group from the pre-training to the post-training 1 phase of the study was attributed to the influence of peer modeling, i.e., the untrained control group operators were copying the behavior of their trained counterparts. Toward the end of the post-training 1 phase, the error rates of the three groups converged, suggesting that the effects of the training program had begun to wear off. Observers also noted that some behaviors were being compromised when employees of different knowledge levels were required to interact, particularly in conflict avoidance situations such as signaling and yielding at blind intersections.

During the post-training 2 phase of the study, all groups improved in performance. The control group's performance improved by 28 percent (from a mean error rate of .32 to .23) while the training group experienced a 4 percent improvement (from a mean error rate of .27 to .26) and the training-plus-feedback group had a 7 percent improvement (from .27 to .25). The authors concluded that there was further evidence of the effect of peer modeling because the performance of all three groups continued to improve although no additional instruction was given.

The retention phase of the study was conducted three months following the completion of the post-training 2 phase of the study. It was intended to determine the longer term effects of the training. During this phase of the study, mean error rates were checked, as was done during the other phases of the study. The results of this phase of the study indicate an additional improvement in the performance of the operators, with the mean error rate decreasing from .25 to .19, a 24 percent improvement in their performance. The total performance gain achieved during this study was a 44 percent improvement from the pre-training (baseline) phase through the retention phase (from a mean error rate of .34 to a final error rate of .19). The data indicate that there were significantly fewer errors at each successive phase of the study.

The second study was conducted to verify and extend the findings of the first study. A modified experimental design was used to eliminate the mitigating influence of the untrained control group. In the second study, all operators were trained at the same time and all received performance feedback. Comparisons were made only before and after training. The study was divided into three phases: Pre-training, post-training and retention. The retention phase of the study was again conducted three months after the conclusion of the prior phase.

Following the training of the vehicle operators, there was a 61 percent improvement in performance scores (from an error rate of .23 to .09). Observation in the retention phase of this study showed an additional reduction of 22 percent in mean error rates (from .09 to .07 mean error rate). The overall improvement in mean error rates between the pre-training error rate (.23) to that achieved during the retention phase (.07) was a reduction of 70 percent.

b. The OSHA Fatality/Catastrophe Reports

OSHA records a summary of the results of investigations of all accidents resulting in fatalities, catastrophes, amputations and hospitalizations of two or more days, and those accidents that have received significant publicity or caused extensive property damage. These summaries are recorded on an OSHA Form 170 and include an abstract describing the activities taking place at the time of the accident and the causes of the accident. These reports are stored in a computerized database system.

A substantial percentage of the serious powered industrial truck accidents that were investigated occurred in the construction industry. Specifically, 29 out of the 200 accidents investigated took place in the construction industry.

c. Bureau of Labor Statistics (BLS) Data

In April, 1994, BLS published a booklet entitled ''*Fatal Workplace Injuries in 1992: A Collection of Data and Analysis*'' (Ex. 3–4). In this booklet, there was an article written by Gary A. Helmer entitled ''*Fatalities Involving Forklifts and Other Powered Industrial Carriers, 1991–1992.*'' This report contains information contained in the Census of Fatal Occupational Injuries (CFOI) on 170 fatal powered industrial truck accidents. Table 1 lists the

classifications of those powered industrial truck accidents.

TABLE 1.—CLASSIFICATION OF FORKLIFT FATALITIES, CFOI, 1991–1992

How accident occurred	Number	Percent
Forklift overturned	41	24
Forklift struck something, or ran off dock	13	8
Worker pinned between objects	19	11
Worker struck by material	29	17
Worker struck by forklift	24	14
Worker fell from forklift	24	14
Worker died during forklift repair	10	6
Other accident	10	6
Total	170	100

Source: Bureau of Labor Statistics, *"Fatal Workplace Injuries in 1992, A Collection of Data and Analysis"*, Report 870, April 1994.

d. Fatality and Injury Data

As discussed in the Preliminary Economic Analysis, there are on average 15 deaths and 1440 serious injuries from powered industrial truck operations in the construction industry each year. It is estimated that this standard would prevent 3 or 4 deaths and 463 to 601 of these serious injuries per year.

V. Basis for Agency Action

OSHA believes that, as the above discussion indicates, there is a sufficient body of data and information on which to base a revision of the existing standard for powered industrial truck operator training in the construction industry. The data indicate that there are a substantial number of fatalities and injuries from industrial truck accidents in the construction industry. Studies indicate that better training would substantially reduce the number of such fatalities and serious injuries. Consequently, these requirements would reduce the number of fatalities and injuries resulting from accidents involving powered industrial trucks operated by untrained or insufficiently trained employees.

In addition, as discussed above, there are other reasons to update the standard. For example, there now exist substantially updated consensus standards on this subject. In addition, OSHA has been petitioned to improve the requirements for industrial truck training. Further, the Advisory Committee on Construction Safety and Health has recommended improving the standard. Finally, the Senate recently passed a resolution urging OSHA to revise its outdated powered industrial truck operator standards.

VI. The Need for Training

Training is generally defined as making a person proficient through the use of specialized instruction and practice. Training is the means by which an employer ensures that employees have the knowledge, skills, and abilities that are necessary for the employees to do their jobs correctly.

Once an employee acquires the basic knowledge, skills, and abilities, refresher or remedial training may be used to reinforce or improve those attributes, to provide new material, to provide material that was previously discussed in a new manner, or to simply maintain an awareness of the material that has previously been taught. Refresher or remedial training is normally conducted on a predetermined periodic basis, that is, on a monthly, semi-annual, or annual basis.

Training may be as simple and informal as a supervisor pointing out an error in the manner in which an employee is doing a job (making an on-the-spot correction) or showing an employee how to do a particular task (demonstrating the proper method to do the job). On the other end of the spectrum is the detailed, structured instruction that uses formal methods of training (lectures, conferences, formal demonstrations, practical exercises, examinations, etc.). Formal training is usually used to impart more, or more complicated information to a trainee.

For the most part, employees do not start out with the knowledge, skills, and abilities to perform the tasks necessary for safe lift truck operation. Although many employees who are selected or assigned to drive powered industrial trucks are licensed to drive automobiles, there are enough dissimilarities between these two types of vehicles and their operation to require additional knowledge, skills, and abilities to operate a powered industrial truck safely. Operational characteristics of powered industrial trucks, such as vehicles equipped with rear-wheel steering and front-wheel drive and the capability to hoist-move-lower loads, require operator training and practice to master the different driving skills that must be used when an employee operates powered industrial trucks.

Many accidents can be prevented, or the seriousness of the injury to the employee can be mitigated, by training employees. Effective training and supervision also can prevent the occurrence of unsafe acts such as speeding, failing to look in the direction of travel, and failing to slow down or stop and sound the vehicle's horn at blind intersections and other areas where pedestrian traffic may not be observable. Another example in which training can prevent or lessen the severity of an accident of this kind is directly related to the stability of powered industrial trucks when traveling with an elevated load. Effective operator training should emphasize that the vehicle can only be moved when the load is at its lowest point. However, even if an operator fails to follow this practice and the vehicle tips over, the injury to the operator is usually minimal if he or she stays with the vehicle. As previously discussed, the usual injury in a powered industrial truck tipover occurs when the operator attempts to jump off the vehicle while it is tipping over. In these cases, since the normal tendency is for a person to jump downward, the operator lands on the floor or ground in the path of the overhead guard, leading to a crushing injury of the head, neck or back. Training an employee to stay with the vehicle will reduce the severity of some of these injuries.

The studies conducted by Cohen and Jensen, discussed under *Studies, Accident, Injury and Other Data* earlier in this preamble, found a reduction in operator errors rate of up to 70 percent from training. Although a 70 percent error rate reduction cannot be directly equated to a corresponding reduction in the number of accidents that this or any other group of operators will experience, improper or unsafe operation of powered industrial trucks is the major cause of accidents and their resultant fatalities and injuries. Therefore, a reduction in the unsafe operation of these trucks will reduce the number of accidents, and the resultant fatalities and injuries.

Although not all powered industrial truck accident reports spell out lack of training as a causal factor in the accident, each accident can, in part, be attributed to the actions or inactions of the operator. For example, when a powered industrial truck tips over, the accident is caused by one or more of several factors, including speeding, traveling with the load in an elevated position, or improperly negotiating a turn. Training can minimize the number of times that these events occur.

Proper training of an employee must take into account the fact that different operating conditions (including the type and size of the load, the type and condition of the surface on which the vehicle is being operated, and other factors) can adversely affect vehicle operation. Construction sites usually include many of these factors, such as rough terrain. Operator training must emphasize two points regarding any

potential accident scenario. These two factors are: (1) The employee should not engage in activities that may cause an accident, and (2) the employee should minimize the potential for injury (either to himself or herself or to other employees) by taking appropriate actions.

VII. Summary and Explanation of the Proposed Rule

a. Specific Provisions Included in the Proposed Standard

OSHA is proposing to improve the training of powered industrial truck operators in construction by adding a new 29 CFR 1926.602(d) that would supersede the current cross- reference to the 1969 ANSI standard insofar as that standard specifies that only trained operators be permitted to operate powered industrial trucks. This proposal is intended to enhance the safe operation of powered industrial trucks in the construction workplace.

In developing this proposal, OSHA looked at the training requirements of the existing national consensus standard for powered industrial trucks, ANSI B56.1–1993, as well as training requirements from other standards (both industry and government). The non-training related requirements of those standards are beyond the scope of this proposal.

The proposed standard includes six elements. First, the employer is only to use powered industrial truck operators who are trained for and capable of performing the job. Operator training is to include both formal training and practical experience. Various relevant topics are to be covered in the training unless they are not relevant to the employer's vehicles or workplace. Refresher training is to be provided, and if there is an accident or unsafe operation of the vehicle, remedial training must be given. Employers are to certify that employees are trained. Prior training and experience may count toward the required training.

At paragraph (d)(1)(i), OSHA specifies that each employee who will be required to operate a powered industrial truck must be capable of performing the duties that are required of the job after training and appropriate accommodation. This means that the employee must have to climb onto and off a truck, to sit on the vehicle for extended periods of time, to turn his or her body to be able to drive in reverse, and to have the physical and mental abilities to perform the job. Information obtained during the initial employee evaluation can be used to, among other things, determine how best to train the employee. For example, if the employee cannot read and comprehend the operator's manuals for the type of trucks that the employee will operate, this information would have to taught by means other than assigning the employee to read the truck manuals. The initial evaluation can also be useful in avoiding duplicative training.

Paragraph (d)(1)(ii) provides that the employer shall ensure that the employee has received required training, that the employee has been evaluated and that the operator can perform the job competently. After the training, the evaluation must be carried out by a designated person so that the employer can ensure that the trainee can perform the duties required of an operator in a competent manner. Conducting evaluations during training is known as a practical exercise or a performance test. OSHA believes that only through evaluation by a knowledgeable person after training can an employer know that the employee has been adequately trained and can safely perform the job.

The designated person may be the employer, if qualified. A small business person who has employees may decide to send the employees to an outside training organization. Alternately, the employer may be sufficiently trained to enable the employer to be qualified as a designated person.

At paragraph (d)(2), OSHA is proposing to require that the employer implement a training program for all powered industrial truck operators. This program would ensure that only trained drivers who have successfully completed the training program would be allowed to operate these vehicles. An exception to the rule would allow trainees to operate powered industrial trucks provided the operation is under the direct supervision of a designated person and the operation is conducted where there is minimum danger to the trainee or other employees.

OSHA is proposing at paragraph (d)(2)(ii) that the training consist of a combination of classroom instruction and practical training. The Agency believes that only a combination of training methods will ensure adequate employee training. Although classroom training is invaluable for the teaching of the principles of vehicle operation, it is the hands-on training and the evaluation of the operation of the vehicle that finally proves the adequacy of the training and the ability of the employee to use that training to operate a powered industrial truck successfully.

At paragraph (d)(2)(iii), OSHA is proposing to require that all training be conducted by a designated person. OSHA defines a designated person as one who has the requisite knowledge, training and experience to train powered industrial truck operators and judge their competence. As discussed elsewhere in this preamble, the employer may have the necessary prerequisites to qualify as a designated person, or he or she may assign the training responsibility to another person (either a knowledgeable employee or an trainer from outside the company).

To ensure that the training contains the appropriate information for the operator, OSHA has provided a list of subjects at paragraph (d)(3). Under this rule, it is the responsibility of the employer to select the particular items that are pertinent to the types of truck that the employee will be allowed to operate and the work environment in which the vehicle will be operated. For example, if the employee will be allowed to operate an order picker, it is essential that he or she understand the location and function of the controls, the location and operation of the powerplant, steering and maneuvering, visibility, inspection and maintenance, and other general operating functions of the vehicle. Additionally, it is essential that the employee know and understand that he or she must be restrained from falling when the platform of the truck is in an elevated position and that the truck must never be driven when the platform is elevated. Under this proposed requirement, it is the responsibility of the employer to select those elements of the training that are necessary for the type of vehicle to be used and the workplace in which that vehicle will be operated. The employer may leave out elements if the employer can demonstrate that they are not relevant to safe operation in the employer's workplace.

An additional component of the training program is a continuing evaluation of the operator. At paragraph (d)(4), OSHA specifies that this evaluation be conducted on a periodic basis so that the employee retains and uses the knowledge, skills and abilities that are necessary for the safe operation of the vehicle. This evaluation need only be conducted at the intervals necessary to ensure that the operators have not forgotten or chosen to disregard their training. OSHA is proposing that such evaluations be carried out at least annually. The evaluation does not have to be formal; for example, it could be something as simple as having the designated person observe an operation to ensure that the powered industrial truck is being operated safely.

OSHA is requiring at paragraph (d)(5) that the employer certify that the

required training and evaluations have been conducted. To minimize paperwork burden on the employer, OSHA is specifying that the certification consist only of the name of the employee, the date of the training or evaluation, and the signature of the person conducting the training or evaluation. In light of the Paperwork Reduction Act of 1995, OSHA is requesting comment on ways it can determine whether employees have been properly trained without using even the minimal requirement of certification. In this paragraph, OSHA also specifies that all of the current training materials used in the conduct of training or the name and address of the outside trainer, if one is used, be maintained.

At paragraph (d)(6), OSHA is proposing to allow the employers to forego those portions of the required training that employees have previously received. The intent of these provisions is to prevent duplicative training. For example if an employee is already trained in powered industrial truck operation, knows the necessary information, has been evaluated, and has proven to be competent to perform the duties of an operator, there is no reason to require an employer to repeat the training.

As previously discussed, three major areas must be emphasized when conducting a powered industrial truck training program. These three areas are: (1) The characteristics, operation and limitations of the vehicles that the trainee will be authorized to operate, (2) the hazards associated with the workplace in which these vehicles will operate, and (3) the general safety rules that apply to these vehicles and their operation.

This proposed rule has been drafted in performance language to allow the employer a reasonable degree of flexibility in developing the training program and conducting the training. OSHA recognizes that there are inherent differences in the capabilities and limitations of employees, both in their ability to assimilate the training and then to use the knowledge that has been gained. Therefore, the proposed regulation does not limit the employer by specifying the manner in which the training must be conducted. Similarly, the specific content of the training course has not been prescribed because different topics must be taught to address the variations associated with different makes and models of vehicles and cover hazards specific to each workplace. However, the proposal does identify the topics that should be covered unless the employer determines that one or more of them are not relevant to the employer's situation.

OSHA believes that the training needs to be administered before the employee begins to operate a vehicle. To this end, OSHA has required initial training of employees so that they will acquire the knowledge and skills that are necessary for the safe operation of the powered industrial truck before being allowed to operate the vehicle without close supervision.

OSHA has generally left the particulars of the type of training (lecture, conference, demonstration, practical exercise, test or examination, etc.) to the employer. However, the training must include some formal instruction and some practical experience. The length of the training must be based on the employee's experience and other qualifications and the nature of the work environment. The training must be based upon the type of vehicles the employee will be allowed to operate, the conditions that exist in the workplace, the general safety rules included in this OSHA standard, the trainer's skills and knowledge, and the trainee's skill level. Consequently, OSHA believes that one standardized training course will not suffice for all employees.

The employer may choose the training provider. This could include contracting with an outside professional training company to come into the company and train the powered industrial truck operators or the employer developing and conducting the training program. In either case, the employer can choose the method or methods by which the employees will be trained and when the training is conducted.

The standard requires at paragraph (d)(4) that a designated person evaluate the trainee's understanding of the training and his/her competency to operate a powered industrial truck. This is the best method of proving that the operator has been adequately trained and that the training has been, and continues to be, effective. By observing how the trainee operates the vehicle, the evaluator can assess how well the trainee has absorbed the necessary information.

When a new employee claims prior experience in operating a powered industrial truck, the employer must ensure that the employee knows how to operate the vehicle safely. This can be ascertained by questioning the employee on various aspects of the operation of the truck and by requiring the operator to demonstrate his or her ability to operate the vehicle safely through the conduct of a practical exercise.

In evaluating the applicability and adequacy of an employee's prior experience, the employer must consider the type of equipment the employee has operated, how long ago this experience was gained, and the type of work environment in which the employee worked. Some written documentation of the earlier training is also necessary to determine that proper training has been given. In addition, the competency of the employee must be evaluated. Based on an evaluation of this information, the employer can determine whether the experience is recent and thorough enough, the documentation sufficient, and the competency adequate to forego some or much of the initial training. Some training on the specific factors of the new employee's workplace will always be necessary. Again, the major criterion for evaluating an employee is: Does the person know how to do the job and does the vehicle operator have and use the knowledge that is needed to do the job safely?

The proposed regulatory text for construction includes some minor changes to improve the clarity from the language proposed for other sectors. OSHA also is proposing to add two non-mandatory appendices to the standard. These appendices are intended to provide guidance to employers in establishing a training program (Appendix A) and in understanding the basic principles of stability (Appendix B). In neither case is the information contained in these appendices intended to provide an exhaustive explanation of the techniques of conducting training or of understanding the principles of stability, but each appendix is intended to introduce the basic concepts so that the employer can use the material to provide basic training.

b. Specific Provisions of the ASME Standard Not Included in This Proposal

OSHA has not included some of the suggested language contained in the ASME B56.1–1993 standard. Specifically, paragraph 4.19.2 of the consensus standard has not been included because other enforceable language in the proposed standard covers the issue. This paragraph states:

> The operator training program should include the user's policies for the site where the trainee will operate the truck, the operating conditions for that location, and the specific truck the trainee will operate. The training program shall be presented to all new operators regardless of previous experience.

The Agency also has not adopted the language contained in 4.19.3(a) of the consensus standard because the responsibility for providing a safe

workplace (including the use of a powered industrial truck) is vested with the employer under the OSH Act. Paragraph 4.19.3(a) specifies, ''The primary responsibility of the operator is to use the powered industrial truck safely following the instructions given in the training program.''

The consensus standard, at 4.19.4(e) and 4.19.5, specifies the type of training and the testing that should be conducted, whereas the OSHA standard leaves the methods of training up to the employer. As explained above, the employer is responsible for selecting the methods that are employed to train the operators. For example, in some circumstances, the employee may be able to gain valuable information from reading the operator's manual for the vehicle. In other circumstances, reading the manual may be less effective than practical lessons in how to operate the truck safely.

Many OSHA standards and consensus standards specify that some means be used to verify that training has been conducted. Examples of such verification include: (1) Documentation of training, (2) retention of lesson plans and attendance rosters and, (3) issuance of training certificates. When refresher or remedial training is specified, these other rules usually require that a set amount of training be conducted at a regular interval (for example, a certain number of hours of refresher training be conducted annually). The proposed rule would require evaluation by a designated person and certification that the employee has taken the training and can competently operate the truck. Course materials also must be kept. OSHA believes that this is a sufficient method of verification. The ASME provision would require additional paperwork that is discouraged by the Paperwork Reduction Act of 1995.

VIII. The Comments and Recommendations of the Advisory Committee on Construction Safety and Health

The Advisory Committee on Construction Safety and Health (ACCSH) was advised at its meeting of February 28 and March 1, 1995, of the effort being undertaken by OSHA to promulgate like training requirements for all powered industrial truck operators regardless of where the powered industrial truck is being used. At that time, the ACCSH recommended to the Agency that the issuance of an NPRM for construction be delayed until the Committee had more time to study the draft of the proposal and to submit its formal comments and recommendations to OSHA. At that meeting, the Committee also set up a task force to consider the matter.

At its meeting of May 25 and 26, ACCSH received the recommendations from the task force. ACCSH voted unanimously that OSHA should publish a proposal for improving the training requirement for powered industrial truck operators in the construction industry. The Committee also suggested that OSHA consider the changes recommended and get feedback from the public on the proposal and then proceed from there (Tr. pp. 202–223)(Ex. 9).

OSHA has carefully considered the comments and recommendations received from the ACCSH. OSHA has decided that the best approach at this time is to raise the suggested ACCSH changes as issues for public comment in this preamble rather than to incorporate them into the proposed regulatory text. OSHA believes this is the best approach to highlight these issues for public comment. After considering the public comments, OSHA will consider the best approach for handling the suggested changes in the final powered industrial truck operator training standard for construction. OSHA also is publishing these recommendations for consideration for inclusion in the final general industry and maritime rules to see whether the ACCSH recommendations may be appropriate in these industries as well. Therefore, OSHA is not making specific word changes in the proposed regulatory text and will examine the comments received in response to this document before it does so. This also may prevent possible confusion, because ACCSH used the specific language and paragraph numbering of the ASME standard rather than the proposed general industry regulatory text and paragraphic numeration when referencing its discussion.

The following issues were submitted by ACCSH. Also included is a short discussion of the reasons for the ACCSH recommendations:

1. In the construction industry, should an employer be allowed to accept the certification of training by a third party such as a union, manufacturer, consultant, or other private or public organization? Since OSHA does not accredit certifiers, what criteria should be used to establish their credibility?

ACCSH recommended that construction employers be permitted to accept such accreditation. In the construction industry, it is common that such training would be presented by the union, an apprenticeship program, or by a local employer organization. In addition, employees often work for an employer only briefly and it would be inefficient for the new employer to have to review the performance of each new employee. If this approach were adopted, there would need to be some mechanism to ensure that the operator would be trained in conditions comparable to those found at the present site and to enable the employer to know that the operator had been trained.

2. What type of testing should be conducted during initial training to judge the competency of the trainee (performance testing and oral and/or written tests)?

A. If tests are administered, what subjects should be tested, and what methods, if any, should be used to judge that the tests are reliable and address the subject matter adequately?

B. What, if any, should be the acceptable pass/fail requirement for the tests?

ACCSH recommended that the employer or other organization training operators give both performance tests and oral/written tests to ensure the skill and knowledge of the operator. The committee also recommended that there should be pass/fail requirements for those tests and that records be kept of the results of the tests. ACCSH believed that this requirement would assist in lowering accident rates. The Committee also suggested that, if this turned out not to be effective, OSHA consider accreditation of training programs.

3. Are some of the listed training subjects not needed?

ACCSH believes that most of the training topics in the proposed standard are necessary but that a few might not be. Specifically, they felt that the recommended topic of the differences between driving an auto and a powered industrial truck might be unnecessary.

4. Should an employee receive refresher or remedial training only if operating a vehicle unsafely or if involved in an accident? Is there any fixed operator retraining frequency suitable for the construction industry?

The Advisory Committee believed that a periodic retraining provision for construction was inappropriate because most construction employees are only on a particular job a short period. However, the Committee recommended reevaluation and possible retraining after an incident, accident or expiration of a certificate. (See question 1.)

IX. Statutory Considerations

Section 2(b)(3) of the Occupational Safety and Health (OSH) Act authorizes

''the Secretary of Labor to set *mandatory occupational safety and health standards* applicable to businesses affecting interstate commerce'', and section 5(a)(2) provides that ''(each employer shall comply with *occupational safety and health standards* promulgated under this Act'' (emphasis added). Section 3(8) of the OSH Act (29 U.S.C. 652(8)) provides that ''the term 'occupational safety and health standard' means a standard which requires conditions, or the adoption or use of one or more practices, means, methods, operations, or processes, reasonably necessary or appropriate to provide safe or healthful employment and places of employment.''

OSHA considers a standard to be ''reasonably necessary or appropriate'' within the meaning of section 3(8) if it meets the following criteria: (1) The standard will substantially reduce a significant risk of material harm; (2) compliance is technologically feasible in the sense that the protective measures being required already exist, can be brought into existence with available technology, or can be created with technology that can reasonably be developed; (3) compliance is economically feasible in the sense that industry can absorb or pass on the costs without major dislocation or threat of instability; and (4) the standard is cost effective in that it employs the least expensive protective measures capable of reducing or eliminating significant risk. Additionally, safety standards must better effectuate the Act's protective purpose than the corresponding national consensus standards, must be compatible with prior agency action, must be responsive to significant comment in the record, and, to the extent allowed by statute, must be consistent with applicable Executive Orders. OSHA believes that application of these criteria results in standards that provide a high degree of worker protection without imposing an undue burden on employers. (See the discussion of 60 FR 13796–13799, March 14, 1995, for a detailed analysis of the case law.)

As discussed in various places in the preamble of the March 14 notice, OSHA has determined that the operation of powered industrial trucks by untrained or inadequately trained operators generally poses significant risks to employees. It is also OSHA's view that operation of powered industrial trucks by untrained or inadequately trained operators poses a significant risk to employees in the construction industry. There have been on average 15 fatalities and 1441 serious injuries in the construction industry annually due to unsafe powered industrial truck operation. OSHA estimates that compliance with the revised training requirement for powered industrial truck operators will reduce the risk of these injuries and deaths to those operators and other employees by between 20 and 45 percent (preventing 3 to 4 fatalities and 463 to 600 serious injuries annually). This constitutes a substantial reduction of significant risk of material harm.

The Agency believes that compliance is technologically feasible because there exists a current rule for the training of powered industrial truck operators and the revised regulation merely specifies in more detail what is to be taught to those operators and requires the employer to institute effective supervisory measures to ensure continued safe operation of those vehicles. In many companies, the training of vehicle operators and the subsequent supervisory measures required by the standard have already been implemented.

Additionally, OSHA believes that compliance is economically feasible, because, as documented by the Preliminary Economic Analysis, all regulated sectors can readily absorb or pass on compliance costs. OSHA estimates total costs of $250,000, a negligible percent of the industry's $500 billion in sales and $35 billion in pretax profits.

The standard's costs, benefits, and compliance requirements are reasonable, amounting to approximately $250,000 per year while preventing 3–4 fatalities and 463–600 serious injuries per year.

In some subsectors of the construction industry there are relatively few lift trucks and in any given year, there may be no fatalities and few injuries in these subsectors. Nevertheless, OSHA believes the risks to individual drivers in these environments are significant and that the costs of compliance in these subsectors will be negligible.

For these reasons and those further spelled out in the Federal Register document of March 14, 1995 (60 FR 13795), OSHA has determined that it is inappropriate to exclude any construction subsectors merely because they have not recently reported documented powered industrial truck injuries or fatalities, insofar as these subsectors contain workplaces where powered industrial trucks are operated.

As discussed above in sector VII(b) of this preamble; many of the provisions of this proposed standard are based on the current ASME consensus standard. Pursuant to section 6(b)(8) of the OSH Act, OSHA explains above why the proposed provisions that differ from the ASME standard better effectuate the purpose of the Act.

Conclusion

OSHA has preliminarily determined that the proposed powered industrial truck standard for construction, like other safety standards, is subject to the constraints of section 3(8) of the OSH Act, and that the standard is ''reasonably necessary or appropriate to provide safe or healthful employment and places of employment.''

The Agency believes that the use of powered industrial trucks in the construction workplace by untrained or poorly trained employees poses significant risks and that the need to require that only properly trained employees operate these vehicles is reasonably necessary to protect affected employees from those risks. OSHA also has determined that compliance with the standard for the training of these operators is technologically feasible because many companies offer the type of training that the standard would require. In addition, OSHA believes that compliance is economically feasible, because, as documented by the Preliminary Economic Analysis (Ex. 2), all regulated sectors can readily absorb or pass on initial compliance costs and the benefits are substantial. In particular, the Agency believes that compliance with the proposed powered industrial truck training requirements will result in substantial cost savings and productivity gains at facilities that utilize powered industrial trucks whose operations might otherwise be disrupted by accidents and injuries.

As detailed in OSHA's March 14, 1995, document (60 FR 13799) and in the Preliminary Economic Analysis, the standard's costs, benefits, and compliance requirements are consistent with those of other OSHA safety standards.

X. Summary of the Preliminary Economic Feasibility and Regulatory Flexibility Analyses and Environmental Impact Assessment

Introduction

Executive Order 12866 and the Regulatory Flexibility Act require Federal Agencies to analyze the costs, benefits and other consequences and impacts of proposed standards and final rules. Consistent with these requirements, OSHA has prepared this preliminary economic analysis to accompany the revised proposal being published, which would extend requirements for the training of powered

industrial truck operators to the construction industry. OSHA's initial proposal, which proposed such training for truck operators in general industry and the maritime industries, was published in the Federal Register on March 14, 1995 (60 FR 13782). These proposed construction industry training requirements will supplement and extend the minimal powered industrial truck operator training requirements currently codified at 29 CFR 1926.602 (c)(1)(vi). This preliminary economic analysis of the potential impacts of the proposal on firms in the construction industry will be incorporated into the Preliminary Economic Analysis developed by OSHA to support the proposed powered industrial truck operator training requirements for the general industry and maritime sectors published on March 14, 1995.

This preliminary economic analysis of the potential impacts of the proposed rule on the construction industry includes a description of the industry, an assessment of the benefits attributable to the proposal, a preliminary determination of the technological feasibility of the proposed requirements, an estimation of the costs of compliance, an analysis of the economic feasibility of the proposed provisions, and an evaluation of the economic and other impacts of the proposed rule on establishments in this sector. This preamble discussion summarizes the more detailed analysis that is available in the docket (Ex. 2).

Affected Industries

Using powered industrial truck sales data provided by the Industrial Truck Association (ITA), OSHA estimates that, of the 822,831 industrial trucks in use in industries covered by OSHA, the construction sector (SICs 15–17) uses about 8,300. This proposed rule will cover construction workers who operate powered industrial trucks, including workers who are employed as dedicated (i.e., full time) truck operators and those whose operation of powered industrial trucks is incidental to the performance of another job. These incidental users of powered industrial trucks include maintenance personnel and general laborers. Non-driving workers such as materials handlers, laborers, and pedestrians who work on or are present in the vicinity of powered industrial truck operations may also be injured or killed in powered industrial truck accidents.

OSHA estimates that approximately 1.2 million workers are employed as industrial truck operators in industries regulated by OSHA. OSHA estimates that 12,400 of these operators are employed by the construction sector.

Technological Feasibility

OSHA did not identify any proposed requirement that raises technological feasibility problems for construction establishments that use industrial trucks. On the contrary, there is substantial evidence that establishments can achieve compliance with all of the proposed requirements using existing methods and equipment. In addition, the proposed standard introduces no technological requirements of any type. Therefore, OSHA has preliminarily concluded that technological feasibility is not an issue in relation to the proposed construction industry training standard for powered industrial truck operators.

Costs of Compliance

The proposed industrial truck operator training requirements would expand the training required by OSHA's existing industrial truck training standard (29 CFR 1926.602 (c)(1)) to include training information on the operating instructions and warnings appropriate to the type of truck used, the specific hazards found in the workplace where the truck will be operated, and the requirements of this standard. Additionally, the proposed provisions require construction employers to monitor the performance of industrial truck operators through an annual evaluation and to provide remedial training when this evaluation suggests that such training is needed.

The annual costs construction employers will incur to comply with the proposed revisions are estimated to be $254,420. Table 2 presents estimated annual costs, by provision, at the three-digit SIC level. OSHA developed these industry compliance cost estimates based on per- operator costs, the number of operators affected, and employee turnover rates. Costs are annualized based on a 7 percent discount rate, as directed by the Office of Management and Budget, and are projected over 10-years.

Current industry practice was also taken into consideration when calculating costs, i.e., where employers have already voluntarily implemented practices that would be required by the proposed standard, no cost is attributed to the new standard. OSHA estimated that it is current practice for 80 percent of employers in this industry to conduct an initial evaluation of each powered industrial truck operator's skill, as would be required by the proposal. In addition, specific equipment training is often a component of initial training in this industry. Many operators are also currently trained in both classroom and hands-on settings, and on the specific type of truck they will use. OSHA estimates that about 75 percent of employers currently are in compliance with these proposed requirements. Across all OSHA-regulated sectors, including construction, 65 percent of employers are assumed to be providing truck operators with training in the hazards of the industrial truck environment they will operate in. This requirement is often overlooked in generic or off-the-shelf training programs and may be inadequately covered in programs provided by external trainers.

TABLE 2.—ANNUALIZED COMPLIANCE COSTS

[For the Proposed Industrial Truck Operator Training Standard in the Construction Sector, by Provision and by Three-Digit SIC]

SIC/Industry	Initial evaluation	Initial training		Monitoring		Remedial training	Annual cost
		Specific equipment	Operating environment	Annual monitoring	Record-keeping		
152 Residential building construction	$905	$2,962	$7,592	$8,297	$6,223	$830	$26,810
153 Operative builders	74	242	620	677	508	68	2,189
154 Nonresidential building construction	1,423	4,655	11,931	13,039	9,779	1,304	42,130
161 Highway and street construction	259	846	2,169	2,371	1,778	237	7,660
162 Heavy construction, except highway	499	1,632	4,184	4,572	3,429	457	14,773
171 Plumbing, heating, air-conditioning .	1,167	3,819	9,788	10,697	8,023	1,070	34,564
172 Painting and paper hanging	322	1,054	2,701	2,952	2,214	295	9,539
173 Electrical work	952	3,115	7,983	8,724	6,543	872	28,190

TABLE 2.—ANNUALIZED COMPLIANCE COSTS—Continued

[For the Proposed Industrial Truck Operator Training Standard in the Construction Sector, by Provision and by Three-Digit SIC]

SIC/Industry	Initial evaluation	Initial training		Monitoring		Remedial training	Annual cost
		Specific equipment	Operating environment	Annual monitoring	Record-keeping		
174 Masonry, stonework and plastering	833	2,727	6,989	7,638	5,728	764	24,679
175 Carpentry and floor work	363	1,187	3,042	3,425	2,493	332	10,742
176 Roofing, siding and sheet metal work	366	1,198	3,071	3,356	2,517	336	10,844
177 Concrete work	427	1,397	3,581	3,914	2,935	391	12,646
178 Water well drilling	36	118	302	330	247	33	1,065
179 Miscellaneous special trade contractors	966	3,159	8,096	8,848	6,636	885	28,590
Total Construction Sector	8,592	28,109	72,051	78,739	59,054	7,874	254,420

Source: US Department of Labor, OSHA, Office of Regulatory Analysis, 1995.
[a] Costs are annualized over 10 years at a 7 percent discount rate (annualization factor 0.1424).
Note: Totals may not add due to rounding.

OSHA estimated per-operator compliance costs for each component of the proposed standard. These compliance costs include the wages of trainees and trainers [2], as well as monitoring and recordkeeping costs. Auxiliary costs (e.g., costs for course development and travel) will remain unchanged from those required by the existing standard, and were not included when computing compliance costs for the proposed revisions. The cost associated with the 30-minute initial truck operator evaluation required to categorize operators either as experienced or inexperienced is estimated to be $11.01; this figure includes the expense of the supervisor's time. The cost per trainee for each of the proposed two and one-half hour training sessions on specific equipment to be used and the hazards in the operating environment is estimated to be $52.74 per session, or $105.48 for both types of training. The per-operator cost for annual monitoring and recordkeeping is estimated to be $16.51. Therefore, the cost of compliance for each untrained newly hired truck operator in construction is estimated to be $133.01 ($11.01 + $105.49 +$16.51).

A more detailed analysis of costs is presented in Chapter III of the full Preliminary Economic Analysis. OSHA welcomes comments on the preliminary costs and the underlying assumptions presented in this Preliminary Economic Analysis.

Benefits

The number of truck-related fatalities and injuries that will be prevented by the proposed training standard in all OSHA-regulated sectors is estimated by first determining the number of powered industrial truck fatalities and injuries attributable to hazards addressed by OSHA's existing powered industrial truck training standards as well as the number of fatalities and injuries determined not to be preventable by OSHA's existing requirements or by the proposed standard. The number of fatalities and injuries likely to be prevented by compliance with the standard is based on the Agency's analysis of powered industrial truck accidents as reported in the narratives and citation data from OSHA's fatality catastrophe reports gathered through the OSHA Integrated Management Information System (IMIS).

OSHA used results from the Cohen and Jensen study (Ex. 4) to derive an estimate of the beneficial effect of enhanced training on powered industrial truck accidents. This study, which was conducted in two warehouses where powered industrial trucks were widely used, provides a quantitative estimate of the effectiveness of an operators' training program similar to the one required by the proposed standard. The training program described in the study included a series of short training sessions, post-training feedback, and supervision and monitoring of driver behavior. The study estimated the effect of increased training and operator monitoring on operator driving practices, and showed that the mean error rates before and after training [3], as well as three months after training, declined by 44 and 70 percent after training, respectively.

As presented in Table 3, an estimated 15 fatalities and 1,441 lost workday injuries occur annually as a result of industrial truck-related accidents in the construction industry. OSHA estimates that compliance with the proposed standard in the construction sector will prevent 3 or 4 of these fatalities and between 463 and 600 lost workday injuries per year. These preventable fatalities and injuries are attributable directly to the proposed training requirements, i.e., they are in addition to the lives already being saved and the injuries already being prevented by OSHA's existing powered industrial truck training requirements for construction (29 CFR 1926.602(c)(1)). A discussion of the methodology used to calculate these estimates is presented in Chapter IV of the Preliminary Economic Analysis.

[2] The construction operator wage rate, with compensation estimated at 30 percent of the wage rate, is estimated to be $18.34 per hour. The supervisor wage rate of $22.01 used in the analysis is calculated by increasing the operator's wage rate by 20 percent.

[3] Mean error rate = operator errors divided by total number of driving behaviors observed.

TABLE 3.—NUMBER OF FATALITIES AND LOST WORKDAY INJURIES POTENTIALLY PREVENTED ANNUALLY BY COMPLIANCE WITH THE PROPOSED POWERED INDUSTRIAL TRUCK TRAINING STANDARD IN THE CONSTRUCTION SECTOR

Sector	Total number of powered industrial truck fatalities	Preventable fatalities under proposed standard		Total number of industrial truck lost workday injuries	Preventable injuries under proposed standard	
		Low estimate	High estimate		Low estimate	High estimate
Construction	15	3.0	3.8	1,441	463	600

Source: U.S. Department of Labor, OSHA, Office of Regulatory Analysis, 1995.

Economic Impacts and Regulatory Flexibility Analysis

OSHA assessed the potential economic impacts of compliance with the proposed standard and has preliminarily determined that the standard is economically feasible for all covered industry groups. Detailed information at the three-digit SIC level is presented in Chapter V of the full Preliminary Economic Analysis.

When an industry enjoys an inelastic demand for its products, any increase in operating costs can ordinarily be passed on to consumers. In this case, the maximum expected price increase is calculated by dividing the average estimated annualized compliance cost in each industry by the average revenue for that industry. As shown in Table 4, OSHA estimates that the average price increase for the construction sector would be negligible, i.e., less than 0.0001 percent. These estimates indicate that, even if all costs were passed on to consumers through price increases, the proposed standard would have a negligible impact on prices overall. Given the minimal price increases necessary to cover the cost of the proposed training requirements, employers should be able to pass along compliance costs to their customers. However, even if all costs were absorbed by the affected firms, the highest reduction in profits in the construction sector would be 0.001 percent for the construction special trades industry (SIC 17). Because most firms will not find it necessary to absorb all of the costs from profits and should be able to pass most if not all of the standard's costs on to consumers, average profits are not expected to decline to the extent calculated here. OSHA, therefore, does not expect the proposed standard to have a significant economic impact on affected firms.

TABLE 4.—ECONOMIC IMPACT OF THE PROPOSED POWERED INDUSTRIAL TRUCKS OPERATOR TRAINING STANDARD IN THE CONSTRUCTION SECTOR

SIC/Industry sector	Value of industry shipments, receipts or sales ($ millions)	Annualized compliance costs	Compliance costs as a percent of sales	Pre-tax income ($ millions)	Compliance costs as a percent of pre-tax income
15 Building Construction	$223,007	$71,128	Negligible	$16,149	0.0004
16 Heavy Construction	77,746	22,433	Negligible	6,496	0.0003
17 Construction (Special Trades)	204,154	160,859	Negligible	13,522	0.0012

Source: U.S. Department of Labor, OSHA, Office of Regulatory Analysis, 1995. Negligible denotes less than 0.0001 percent.

In accordance with the Regulatory Flexibility Act of 1980 (5 U.S.C. 601 *et seq.*), OSHA has also analyzed the economic impact of the proposed standard on small establishments (19 or fewer employees), looking particularly for evidence that the rule would have a significant impact on a substantial number of small entities. Small businesses will incur lower compliance costs than larger businesses because the compliance costs depend directly on the number of industrial truck operators requiring training in a given facility. OSHA has preliminarily concluded that the proposed standard would not have a significant impact on a substantial number of small entities.

It has already been shown that the revenue and price increases for all businesses are negligible. To test the possibility that the proposed standard might have significant impacts on some small businesses, OSHA developed a worst case-analysis of small firms in the construction sector by assuming that the establishment is currently not in compliance with any of the requirements of the proposed standard and that all truck operators in the establishment would need specific equipment and operating environment training, i.e., that none of the operators currently employed have any training. The representative establishment was assumed to have 14 employees, the average for establishments with 10 to 19 employees. OSHA estimates that 60 percent of employees, or a total of 8 employees, would operate powered industrial truck either full-time or as part of another job. Using a turnover rate of 15 percent, the small establishment is expected to spend $449 annually to achieve full compliance with the proposed standard. Under this worst case scenario, the impacts of compliance costs as a percent of revenues are approximately 0.06 percent, an insignificant impact even in the worst case. Similarly, OSHA estimates that, if the average small construction establishment could not pass any of the compliance costs through to its customers (a highly unlikely scenario), the costs would impact average profits by less than 1.2 percent. These impacts are judged to be relatively minor; therefore, the proposed standard is preliminarily determined to be economically feasible even for very small construction industry establishments.

Environmental Impact

The proposed standard has been reviewed in accordance with the requirements of the National Environmental Policy Act of 1969 (42

U.S.C. 4321, et seq.), the regulation of the Council on Environmental Quality (40 CFR part 1500 through 1517), and the Department of Labor's NEPA procedures (29 CFR part 11). As a result of this review, OSHA has determined that the proposed standard will have no significant environmental impact.

XIII. Federalism

This proposed regulation has been reviewed in accordance with Executive Order 12612 (52 FR 41685, Oct. 30, 1987), regarding Federalism. This Order requires that agencies, to the extent possible, refrain from limiting state policy options, consult with states prior to taking any actions which would restrict state policy options, and take such actions only when there is clear constitutional authority and the presence of a problem of national scope. The Order provides for preemption of state law only if there is a clear Congressional intent for the Agency to do so. Any such preemption is to be limited to the extent possible.

Section 18 of the Occupational Safety and Health Act (OSH Act) expresses Congress' intent to preempt state laws relating to issues on which Federal OSHA has promulgated occupational safety and health standards. Under the OSH Act, a state can avoid preemption in issues covered by Federal standards only if it submits, and obtains Federal approval of, a plan for the development of such standards and their enforcement. Occupational safety and health standards developed by such Plan states must, among other things, be at least as effective in providing safe and healthful employment and places of employment as the Federal standards. When such standards are applicable to products distributed or used in interstate commerce they may not unduly burden commerce and must be justified by compelling local conditions.

The Federal proposed standard on powered industrial truck operator training addresses hazards that are not unique to any one state or region of the country. Nonetheless, states with occupational safety and health plans approved under section 18 of the OSH Act will be able to develop their own state standards to deal with any special problems which might be encountered in a particular state. Moreover, because this standard is written in general, performance-oriented terms, there is considerable flexibility for state plans to require, and for affected employers to use, methods of compliance which are appropriate to the working conditions covered by the standard.

In brief, this proposed rule addresses a clear national problem related to occupational safety and health in general industry. Those states which have elected to participate under section 18 of the OSH Act are not preempted by this standard, and will be able to address any special conditions within the framework of the Federal Act while ensuring that the state standards are at least as effective as their standard. State comments are invited on this proposal and will be fully considered prior to promulgation of a final rule.

XIV. OMB Review Under the Paperwork Reduction Act

This paragraph contains a collection of information as defined in OMB's new regulations at 60 FR 44978 (August 29, 1995) in § 1926.602(d)(5). This provision requires employers to prepare and maintain a certification record. Specifically, the employer must prepare a record to certify that employees have been trained and evaluated as required by the standard. The record includes the name of the employee who was trained, the date of the training and the signature of the person who performed the training and evaluation.

Under the Paperwork Reduction Act of 1995, agencies are required to seek OMB approval for all collections of information. As part of the approval process, agencies are required to solicit comment from affected parties with regard to the collection of information, including the financial and time burdens estimated by the agencies for the collection of information. OSHA believes it is necessary for employers to prepare the certification record to verify that powered industrial truck operators are trained to perform their duties competently and safely. To comply with the training requirement, employers must keep a record certifying that their employees have successfully completed powered industrial truck operator training. Safe operation can decrease the number of fatalities and injuries associated with powered industrial trucks.

OSHA estimates that it will take employers about 1 hour to prepare and 8 hours to deliver the training; and another 15 minutes to prepare a certification record, make it available during compliance inspections, retain current training materials and course outlines, and document the types of trucks that an operator is authorized to operate. It will cost employers on average about $53 to initially train and certify each employee. The total respondent burden for construction workplaces in the first year is $45,709 and 6,411 burden hours. In subsequent years cost is $6,000 and the hourly burden is 3,543. The number of operators in construction is 1% of the total number.

OSHA requests comment from the public on all aspects of this collection of information. Specifically, OSHA requests comment on whether this proposed collection of information does:

- Ensure that the collection of information is necessary for the proper performance of the functions of the agency, including whether the information will have practical utility;
- Evaluate the accuracy of the agency's estimate of the burden of the proposed collection of information, including the validity of the methodology and assumptions used;
- Enhance the quality, utility, and clarity of the information to be collected; and
- Minimize the burden of the collection of information on those who are to respond, including through the use of appropriate automated, electronic, mechanical, or other technological collection techniques or other forms of information technology, e.g., permitting electronic submissions of responses.

Comments on the collection of information proposed provision should be sent to the OMB Desk Officer for OSHA at Room 10235, 726 Jackson Place, NW, Washington, DC 20503. Commenters are encouraged to send a copy of their comment on the collection of information to OSHA along with their other comments. The supporting statement for this collection of information requirement is available in both OSHA and OMB Docket Offices.

OMB is currently reviewing OSHA proposed collection of information to determine its consistency with the Paperwork Reduction Act of 1995. At this time OMB has not approved this collection of information.

XV. Public Participation

Interested persons are requested to submit written data, views and arguments concerning this proposal. These comments must be postmarked by April 1, 1996, and submitted in quadruplicate to the Docket Office; Docket No. S–008, Room N2624; U.S. Department of Labor, Occupational Safety and Health Administration; 200 Constitution Ave., NW; Washington, DC 20210.

All written comments received within the specified comment period will be made a part of the record and will be available for public inspection and copying at the above Docket Office address. The comments submitted as part of this proposal for construction also will be considered part of the record for general industry and maritime and the comments for general industry and maritime will be considered part of the record for this

rulemaking. In addition, OSHA is reopening the record for additional comment on the proposed requirements for general industry and maritime to coincide with the comment period for construction.

This rulemaking is for procedural purposes combined with the rulemaking that was proposed for general industry and maritime industries on March 14, 1995. The docket will be combined, comments and evidence submitted in response to one notice, need not be repeated for the other notice and will be considered for all sectors. The hearing will be conducted for all sectors. Of course, to the extent that the record supports different provisions for different sectors, these differences will be incorporated into the final rule.

Notice of Intention to Appear at the Informal Hearing

Pursuant to section 6(b)(3) of the Act, an opportunity to submit oral testimony concerning the issues raised by the proposed standard including economic and environmental impacts, will be provided at an informal public hearing to be held in Washington, DC on April 30, 1996. If OSHA receives sufficient requests to participate in the hearing, the hearing period may be extended. Conversely, the hearing may be shortened if there are few requests.

The hearing will commence at 9:30 a.m. on April 30, 1996, in the Auditorium, Frances Perkins Building, U.S. Department of Labor, 200 Constitution Avenue NW, Washington, DC 20210.

All persons desiring to participate at the hearing must file in quadruplicate a notice of intention to appear, postmarked on or before April 1, 1996. The notice of intention to appear, which will be available for inspection and copying at the OSHA Technical Data Center Docket Office (Room N2624), telephone (202) 219–7894, must contain the following information:

1. The name, address, and telephone number of each person to appear;
2. The capacity in which the person will appear;
3. The approximate amount of time required for the presentation;
4. The issues that will be addressed;
5. A brief statement of the position that will be taken with respect to each issue; and
6. Whether the party intends to submit documentary evidence and, if so, a brief summary of it.

The notice of intention to appear shall be mailed to Mr. Thomas Hall, OSHA Division of Consumer Affairs, Docket S–008, Room N3647, U.S. Department of Labor, 200 Constitution Avenue NW, Washington, DC 20210; telephone (202) 219–8615.

A notice of intention to appear also may be transmitted by facsimile to (202) 219–5986 (Attention: Thomas Hall), by the same date, provided the original and 3 copies are sent to the same address and postmarked no more than 3 days later.

Filing of Testimony and Evidence Before the Hearing

Any party requesting more than 10 minutes for a presentation at the hearing, or who will submit documentary evidence, must provide in quadruplicate, the complete text of the testimony, including any documentary evidence to be presented at the hearing. One copy shall not be stapled or bound and be suitable for copying. These materials must be provided to Mr. Thomas Hall, OSHA Division of Consumer Affairs at the address above and be postmarked no later than April 15, 1996.

Each such submission will be reviewed in light of the amount of time requested in the notice of intention to appear. In those instances when the information contained in the submission does not justify the amount of time requested, a more appropriate amount of time will be allocated and the participant will be notified of that fact prior to the informal public hearing.

Any party who has not substantially complied with this requirement may be limited to a 10-minute presentation, and may be requested to return for questioning at a later time.

Any party who has not filed a notice of intention to appear may be allowed to testify for no more than 10 minutes as time permits, at the discretion of the Administrative Law Judge, but will not be allowed to question witnesses.

Notice of intention to appear, testimony and evidence will be available for copying at the Docket Office at the address above.

Conduct and Nature of the Hearing

The hearing will commence at 9:30 a.m. on April 30, 1996. At that time, any procedural matters relating to the proceeding will be resolved.

The nature of an informal rulemaking hearing is established in the legislative history of section 6 of the OSH Act and is reflected by OSHA's rules of procedure for hearings (29 CFR 1911.15(a)). Although the presiding officer is an Administrative Law Judge and limited questioning by persons who have filed notices of intention to appear is allowed on crucial issues, the proceeding is informal and legislative in type. The Agency's intent, in essence, is to provide interested persons with an opportunity to make effective oral presentations that can proceed expeditiously in the absence of procedural restraints that impede or protract the rulemaking process.

Additionally, since the hearing is primarily for information gathering and clarification, it is an informal administrative proceeding rather than an adjudicative one. The technical rules of evidence, for example, do not apply. The regulations that govern hearings and the pre-hearing guidelines to be issued for this hearing will ensure fairness and due process and also facilitate the development of a clear, accurate and complete record. Those rules and guidelines will be interpreted in a manner that furthers that development. Thus, questions of relevance, procedure and participation generally will be decided so as to favor development of the record.

The hearing will be conducted in accordance with 29 CFR part 1911. It should be noted that § 1911.4 specifies that the Assistant Secretary may, upon reasonable notice, issue alternative procedures to expedite proceedings or for other good cause.

The hearing will be presided over by an Administrative Law Judge who makes no decision or recommendation on the merits of OSHA's proposal. The responsibility of the Administrative Law Judge is to ensure that the hearing proceeds at a reasonable pace and in an orderly manner. The Administrative Law Judge, therefore, will have all the powers necessary and appropriate to conduct a full and fair informal hearing as provided in 29 CFR part 1911, including the powers:

1. To regulate the course of the proceedings;
2. To dispose of procedural requests, objections and comparable matters;
3. To confine the presentations to the matters pertinent to the issues raised;
4. To regulate the conduct of those present at the hearing by appropriate means;
5. At the Judge's discretion, to question and permit the questioning of any witness and to limit the time for questioning; and
6. At the Judge's discretion, to keep the record open for a reasonable, stated time (known as the post-hearing comment period) to receive written information and additional data, views and arguments from any person who has participated in the oral proceedings.

OSHA recognizes that there may be interested persons who, through their knowledge of safety or their experience in the operations involved, would wish to endorse or support certain provisions

in the standard. OSHA welcomes such supportive comments, including any pertinent accident data or cost information that may be available, so that the record of this rulemaking will present a balanced picture of the public response on the issues involved.

XVI. State Plan Standards

The 25 States with their own OSHA approved occupational safety and health plans must adopt a comparable standard within six months of the publication date of the final standard. These States are: Alaska, Arizona, California, Connecticut (for State and local government employees only), Hawaii, Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, Nevada, New Mexico, New York (for State and local government employees only), North Carolina, Oregon, Puerto Rico, South Carolina, Tennessee, Utah, Vermont, Virginia, Virgin Islands, Washington, and Wyoming. Until such time as a State standard is promulgated, Federal OSHA will provide interim enforcement assistance, as appropriate, in those States.

List of Subjects in 29 CFR part 1926

Construction industry, Motor vehicle safety, Occupational safety and health, Transportation.

XVII. Authority

This document was prepared under the direction of Joseph A. Dear, Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, 200 Constitution Avenue, NW., Washington, DC 20210.

Accordingly, pursuant to section 4, 6(b), 8(c) and 8(g) of the Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657), the Construction Safety Act (40 U.S.C. 333), Secretary of Labor's Order No. 1–90 (55 FR 9033), and 29 CFR part 1911, it is proposed to amend 29 CFR part 1926 as set forth below.

Signed at Washington, DC, this 22nd day of January, 1996.

Joseph A. Dear,

Assistant Secretary of Labor.

PART 1926—CONSTRUCTION SAFETY AND HEALTH STANDARDS

1. The authority citation for subpart O of part 1926 would be revised to read as follows:

Authority: Section 107, Construction Work Hours and Safety Standards Act (Construction Safety Act) (40 U.S.C. 333); secs. 4, 6, 8 of the Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657); Secretary of Labor's Order No. 12–71 (36 FR 8754), 8–76 (41 FR 25059), 9–83 (48 FR 35736), or 1–90 (55 FR 9033), as applicable. Section 1926.602 also issued under 29 CFR part 1911.

2. Section 1926.602 is proposed to be amended by adding a new paragraph (d) and by adding appendices A and B to read as follows:

§ 1926.602 Material handling equipment.

* * * * *

(d) Powered industrial, truck Operator training.—(1) *Operator qualifications.* (i) The employer shall ensure that each powered industrial truck operator is capable of performing the duties that are required to operate the truck safely.

(ii) Prior to permitting an operator to drive except for training purposes, the employer shall ensure that each operator has received the training required by this paragraph, that each operator has been evaluated by a designated person while performing the required duties, and that each operator performs the required duties competently.

(2) *Training program implementation.* (i) The employer shall implement a training program and ensure that only trained operators who have successfully completed the training program are allowed to operate powered industrial trucks. Exception: Trainees under the direct supervision of a designated person shall be allowed to operate a powered industrial truck provided the operation of the vehicle is conducted in an area where other employees are not near and where the conditions are such that the trainee can safely operate the truck.

(ii) Training shall consist of a combination of classroom instruction (Lecture, discussion, video tapes, and/or conference) and practical training (demonstrations and practical exercises by the trainee).

(iii) All training and evaluation shall be conducted by a designated person who has the requisite knowledge, training and experience to train powered industrial truck operators and judge their competency.

(3) *Training program content.* Powered industrial truck operator trainees shall be trained in the following topics unless the employer can demonstrate that some of the topics are not needed for safe operation.

(i) Truck related topics.

(A) All necessary operating instructions, warnings and precautions for the types of trucks the operator will be authorized to operate;

(B) Similarities to and differences from the automobile;

(C) Controls and instrumentation: location, what they do and how they work;

(D) Power plant operation and maintenance;

(E) Steering and maneuvering;

(F) Visibility (including restrictions due to loading);

(G) Fork and attachment adaption, operation and use limitations;

(H) Vehicle capacity;

(I) Vehicle stability;

(J) Vehicle inspection and maintenance;

(K) Refueling or charging and recharging batteries;

(L) Operating limitations; and

(M) Any other operating instruction, warning, or precaution listed in the operator's manual for the type vehicle that the employee is being trained to operate.

(ii) Workplace related topics.

(A) Surface conditions where the vehicle will be operated;

(B) Composition of probable loads and load stability;

(C) Load manipulation, stacking, unstacking;

(D) Pedestrian traffic;

(E) Narrow aisles and other restricted places of operation;

(F) Operating in hazardous classified locations;

(G) Operating the truck on ramps and other sloped surfaces that could affect the stability of the vehicle;

(H) Other unique or potentially hazardous environmental conditions that exist or may exist in the workplace; and

(I) Operating the vehicle in closed environments and other areas where insufficient ventilation could cause a buildup of carbon monoxide or diesel exhaust.

(iii) The requirements of this section.

(4) *Evaluation and refresher or remedial training.* (i) Sufficient evaluation and remedial training shall be conducted so that the employee retains and uses the knowledge, skills and ability needed to operate the powered industrial truck safely.

(ii) An evaluation of the performance of each powered industrial truck operator shall be conducted at least annually by a designated person.

(iii) Refresher or remedial training shall be provided when there is reason to believe that there has been unsafe operation, when an accident or a near-miss occurs or when an evaluation indicates that the operator is not capable of performing the assigned duties.

(5) *Certification.* (i) The employer shall certify that each operator has received the training, has been evaluated as required by this paragraph, and has demonstrated competency in the performance of the operator's duties. The certification shall include the name

of the trainee, the date of training, and the signature of the person performing the training and evaluation.

(ii) The employer shall retain the current training materials and course outline or the name and address of the person who conducted the training if it was conducted by an outside trainer.

(6) *Avoidance of duplicative training.* (i) Each current truck operator who has received training in any of the elements specified in paragraph (d)(3) of this section for the types of truck the employee is authorized to operate and the type of workplace that the trucks are being operated in need not be retrained in those elements if the employer certifies in accordance with paragraph (d)(5)(i) of this section that the operator has been evaluated and found to be competent to perform those duties.

(ii) Each new truck operator who has received training in any of the elements specified in paragraph (d)(3) of this section for the types of truck the employee will be authorized to operate and the type of workplace in which the trucks will be operated need not be retrained in those elements before initial assignment in the workplace if the employer has a record of the training and if the employee is evaluated pursuant to paragraph (d)(1)(ii) of this section and is found to be competent.

Appendix A—Training of Powered Industrial Truck Operators

(Non-mandatory appendix to paragraph (d) of this section)

A–1. Operator Selection

A–1.1. Prospective operators of powered industrial trucks should be identified based upon their ability to be trained and permitted to perform job functions that are essential to the operation of a powered industrial truck. Determination of the capabilities of a prospective operator to fulfill the demands of the job should be based upon the tasks that the job demands.

A–1.2. The employer should identify all the aspects of the job that the employee must meet/perform when doing his or her job. These aspects could include the level at which the employee must see and hear, the physical demands of the job, and the environmental extremes of the job.

A–1.3. One factor to be considered is the ability of the candidate to see and hear within reasonably acceptable limits. Included in the vision requirements are the ability to see at distance and peripherally. In certain instances, there also is a requirement for the candidate to discern different colors, primarily red, yellow and green.

A–1.4. The environmental extremes that might be demanded of a potential powered industrial truck operator include the ability of the person to work in areas of excessive cold or heat.

A–1.5. After an employee has been trained and appropriate accommodations have been made, the employer needs to determine whether the employee can safely perform the job.

A–2. The Method(s) of Training

A–2.1. Among the many methods of training are the lecture, conference, demonstration, test (written and/or oral) and the practical exercise. In most instances, a combination of these methods has been successfully used to train employees in the knowledge, skills and abilities that are essential to perform the job function that the employee is being trained to perform. To enhance the training and to make the training more understandable to the employee, employers and other trainers have used movies, slides, video tapes and other visual presentations. Making the presentation more understandable has several advantages including:

(1) The employees being trained remain more attentive during the presentation if graphical presentation is used, thereby increasing the effectiveness of the training;

(2) The use of visual presentations allows the trainer to ensure that the necessary information is covered during the training;

(3) The use of graphics makes better utilization of the training time by decreasing the need for the instructor to carry on long discussions about the instructional material; and

(4) The use of graphics during instruction provides greater retention by the trainees.

A–3. Training Program Content

A–3.1. Because each type (make and model) of powered industrial truck has different operating characteristics, limitations and other unique features, an optimum employee training program for powered industrial truck operators must be based upon the type vehicles that the employee will be trained and authorized to operate. The training must also emphasize the features of the workplace that will affect the manner in which the vehicle must be operated. Finally, the training must include the general safety rules applicable to the operation of all powered industrial trucks.

A–3.2. Selection of the methods of training the operators has been left to the reasonable determination of the employer. Whereas some employees can assimilate instructional material while seated in a classroom, other employees may learn best by observing the conduct of operations (demonstration) and/or by having to personally conduct the operations (practical exercise). In some instances, an employee can receive valuable instruction through the use of electronic mediums, such as the use of video tapes and movies. In most instances, a combination of the different training methods may provide the mechanism for providing the best training in the least amount of time. OSHA has specified at paragraph (d)(2)(ii) that the training must consist of a combination of classroom instruction and practical exercise. The use of both of these modes of instruction is the only way of ensuring that the trainee has received and comprehended the instruction and can use the information to safely operate a powered industrial truck.

A–4. Initial Training

A–4.1. The following is an outline of a generalized forklift operator training program:

(1) Characteristics of the powered industrial truck(s) the employee will be allowed to operate:

(a) Similarities to and differences from the automobile;

(b) Controls and instrumentation: location, what they do and how they work;

(c) Power plant operation and maintenance;

(d) Steering and maneuvering;

(e) Visibility;

(f) Fork and/or attachment adaption, operation and limitations of their use;

(g) Vehicle capacity;

(h) Vehicle stability;

(i) Vehicle inspection and maintenance;

(j) Refueling or charging and recharging batteries.

(k) Operating limitations.

(l) Any other operating instruction, warning, or precaution listed in the operator's manual for the type of vehicle the employee is being trained to operate.

(2) The operating environment:

(a) Floor surfaces and/or ground conditions where the vehicle will be operated;

(b) Composition of probable loads and load stability;

(c) Load manipulation, stacking, unstacking;

(d) Pedestrian traffic;

(e) Narrow aisle and restricted place operation;

(f) Operating in classified hazardous locations;

(g) Operating the truck on ramps and other sloped surfaces that would affect the stability of the vehicle;

(h) Other unique or potentially hazardous environmental conditions that exist or may exist in the workplace.

(i) Operating the vehicle in closed environments and other areas where insufficient ventilation could cause a buildup of carbon monoxide or diesel exhaust.

(3) The requirements of this OSHA Standard.

A–5. Trainee Evaluation

A–5.1. The provisions of these proposed requirements specify that an employee evaluation be conducted both as part of the training and after completion of the training. The initial evaluation is useful for many reasons, including:

(1) the employer can determine what methods of instruction will produce a proficient truck operator with the minimum of time and effort;

(2) the employer can gain insight into the previous training that the trainee has received; and

(3) a determination can be made as to whether the trainee will be able to successfully operate a powered industrial truck. This initial evaluation can be completed by having the employee fill out a questionnaire, by an oral interview, or by a combination of these mechanisms. In many cases, answers received by the employee can be substantiated by contact with other employees or previous employers.

A–6. Refresher or Remedial Training

A–6.1. (The type of information listed below would be used when the training is more than an on-the-spot correction being made by a supervisor or when multiple instances of on-the-spot corrections have occurred.) When an on-the-spot correction is used, the person making the correction should point out the incorrect manner of operation of the truck or other unsafe act being conducted, tell the employee how to do the operation correctly, and then ensure that the employee does the operation correctly.

A–6.2. The following items may be used when a more general, structured retraining program is utilized to train employees and eliminate unsafe operation of the vehicle:

(1) Common unsafe situations encountered in the workplace;

(2) Unsafe methods of operating observed or known to be used;

(3) The need for constant attentiveness to the vehicle, the workplace conditions and the manner in which the vehicle is operated.

A–6.3. Details about the above subject areas need to be expanded upon so that the operator receives all the information that is necessary for the safe operation of the vehicle. Insight into some of the specifics of the above subject areas may be obtained from the vehicle manufacturers' literature, the national consensus standards [e.g. the ASME B56 series of standards (current revisions)] and this OSHA Standard. Appendix B—Stability of Powered Industrial Trucks (Non-mandatory appendix to paragraph (d) of this section)

B–1. Definitions

To understand the principle of stability, understanding definitions of the following is necessary:

Center of Gravity is that point of an object at which all of the weight of an object can be considered to be concentrated.

Counterweight is the weight that is a part of the basic structure of a truck that is used to offset the weight of a load and to maximize the resistance of the vehicle to tipping over.

Fulcrum is the axis of rotation of the truck when it tips over.

Grade is the slope of any surface that is usually measured as the number of feet of rise or fall over a hundred foot horizontal distance (this measurement is designated as a percent).

Lateral stability is the resistance of a truck to tipping over sideways.

Line of action is an imaginary vertical line through the center of gravity of an object.

Load center is the horizontal distance from the edge of the load (or the vertical face of the forks or other attachment) to the line of action through the center of gravity of the load.

Longitudinal stability is the resistance of a truck to overturning forward or rearward.

Moment is the product of the weight of the object times the distance from a fixed point. In the case of a powered industrial truck, the distance is measured from the point that the truck will tip over to the line of action of the object. The distance is always measured perpendicular to the line of action.

Track is the distance between wheels on the same axle of a vehicle.

Wheelbase is the distance between the centerline of the front and rear wheels of a vehicle.

B–2. General

B–2.1. Stability determination for a powered industrial truck is not complicated once a few basic principles are understood. There are many factors that influence vehicle stability. Vehicle wheelbase, track, height and weight distribution of the load, and the location of the counterweights of the vehicle (if the vehicle is so equipped), all contribute to the stability of the vehicle.

B–2.2. The ''stability triangle'', used in most discussions of stability, is not mysterious but is used to demonstrate truck stability in a rather simple fashion.

B–3. Basic Principles

B–3.1. The determination of whether an object is stable is dependent on the moment of an object at one end of a system being greater than, equal to or smaller than the moment of an object at the other end of that system. This is the same principle on which a see saw or teeter-totter works, that is, if the product of the load and distance from the fulcrum (moment) is equal to the moment at the other end of the device, the device is balanced and it will not move. However, if there is a greater moment at one end of the device, the device will try to move downward at the end with the greater moment.

B–3.2. Longitudinal stability of a counterbalanced powered industrial truck is dependent on the moment of the vehicle and the moment of the load. In other words, if the mathematic product of the load moment (the distance from the front wheels, the point about which the vehicle would tip forward) to the center of gravity of the load times the weight of the load is less than the moment of the vehicle, the system is balanced and will not tip forward. However, if the load-moment is greater than the vehicle-moment, the greater load-moment will force the truck to tip forward.

B–4. The Stability Triangle

B–4.1. Almost all counterbalanced powered industrial trucks have a three point suspension system, that is, the vehicle is supported at three points. This is true even if it has four wheels. The steer axle of most trucks is attached to the truck by means of a pivot pin in the center of the axle. This three point support forms a triangle called the stability triangle when the points are connected with imaginary lines. Figure 1 depicts the stability triangle.

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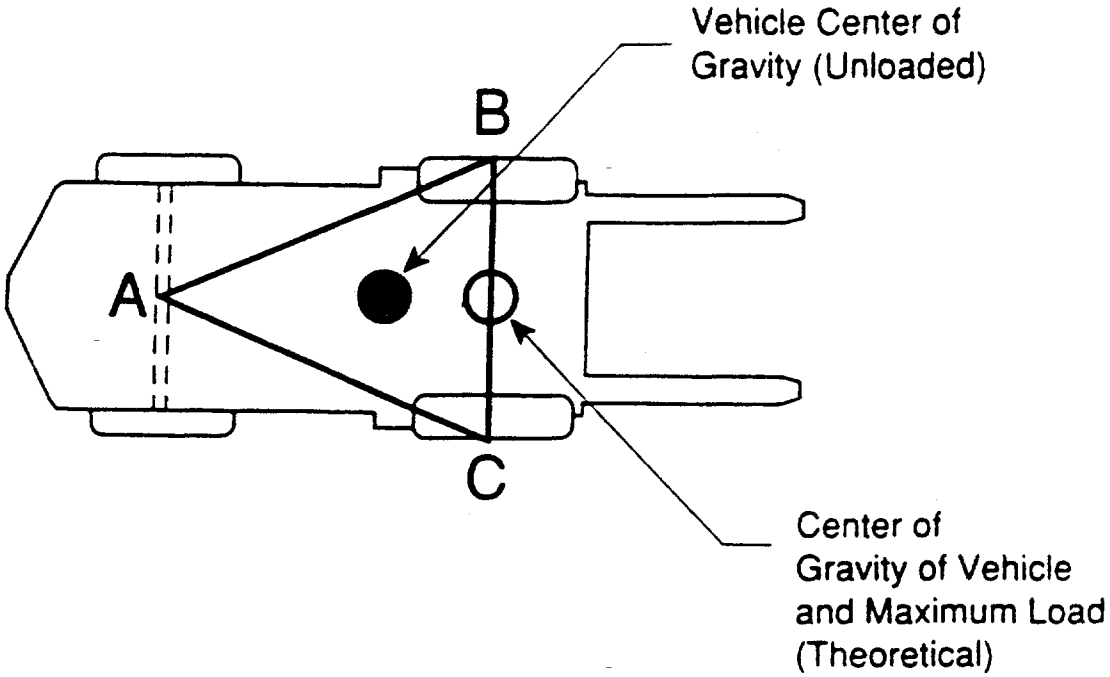

Figure 1.

NOTES:

1. When the vehicle is loaded, the combined center of gravity shifts toward line B-C. Theoretically the max load will result in the CG at the line B-C. In actual practice, the combined CG should never be at line B-C.

2. The addition of additional counterweight will cause the truck CG to shift toward point A and result in a truck that is less stable laterally.

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B–4.2. When the line of action of the vehicle or load-vehicle falls within the stability triangle, the vehicle is stable and will not tip over. However, when the line of action of the vehicle or the vehicle/load combination falls outside the stability triangle, the vehicle is unstable and may tip over. (See Figure 2.)

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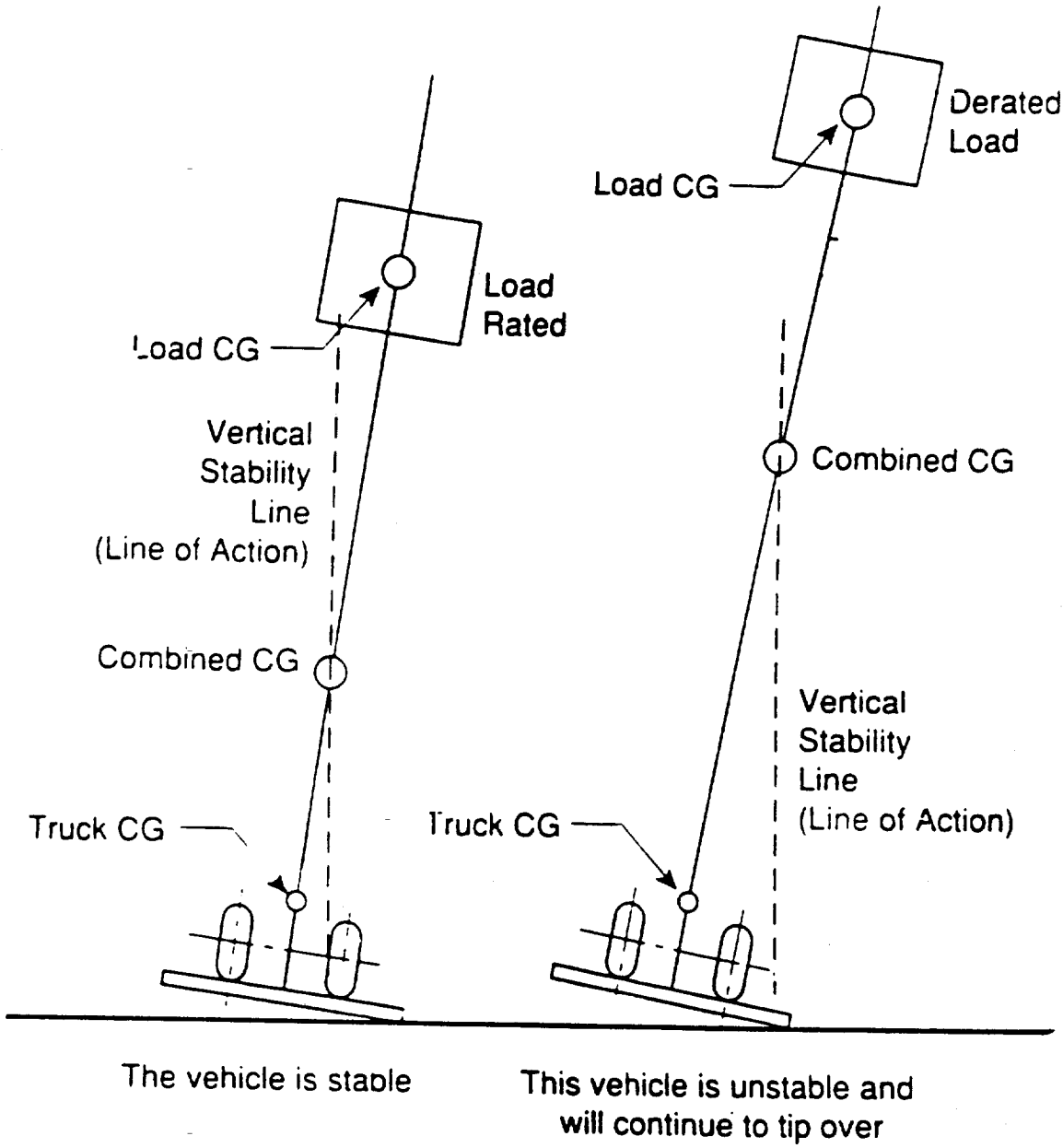

Figure 2.

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B–5. Longitudinal Stability

B–5.1. The axis of rotation when a truck tips forward is the point of contact of the front wheels of the vehicle with the pavement. When a powered industrial truck tips forward, it is this line that the truck will rotate about. When a truck is stable the vehicle-moment must exceed the load-moment. As long as the vehicle-moment is equal to or exceeds the load-moment, the vehicle will not tip over. On the other hand, if the load-moment slightly exceeds the vehicle-moment, the truck will begin the tip forward, thereby causing loss of steering control. If the load-moment greatly exceeds the vehicle-moment, the truck will tip forward.

B–5.2. In order to determine the maximum safe load moment, the truck manufacturer normally rates the truck at a maximum load at a given distance from the front face of the forks. The specified distance from the front face of the forks to the line of action of the load is commonly called a load center. Because larger trucks normally handle loads that are physically larger, these vehicles have greater load centers. A truck with a capacity of 30,000 pounds or less capacity is normally rated at a given load weight at a 24-inch load center. For trucks of greater than 30,000 pound capacity, the load center is normally rated at 36- or 48-inch load center distance. In order to safely operate the vehicle, the operator should always check the data plate and determine the maximum allowable weight at the rated load center.

B–5.3. Although the true load moment distance is measured from the front wheels, this distance is greater than the distance from the front face of the forks. Calculation of the maximum allowable load moment using the load center distance always provides a lower load moment than the truck was designed to handle. When handling unusual loads, such as those that are larger than 48 inches long (the center of gravity is greater than 24 inches), with an offset center of gravity, etc., then calculation of a maximum allowable load moment should be undertaken and this value used to determine whether a load can be handled. For example, if an operator is operating a 3000 pound capacity truck (with a 24 inch load center), the maximum allowable load moment is 72,000 inch-pounds (3,000 times 24). If a probable load is 60 inches long (30 inch load center), then the maximum weight that this load can weigh is 2,400 pounds (72,000 divided by 30).

B–6. Lateral Stability

B–6.1. The lateral stability of a vehicle is determined by the position of the line of action (a vertical line that passes through the combined center of gravity of the vehicle and the load) relative to the stability triangle. When the vehicle is not loaded, the location of the center of gravity of the truck is the only factor to be considered in determining the stability of the truck. As long as the line of action of the combined center of gravity of the vehicle and the load falls within the stability triangle, the truck is stable and will not tip over. However, if the line of action falls outside the stability triangle, the truck is not stable and may tip over.

B–6.2. Factors that affect the lateral stability of a vehicle include the placement of the load on the truck, the height of the load above the surface on which the vehicle is operating, and the degree of lean of the vehicle.

B–7. Dynamic Stability

B–7.1. Up to this point, we have covered stability of a powered industrial truck without consideration of the dynamic forces that result when the vehicle and load are put into motion. The transfer of weight and the resultant shift in the center of gravity due to the dynamic forces created when the machine is moving, braking, cornering, lifting, tilting, and lowering loads, etc., are important stability considerations.

B–7.2. When determining whether a load can be safely handled, the operator should exercise extra caution when handling loads that cause the vehicle to approach its maximum design characteristics. For example, if an operator must handle a maximum load, the load should be carried at the lowest position possible, the truck should be accelerated slowly and evenly, and the forks should be tilted forward cautiously. However, no precise rules can be formulated to cover all of these eventualities.

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