MRLDA In-House Hoisting Training Program

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MRLDA In-House Hoisting Training Program:

WRITTEN COMPLIANCE PLAN

For

_____

Name of Facility

Purpose of the Plan

This written compliance plan for our forklift and powered industrial truck program is for you, our employee. Throughout this plan we use "forklift" as a shorthand for all of our "forklifts and powered industrial trucks." The formal name of this program is the "MRLDA In-House Hoisting Training Program". This written plan describes how we comply with forklift training requirements for "Class 1: Hoisting, subdivision C," as established by the Massachusetts Department of Public Safety (DPS) (see 520 CMR 6.00 and M.G.L. Chapter 146, Section 53). And, this written plan also sets forth information on how we comply with OSHA's (Occupational Safety and Health Administration's) powered industrial truck standard (29 CFR part 1910.178 and 29 CFR 1926).

Employee Rights and Responsibilities

This written plan is for your information. It describes what we do to maintain our forklift in a safe condition, worksite hazards that may affect the safe use of our forklift, and our forklift training program. You have a right to this information.

It is your responsibility to inform us if there is anything you do not fully understand about our forklift safety program. You have three specific responsibilities. (1) You are responsible for recognizing the safe versus unsafe condition of a forklift as set forth on the "Daily Inspection" form and "Equipment Assessment" form, both of which follow. (2) You are responsible for recognizing worksite hazards that may affect the safe use of our forklift, which are also set forth on the "Equipment Assessment" form. And, (3) you are responsible for operating our forklift in a safe manner and following the guidelines set forth in training.

The following individual serves as our safety supervisor for our forklift program and will be pleased to answer any questions you may have:

_____

(insert name and/or title of individual).

It is your responsibility to inform the safety supervisor if you believe practices followed during work, worksite hazards, or the condition of our forklift affect the safe use of our forklift. This also applies to hazards you may become aware of outside our facility, such as parking lots. It is also your responsibility to inform the safety supervisor if you become aware of any forklift operator who puts himself, herself, or others at risk in their operation of our forklift. By carrying out these responsibilities we can continue to improve the safety of our work practices and conditions.

It is our responsibility to maintain the forklift in a safe condition, based on information which employees bring to the attention of the supervisor of our forklift program. We are also responsible for eliminating or control hazards, which may affect the safe operation of our forklift. And, it is our duty to provide forklift training.

Training

We provide formal, group classroom training on forklift safety, or individual classroom training, as necessary. We also provide practical assessments, in which we assess the competency of our forklift drivers in the actual operation of our forklift. Where necessary, the safety supervisor or designee provides additional training. Training consists of live, *interactive* instruction, which we may supplement with training aids, such as DVDs. We encourage you to ask questions about anything you do not understand.

1. Group training documentation. Our group training includes the following, as checked (✔):

- ❑ forklift safety DVD
- ❑ Practice completing the forklift "Daily Inspection" form on the company's forklift(s).
- ❑ Practice completing the "Equipment Assessment" form
- ❑ "Employee Quiz" (the quiz is a training exercise in that it is read out loud and all employees learn the correct answer)

2. Group training topics. The formal, group training covers the following topics:

1. General hazards of forklifts
2. Hazards of specific types of forklifts
3. Environmental hazards in the worksite, especially weather
4. Other hazards, including uneven surfaces and forklift characteristics such as load limits

3. Individual training. Our practical, individual training consists of the following:

1. Competency assessment of drivers on the actual operation of forklift(s) in our facility
2. Completion of an "Operator Assessment" (Parts 1 and 2) for *each* driver

4. Refresher training. The DPS and OSHA require an initial evaluation of each driver's skill in operating a forklift. Every three years both regulatory agencies requires refresher training. Certain factors may require training *before* three years elapse. These factors include:

1. A near-miss or accident involving an operator
2. The introduction of a new forklift
3. Workplace redesign which may affect the safe use of the forklift
4. Reassignment of a driver to a new work area with substantially different worksite features
5. Driver skills and performance necessitate retraining

5. Qualified trainer. The DPS requires that a qualified trainer provides instruction. Trainer qualifications are set forth in 520 CMR 6.00 and M.G.L. Chapter 146, Section 53.

Curriculum and Training Materials: Overview

We designed the curriculum and training materials for the "MRLDA In-House Hoisting Training Program." In order to fulfill the Department of Public Safety's "Class 1: Hoisting, subdivision C" operations for forklifts, which require 4 hours of training. In addition, the curriculum and training materials meet OSHA's requirements for forklifts, more formally referred to as "powered industrial trucks," as set forth in 29 CFR 1910 (the standards for general industry) and 29 CFR 1926 (the standards for construction). The "curriculum" refers to the "course of study," and "training materials" refers to the "MRLDA In-House Hoisting Training Program Manual", which includes resources (written compliance plan, assessment forms, checklists, records of training, forklift safety training DVD, training records, etc.), used to support the course of study.

The curriculum includes two major components (see "I.A" and "I.B" below). The training materials also includes two major components (see "II.A" and "II.B" below).

I. Curriculum

A. Required Topics

1. Laws, Regulations and Standards
2. Examination (i.e., employee quiz)
3. Operating Procedures for Hoisting Machinery
4. Classification of Licenses

B. Required Classroom Hours

II. Training Materials

A. Assessment Forms and Handouts

1. Daily Inspection
2. Equipment Assessment (Periodic)
3. Load Composition (see OSHA eTool titled "Load Handling: Load Composition")
4. Training Topics
5. Examination
6. Examination Answer Key
7. "Forklift Safety: OSHA Final Rule" (DVD)
8. Operator Assessment (Part 1)
9. Operator Assessment (Part 2)

B. Manual and Forklift Safety Training DVD

1. "MRLDA In-House Hoisting Training Program"
2. Forklift Safety Training DVD

Curriculum (Class 1C: Hoisting Operations for Forklifts)

This section presents the Required Topics as well as the Required Classroom Hours. For each of the Required Topics described below, we also present the instructional method used to present that Topic.

A. Required Topics

The curriculum consists of the following five topics, which enable companies to comply with the requirements of 520 CMR 6.07, "In-Service Training Program for Exempt Companies."

1. Laws, Regulations and Standards

[see 520 CMR 6.07(4)]

Instructional Method: classroom instruction which is live, interactive discussion, with participants offered the opportunity to ask questions and make comments during the discussion.

Topics include:

1. MGL c. 146
2. 520 CMR 6.00
3. 520 CMR 14.00
4. OSHA Standards 29 CFR 1926
4. OSHA Standards 29 CFR 1910
6. ANSI B30
7. MGL c. 82 § 40
8. MGL c. 82A
7. MGL c. 164 § 76D

As part of training on this topic the instructor discusses the following (see 520 CMR 6.07(6) and 6.07(7).

1. Records retention requirements (3-year requirement)
2. Security of Company Licenses
3. Documentation of employee completion of training requirements (instructor signature)
4. Falsification of documents

2. Examination

[see 520 CMR 6.07(5)]

Instructional Method: written examination, with feedback on correct and incorrect answers and instruction on items answered incorrectly. The exam includes "True/False" items and "fill-in-the-blank" items.

3. Operating Procedures for Hoisting Machinery

Instructional Method: classroom instruction which is live, interactive discussion, with participants offered the opportunity to ask questions and make comments during the discussion.

[see 520 CMR 6.08 and 6.09 which specify required items, unless noted otherwise]

1. Manufacturers' specifications for hoisting machinery
    a. load weight, load size and load position
    b. safe load capacity (including load charts and manufacturers' specifications)
    c. maximum load moment
    d. balance
    e. stability
2. Specifications for hoisting machinery when a manufacturer does not exist
    a. responsibilities of a Massachusetts professional engineer
3. Maintenance, repair and refueling
    a. conducted when the machine is inoperable, secure, and prior to operation
4. Daily inspections
    a. daily inspection items: wire ropes, bearings, gears, friction clutches, brakes, chain drives and other parts subject to wear
    b. other daily inspection items
    b. daily inspection log sheets: developed in accordance with 29 CFR 1926 and 29 CFR 1910; and maintained during the useful life of the machine)
5. Inspection records
    a. written, signed, kept with hoisting machinery (see 29 CFR 1926.1412)
6. Walk-around inspections prior to operation
7. Distracted driving of hoisting machinery and its prohibition
8. Rated capacity
    a. conditions that must be met in order to exceed the rated capacity
9. Need for attentiveness when operating hoisting machinery
    a. prohibition of erratic operation
    b. prohibition of operations under the influence of drugs and alcohol
10. Safe use of rotating superstructures
11. Testing of controls
    a. need to test controls prior to operating hoisting machinery
    b. need to make repairs in accord with the manufacturers' requirements
12. Need to respond to directions from Signal Persons, except in emergencies
13. Operator warning signals and when to sound them
14. Operator responsibility for safe operations and authority to stop work
15. Securement of unattended hoisting machinery
16. Power failures of hoisting machinery and operator responsibilities
    a. response to power failures and suspended loads

17. Prohibition of working under a suspended load
18. Access to manufacturers' load charts and operation manuals
19. Power line clearances
20. Use of outriggers/stabilizers
21. Dig safe operations
22. Brakes (adequacy of wheel brakes) (see 520 CMR 6.09)
23. Safe speeds (see 520 CMR 6.09)
24. Types of qualified forklift operators (see 520 CMR 6.09)
    a. licensed operators
    b. apprentice licensee (who is under the direct supervision of a licensed operator)
25. Equipment assessment (periodic)
    a. Note: OSHA requires a periodic equipment assessment (see 29 CFR 1910.178). The periodic equipment assessment is more in-depth than the daily inspection.

4. Classification of Licenses: Qualifications

Instructional Method: classroom instruction which is live, interactive discussion, with participants offered the opportunity to ask questions and make comments during the discussion. [see 520 CMR 6.10]

Note: we include this item in our curriculum to inform participants what equipment the IC license entitles them to operate, and what equipment it does *not entitle* them to operate.

1. Class 1 (Hoisting) and Four Subdivisions
    a. Note: There are four subdivisions of the Class I (Hoisting) license: 1A, 1B, 1C, 1D. This training program only pertains to forklifts, as covered by subdivision IC, which requires four hours of training.
2. Prerequisites for applicants (i.e., operators) (as set forth in 520 CMR 6.02)
    a. age requirements (minimum age of 18, including those applying for an Apprentice License
    b. required documentation
        1. completed application form
        2. fee
        3. DOT medical certificate or ANSI/ASME B30.5-2011 qualifications for operators
        4. photograph, or permission to gain access to the Massachusetts Registry of Motor Vehicles database
        5. copy of the applicant's driver's license
        6. copy of the "Annual Apprentice ID Card" (only required for applicants who apply for an Apprentice License)

B. Required Classroom Hours

The curriculum is a minimum of 4 classroom hours, as required by 520 CMR 6.07. Companies supplement this with an assessment of operator skills on applicable hoisting equipment. The classroom education consists of 4 modules, as set forth below.

Classroom Education (4 hours)

.25	hours:	Laws, Regulations and Standards
.25	hours:	Classification of Licenses: Qualifications
2.75	hours:	Operating Procedures for Hoisting Machinery*
.25	hours:	MRLDA In-House Hoisting Training Program Manual
.50	hours:	Examination
4.00	hours:	TOTAL

* Notes:

A. the module titled "Operating Procedures for Hoisting Machinery" includes the following forms, which companies review as part of the Classroom Education:

1. Daily Inspection
2. Equipment Assessment (Periodic)
3. Load Composition (see OSHA eTool titled "Load Handling: Load Composition")

B. the module titled "MRLDA In-House Hoisting Training Program" includes a review of this manual, which includes the company's customized written compliance plan, as required by OSHA's Powered Industrial Truck standard (see 29 CFR 1910.178).

Practical Assessment

.50 hours: Per Person (minimum assessment period for an experienced, skilled operator)*

Instructional Method: the instructor uses an interactive method to discuss the following forms:

1. Daily Inspection
2. Equipment Assessment (Periodic)

Upon completion of these two forms, the instructor assesses performance on hoisting machinery using the following checklists:

1. Operator Assessment (Part 1)
2. Operator Assessment (Part 2)

* Notes:

A. Both Operator Assessment Part 1 and Part 2 are 20-item checklists of operator performance. On *each* Assessment operators must achieve a score of 100%, as indicated by a checkmark in the "Yes" or "N/a" (not applicable) box.

Training Materials (Class 1C: Hoisting Operations for Forklifts)

1. MRLDA In-House Hoisting Training Program Manual
2. Daily Inspection
3. Equipment Assessment (Periodic)
4. Load Composition (see OSHA eTool on “Load Handling”)
5. Examination
6. Examination Answer Key
7. “Forklift Safety: OSHA Final Rule”
8. Operator Assessment (Part 1)
9. Operator Assessment (Part 2)

Additional Information

For additional information on our forklift safety program contact your safety supervisor.

MRLDA In-House Hoisting Training Program:

DAILY INSPECTION

Type of Equipment (Manufacturer)	Date of Equipment Assessment
Model and/or Identification Number	Evaluator (legible signature)

I. Are the following acceptable?	Check (✔) one Yes	N/a*	No
1. Leaks puddles and drips (check for oil and hydraulic leaks) ……	❑	❑	❑
2. Tires (check overall condition, nuts, bolts) …..…….	❑	❑	❑
3. Fork latches (check securement devices) …..…….	❑	❑	❑
4. Forks (check for cracks) …..……	❑	❑	❑
5. Hydraulic hoses (check for cracks) …..……	❑	❑	❑
6. Fluids (ex. oil) …..……	❑	❑	❑
7. Horn, backup alarm (if applicable) lights…..……	❑	❑	❑
8. Hand brake and foot brake [520 CMR 6.08(1)(a)]…..…….	❑	❑	❑
9. Steering wheel play…..……..	❑	❑	❑
10. Overall safety ……..	❑	❑	❑
a. seat belt			
b. propane tank locator pin and propane tank securement			
c. wire ropes [520 CMR 6.08(1)(a)]			
c. bearings [520 CMR 6.08(1)(a)]			
c. gears [520 CMR 6.08(1)(a)]			
c. friction clutches [520 CMR 6.08(1)(a)]			
c. chain drives [520 CMR 6.08(1)(a)]			
c. other items subject to wear [520 CMR 6.08(1)(a)]			
Percent Correct (a "Yes" or "N/a" answer)	_____		
II. Is the equipment safe to use? (If "No," remove from service)	❑	❑	❑

_____

_____

_____

* "N/a" means "not applicable." Describe required and recommended repairs on the above lines. "CMR" refers to "Code of Massachusetts Regulations" (see the specific citations). Maintain written and signed "Daily Inspection" forms during the useful life of the equipment

MRLDA In-House Hoisting Training Program:

EQUIPMENT ASSESSMENT (PERIODIC)

_____	_____
Type of Equipment (Manufacturer)	Date of Equipment Assessment
_____	_____
Model and/or Identification Number	Evaluator

I. Are the following acceptable?	Check (✔) one Yes	N/a*	No
1. Controls and gauges …….	❑	❑	❑
2. Lights …..……..	❑	❑	❑
3. Horn ……..	❑	❑	❑
4. Backup alarm ……	❑	❑	❑
5. Parking brake ……	❑	❑	❑
6. Foot brake …….	❑	❑	❑
7. Hoses ……	❑	❑	❑
8. Hose connections (are they secure, to prevent leaks) ……...	❑	❑	❑
9. Chains and cables (greased and in good condition) ……..	❑	❑	❑
10. Tires and rims ……	❑	❑	❑
11. Seat belt (accessible) …….	❑	❑	❑
12. Fork latches and forks ……	❑	❑	❑
13. Forks (greased to ease movement) ……	❑	❑	❑
14. Operator manual ……	❑	❑	❑
15. Oil level …….	❑	❑	❑
16. Hydraulic fluid level …….	❑	❑	❑
17. Transmission fluid …….	❑	❑	❑
18. Engine coolant ……..	❑	❑	❑
19 Filters ……	❑	❑	❑
20. Periodic assessments (specify frequency)_____….	❑	❑	❑
Percent Correct (a "Yes" or "N/a" answer)	_____		
II. Is the equipment safe to use? (If "No," remove from service)	❑	❑	❑

_____

_____

* "N/a" means "not applicable." Describe required and recommended repairs on the above lines.

MRLDA In-House Hoisting Training Program:

TRAINING TOPICS

_____ _____

Instructor (please print *neatly)* Date

Note to the instructor: ***Check (✓) the appropriate box(es)***

❑ Training covered all the topics in section I, as required by the DPS.

❑ Training included the instructional aid "Forklift Safety: OSHA Final Rule."

I. DPS Required Training Topics

1. Laws, Regulations and Standards

Topics include:

1. MGL c. 146
2. 520 CMR 6.00
3. 520 CMR 14.00
4. OSHA Standards 29 CFR 1926
4. OSHA Standards 29 CFR 1910
6. ANSI B30
7. MGL c. 82 § 40
8. MGL c. 82A
7. MGL c. 164 § 76D

Additional topics:

1. Records retention requirements (3-year requirement)
2. Security of Company Licenses
3. Documentation of employee completion of training requirements (instructor signature)
4. Falsification of documents

2. Operating Procedures for Hoisting Machinery
    1. Manufacturers' specifications for hoisting machinery
        a. load weight, load size and load position
        b. safe load capacity (including load charts and manufacturers' specifications)
        c. maximum load moment
        d. balance
        e. stability
    2. Specifications for hoisting machinery when a manufacturer does not exist
        a. responsibilities of a Massachusetts professional engineer
    3. Maintenance, repair and refueling
        a. conducted when the machine is inoperable, secure, and prior to operation

4. Daily inspections
    a. daily inspection items: wire ropes, bearings, gears, friction clutches, brakes, chain drives and other parts subject to wear
    b. other daily inspection items (not required by 520 CMR 6.08)
    b. daily inspection log sheets: developed in accordance with 29 CFR 1926 and 29 CFR 1910; and maintained during the useful life of the machine)
5. Inspection records
    a. written, signed, kept with hoisting machinery (see 29 CFR 1926.1412)
6. Walk-around inspections prior to operation
7. Distracted driving of hoisting machinery and its prohibition
8. Rated capacity
    a. conditions that must be met in order to exceed the rated capacity
9. Need for attentiveness when operating hoisting machinery
    a. prohibition of erratic operation
    b. prohibition of operations under the influence of drugs and alcohol
10. Safe use of rotating superstructures
11. Testing of controls
    a. need to test controls prior to operating hoisting machinery
    b. need to make repairs in accord with the manufacturers' requirements
12. Need to respond to directions from Signal Persons, except in emergencies
13. Operator warning signals and when to sound them
14. Operator responsibility for safe operations and authority to stop work
15. Securement of unattended hoisting machinery
16. Power failures of hoisting machinery and operator responsibilities
    a. response to power failures and suspended loads
17. Prohibition of working under a suspended load
18. Access to manufacturers' load charts and operation manuals
19. Power line clearances
20. Use of outriggers/stabilizers
21. Dig safe operations
22. Brakes (adequacy of wheel brakes) (see 520 CMR 6.09)
23. Safe speeds (see 520 CMR 6.09)
24. Types of qualified forklift operators (see 520 CMR 6.09)
    a. licensed operators
    b. apprentice licensee (who is under the direct supervision of a licensed operator)
25. Equipment assessment (periodic)
    a. Note: OSHA requires a periodic equipment assessment (see 29 CFR 1910.178). The periodic equipment assessment is more in-depth than the daily inspection.

3. Classification of Licenses: Qualifications

II. Topics Covered in "Forklift Safety: OSHA Final Rule" (DVD)

Set forth below are topics covered in the instructional aid (DVD) titled "Forklift Safety: OSHA Final Rule."

1. Truck-related topics
    1. Operating instructions and precautions for forklifts
    2. Differences between a forklift and a car
    3. Forklift controls and instruments
    4. Maneuverability and steering
    5. Factors affecting ability to see on a forklift
    6. Vehicle load limit (load rating and rated capacity)
    7. Vehicle "stability triangle"
    8. Daily inspections
    9. Refueling and recharging hazards
    10. Operating limitations
    11. Other topics (e.g., as set forth in owner's manual)

2. Worksite topics
    1. Surface conditions
    2. Load composition
    3. Stacking and unstacking
    4. Foot traffic
    5. Narrow passageways and prohibited areas
    6. Ramps and slopes
    7. Carbon monoxide hazards
    8. Other factors

MRLDA In-House Hoisting Training Program:

TRAINING DOCUMENTATION AND RESOURCES

Three types of information documenting employee training and performance in the operation of forklifts and powered industrial trucks appear on the following pages, where applicable:

1. Certification of training and performance
   a. operator summary form
   b. trainer summary form
   c. operator "wallet cards" (copies of Company Licenses or DPS-issued licenses)
   d. trainer "wallet cards" (copies of DPS-issued licenses)

2. Operator assessments, Part I and Part II

3. Employee quizzes, i.e., examinations

This section also includes Training Resources, which follow directly:
1. OSHA eTool on forklift "Load Composition"

Occupational Safety & Health Administration - eTools on Forklift Load Composition

Load Handling:

Load Composition

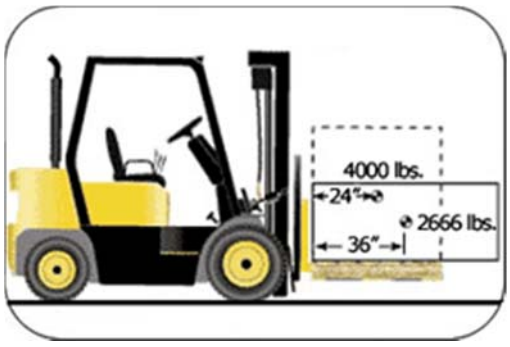

Figure 1. As the center of gravity for the load moves forward, the lifting capacity for the forklift decreases.

The stated capacity of a forklift only applies to the load center indicated on the data plate. If the load is not centered at the specified position, the forklift's capacity will be reduced. Loads come in all shapes and sizes, not just symmetrical boxes. The load size, position, and weight distribution critically affect the forklift's capacity and the stability of the truck. Consider the following factors before engaging a load:

- Weight, Size, and Position
- Safe Load Capacity
- Maximum Load Moment
- Balance
- Stability

Weight, Size, and Position

Load weight, weight distribution, size, shape, and position are key factors affecting the stability of the forklift. Forklifts are designed to carry a capacity load at a standard load center, commonly 24 inches. This means that the forklift's capacity was determined as if the load were a cube whose weight is evenly distributed (i.e., whose center of gravity is exactly in the center of the cube) and which is resting on a standard pallet having dimensions of 48 inches by 48 inches. With such a load, the horizontal distance from the center of the load to the vertical part of the forks would be 24 inches. Of course, most loads are not perfectly shaped cubes having their center of gravity exactly in the middle of the cube. To the extent that the load differs from this theoretical load — such as if it is irregularly shaped, has unbalanced weight distribution, or is not centered on the forks — the capacity may be reduced.

Figure 2. The same 4500 pounds weight loaded properly (top) will exceed the rated capacity of 4500 pounds if the rectangular box is positioned lengthwise (bottom).

Potential Hazards:

While arranging a load, be aware of the following:

- tipover
- Loss of steering control (Shifting too much weight forward raises the rear wheels.)
- Falling load
- Collision

Requirements and Recommended Practices:

- Do not exceed the capacity of the forklift that appears on the forklift's data plate (sometimes called the "nameplate"). If the load is oversized, irregularly shaped, or loaded incorrectly, the actual load center distance could exceed the stated load center distance, causing the truck's capacity to be exceeded. (Figure 2).
- Always minimize the distance from the front wheels to the load center. Load a large rectangular box widthwise across the forks of the truck as in Figure 2. Placing a large rectangular load lengthwise causes the load center to shift forward further away from the front wheels, exceeding the truck's capacity and lifting the rear wheels off the ground.
- Load as close to the front wheels as possible to minimize the load center distance. Load the heaviest part toward the mast. (Figure 3)
- Position the load in a way that will shorten the load center distance.

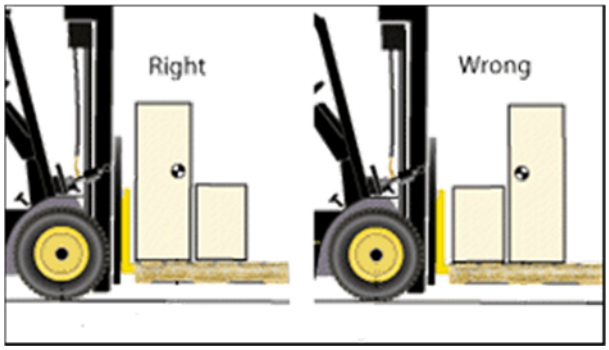

Figure 3. The heaviest weight should be loaded as close to the masts as possible.

Safe Load Capacity

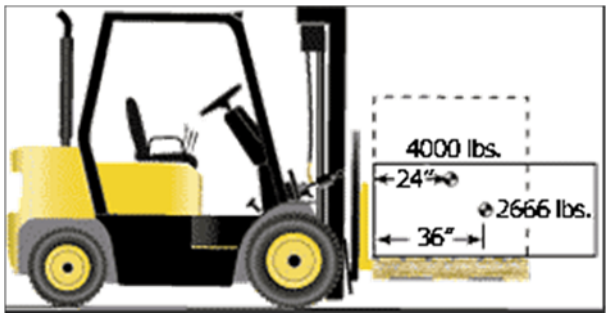

Figure 4. Improperly distributed loads may tip the forklift if

Requirements and Recommended Practices:

the operator exceeds the stated capacity of the truck. This forklift can carry 4,000 pounds at a 24 inches load center, but only 2,666 pounds at a 36 inches load center.

- Estimate the safe load capacity with oversized loads.
- If the stated load center is exceeded, compensate by reducing the weight of the load.
- Consult the forklift manufacturer's instructions when handling large or unusually configured loads.
- **Tip:** Use field calculations to estimate the reduced lifting capacity if manufacturer's instructions are not available. This calculation method will not produce exact load reduction figures. Use this method only as a guideline. The forklift manufacturer is the source of more precise information.

Field Calculation of Safe Load Capacity

Assume a situation where a forklift truck that has a 5,000 pound capacity at a 24 inch load center needs to handle a load whose center is 28 inches from the front face of the forks in the horizontal direction. The first thing to recognize is that the actual load center distance of 28 inches exceeds the standard load center distance of 24 inches on which the 5000 pound capacity is based, so the safe load capacity is actually less than 5000 pounds.

To estimate the truck's safe load capacity at a 28-inch load center, take the rated load center and divide it by the actual load center. Then multiply this number by the stated capacity to get the new approximate safe load capacity:

24 in/28 in x 5,000 lb = 4,285 lb (approximate safe load capacity)

Using the example in Figure 4, take the stated standard load center of 24 inches and divide it by the actual load center of 36 inches. Multiply this number by the stated capacity of 4,000 lb to get the new approximate safe load capacity:

24 in/36 in x 4,000 lb = 2,666 (approximate safe load capacity)

Maximum Load Moment

The way in which weight is distributed changes the amount of weight the lift truck will safely carry. You can experience this for yourself by doing the following activity:

Lift a 5 pound box. As you extend your arms, the center of the box's weight moves a greater distance from your body, so the box feels heavier and you will tend to fall forward. The same idea of increasing the load center distance applies to a playground see-saw: the farther you sit from the middle, the more you increase the load center distance and the more force you put on that end. The same principle—increasing the load center distance—can cause a forklift to tipover.

Figure 5. Lifting a 5 lb box directly up has the effect of lifting 5 lbs.

When the load center distance increases, it is actually increasing something called the "Load Moment":

Load Moment is the product of the object's weight multiplied by the object's distance from the fulcrum, which is a fixed point that acts as the pivot point. On a sit-down counterbalanced forklift, the fulcrum or pivot point is the axle of the front wheels. It is this product, or Load Moment, which determines how much overturning force is being applied to the forklift.

Figure 6. As the distance increases from the shoulder, the moment, or apparent weight increases so that a 5 pound box seems to weigh 12 pounds.
View Animation

Load Moment = Weight X Distance

Because the overturning force depends on both the weight of the load and the load's distance from the pivot point, a forklift's capacity is always stated in terms of both: the load's weight and its load center distance. For example, if a forklift's capacity as stated on its data plate is "3,000 pounds at a 24 inch load center," this means that the Load Moment cannot safely exceed 72,000 inch-pounds (24-in. x 3,000 lb = 72,000 inch-pounds.) If the load center distance for the actual load is greater than the standard 24 inches, the only way to keep the Load Moment from exceeding 72,000 inch-pounds is to reduce the load. The easiest way to determine the maximum load when the load center distance is greater than the distance stated on the data plate is to divide the maximum Load Moment by the actual load center distance. For example:

If a load is 60 inches long (30-inch load center) then the maximum that this load can weigh is:

72,000 inch-pounds / 30 in-load center = 2,400 pounds

Potential Hazards:

While carrying a load near the maximum allowable capacity, be aware of the following:

- Danger of tipover
- Danger of losing load
- Danger of being struck by falling load

Figure 7. Improperly distributed loads may tip the forklift if the maximum load moment is exceeded.

Requirements and Recommended Practices:

- Calculate a **maximum allowable load moment** to determine whether an unusual load, such as one that is longer than 48 inches (i.e., the load center distance would be greater than 24 inches) or that has an offset center of gravity (i.e., uneven weight distribution) can be handled safely.
- Minimize the load center distance measured from the back of the forks to the center of the load. This allows the forklift to carry more weight.

  As illustrated in Figure 7, a truck that has a 4,500 pound capacity at a 24-inch load center will tipover if a 60-inch load is positioned lengthwise. Positioning the load in this way increases the load center distance to 30 inches and increases the load moment by 27,000 inch-pounds.

  In Figure 7 the forklift safely carries the 4,500 pound load at a load center distance of 24 inches, but tips over when the load center increases to 30 inches. Here's the calculation: 30 inches X 4,500 pounds = 135,000 inch-pounds
  24 inches X 4,500 pounds = 108,000 inch-pounds The load moment is increased by 27,000 inch-pounds.

  If the load center distance is 30 inches, the only way to keep the maximum allowable load moment within 108,000 inch-pounds is to limit the weight of the load to 3600 pounds:

  30 inches X 3600 pounds = 108,000 inch-pounds

- Use extra caution when handling extra heavy loads that may approach the truck's maximum capacity. For example, when handling 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, there is no one rule for all situations.
- Maintain control of the vehicle at all times. The operator is responsible for handling the truck. Drive slower when carrying a load near the maximum allowable.
- Do not exceed the stated capacity of your truck. Know its mechanical limits.

Balance

Understanding why forklifts tipover and why loads become unstable and fall is very important to preventing accidents. Important factors that affect a forklift's balance are:

- Center of Gravity
- Shifting Center of Gravity

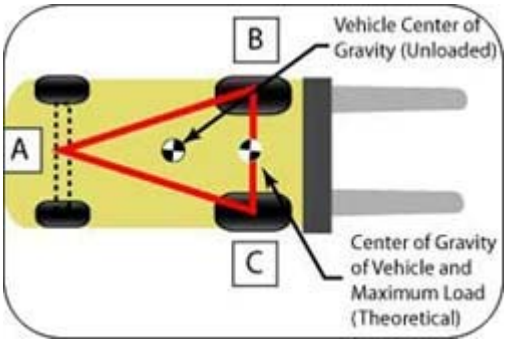

Figure 8. Stability Triangle formed by connecting the three support points of a powered industrial truck's suspension system.

Center of Gravity

Potential Hazards:

While operating a forklift, be aware of the following:

- Tipover
- Falling load

Requirements and Recommended Practices:

- Distribute the weight evenly when carrying irregular sized loads (Figure 9). [29 CFR 1910.178 App A]
- Keep the center of gravity of the load as near as possible to the center going horizontally across the forks.
- Keep the center of gravity of the load as near to the front wheels as possible.

Figure 9. Use special care when carrying a wide load. Turn slowly to prevent the load from shifting.

Shifting Center of Gravity

All objects have a specific center of gravity. Gravity is a force that always pulls objects toward the earth's core. Center of gravity means the point on an object at which all of the object's weight is concentrated and all of the parts balance each other. For symmetrical loads, the center of gravity is at the middle of the load in terms of the load's length, width and height. (Figure 10). Since the capacity of the forklift is based on the assumption of a cube having the center of gravity in the middle, the shape and position of the actual load are key factors when determining whether a load can be carried safely.

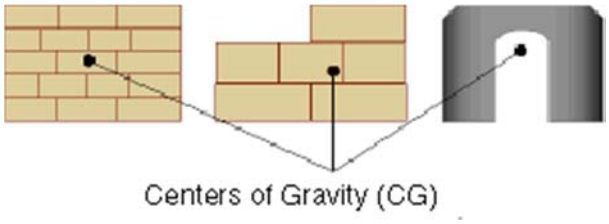

Figure 10. The Center of Gravity (CG) is in the center of a symmetrical load but is off center in an irregular load. In the third example, the CG is outside the boundaries of the object.

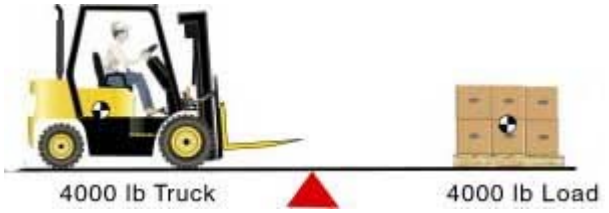

Figure 11. A 4,000 pound truck is balanced by a 4,000 pound load.

When a load is placed on a forklift, the key concept is the combined center of gravity of the forklift and the load. For example, a typical unloaded forklift weighing 4000 pounds may have its center of gravity about 10 inches (25.4 cm) above and two feet (0.6 m) behind the front axle, about half way up the truck body. The heavy counterweight located toward the rear of the forklift places the center of gravity toward the rear, which keeps the forklift from tipping forward. In the meantime, a 4,000 pound load consisting of a cube with even weight distribution has a CG in its center. When the load is placed on the forklift, the combined center of gravity of the forklift and the load will move forward, but the forklift will not tipover so long as the weight of the load is centered and does not exceed the capacity stated on the data plate. But if the load is too heavy, or if it is placed at the end of the forks so that the load center distance is increased, the excessive load moment will cause the forklift to tip forward. Remember, when the forklift engages a load, the combined center of gravity of both the load and the truck system shift forward from the center of gravity of the unloaded forklift. (Figure 11 and 12)

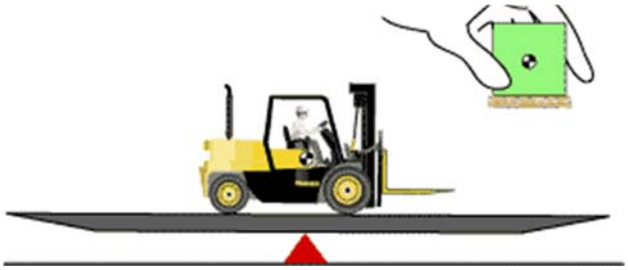

Figure 12. Notice the center of gravity of the load and truck system shift forward toward the front wheels as the load is engaged.
View Animation

Potential Hazards:

Be aware of tipover or falling loads while:

- Operating a forklift, as the center of gravity shifts.
- Engaging or depositing a load.

Requirements and Recommended Practices:

- Handle loads within the capacity of the truck as stated on the data plate. [29 CFR 1910.178(o)(2)]
- Do not operate a forklift if the back wheels begin to lift off the ground. This is an indication that the forklift is overloaded. The center of gravity has shifted too far forward over the axle of the front wheels and the forklift may teeter on the wheels.
- Handle only stable or safely arranged loads. Exercise caution when handling off-center loads that cannot be centered. [29 CFR 1910.178(o)(1)]
- Tilt the mast forward cautiously when positioning the load onto the stack. [29 CFR 1910.178 App A]
- Never travel with the load elevated. Elevating the load increases the load center distance by shifting the center of gravity upward and forward, making the forklift and the load less stable (Figure 5).
- Adjust long or high (including multiple-tiered) loads which may affect capacity. [29 CFR 1910.178(o)(3)]
- Keep the center of gravity of the load as low to the ground and as close to the front wheels as possible:
  - Carry the load at the lowest position possible, 4 to 6 inches from the ground.
  - Tilt the mast back and position the heaviest part of the load against the carriage.
  - Travel with the mast tilted back to stabilize the load.

Stability

Maintaining stability of a powered industrial truck is easier once you understand a few basic principles. There are many aspects of a vehicle's stability:

- The Stability Triangle
- Longitudinal Stability
- Lateral Stability
- Dynamic Stability

NOTE: This discussion focuses on sit-down counterbalanced forklifts. "Counterbalanced" means that

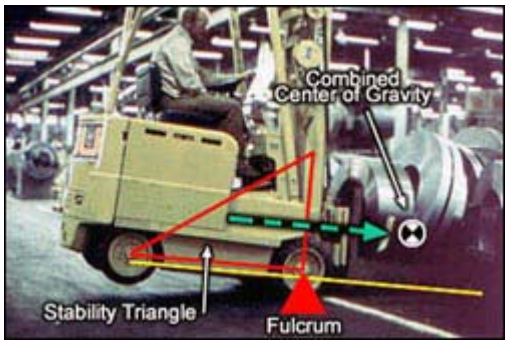

Figure 13. Longitudinal stability is lost when the center of gravity moves too far forward.

the truck is weighted in the back with counterweight so that it will not tipover when the load is placed on the front. The counterweight is located between or behind the rear wheels and provides a weight in the back to "counterbalance" the weight of the load in the front. For a brief summary of other types of forklifts, see Types and Fundamentals.

The Stability Triangle

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 the vehicle has four wheels. The truck's steer axle is attached to the truck by a pivot pin in the axle's center. When this point is connected to the front wheels with imaginary lines, this three-point support forms a triangle called the stability triangle (Triangle ABC where Point A is the pivot point in the rear axle and Points B and C are the front wheels). (Figure 14) [A-4.1, 29 CFR 1910.178 Appendix A] So long as the center of gravity remains within this stability triangle, the truck is stable and will not tip over.

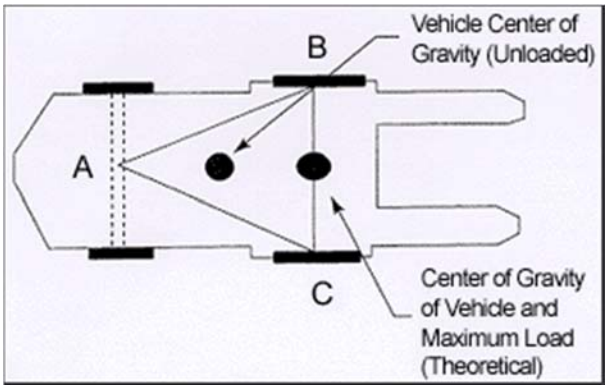

Figure 14. When the vehicle is loaded, the combined center of gravity (CG) shifts toward line B-C. Theoretically the maximum load will result in the CG at the line B-C. In actual practice, the combined CG should never be at line B-C.

When the forklift is not loaded, the location of the forklift's center of gravity is the only factor to be considered in determining its stability. In Figure 14, the center of gravity is between the axle of the steer wheels at A and the drive wheels at B-C and it is marked with the arrow as the Vehicle Center of Gravity (Unloaded). In Figure 15, the combined center of gravity of the forklift and its maximum load shifts forward toward the load so that it is now located on the line representing the front axle, at the very edge of the stability triangle. While the loaded forklift is still theoretically stable, in practice the combined center of gravity should never reach this line because sudden stops, starts, and turns could shift the center of gravity further out and destabilize the forklift.

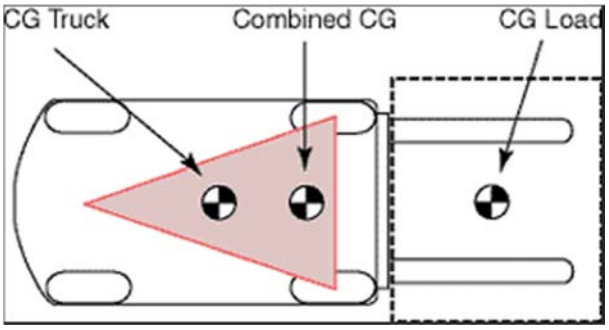

Figure 15. The forklift will not tipover as long as the Combined Center of Gravity of the truck and load system remains within the Stability Triangle.

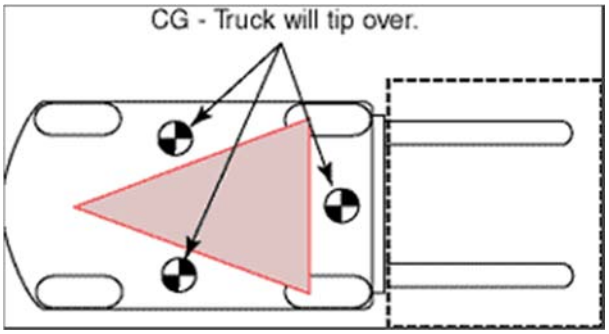

Figure 16. If the CG shifts outside the boundaries of the stability triangle, the truck will tipover.

As seen in Figures 16 and 17, a shift of the center of gravity occurs as the forklift is loaded. The forklift is more stable when it is properly loaded than when it is unloaded. However, improper loading, such as loading the forklift beyond its capacity, or loading an oversize or wide load without adjusting the weight, will cause the forklift to tipover, either laterally on its side or longitudinally forward. The direction of the tipover will depend on where the combined center of gravity shifts outside the stability triangle.

Additional Information:

The Powered Industrial Truck Standard has a non-mandatory Appendix which more fully describes the forces involved and includes figures and definitions: [29 CFR 1910.178 Appendix A]

- **Lateral stability** is a truck's resistance to overturning sideways.
- **Dynamic stability** refers to the idea that an unloaded forklift's center of gravity and a loaded forklift's combined center of gravity can shift outside of the stability triangle as a result of certain movements, such as sudden stops and starts, turns, or operating on grades.
- **Line of action** is an imaginary vertical line through an object's center of gravity.
- **Load center** is the horizontal distance from the fork's or other attachment's vertical face to the line of action through the load's center of gravity.
- **Moment** is the product of the object's weight times the distance from a fixed point (usually the fulcrum). In the case of a powered industrial truck, the distance is measured from the point at which the truck will tipover to the object's line of action. The distance is always measured perpendicular to the line of action. [29 CFR 1910.178 Appendix A]

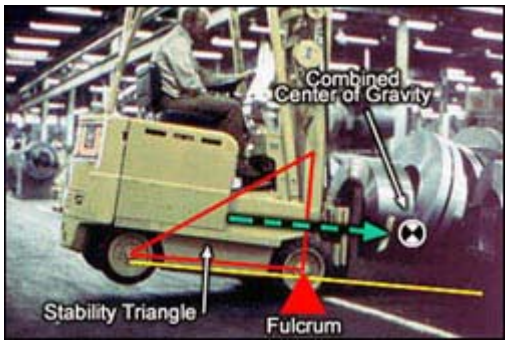

Figure 17. The combined center of gravity of the truck and load system shifts forward outside the stability triangle, as the load's moment is greater than the vehicle's moment, and the forklift tips forward, pivoting on the front axle or fulcrum.

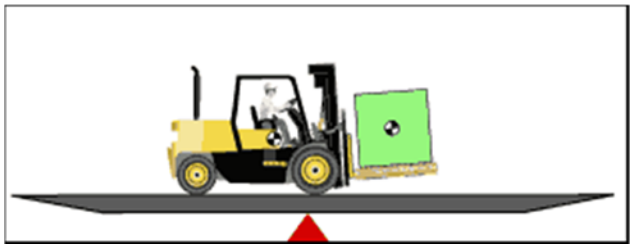

Figure 18. The forklift teeters and finds its balance point. As the load is added to the seesaw, the moment is increased on the right side. The loaded forklift reverses and finds a new balance point at its combined center of gravity.
View Animation

Requirements and Recommended Practices:

Figure 19. Use extra caution when carrying loads that approach a vehicle's maximum design limits.

- Maintain stability. Keep the combined center of gravity within the stability triangle.
- Do not accelerate rapidly or brake suddenly. Sudden changes in direction may also shift the combined center of gravity outside the vehicle's stability triangle and destabilize it.
- Do not turn rapidly. The combined center of gravity may shift outside the stability triangle and may cause the vehicle to tipover to the left or right.
- Never turn on a grade or ramp. Even a 10 percent grade may shift the combined center of gravity outside the stability triangle and cause the vehicle to roll over laterally.
- Cross an obstacle (railroad tracks, beam, pot hole) at a 45 degree angle, so both wheels do not elevate simultaneously.
- Maintain control of your vehicle at all times. Adjust your speed to match the conditions. Be aware and anticipate dangerous motions and avoid them.
- Consider the dynamic forces that result when the vehicle and load are put into motion. The weight's transfer 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. [A-7.1. 29 CFR 1910.178 Appendix A]
- When determining whether a load can be safely handled, the operator should exercise extra caution when handling loads that are close to the truck's stated capacity.

  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 one rule can cover all eventualities. [A-7.2. 29 CFR 1910.178 Appendix A]

MRLDA In-House Hoisting Training Program:

CERTIFICATION OF TRAINING AND PERFORMANCE

(*OPERATOR SUMMARY FORM*)

_____	_____
Type of Equipment	Date (Training and Performance Evaluation)
_____	_____
Company	Evaluator

Certification is valid for 3 years from the date noted below

Employee Name	Certification Date	Recertification Date(s)
_____	_____	
_____	_____	
_____	_____	
_____	_____	
_____	_____	
_____	_____	
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MRLDA In-House Hoisting Training Program:

CERTIFICATION OF TRAINING AND PERFORMANCE

(*TRAINER SUMMARY FORM*)

_____	_____
Type of Equipment	Date (Training and Performance Evaluation)
_____	_____
Company	Evaluator

Certification is valid for 2 years from the date noted below
(unless extended by the Department of Public Safety)

Employee Name	Certification Date	Recertification Date(s)
_____	_____	
_____	_____	
_____	_____	
_____	_____	
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MRLDA In-House Hoisting Training Program:

OPERATOR ASSESSMENT (PART 1)

_____	_____
Type of Equipment	Date of Operator Assessment
_____	_____
Operator	Evaluator

	Check (✔) one		
	Yes	N/a*	No
1. Conducted equipment walk-around to insure its safe condition	❑	❑	❑
2. Conducted walk-around to verify people are clear of equipment	❑	❑	❑
3. Avoided practices that divert attention from operating equipment	❑	❑	❑
4. Operated equipment within its rated capacity	❑	❑	❑
5. Avoided operating the equipment erratically	❑	❑	❑
6. Avoided the influence of alcohol and drugs	❑	❑	❑
7. Avoided operating equipment while physically or mentally unfit	❑	❑	❑
8. Tested all controls prior to operating hoisting machinery	❑	❑	❑
9. Insured repairs were in accord with manufacturer requirements	❑	❑	❑
10. Sounded horn before traveling and when approaching people	❑	❑	❑
11. Stopped work if the safety of any action is in doubt	❑	❑	❑
12. Secured unattended equipment per manufacturer requirements	❑	❑	❑
13. Secured equipment during a power failure	❑	❑	❑
14. Lowered loads during a power failure	❑	❑	❑
15. Insured people do not work under suspended loads	❑	❑	❑
16. Maintained load charts and operation manuals at the equipment	❑	❑	❑
17. Removed forks from load without disturbing the load	❑	❑	❑
18. Maintained clearance of electrical lines (minimum 10’ clearance)	❑	❑	❑
19. Used outriggers/stabilizers where necessary	❑	❑	❑
20. Operated equipment at safe speeds	❑	❑	❑
Percent Correct (a "Yes" or "N/a" answer)	_____		
Did the operator pass the assessment (part 1)?	❑	❑	❑

* "N/a" means "not applicable." Write comments on operator performance on the above line. The 20 items in Part 1 of the operator assessment are derived from the “Code of Massachusetts Regulations” (CMR) (see 520 CMR 6.08(C)(1) – 6.08(C)(17) and 520 CMR 6.09 “Special Requirements for Forklifts.”

MRLDA In-House Hoisting Training Program:

OPERATOR ASSESSMENT (PART 2)

_____	_____
Type of Equipment	Date of Operator Assessment
_____	_____
Operator	Evaluator

	Check (✔) one		
	Yes	N/a*	No
1. Used a 3-point stance to get on the forklift	❑	❑	❑
2. Used a seat belt	❑	❑	❑
3. Demonstrated proficiency with operator controls	❑	❑	❑
4. Sounded horn and/or was cautious at corners and blind spots	❑	❑	❑
5. Yielded to pedestrians	❑	❑	❑
6. Drove under control, both forwards and backwards	❑	❑	❑
7. Checked behind himself/herself before backing	❑	❑	❑
8. Maneuvered safely, based on worksite conditions and weather	❑	❑	❑
9. Emphasized safety over speed	❑	❑	❑
10. Approached the load with forks 4-6" from ground	❑	❑	❑
11. Lifted load safely, based on load weight and forklift load limit	❑	❑	❑
12. Lowered load before transporting it, where practical	❑	❑	❑
13. Transported load close to ground	❑	❑	❑
14. Transported load safely, especially loose or slippery stock	❑	❑	❑
15. Balanced the load, observing the load's center of gravity	❑	❑	❑
16. Stacked the load evenly and neatly	❑	❑	❑
17. Removed forks from load without disturbing the load	❑	❑	❑
18. On stopping, placed forks on floor	❑	❑	❑
19. On stopping, placed controls in neutral, set brakes, turned key off	❑	❑	❑
20. Used a 3-point stance to get off the forklift	❑	❑	❑
Percent Correct (a "Yes" or "N/a" answer)	_____		
Did the operator pass the assessment (part 2)?	❑	❑	❑

_____

_____

* "N/a" means "not applicable." Write comments on operator performance on the above lines.

MRLDA In-House Hoisting Training Program:

EMPLOYEE QUIZZES

We file employee quizzes as checked (✔).

☐ on the following pages

☐ other location (specify)_____

MRLDA In-House Hoisting Training Program:

EMPLOYEE QUIZ

Name (please print *neatly)*	Instructor
Company	Date

	Check (✓) one **True**	**False**
1. The maximum load that I can safely lift with a forklifts (and powered industrial trucks) is 2 times the "rated capacity."	❑	❑
2. When driving an empty forklift, forks should be kept at least 18 inches off the ground, to prevent impact with uneven floor.	❑	❑
3. I need to drive a forklift over a bump such as a track or a curb that separates floors that are at two different levels. As a general rule, the safest way to cross the curb with lumber that can slide or with products on a pallet that can tip over, is at a *significant angle.*	❑	❑
4. I can adjust the forks on our forklift(s) to make them closer together or farther apart.	❑	❑
5. If I need to move a load on a pallet I should move the forks *closer together* so as to maintain the forklift's center of gravity.	❑	❑
6. At times I lift products on pallets whose weight is *not* evenly distributed. As a general rule, the *heaviest* side of the pallet should be close to the mast.	❑	❑
7. A forklift and car both have four wheels and therefore have a similar "stability triangle."	❑	❑
8. A variety of factors can affect the "stability triangle" and cause a forklift to tip, including: how I place a load on the forks, how high I raise the load, and the angle of the floor under the forklift.	❑	❑
9. Certain types of loads that I have to lift and the layout of our facility present conditions that may be hazardous to the driver of the forklift or other employees.	❑	❑
10. When a forklift is idle, it is safe to leave it and check out loads that need to be moved. No special precautions are necessary.	❑	❑

FORKLIFT SAFETY: EMPLOYEE QUIZ [Answer Key]

Name (please print *neatly)* _____ Instructor _____

Company _____ Date _____

	Check (✓) one **True**	**False**
1. The maximum load that I can safely lift with a forklifts (and powered industrial trucks) is 2 times the "rated capacity." **False. The "rated capacity" is the <u>maximum load</u> you can safely lift.**	❑	☑
2. When driving an empty forklift, forks should be kept at least 18 inches off the ground, to prevent impact with uneven floor. **False. Keep forks 4" to 6" off the ground, as a general rule.**	❑	☑
3. I need to drive a forklift over a bump such as a track or a curb that separates floors that are at two different levels. As a general rule, the safest way to cross the curb with lumber that can slide or with products on a pallet that can tip over, is at a *significant angle.* **False. The safest way to over a curb when carrying a product that slides or a pallet of supplies is to either: (1) drive straight over the curb (so that both wheels go over the curb at the same time), or (2) drive one wheel on the curb and then the next wheel. The safest way also requires the operator to stop and think as to how to drive over the curb without damaging the product or putting the driver at risk of an injury. Crossing a curb at a significant angle is only appropriate when driving an *empty* forklift.**	❑	☑
4. I can adjust the forks on our forklift(s) to make them closer together or farther apart.	☑	❑
5. If I need to move a load on a pallet I should move the forks *closer together* so as to maintain the forklift's center of gravity. **False. Keep the forks as wide as possible (so that they fit within the pallet).**	❑	☑
6. At times I lift products on pallets whose weight is *not* evenly distributed. As a general rule, the *heaviest* side of the pallet should be close to the mast.	☑	❑
7. A forklift and car both have four wheels and therefore have a similar "stability triangle." **False. A forklift is more unstable than a car.**	❑	☑
8. A variety of factors can affect the "stability triangle" and cause a forklift to tip, including: how I place a load on the forks, how high I raise the load, and the angle of the floor under the forklift. **True.**	☑	❑
9. Certain types of loads that I have to lift and the layout of our facility present conditions that may be hazardous to the driver of the forklift or other employees. **True. Employees should identify 3 loads (products) that are challenging to transport and 3 features of the layout of the company that make work challenging, on the lines below.**	☑	❑
10. When a forklift is idle, it is safe to leave it and check out loads that need to be moved. No special precautions are necessary. **False. Lower the forks, turn off the forklift, and take the key if going more than 25' away.**	❑	☑

MRLDA In-House Hoisting Training Program:

TRAINER QUALIFICATIONS

List forklift trainers below.

MRLDA In-House Hoisting Training Program:

ANNUAL PROGRAM REVIEW

_____	_____
Facility	Conducted by
_____	_____
Date	Title

	Check (✔) one		
	Yes	N/a*	No
1. Do you have a written forklift and powered industrial truck compliance plan?	❑	❑	❑
2. Do you conduct written daily inspections of forklifts and powered industrial trucks?	❑	❑	❑
3. Do you conduct equipment assessments?	❑	❑	❑
4. Do you have operator assessments for each user?	❑	❑	❑
5. Do you have operator assessments that are current for each operator? (Training due every 3 years)	❑	❑	❑
6. Do you have operator assessments that are relevant to your worksite conditions?	❑	❑	❑
7. Does your trainer have appropriate qualifications, and can you document this?	❑	❑	❑
8. Does your training cover required topics and can you document this? (e.g., by a training outline)	❑	❑	❑
9. Does your training program assess employee mastery of material presented and can you document this? (e.g., by a quiz)	❑	❑	❑
10. Do you conduct an annual review of this program? (date of prior review _____	❑	❑	❑
Percent Correct (a "Yes" or "N/a" answer)	_____		

Comments (identify the item number you are referring to)

_____

_____

_____

* ”N/a” is “not applicable.”

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Section 53 Necessity of licenses; classification of hoisting machinery; exemptions

Section 53. (a) No person shall operate derricks, cableways, machinery used for discharging cargoes, temporary elevator cars used on excavation work or used for hoisting building material, when the motive power to operate such machinery is mechanical and other than steam, unless such person holds a license or temporary permit as provided in this section. The owner or user of such hoisting machinery shall not operate, or cause to be operated, such machinery, unless the person operating it is duly licensed or possesses a temporary permit. Any operator of such hoisting machinery when it is being used exclusively for agricultural purposes shall be exempt from this section.

(b) For licensing and temporary permitting purposes, the commissioner shall classify hoisting machinery by categories, depending on size, weight, common usage, capacity, power source or such other characteristics as the commissioner may find appropriate; provided, however, that at least 1 category shall include cranes and other similar equipment and 1 category shall include excavating equipment.

The commissioner shall adopt rules and regulations under chapter 30A, embodying the classifications of hoisting machinery and establishing criteria and procedures for the issuance, denial, renewal, suspension and revocation of licenses or temporary permits to operate hoisting machinery; provided, however, that a final adjudication that there has been a violation of federal or state occupational safety and health regulations or any other rule adopted by the department, shall be cause for the denial, suspension or revocation of any license or temporary permit issued under this section. Criteria for issuance of such license shall include, but not be limited to, training and experience requirements appropriate to the categories of machinery for which the license is intended. Criteria for issuance of such temporary permit shall include, but not be limited to, training and experience requirements appropriate to the compact equipment for which the permit is intended.

(c) Notwithstanding any other provisions of this chapter, actions taken or decisions reached by the department or a representative of the department regarding the issuance, denial, renewal, revocation or suspension of a license or temporary permit to operate hoisting machinery, or appeals resulting from such an issuance, denial, renewal, revocation or suspension, shall be taken or made on the basis of the rules and regulations adopted under this section.

(d)(1) In cases where a district engineering inspector finds that the immediate suspension or revocation of a license to operate hoisting machinery is necessary for the preservation of the public health or safety, the inspector may order such suspension or revocation pending the outcome of a hearing, under the procedures set forth in the regulations promulgated and adopted under this section.

(2) In cases where a district engineering inspector or party issuing a temporary permit finds that the immediate suspension or revocation of a temporary permit to operate hoisting machinery is necessary for the preservation of the public health or safety, the inspector may order such suspension or revocation under the procedures set forth in the regulations promulgated and adopted under this section.

(e) The following entities shall be exempt from this section: (1) a utility company which has self propelled truck mounted cranes, derricks and similar hoisting equipment which is used for the maintenance and construction of the equipment of such company; (2) a company which operates hoisting equipment specifically limited to industrial lift trucks, fork lifts, overhead cranes and other hoisting equipment, specifically authorized by the department and used exclusively on company property; and (3) any company which has equipment such as cranes, derricks and similar hoisting equipment used only on utility company property.

Such exemption shall only apply if a company has: (1) at least 1 supervisory employee on site at all times of operation who holds a license issued by the department under this section and is designated as the responsible person in charge of hoisting equipment during that period of operation; (2) an inservice training program for employees approved by the department which may be audited by the department; and (3) company licenses issued to each trained and certified employee which shall contain a picture of the licensee, a list of the specific hoisting equipment the licensee has been qualified to operate and the signature of the supervisor who holds a department license.

Any other company which has equipment such as cranes, derricks and similar hoisting equipment used only upon utility company property shall also be exempt from this section; provided, however, that the company has complied with all of the requirements of the preceding paragraph.

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Section 53A Rules and regulations; classifications of hoisting machinery; criteria for issuing apprentice operator licenses

Section 53A. The commissioner shall issue rules and regulations, pursuant to chapter 30A, embodying the classifications of hoisting machinery and establishing criteria and procedures for the issuance, denial, renewal, suspension and revocation of licenses of apprentice operators of such machinery. However, a final adjudication that there has been a violation of federal or state occupational safety and health regulations, or any rule or regulation adopted by the department, shall be cause for the denial, revocation or suspension of any license issued under this section. Criteria for issuance of such licenses shall include, but not be limited to, training and experience requirements appropriate to the categories of machinery for which the license is intended, and registration with the apprenticeship council within the department of labor standards. A holder of such apprentice license may operate hoisting machinery only under the guidance and supervision of a holder of a license to operate for the category of hoisting machinery to be operated by the apprentice.

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Section 54 Carrying of license or temporary permit

Section 54. A license or temporary permit to operate hoisting machinery shall be carried on the person of the operator or apprentice operator while operating such hoisting machinery. In the case of a temporary permit to operate compact hoisting equipment the operator must also carry a valid driver’s license.

Section 54A. Whoever violates any provision of section 53, 53A or 54, or any rule or regulation made thereunder, shall be punished by a fine of not less than five hundred dollars and not more than three thousand dollars, or by imprisonment for not more than three months, or both such fine and imprisonment. Whoever prevents or attempts to prevent any inspector from entering on any premises in the discharge of his duty with respect to sections fifty-three and fifty-four, shall be punished by a fine of not less than two hundred and fifty dollars and not more than three thousand dollars, or by imprisonment for not more than three months, or both such fine and imprisonment.

Any person who permits an unlicensed person to operate hoisting machinery shall be subject to a fine of not less than one thousand dollars and not more than three thousand dollars, or by imprisonment for not more than three months, or both such fine and imprisonment.

Section 55. Whoever violates any provision of sections forty-two to fifty-one, inclusive, or any rule made thereunder, or prevents or attempts to prevent an inspector from entering on any premises in the discharge of his duty with respect to said sections, shall be punished by a fine of not less than ten nor more than three hundred dollars, or by imprisonment for not more than three months.

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Section 56 Examiners; administration of oath to applicants

Section 56. The chief and inspectors of the division shall act, as provided in sections fifty-seven to sixty-seven, inclusive, as examiners of applicants for certificates of competency to inspect boilers, and for licenses as engineers or firemen or operators of hoisting machinery. The chief or any such inspector may administer the oath to applicants. The commissioner may authorize a person or entity offering the short term rental of compact hoisting equipment to examine applicants and issue temporary permits according to regulations promulgated by the department.

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Section 57 Application; fees, number of examinations; frequency of applications

Section 57. Each application for a license as an engineer or fireman of a class specified herein or as an operator of hoisting machinery not run by steam shall be made upon a blank furnished by the department, signed and sworn to by the applicant, and shall show the total experience of the applicant. Each such application for a first class engineer's license, second class engineer's license or for a special license; for a third class, fourth class or portable class engineer's license or a steam fire engineer's license; for a first class or second class fireman's license; and for a license for operating hoisting machinery not run by steam shall be accompanied by an examination fee to be determined annually by the commissioner of administration under the provision of section three B of chapter seven. Each such application shall entitle the applicant to one examination only, except in case of an appeal under section sixty-six; provided, however, that no person shall make application hereunder for a license of any particular class oftener than once in ninety days. The fee for an examination on appeal shall be determined annually under the aforementioned chapter seven provision.

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Section 58 Taking notes at examinations and on appeals; representative of insurer

Section 58. In all examinations, except examinations for temporary permits, or appeals the applicant may have one person present who may take notes if he so desires. In case of applicants for certificates of competency to inspect boilers such person shall be a representative of an insurance company employing the applicant or wishing to do so.

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Section 59 Suspension, revocation, loss or destruction of certificates or licenses; fee

Section 59. A certificate of competency to inspect boilers shall be revoked and a license as engineer or fireman or operator of hoisting machinery shall be suspended or revoked for incompetence or untrustworthiness of the holder thereof. A wilfully false statement in the application shall be sufficient cause for revocation at any time. If a certificate or license is lost or destroyed a new certificate shall be issued without examination upon satisfactory proof thereof. The fee for such new certificate shall be determined annually by the commissioner of administration under the provision of section three B of chapter seven.

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Section 60 Request of insurer for examination of person applying for inspector of boilers or amusement devises position accompanying application; fee

Section 60. The application of a person desiring to act as inspector of boilers or an inspector of amusement devices for an insurance company shall be accompanied by a written request of said company for an examination of such person, together with a fee, the amount of which shall be determined annually by the commissioner of administration. An individual, who is an employee of an amusement park or who performs or has performed inspections of amusement devices for the division shall be eligible for a certificate of competency to inspect amusement devices.

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Section 61 Board of examiners; subject matter of examination

Section 61. Three inspectors of the division shall act as a board of examiners. The applicant shall be examined as to the construction, installation, maintenance and repair of steam boilers and their appurtenances in the case of an applicant for a certificate of competency to inspect steam boilers, and, in the case of an applicant for a certificate of competency to inspect amusement devices, shall be examined in such matters as the inspectors shall deem relevant.

Section 62. If the applicant is found competent he shall receive a certificate of competency to inspect steam boilers or to inspect amusement devices, as the case may be; provided, however, that if the holder of a certificate ceases to be employed as an inspector for a period of one year or more his certificate shall lapse and he shall be required to submit to reexamination for a new certificate. The fee for such reexamination shall be determined annually by the commissioner of administration under the provision of section three B of chapter seven. Said certificate shall continue in force until the date of birth of the holder of the certificate occurring more than twelve months but not more than twenty-four months after the effective date of such certificate unless sooner revoked.

If any such certificate of competency to inspect steam boilers or amusement devices or the renewal thereof expires in any even year, any subsequent renewal shall expire on the next anniversary of the holder’s date of birth occurring in an even year.

If any such certificate of competency to inspect steam boilers or to inspect amusement devices or renewal thereof expires in an odd year, any subsequent renewal shall expire on the next anniversary of the holder’s date of birth occurring in an odd year. A certificate of competency to inspect steam boilers or to inspect amusement devices issued to a person born on February twenty-ninth shall, for the purposes of this section, expire on March first. The fee for the renewal of the certificate of competency shall be determined pursuant to the aforementioned chapter seven provision. Certificates not renewed at expiration date shall become void, and shall after one year be reinstated only by reexamination of the former holder of the certificate; provided, however, that if the holder of a certificate of competency is on active duty with the armed forces of the United States, the certificate shall remain valid until the holder is released from active duty and for a period of not less than 90 days following that release. A notice of the date of expiration of a certificate of competency to inspect steam boilers or to inspect amusement devices shall, at least thirty days prior to such date, be sent to the holder of the certificate. The inspector of the division for the town where a holder of the certificate resides may issue a renewal certificate. A person whose certificate of competency is suspended or revoked shall surrender his certificate to the chief or an inspector of the division.

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Section 63 Appeals; rehearing; fee; finality of decision

Section 63. A person who is refused a certificate of competency, or whose certificate is revoked, may appeal from such decision to the commissioner, who shall grant a rehearing of the case by a board of five examiners, no one of whom shall have acted as an examiner in the former instance; provided, that in the case of a person desiring to appeal from a refusal to issue to him a certificate of competency such appeal is accompanied by a fee to be determined annually by the commissioner of administration under the provision of section three B of chapter seven. Their decision shall be final if approved by said commissioner.

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Section 64 Engineers and firemen; examinations; appeal

Section 64. Whoever desires to act as an engineer or fireman shall apply for a license to the department. The applicant shall be examined by the inspector assigned to the district in which the applicant resides or is employed. The examinations shall be uniform throughout the commonwealth in a form approved by the commissioner, in consultation with the chief, and shall be given in two parts, the first part of which shall be written and the second of which shall be oral; provided, however, that any applicant may be given only an oral examination if he so requests in writing, stating the reasons for such request and if such reasons are deemed valid by the chief or his designee. A mark of seventy percent shall be considered passing on any such written examination and such passing mark shall remain valid for a period of one year. The failure of any applicant taking a written examination to achieve such a passing mark shall result in the removal of his application from any further consideration. The time allotted for the written examination shall be four hours. An oral examination shall be recorded on tape and such tape shall remain on file with the department through the expiration of the time allowed for appeal.

Upon the successful completion of the examination process, the applicant if found competent and trustworthy, shall receive a license graded in accordance with the merits of his examination. An applicant for a first or second class engineer’s license shall be examined by a board consisting of three district engineering inspectors of the department, or two such inspectors and the chief, if such chief is a qualified examiner, and, if the applicant is employed, one member of said board shall be the department inspector of boilers assigned to the area where the applicant is so employed, and the decision of said board shall be final. An applicant for a license as an engineer of any other class or as a fireman, or for a special license, shall be examined by one inspector of the division, from whose decision there shall be an appeal as provided in section sixty-six.

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Section 65 Operators of hoisting machinery; licenses; application; examination

Section 65. Whoever desires to act as an operator of hoisting machinery shall apply to the department for a license. If the criteria for licensure established by the commissioner pursuant to section fifty-three are met by the applicant, such applicant shall be required to pass a written or practical examination, or both, in accordance with the standards set in regulations promulgated under the provisions of said section fifty-three. Any operator of hoisting machinery whose license is revoked, and any person who is penalized under the provisions of section fifty-four A, shall be required to pass both a written and practical examination before he may be issued a subsequent license. The passing of the applicable examination shall entitle the applicant to a license to operate hoisting machinery in the category or categories for which he has applied and been examined. Each license issued shall contain a photograph of the licensee.

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Section 65A Issuance of temporary permits by person or entity from which hoisting machinery is to be rented

Section 65A. Whoever desires to act as an operator of compact hoisting machinery for rent for which licensure is required under section 53, on a temporary basis, shall apply to the person or entity from which the machinery is to be rented for a temporary permit; provided, however, that the person or entity renting such machinery shall have obtained authorization to issue temporary permits from the commissioner. If the applicant meets the criteria for issuance of a temporary permit established by the commissioner under said section 53, such applicant shall then be required to pass an examination under the standards set in the regulations promulgated under said section 53. If the applicant passes the examination, the applicant shall be entitled to a temporary permit to operate hoisting machinery in the category or categories for which the applicant has applied and been examined. No temporary permit may be renewed and no person may be issued more than 1 temporary permit in any 45 day period. The commissioner may periodically review the records of any person or entity that is authorized to issue temporary permits to ensure compliance with this section and any regulation promulgated under said section 53.

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Section 66 Appeals; board of appeal; finality of decision

Section 66. A person aggrieved by the action of a single examiner in refusing, suspending or revoking a license to act as engineer, fireman or operator of hoisting machinery may, within one week, appeal therefrom to the chief, who shall appoint three inspectors of the division, or himself and two inspectors, to act together as a board of appeal. The decision of a majority of the members of the board of appeal shall be final.

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Section 67 Licenses; duration; fees; expiration; renewal; revocation

Section 67. A license shall continue in force until the date of birth of the licensee occurring more than twelve months but not more than twenty-four months after the effective date of such license unless suspended or revoked for incompetence or untrustworthiness of the licensee, except that a special license shall not continue in force after the holder thereof ceases to be employed in the plant specified in the license. If any such license or the renewal thereof expires in an even year, any subsequent renewal shall expire on the next anniversary of the licensee's date of birth occurring in an even year. If any such license or renewal thereof expires in an odd year, any subsequent renewal shall expire on the next anniversary of the licensee's date of birth occurring in an odd year. A license issued to a person born on February twenty-ninth shall, for the purposes of this section, expire on March first. The fee for the renewal of a license shall be determined annually by the commissioner of administration under the provision of section three B of chapter seven for the filing thereof; provided, however, that in no case shall the fee for the renewal of a license to operate hoisting machinery be less than sixty dollars, and in no case shall the fee for a new license to operate hoisting machinery be less than seventy-five dollars. Licenses not renewed at expiration date shall become void, and shall after one year be reinstated only by re-examination of the licensee; provided, however, that if the licensee is on active duty with the armed forces of the United States, the license shall remain valid until the licensee is released from active duty and for a period of not less than 90 days following that release. A notice of the date of expiration of a license shall, at least thirty days prior to such date, be sent to the licensee. The inspector of the division for the town where a licensee resides may issue a renewal license. A person whose license is suspended or revoked shall surrender his license to the chief or an inspector of the division. If a new license of a different grade is issued, the old license shall be destroyed by the examiner.

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Section 67A Examiners; time of examinations

Section 67A. The chief of inspections, the supervising inspector of the division or an inspector of the division shall act as an examiner for the certification of oil burner technicians. The chief of inspections shall cause examinations to be held in such cities and at such times as he may deem necessary.

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Section 68 Repealed, 1953, 319, Sec. 22

Repealed, 1953, 319, Sec. 22

Section 69. The commissioner may expend the amount annually appropriated for investigation work, for apparatus used in connection with the inspection of steam boilers and for the installation and maintenance of apparatus in the examination of engineers and firemen.

REGULATION FILING AND PUBLICATION

1. Regulation Chapter Number and Heading:

   520 CMR 6.00

2. Name of Agency:

   Department of Public Safety

3. This document is reprinted from the Code of Massachusetts Regulations and contains the following:

520 CMR 6.01	General Provisions, Scope, Definitions, Standards Adopted
520 CMR 6.02	General Administrative Provisions, Including Requirements for Licensure, Apprentice Licenses, and Renewals
520 CMR 6.03	Issuance of Temporary Permits to Operate Rented Compact Hoisting Machinery
520 CMR 6.04	Continuing Education and Training Facilities
520 CMR 6.05	Apprentice Licenses
520 CMR 6.06	Exempt Companies; Exemptions for Licensing Requirements, Pursuant to M.G.L. c. 146, Section 53
520 CMR 6.07	In-Service Training Program for Exempt Companies
520 CMR 6.08	Operating Procedures for Hoisting Machinery
520 CMR 6.09	Special Requirements for Cranes, Derricks, Pile Drivers, Excavating Machines, Fork Lifts, and Hoists
520 CMR 6.10	Classification of Licenses; Qualifications
520 CMR 6.11	Operation of Hoisting Machinery; Accident Reporting
520 CMR 6.12	Suspension, Revocation, and Appeals of Licensing, Certification, and Temporary Permitting

520 CMR 6.13 Variance Procedure

Under the provisions of Massachusetts General Laws, Chapter 30A, Section 6 and Chapter 233, Section 75, this document shall not be used as evidence of the original documents on file with the State Secretary.

520 CMR 6.00: HOISTING MACHINERY

6.01: General Provisions, Scope, Definitions, Standards Adopted

(1) Scope.

520 CMR 6.00 is promulgated by the Department of Public Safety pursuant to authority granted by M.G.L. c. 146, §53. The purpose of 520 CMR 6.00 is to establish reasonable requirements to protect the public safety of the citizens of the Commonwealth from the hazards inherent in the operation of Hoisting Machinery by establishing the minimum standards necessary to obtain a Hoisting Machinery operator's License or Temporary Permit and the minimum safety standards to be followed during the operation of Hoisting Machinery. 520 CMR 6.00 shall apply to:

Hoisting Machinery as defined in 520 CMR 6.01 that is used on private or public property for the erection, construction, alteration, demolition, repair or maintenance of buildings, structures, bridges, highways, roadways, dams, tunnels, sewers, underground buildings or structures, underground pipelines or ducts and all other construction projects or facilities or other uses on private or public grounds including the warehousing and movement of materials, except when being used exclusively for agriculture purposes.

(2) Definitions.

The following words and terms, when used in 520 CMR 6.00 shall have the following meanings unless the context clearly indicates otherwise or the term is redefined for a specific section or purpose:

ANSI. American National Standards Institute.

Apprentice License. A document issued by the Department upon proof of registration at a Training Facility and with the Division of Apprentice Training within the Department of Labor Standards, which enables the holder to operate Hoisting Machinery under the direct guidance and supervision of a duly licensed person licensed to operate the category of Hoisting Machinery for which documentation is issued.

Apprentice Licensee. A person, who is at least 18 years of age, holds a valid driver's license, is registered with the Department of Labor Standards, and has obtained an Apprentice License to operate Hoisting Machinery while under the direct guidance and supervision of a duly licensed person.

ASME. American Society of Mechanical Engineers.

Cargo. A load, quantity, or volume that can be processed or transported.

Certificate of Completion. A uniform certificate issued by a Training Facility to a Licensee upon the satisfactory completion of a continuing education curriculum.

Chief. The Chief of Inspections – Mechanical of the Department of Public Safety.

Commissioner. The Commissioner of the Department of Public Safety.

Compact Hoisting Machinery. Hoisting Machinery with a gross vehicle weight not exceeding 10,000 pounds, excluding Class 1, Class 3, and Class 4 Hoisting Machinery as listed in 520 CMR 6.10. Hoisting Machinery operated under a Temporary Permit shall not exceed a gross vehicle weight 8,000 pounds.

Company License. A License issued by an Exempt Company that has a Department approved In-Service Training program and which is only valid for Hoisting Machinery used on Company Property.

Company Property. Property which is owned or under the care and control of a tenant company under a lease or rental agreement. No operation shall occur on any public or a private way, excluding Company Property.

Competent Person. One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate such conditions.

Department. The Department of Public Safety.

DAT. The Division of Apprentice Training.

DOT. The United States Department of Transportation.

Emergency Procedure. Actions required to be taken when imminent danger may occur to prevent damage to life, property, or to ensure public safety.

Fork Lift. Any mobile power-propelled truck used to carry, push, pull, lift, stack or tier materials. Earth moving and over the road haulage trucks are not included in the definition. Equipment that was designed to move earth but has been modified to accept forks are also not included.

Hoisting Machinery. Derricks, cableways, machinery used for discharging Cargoes, and temporary elevator cars used on excavation work or used for hoisting building material, when the motive power to operate such machinery is mechanical and other than steam, including but not limited to excavators, backhoes, front end loaders, uniloaders, skid loader, skid steer loaders, compact loaders or similar devices, lattice cranes, derricks, cranes with or without wire rope; all Fork Lifts, powered industrial lift trucks, overhead hoists (underhung), overhead cranes, underhung cranes, monorail cranes, lifting devices, cableways, powered platforms and any other equipment that has the minimum capability of hoisting the load higher than 10 feet or that has the capability of lifting loads greater than 500 pounds or if the capacity of

the bucket exceeds 1/4 cubic yard capacity; overhead bridge cranes, electric or air driven hoists, pendant controlled hoists, specialty equipment as categorized by License grade in this regulation.

Incident. A situation that results in Serious Injury, Property Damage, or any condition that is necessary for the preservation of the public health or safety at a site.

Injury and Incident Documentation. A form furnished by the Department of Public Safety detailing all specific information regarding any Serious Injury or Mechanical Failure that may have occurred.

In-Service Training. A company program that has been approved by the Department and is required for issuance of a Company License by those companies that have been exempted from hoisting licensing requirements, pursuant to M.G.L. c. 146, Section 53.

Inspector. District Engineering Inspector employed by the Department of Public Safety.

Instructor. An individual duly licensed by the Department as a Hoisting Machinery operator who educates and trains Licensees and Apprentice Licensees in the operation of Hoisting Machinery.

License. A document issued by the Department to an individual to operate a certain type and class of Hoisting Machinery.

Licensee. A person who is at least 18 years old, holds a valid driver's license and has completed the necessary requisites for licensure to operate Hoisting Machinery.

Mechanical Failure. Damage to Hoisting Machinery which affects the capacity or safe operation of the equipment per the manufacturer's specifications.

Modification. Alterations, extensions or repairs made to Hoisting Machinery which alter the machinery's original structure.

Operator's Manual. The document created by the manufacturer of the Hoisting Machinery that contains the required procedures and forms for the safe operation of Hoisting Machinery at the stated site pertaining to that specific equipment.

Placard. A Department issued certificate posted on Hoisting Machinery which acts as a notice of the unsafe condition of the machinery.

Property Damage. Damage of private or public property that exceeds $5,000 per Incident.

Qualified Welder. A welder certified by the American Welding Society (AWS) or an acceptable alternative welding certification.

SAE. Society of Automotive Engineers.

Serious Injury. A personal injury/illness that results in death, dismemberment, significant disfigurement, permanent loss of the use of a body organ, member, function, or system, a compound fracture, or other significant injury/illness that requires immediate admission and observation by a licensed physician.

Signal Person. A trained individual qualified in the use of signals to direct the operator of Hoisting Machinery and warn of possible or existing hazards through the use of hand signals, audible signals, or flashing lights. (See Appendix A)

Short-Term Rental Entity. A person or organization approved by the Department, who is in the business of renting Compact Hoisting Machinery for which a Temporary Permit is required.

Short-Term Rental Entity Facilitator. An employee of the Short-Term Rental Entity who holds a Massachusetts Hoisting License issued by the Department and is responsible for the written and practical training, examinations, and issuance Temporary Permits.

Temporary Permit. A non-renewable permit to operate Compact Hoisting Machinery, with a gross vehicle weight not exceeding 8,000 pounds, issued by a Department approved Short-Term Rental Entity for no more than 14 consecutive days.

Temporary Permit Holder. A person who is at least 18 years of age, holds a valid driver's license, and has obtained a Temporary Permit to operate Compact Hoisting Machinery with a gross vehicle weight not exceeding 8,000 pounds.

Training Facility. A site including buildings and machinery located thereon, that has been approved by the Department to train individuals in the safe operation of Hoisting Machinery and may also provide courses in continuing education for individuals licensed to operate Hoisting Machinery.

Training Period. Time during which an Apprentice Licensee participates in a training program on-site at a Training Facility.

Utility. Any organization or company which provides electricity, natural gas, phone or cable services to the public.

(3) Regulations and Standards Adopted. The standard for operation of Hoisting Machinery shall be in accordance with the following:

ANSI/ASME	
B30.2-2011	Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)
B30.3-2012	Tower Cranes
B30.5-2011	Mobile and Locomotive Cranes

B30.9-2010	Slings
B30.10-2009	Hooks
B30.11-2010	Monorails and Underhung Cranes
B30.16-2012	Overhead Hoists (Underhung)
B30.17-2006 (R2012)	Overhead and Gantry Cranes (Top Running Bridge, Single Girder, Underhung Hoist)
B30.20-2010	Below-the-Hook Lifting Devices
B30.22-2010	Articulating Boom Cranes
B30.26-2010	Rigging Hardware, Includes Errata (2011)

SAE

J1307-2002	Excavator and Backhoe Hand Signals

The Occupational Safety and Health Administration (OSHA) Regulations

29 CFR 1926	Safety and Health Regulations for Construction
29 CFR 1910	Occupational Safety and Health Standards

Regulations

220 CMR 99	Procedures for the Determination and Enforcement of Violations of MGL c.82, sec.40 ("Dig Safe")

6.02: General Administrative Provisions, Including Requirements for Licensure, Apprentice Licenses, and Renewals

(1) Scope. 520 CMR 6.00 establishes general administrative provisions including License issuance, License renewals, fees, examinations, and appeals for all Hoisting Machinery licensure.

(2) General requirements for licensure.

(a) All applicants, including those applying for an Apprentice License, must be at least 18 years of age.

(b) All applicants must submit the following documentation:

1. A completed application on a form authorized by the Department to operate Hoisting Machinery as provided by the Department;
2. A fee to be determined annually by the Secretary of Administration and Finance under the provisions of M.G.L. c. 7, §3B;
3. A legible photocopy of the applicant's valid DOT medical certificate or ANSI/ASME B30.5-2011 qualifications for operators. In the event that the DOT medical certificate expires prior to the expiration of the Hoisting License, the Licensee shall submit a legible photocopy of the new certificate;
4. A photograph or permission to gain access to the Massachusetts Registry of Motor Vehicles database if

applicant is a resident of Massachusetts;

5. A legible photocopy of the applicant's valid driver's license. In the event that the applicant's driver's license expires prior to the expiration of the Hoisting License, the applicant shall submit a legible photocopy of the new driver's license when it is received;
6. In addition to the requirements of 520 CMR 6.02 (2)(b)(1-5), applicants for an Apprentice License must also submit a copy of their Annual Apprentice ID Card issued by the DAT

(3) Examination for License to Operate Hoisting Machinery.

(a) Written:

(1) All applicants for a License to operate Hoisting Machinery License shall pass a written examination administered by the Department by earning a minimum grade of 70% and must demonstrate knowledge of the following:

a. the operation of the equipment for which they are being examined;
b. the ability to comprehend and interpret all Placards, operation manuals, safety codes and other information pertinent to safe hoisting operations in the English language;
c. Emergency Procedures;
d. Massachusetts General Laws and regulations as they relate to Hoisting Machinery.

(2) Individuals receiving a failing score may not retake an examination for a License to operate Hoisting Machinery within 90 days of the previous examination.

(3) In addition to the written examination, applicants for licensure to operate Hoisting Machinery may be required to pass a practical examination at the discretion of the Department or if required by Federal law for the specific type of equipment for which they have applied to operate.

(b) Practical Examination:

Applicants taking the practical examination must demonstrate knowledge of the following:

(1) The ability to operate the equipment for which they are being examined;

(2) The ability to comprehend and interpret all Placards, operators' manuals, safety codes and other information pertinent to safe hoisting operations;
(3) The ability to comprehend and interpret hand signals;
(4) The ability to communicate in English;
(5) Emergency Procedures;
(6) Applicable Massachusetts General Laws and regulations as they relate to Hoisting Machinery.

(4) Hoisting Licenses shall be carried on the person of the operator during all times the operator is operating Hoisting Machinery and shall be furnished for inspection by the operator at the request of the Chief or Inspector or the Commissioner.

(5) Denial; appeals.

(a) The Department may refuse to issue a License to an applicant based on the following grounds:

(1) Submittal of an incomplete application or submittal of an application on a form not authorized by the Department;
(2) Failure to submit required fees;
(3) Submittal of false, invalid, incorrect or fraudulent information;
(4) If at the time of application, the applicant is under investigation by the Department;
(5) Failure to pass a practical examination (if required);
(6) Failure to pass the required written examination.

(b) If the Department refuses to issue a License based upon any of the reasons set forth in 6.02 (5)(a)(1-6) it shall notify the applicant in writing, setting forth the reasons for the denial. Within one week of receipt of the denial, the applicant may make written demand on a form authorized by the Department to the Chief for a hearing before a board of appeals consisting of three Department Inspectors appointed by the Chief or the Chief and two Inspectors. The hearing shall be held promptly and in accordance with MGL c. 30A and 801 CMR 1.02.

(c) Failure to Pass Written Examination as required by 520 CMR 6.02(5)(a)(6):The results of the written examination shall be posted on the Department's website (www.mass.gov/dps). If an applicant receives a failing score, the applicant may make written demand upon the Chief for a hearing. The written demand must be submitted on a form authorized by the Department within one week of the examination score being posted on the website. The hearing shall be held before a board of appeals consisting of three Department Inspectors appointed by the Chief or the Chief and two Inspectors. The hearing shall be held promptly and in accordance with M.G.L. c. 30A and 801 CMR 1.02.

(d) If, after a hearing pursuant to 520 CMR 6.02(5)(b) or (c), the Board denies the issuance of the License, it shall notify the applicant in writing. Such notice shall be sent by certified mail and/or first class mail and shall contain the reasons supporting the denial. Within 30 days after receipt of the notice, the applicant may appeal such denial to Superior Court in accordance with MGL c. 30A, § 14.

(6) License Renewals:

All applicants for renewal licensure shall submit the following to the Department:

(1) A Certificate of Completion evidencing the satisfaction of continuing education hours required pursuant to 520 CMR 6.04;
(2) A completed application with a valid and current mailing address and email address on a form authorized by the Department to operate Hoisting Machinery as provided by the Department;
(3) A fee to be determined annually by the Secretary of Administration and Finance under the provisions of MGL c. 7, §3B;A legible photocopy of the applicant's valid DOT medical certificate or ANSI/ASME B30.5-2011 qualifications for operators. In the event that the DOT medical certificate expires prior to the expiration of the Hoisting License, the Licensee shall submit a legible photocopy of the new certificate;
(4) A photograph or permission to gain access to the Massachusetts Registry of Motor Vehicles database if applicant is a resident of Massachusetts;
(5) A legible photocopy of the applicant's valid driver's license. In the event that the applicant's driver's license expires prior to the expiration of the Hoisting License, the applicant shall submit a legible photocopy of the new driver's license when it is received.

In accordance with MGL c. 146, § 67, a notice of the date of expiration of a License shall, at least 30 days prior to such date, be sent to the Licensee. It is the responsibility of the Licensee to notify the Department of any changes to their mailing address and email address. Failure to provide the Department with a valid and current mailing address and email address may result in the delay of a License renewal. Licenses not renewed at expiration date shall become void, and shall after one year be reinstated only by re-examination of the Licensee.

(7) Renewals of Apprentice Licenses:

(a) Apprentice Licenses shall be valid for the term of registration. Apprentice Licenses may be renewed upon the submission of a copy of

the applicant's Annual Apprentice ID Card issued by the DAT as proof that the Apprentice Licensee remains registered with the Division of Apprentice Training of the Department of Labor Standards.

(b) Applicants for Apprentice License renewals shall also submit the following:

1. A complete application with a valid and current mailing address and email address for renewal of an Apprentice License to operate Hoisting Machinery as provided by the Department;
2. A fee to be determined annually by the Secretary of Administration and Finance under the provisions of MGL c. 7, §3B;
3. A valid DOT medical certificate documenting that the applicant meets the criteria for a DOT medical examination or ANSI/ASME B30.5-2011 qualifications for operators;
4. A Certificate of Completion;
5. A photograph or permission to gain access to the Massachusetts Registry of Motor Vehicles database if applicant is a resident of Massachusetts;
6. A legible photocopy of a valid driver's license.

In accordance with MGL c. 146, § 67, a notice of the date of expiration of an Apprentice License shall, at least 30 days prior to such date, be sent to the Apprentice Licensee. It is the responsibility of the Apprentice Licensee to notify the Department of any changes to their mailing address and email address. Failure to provide the Department with a valid and current mailing address and email address may result in the delay of an Apprentice License renewal. Apprentice Licenses not renewed at expiration date shall become void, and shall after one year be reinstated only by re-examination of the Apprentice Licensee.

6.03: Issuance of Temporary Permits to Operate Rented Compact Hoisting Machinery

(a) Approval by Department: All individuals or organizations seeking approval to issue Temporary Permits as Short Term Rental Entities shall submit for the Department's approval, the following:

1. A completed application on a form furnished by the Department;
2. A copy of the training program to be used by the Short Term Rental Entity in accordance with 520 CMR 6.00;
   (1) A list of all instructors employed by the rental company, including the names, License numbers with designated type and class of Hoisting Machinery, and expiration

dates;

(2) A course syllabus for each equipment type to be used in the training program;

(3) The minimum topics and texts included as part of the training program curriculum shall include but may not be limited to:

1. MGL c. 146;
2. 520 CMR 6.00;
3. 520 CMR 14.00;
4. OSHA Standards 29 CFR 1926;
5. MGL c. 82, §40;
6. MGL c. 82A;
7. MGL c. 164, §76D;
8. 220 CMR 99.00 (Dig Safe).

3. A copy of the examination(s) to be used;
4. The make and model of the equipment to be used in the training program;
5. the name and Massachusetts Hoisting License number of at least 1 individual who will act as the Short Term Rental Entity Facilitator;
6. A legible photocopy of the Short Term Rental Entity Facilitator's Massachusetts Hoisting License;
7. A legible photocopy of the Short Term Rental Entity Facilitator's driver's license.

The Department shall issue a certificate of approval to individuals or organizations seeking approval to issue Temporary Permits as Short Term Rental Entities. Approval shall be contingent upon having a Short Term Rental Entity Facilitator that holds a valid Massachusetts Hoisting License in the applicant entity's employ.

(b) The Short Term Rental Entity shall have a Short Term Rental Entity Facilitator to monitor all permitting requirements. The Short Term Rental Entity Facilitator shall hold a Massachusetts Hoisting License of equal or greater grade of Massachusetts License than the Compact Hoisting Machinery to be rented and will verify by their signature on the Temporary Permit that all those issued Temporary Permits have fully participated in the Short Term Rental Entity's training program and passed the examination;

(c) If the Short Term Rental Entity Facilitator is no longer employed by the rental entity or is no longer going to serve as the Facilitator, the Short Term Rental Entity shall notify

the Department of the new facilitator within 14 days of the change on a form authorized by the Department. No Temporary Permits shall be issued by the Short Term Rental Entity without a valid Short Term Rental Entity Facilitator approved by the Department.

(d) Requirements for Short-Term Rental Entity Training Program. Short Term Rental Entities shall comply with the following requirements:

(1) Any entity that has been approved by the Department to issue Temporary Permits must have a valid certificate of approval posted visibly at the rental location.
(2) No person shall be issued more than 1 Temporary Permit in any 45 day period from the expiration of said Temporary Permit.

(e) Requirements for Temporary Permits:
(1) All applicants must be at least 18 years of age.
(2) All applicants must possess a valid driver's license to operate a motor vehicle.

(f) All applicants must submit the following documentation to the Short-Term Rental Entity prior to taking the examination for a Temporary Permit:
(1) A complete application to operate a specific type of Compact Hoisting Machinery as provided by the Short-Term Rental Entity;
(2) A legible photocopy of the applicant's valid driver's license.

(g) Issuance of Temporary Permits.

(1) Only upon compliance with the requirements described in 520 CMR 6.03, the Short Term Rental Entity may issue a Temporary Permit to operate the rented Compact Hoisting Machinery during the rental terms. The Temporary Permit shall not be valid for more than 14 consecutive days.
(2) This Temporary Permit shall be on a form authorized by the Department.
(3) The Short Term Rental Entity shall retain the original Temporary Permit application, the examination(s), and duplicates of the Temporary

Permit for a period of 3 years.

(4) Rental facilities shall issue a Temporary Permit (provided on a standard form by the Department) to those who satisfactorily complete and pass an examination. Temporary Permits shall contain the following information:

a. Name of Temporary Permit Holder;

b. Address of Temporary Permit Holder;

d. Name and address of Short Term Rental Entity issuing the Temporary Permit;

e. The printed name and legible signature of the Short Term Rental Entity Facilitator verifying that the participant has completed the permit requirements;

f. the issuance and expiration date of the Temporary Permit;

g. the description of Compact Hoisting Machinery for which the Temporary Permit is valid;

h. the make and model of the piece of Compact Hoisting Machinery that is being rented;

i. a photograph of the Temporary Permit holder.

(h) Short Term Rental Entities that are approved to issue Temporary Permits shall keep uniform records of Temporary Permit Holders documentations and have those records readily accessible to Inspectors of the Department upon request for a period of 3 years. They shall be responsible for the security and retention of all uniform permits and the proper issuance thereof.

(i) Falsification of Documents. The fraudulent issuance of Temporary Permits by any Licensee shall be grounds for initiating formal proceedings under MGL c. 146 § 59 and c. 30A and may be grounds for the Department to immediately suspend or revoke its approval of the Short Term Rental Entity to issue Temporary Permits.

(j) A Temporary Permit is only valid for Compact Hoisting Machinery as defined in 520 CMR 6.01.

(k) A Temporary Permit and a valid driver's license shall be carried on the person of the operator during all times the

operator is operating rented Compact Hoisting Machinery, pursuant to MGL c. 146 § 54, and shall be furnished for inspection by the operator at the request of the Chief or Inspector or the Commissioner.

(l) If a person wishes to rent a piece of Compact Hoisting Machinery more than 45 days after the expiration of a Temporary Permit they must go through an approved Short Term Rental Entity's training program and take the examination again to have a new temporary permit issued.

6.04: Continuing Education and Training Facilities

All Hoisting License holders must complete continuing education requirements of this section prior to license renewal, unless a request for an inactive license status has been made pursuant to 520 CMR 6.04(3).

(1) Continuing Education and Training Facilities.

(a) Approval by Department

All individuals or organizations seeking approval to operate as a Training Facility that offers one or more continuing education course(s) shall submit, for the Department's approval, an application on a form furnished by the Department as well as a copy of all curriculum, training materials, certificates of completion to be used by the facility, and a list including the names and Massachusetts Hoisting Machinery License numbers of all Instructors. Curriculum must contain the minimum topics and associated hours for those topics as listed in 520 CMR 6.04(b)6.

(b) The following provisions are required in order for any institution or organization to have their continuing education program considered for approval:

1. A copy of all curriculum, training material, and Certificate of Completion to be used must be provided to the Department.
2. Curriculum must contain the minimum topics and associated hours for those topics as listed in 520 CMR 6.04(b)6.
3. All courses must be monitored by a Massachusetts Hoisting Licensee of equal or greater grade of Massachusetts License, who will verify by their printed name, legible signature, and hoisting license number on the Certificate of Completion, that all those issued a Certificate of Completion have fully participated in the program for which they have been issued a certificate.
4. Instructors may receive continuing education credits for providing instruction, however Instructors shall only be credited hours for the actual non-redundant time that they have spent actively participating in the

instruction of the program.
5. Method of Verification. Each program must provide a means to ensure certificate authenticity. Such means shall include, but not be limited to:

a. School embossment of certificate; or

b. Computer data transfer of program participants to the Department; or

c. Signature verification; or

d. Numbered certificates and a list of corresponding Licensees.

6. Curriculum. Continuing education programs approved by the Department shall offer a curriculum that, at a minimum, complies with the following requirements for each associated class of Hoisting Machinery licensure:

a. Class 1 (Hoisting) Licenses:

i. The minimum number of continuing education hours required for renewal of a 1A, 1B, or 1C License shall be four (4) classroom hours and two (2) classroom hours for the renewal of a1D License.

ii. The minimum topics and texts included as part of the continuing education curriculum for purposes of renewing a 1A, 1B, 1C, or 1D License shall include but may not be limited to:

1. MGL c. 146;
2. 520 CMR 6.00;
3. 520 CMR 14.00;
4. OSHA Standards 29 CFR 1926;
5. OSHA Standards 29 CFR 1910;
6. ANSI B30;
7. MGL c. 82, §40;
8. MGL c. 82A;
9. MGL c. 164, §76D.

b. Class 2 (Excavation) Licenses:

i. The minimum number of continuing education hours required for renewal of a 2A, 2B, 2C, and 2D License shall be four (4) classroom hours.

ii. The minimum topics and texts included as part of the continuing education curriculum

for purposes of renewing a 2A, 2B, 2C, or 2D License shall include but may not be limited to:

1. MGL c. 146;
2. 520 CMR 6.00;
3. 520 CMR 14.00;
4. OSHA Standards 29 CFR 1926
5. MGL c. 82, §40;
6. MGL c. 82A;
7. MGL c. 164, §76D;
8. 220 CMR 99.00 (Dig Safe).

c. Class 3 (Tower and Electric) Licenses:

i. The minimum number of continuing education hours required for renewal of a 3A License shall be four (4) classroom hours.

ii. The minimum topics and texts included as part of the continuing education curriculum for purposes of renewing a 3A License shall include but may not be limited to:

1. MGL c. 146;
2. 520 CMR 6.00;
3. OSHA Standard 29 CFR 1926;
4. OSHA Standard 29 CFR 1910;
5. ANSI B30.

d. Class 4 (Specialty) Licenses:

i. The minimum number of continuing education hours required for renewal of a 4A License shall be four (4) classroom hours.

ii. The minimum number of continuing education hours required for renewal of a 4B, 4C, 4D, 4E, 4F, or 4G License shall be two (2) hours.

iii. The minimum topics and texts included as part of the continuing education curriculum for purposes of renewing a 4A, 4B, 4C, 4D, 4E, 4F, or 4G License shall include but may not be limited to:

1. MGL c. 146;
2. 520 CMR 6.00;
3. 520 CMR 14.00
4. OSHA Standards 29 CFR 1926;
5. OSHA Standards 29 CFR 1910;
6. ANSI B30;
7. MGL c. 82, §40
8. MGL c. 82A;
9. MGL c. 164, §76D;
10. 220 CMR 99.00 (Dig Safe).

7. List of Instructors. Each program must provide a list including the names and Massachusetts Hoisting Machinery License numbers of all continuing education Instructors employed by the Training Facility. Names and applicable License numbers of Instructors shall be updated by the Training Facility operator within 14 days of the employment or the cessation of employment of an Instructor by a Training Facility on a form furnished by the Department.

(c) Certificates of Completion.

(1) Training Facilities shall issue a Certificate of Completion to Licensees who satisfactorily complete a continuing education course. Upon completion, all Massachusetts operators of Hoisting Machinery shall receive a Department approved certificate, a copy of which shall be retained by the Training Facility. It shall be furnished at the request of the Department. Certificates of Completion shall contain the following information:

a. Name of participant;

b. Address of participant;

c. E-mail address of participant;

d. Massachusetts License grade and number of participant;

e. Name and address of the institution or organization providing the continuing education/assessment;

f. A printed name and legible signature of a Licensee verifying participant has completed the hours as listed on the certificate; and. The License number of the Licensee endorsing the certificate;

h. Date of issuance.

(2) Each program must provide a means to ensure certificate authenticity and shall provide evidence of the means of certification to the Department. Such means shall include:

a. School embossment of certificate; or

b. Computer data transfer of program participants to the Department; or

c. Signature verification; or

d. Numbered certificates and a list of corresponding Licensees.

(d) Program Instructors who are approved to conduct continuing education programs shall keep uniform records of attendance of Licensees and have those records readily accessible to Inspectors of the Department upon request for a period of 3 years. They shall be responsible for the security and retention of all uniform certificates and the proper issuance thereof. Instructors shall verify by signature that participants in continuing education programs have satisfactorily completed the necessary training.

(e) Falsification of Documents. The falsification of attendance records or fraudulent issuance of certificates of completion by any Licensee shall be grounds for initiating formal proceedings under MGL c. 146 § 59 and c. 30A and may also result in immediate suspension or revocation of the License.

(2) Continuing Education Requirements for License Renewal

(a) Subsequent renewals of any License other than Apprentice Licenses that expires in an even year shall expire on the next anniversary of the Licensee's date of birth occurring in an even year. Subsequent renewals of any License other than an Apprentice License that expires in an odd year shall expire on the next anniversary of the Licensee's date of birth occurring in an odd year.
(b) Renewals of Licenses shall be granted upon submission of required documentation pursuant to 520 CMR 6.02.
(c) The Department may accept education, training, or service completed by an individual as a member of the armed forces, as defined in M.G.L. c. 4 § 7, clause 43, or the United States military reserves as an alternative or in addition to submission of required documentation pursuant to 520 CMR 6.02. The applicant shall submit a license renewal application along with a Verification of Military Experience and Training form and any other supporting documentation. The education, training, or service submitted to the Department shall have been completed within 24 months of submission.

(3) Inactive Status.

(a) Any operator of Hoisting Machinery who is unable to obtain the required continuing education necessary to renew their License may request that the License be placed in inactive status for up to 1 continuing education cycle. Such request shall be made in writing on a form furnished by the Department.
(b) Operators holding a License on inactive status shall not be authorized to operate Hoisting Machinery for the time period that the License is inactive.

(c) A determination by the Department that a Licensee may return to active status shall be made following the Department's receipt of a written request by the Licensee on a form furnished by the Department, the required renewal fee, a Certificate of Completion, and submission of required documentation pursuant to 520 CMR 6.02(6).

(4) Expiration. Pursuant to M.G.L. c. 146, Section 67, Licenses not renewed on or before the expiration date shall become void, and shall, after one year, be reinstated only by re-examination of the Licensee in accordance with 520 CMR 6.02. This provision does not apply to Licenses which are considered in inactive status.

(a) License Extension – Military Service. If the licensee is on active duty with the armed forces of the United States, as defined in M.G.L. c. 4 § 7 clause forty- third, the license shall remain valid until the licensee is released from active duty and for a period of not less than 90 days following that release. For this section to apply, the licensee must be given an Honorable Discharge, a General Discharge, or an Under Other than Honorable Conditions (UOTHC) Discharge as noted on their discharge and separation papers.

6.05: Apprentice Licenses

(a) The Department may issue an Apprentice License to currently unlicensed individuals who are registered as apprentices at a Training Facility and submit proof of registration with the Department of Labor Standards pursuant to M.G.L. c. 146, §53A. The Apprentice License shall allow for operation of Hoisting Machinery during the Training Period, provided that the holder operates the Hoisting Machinery only while under the direct guidance of a duly licensed person. The Apprentice License shall be kept on the person of the Apprentice Licensee at all times during the operation of Hoisting Machinery and shall be valid for the term of registration with the Department of Labor Standards.

(b) Training Facilities for Apprentice Licensees Only:

(1) All individuals or organizations seeking approval to operate a Training Facility offering courses limited solely to Apprentice Licensee training courses and not continuing education shall submit a list including the names and Massachusetts Hoisting Machinery License numbers of all Instructors employed by the Training Facility.

(2) Enforcement Date. In order to provide adequate time for individuals and organizations to implement these regulations, the Department shall begin enforcement of 520 CMR 6.05 on January 1, 2014.

6.06: Exempt Companies; Exemptions for Licensing Requirements, Pursuant to M.G.L. c. 146, Section 53

(a) The following companies may be exempt from the licensing and permitting requirements of 520 CMR 6.02 and 6.03, provided that certain provisions are met:

(1) Utility Companies: Utility companies which have self- propelled truck mounted cranes, derricks and similar Hoisting Machinery which is used for the maintenance and construction of the utility company's own equipment.
(2) Companies Operating Solely on Company Property: A company which operates Hoisting Machinery specifically limited to industrial lift trucks, Fork Lifts, overhead cranes and other Hoisting Machinery specifically authorized by the Department and used exclusively on Company Property.
(3) Companies Operating Solely on Utility Property: Any company which has equipment such as cranes, derricks and similar Hoisting Machinery used solely on Utility Company Property.

Subcontractors working for exempt companies are excluded from the provisions for exemption.

(b) For any of the exemptions in this section to apply, the following requirements must be met:

(1) The company must have at least 1 supervisory employee on site at all times of operation who holds a License for the equipment being used, issued by the Department under M.G.L. c. 146, Section 53 and is designated as the responsible person in charge of Hoisting Machinery during that period of operation;
(2) The company must have an In-Service Training program for employees approved by the Department which may be audited by the Department. The In-Service Training program must meet all of the requirements of 520 CMR 6.07;
(3) Company Licenses must be issued to each trained and certified employee and shall contain a picture of the Licensee, a list of the specific Hoisting Machinery the Licensee has been qualified to operate and the printed name and legible signature of the supervisor who holds a Department License to operate that type of equipment.

6.07: In-Service Training Program for Exempt Companies

This section shall apply to In-Service Training programs for Company Licenses for exempt companies as defined in 520 CMR 6.06. All approvals previously issued by the Department for an In-Service Training program will be rescinded 120 days from the date this section goes into effect. All companies must reapply for approval and then must reapply biennially.

(1) Approval by Department: All individuals or organizations seeking approval to operate an In-Service Training program shall submit, for the Department's approval:
    a. A completed application on a form furnished by the Department;

b. Identification of Department-approved curriculum or a copy of company curriculum and training materials, all of which shall incorporate a classroom and a practical component;
c. a list including the names and Massachusetts Hoisting Machinery License numbers of all Instructors, a legible photocopy of Instructors' Massachusetts Hoisting Machinery License, and legible photocopies of the Company Licenses;
d. A list of the type of equipment, including model and make, to be used in the company's In-Service Training program.

(2) The Department shall issue a certificate of approval for In-Service Training programs. Approval shall be contingent upon having a Massachusetts Hoisting License holder in the applicant company's employ.

(3) All In-Service Training Programs must be supervised by a Massachusetts Hoisting Licensee of equal or greater grade of Massachusetts License, who will verify by their printed name and legible signature on the Company License that all those issued Company Licenses have fully participated in the program for which they have been issued a permit.
a. Method of Verification. Each program must provide a means to ensure Company License authenticity. Such means shall include, but not be limited to:

1. Embossment of Company License
2. Computer data transfer of program participants
3. Signature verification
4. Numbered Company Licenses
5. Date of issuance
6. Date of expiration.

(4) In-Service Training Program: In-Service Training programs approved by the Department shall offer a program that, at a minimum, complies with the following requirements for each associated class of Hoisting Machinery licensure:

a. Class 1 (Hoisting) Licenses:

i. The minimum number of continuing education hours required for renewal of a 1A, 1B, or 1C License shall be four (4) classroom hours and two (2) classroom hours for the renewal of a1D License.

ii. The minimum topics and texts included as part of the continuing education curriculum for purposes of renewing a 1A, 1B, 1C, or

1D License shall include but may not be limited to:

1. MGL c. 146;
2. 520 CMR 6.00;
3. 520 CMR 14.00;
4. OSHA Standards 29 CFR 1926;
5. OSHA Standards 29 CFR 1910;
6. ANSI B30;
7. MGL c. 82, §40;
8. MGL c. 82A;
9. MGL c. 164, §76D.

b. Class 2 (Excavation) Licenses:

i. The minimum number of continuing education hours required for renewal of a 2A, 2B, 2C, and 2D License shall be four (4) classroom hours.

ii. The minimum topics and texts included as part of the continuing education curriculum for purposes of renewing a 2A, 2B, 2C, or 2D License shall include but may not be limited to:

1. MGL c. 146;
2. 520 CMR 6.00;
3. 520 CMR 14.00;
4. OSHA Standards 29 CFR 1926
5. MGL c. 82, §40;
6. MGL c. 82A;
7. MGL c. 164, §76D;
8. 220 CMR 99.00 (Dig Safe).

c. Class 3 (Tower and Electric) Licenses:

i. The minimum number of continuing education hours required for renewal of a 3A License shall be four (4) classroom hours.

ii. The minimum topics and texts included as part of the continuing education curriculum for purposes of renewing a 3A License shall include but may not be limited to:

1. MGL c. 146;
2. 520 CMR 6.00;
3. OSHA Standard 29 CFR 1926;
4. OSHA Standard 29 CFR 1910;
5. ANSI B30.

d. Class 4 (Specialty) Licenses:

i. The minimum number of continuing education hours required for renewal of a 4A License shall be four (4) classroom hours.

ii. The minimum number of continuing education hours required for renewal of a 4B, 4C, 4D, 4E, 4F, or 4G License shall be two (2) hours.

iii. The minimum topics and texts included as part of the continuing education curriculum for purposes of renewing a 4A, 4B, 4C, 4D, 4E, 4F, or 4G License shall include but may not be limited to:

1. MGL c. 146;
2. 520 CMR 6.00;
3. 520 CMR 14.00
4. OSHA Standards 29 CFR 1926;
5. OSHA Standards 29 CFR 1910;
6. ANSI B30;
7. MGL c. 82, §40
8. MGL c. 82A;
9. MGL c. 164, §76D;
10. 220 CMR 99.00 (Dig Safe).

(5) Requirements for Company Licenses

(1) Facilities shall issue a Company License to those who satisfactorily complete an In-Service Training program and pass an examination. Company Licenses shall contain the following information:

a. Name of company Licensee;

b. Address of company Licensee;

c. Name and address of the institution or organization providing the In-Service Training program;

d. The printed name and legible signature of a Massachusetts Hoisting Licensee verifying participant has completed the In-Service Training program;

e. The License number of the Licensee endorsing the Company License.

f. A photograph of the company Licensee.

(6) Exempt Companies that are approved to conduct In-Service Training programs shall keep uniform records of company Licensees and have those records readily accessible to Inspectors of the Department upon request for a period of 3 years. They shall be responsible for the security and retention of all uniform Company Licenses and the proper issuance thereof. Instructors shall verify by signature that participants in In-Service Training programs have satisfactorily completed the necessary training.

(7) Falsification of Documents. The falsification of attendance records or fraudulent issuance of Company Licenses by any Massachusetts Hoisting Licensee shall be grounds for initiating formal proceedings under M.G.L. c. 146 section 59 and c. 30A and may also be grounds for the immediate revocation or suspension of the approval to issue Company Licenses.

(8)Approval for any In-Service Training program shall be valid for 2 years from the date of issuance.

6.08: Operating Procedures for Hoisting Machinery

(1) All Hoisting Machinery shall be operated in accordance with the manufacturer's specifications. In the event the manufacturer does not exist, a Massachusetts registered professional engineer shall review and approve, in writing, the actions and reasons for said specifications. The manufacturer or the professional engineer shall demonstrate to the Department upon request, from standards or from the maintenance manual, that the specifications will not compromise the integrity of the Hoisting Machinery and public safety. Prior to operation, the operator shall perform the following:

(a) Maintenance. Maintenance, repair and refueling shall be done when the machine is inoperable and secure.

(b) Required Inspections. Visual inspection shall be made daily of wire ropes, bearings, gears, friction clutches, brakes, chain drives and other parts subject to wear on all Hoisting Machinery to ensure against development of unsafe conditions. A daily log sheet in accordance with 29 CFR 1926 and 29 CFR 1910 inspectional methods shall be available to the Department during the useful life of the machine.

(c) Additional Requirements.

(1) A written and signed record of all inspections shall be kept with the Hoisting Machinery and made available at the site for examination by the Department that conforms with the requirements of 29 CFR 1926.1412.

(2) Prior to starting any Hoisting Machinery, the operator must make a complete walk -around of the equipment to verify people are clear of the equipment, and that it is in a safe condition.

(3) The operator shall not engage in any practice that will divert their attention while engaged in operating the Hoisting Machinery.

(4) At no time shall the operator of Hoisting Machinery operate or be required to operate the Hoisting Machinery beyond its rated capacity without the manufacturer's written approval which shall include a new chart showing the new limitations. Other than assembly/disassembly, the use of the load moment indicator override key or the entering of false crane set-up criteria to increase rated capacity is strictly forbidden.

(5) The operator shall operate Hoisting Machinery only when fully attentive. The operator shall not operate the equipment erratically and/or under the influence of alcohol or drugs. When an operator is physically or mentally unfit, the operator shall not operate Hoisting Machinery.

(6) Prior to operating Hoisting Machinery with a rotating superstructure, safety procedures such as but not limited to: the erection of barricades, warning lines or other procedures shall be used to prevent entry into the swinging superstructure's radius.

(7) All controls shall be tested by the operator prior to operating the Hoisting Machinery. If any controls are found to be functioning improperly, repairs shall be made in accordance with manufacturer's requirements prior to the operation of the Hoisting Machinery.

(8) Operators shall respond only to signals given by a Signal Person except in emergency situations.

(9) If a warning signal is furnished by the operator, it shall be sounded each time before traveling, and intermittently during travel particularly when approaching people.

(10) The operator shall be responsible for those operations under

their direct control. When there is any doubt as to the safety of any action, the operator shall have the authority to stop and refuse to handle loads until safety has been assured.

(11) The operator is responsible for securing any unattended Hoisting Machinery in accordance with applicable manufacturer's specifications.

(12) If power fails during operation of any Hoisting Machinery, the operator shall secure the machine prior to leaving the equipment. When practical, suspended loads shall be landed under brake control.

(13) At no time shall persons work under a boom or a load suspended thereon except in the case of tower cranes.

(14) All manufacturer's load charts and operation manuals shall be kept in the Hoisting Machinery.

(15) All applicable power line clearances shall be maintained.

(16) Hoisting Machinery equipped with outriggers/stabilizers shall be used, with adequate blocking, according to manufacturer's specifications or surface conditions.

(17) Dig Safe. Prior to any excavation, Dig Safe and other utilities not covered by Dig Safe must be notified. The operator must have a Dig Safe permit number, start date, and time.

6.09: Special Requirements for Cranes, Derricks, Pile Drivers, Excavating Machines, Fork Lifts, and Hoists

The operator shall not operate the Hoisting Machinery unless the following requirements are met:

Special Requirements for Cranes

(1) Loading. Material moving, handling or Hoisting Machinery shall be loaded in accordance with the manufacturer's specifications. Manufacturers' load-rating plates or applicable load charts shall be kept in the cab of the crane in clear view of the operator. Rating plates or load charts for boom cranes shall clearly indicate the safe load for maximum and minimum positions of the boom and for at least two intermediate positions. The procedures applicable to the operation of the equipment, including instructions, recommended operating speeds, special hazard warnings, and Operator's Manual, must be readily available in the cab at

all times for use by the operator. Where rated capacities are available in the cab only in electronic form: In the event of a failure which makes the rated capacities inaccessible, the operator must immediately cease operations or follow safe shut-down procedures until the rated capacities (in electronic or other form) are available.

(2) Boom Stops. Devices to prevent the boom from falling over backward shall be provided on cranes. Cable boom stops by themselves shall not be considered as adequate for this purpose.

(3) Speed Controls and Stops. Hoisting Machinery operating on rails, tracks or trolleys shall be equipped with speed controls and shall have positive stops or limiting devices to prevent overrunning safe limits.

(4) Equipment Modifications. Any Modification made to Hoisting Machinery shall maintain at least the same factor of safety as the original designed equipment. A record of the differences between the unmodified machinery and the modified machinery shall be maintained by the owner of the machinery and furnished to the Department upon request. All Modifications shall be done with the manufacturer's written approval. If the manufacturer's written approval cannot be obtained, the owner shall have a professional engineer create and certify a procedure which shall be added to the permanent record of the equipment.

(5) Protection of Operator. The operator of material handling and moving equipment when exposed to overhead hazards or the elements shall be protected with a cab or equivalent covering affording adequate protection but which shall not cut off his vision of the load movements. All windows in cabs shall be of safety glass, or equivalent, that introduces no visible distortion that will interfere with the safe operation of the machine.

(6) Required Presence. Operators of material moving, handling or Hoisting Machinery shall remain at the controls while the load is suspended, except in cases where loss of power occurs in which case operators shall act pursuant to 520 CMR 6.08(1)(c)(12). The operator of the machine shall not leave the machine while the master clutch is engaged.

(7) Erection or Dismantling. Crane erection or dismantling shall be performed in accordance with the manufacturer's specifications and 29 CFR 1926, under the supervision of his representative or other persons experienced in erection and/or dismantling of this type of equipment. The attachments used with cranes shall not exceed the capacity, rating or scope recommended by the manufacturer.

(8) Factor of Safety. All parts of the crane and supports shall be designed, constructed and maintained to withstand all stresses resulting from intended use with a safety factor of not less than 2.0.

(9) Capacity Schedule/Load Charts. Each crane model shall contain a schedule of load capacities in the operator's station at all times.

(10) Tower Crane Foundations. Tower crane foundations must be designed by the manufacturer or a registered professional engineer.

(11) Wind Speed. Wind speed must not exceed manufacturer's recommendations for continued work operations.

(12) Tower Crane Safety Devices. All required safety devices for tower cranes must be installed and properly functioning.

(13) Tower Crane operational Aids. All required operational aids for tower cranes must be installed and functioning properly or approved temporary alternative measures in place.

Special Requirements for Derricks

Required Inspection. Guys, cable clamps and other rigging shall be visually checked by the operator at the beginning of each work day and before making any lifts that are near the capacity of the rig or as otherwise required by the manufacturer.

Frequent checking by a duly licensed person of lead cables and mast foot blocks shall be performed to ensure that cables are not crossed or fouled. Lead line blocks shall be checked frequently to ensure that they are properly secured. Leads shall be so arranged as to minimize tripping hazards.

Special Requirements for Pile Drivers

(1) Inspection. All pile driving equipment shall be inspected daily before the start of work by a licensed operator of the equipment and all unsafe conditions and defective parts shall be corrected before beginning operations.

(2) Driver Not in Use. When the pile driver is not in use, the hammer shall be chocked or blocked in the leads or lowered to the ground.

(3) Temporary Interruption. The operator of every pile driver shall remain at his post when the driving is interrupted until the hammer has been chocked or blocked in the leads, or has been lowered and is resting on a driven pile or on the ground.

(4) Jib Attachment. Pile drivers shall not be used with a jib attached.

(5) Stop Blocks. Stop blocks shall be provided for the leads to prevent the hammer from being raised against the head block.

Special Requirements for Fork Lifts

Only a duly licensed operator or Apprentice Licensee under the direct supervision of a duly licensed operator shall operate a Fork Lift. No Fork Lift shall be loaded beyond its capacity rating.

(1) Brakes. Every power operated Fork Lift shall be equipped with adequate wheel brakes.

(2) Operation. No Fork Lift shall be operated at unsafe speeds. No person except a duly licensed operator or Apprentice Licensee under the direct supervision of a duly licensed operator shall be permitted on a Fork Lift while it is in operation.

Special Requirements for Excavating Machines, including backhoes and frontend loaders

(1) Dig Safe. Prior to any excavation, Dig Safe and other utilities not covered by Dig Safe must be notified. The operator must have a Dig Safe permit number, start date, and time.

(2) Protection of Operator. Where the operator of an excavating machine may be exposed to the elements or overhead hazards, a suitable equipped cab for protection against such conditions shall be provided.

(3) Operation. Excavating machines shall be operated by a Licensee, Temporary Permit Holder, or an Apprentice Licensee under the direct supervision of a duly licensed operator. SAE hand signals shall be used with excavating machinery. No person except the operating crew or Apprentice Licensee operating under the direct supervision of a duly licensed operator shall be permitted on an excavating machine while it is in operation. No person other than the pitman and excavating crew shall be permitted to stand within the full working radius of an excavator or backhoe while the shovel or backhoe is in operation. Excavating machinery shall not be allowed to straddle an open trench.

Special Requirements for Crane or Derrick Suspended Personnel Platforms

The hoisting, lowering, swinging, or traveling while anyone is on the load or hook is prohibited except when the use of a conventional means of access to any

elevated worksite would be impossible or more hazardous. Operations must comply with the provisions of 29 CFR 1926.550(g)(3), (4), (5), (6), (7), and (8).

Crane and Derrick Operations. Where conventional means (e.g., scaffolds, ladders) of access would not be considered safe, personnel hoisting operations, which comply with the terms of this regulation, would be authorized.

Cranes and derricks used to hoist personnel must be placed on a firm foundation and the crane or derrick must be uniformly level within 1 percent of level grade.

The crane operator must always be at the controls when the crane engine is running and the personnel platform is occupied. The crane operator also must have full control over the movement of the personnel platform. Any movement of the personnel platform must be performed slowly and cautiously without any sudden jerking of the crane, derrick, or the platform. Wire rope used for personnel lifting must have a minimum safety factor of seven. Rotation resistant rope must have a minimum safety factor of ten.

When the occupied personnel platform is in a stationary position, all brakes and locking devices on the crane or derrick must be set.

The combined weight of the loaded personnel platform and its rigging must not exceed 50 percent of the rated capacity of the crane or derrick for the radius and configuration of the crane or derrick.

Instruments and Components. Cranes and derricks with variable angle booms must have a boom angle indicator that is visible to the operator. Cranes with telescoping booms must be equipped with a device to clearly indicate the boom's extended length, or an accurate determination of the load radius to be used during the lift must be made prior to hoisting personnel. Cranes and derricks also must be equipped with (1) an anti-two-blocking device that prevents contact between the load block and overhaul ball and the boom tip, or (2) a two-block damage-prevention feature that deactivates the hoisting action before damage occurs.

Personnel Platforms. Platforms used for lifting personnel must be designed with a minimum safety factor of five and designed by a professional engineer or a qualified person competent in structural design. The suspension system must be designed to minimize tipping due to personnel movement on the platform.

Each personnel platform must be provided with a standard guardrail system that is enclosed from the toeboard to the mid-rail to keep tools, materials, and equipment from falling on employees below. The platform also must have an inside grab rail, adequate headroom for employees, and a plate or other permanent marking that clearly indicates the platform's weight and rated load capacity or maximum intended load. When personnel are exposed to falling objects, overhead protection on the platform and the use of hard hats are required.

An access gate, if provided, must not swing outward during hoisting and must have a restraining device to prevent accidental opening.

All rough edges on the platform must be ground smooth to prevent injuries to employees.

All welding on the personnel platform and its components must be performed by a Qualified Welder who is familiar with weld grades, types, and materials specified in the platform design.

Loading. The personnel platform must not be loaded in excess of its rated load capacity or its minimum intended load. Only personnel instructed in the requirements of the regulation and the task to be performed—along with their tools, equipment, and materials needed for the job—are allowed on the platform. Materials and tools must be secured and evenly distributed to balance the load while the platform is in motion.

Rigging. When a wire rope bridle is used to connect the platform to the load line, the bridle legs must be connected to a master link or shackle so that the load is evenly positioned among the bridle legs. Bridles and associated rigging for attaching the personnel platform to the hoist line must not be used for any other purpose.

Attachment assemblies such as hooks must be closed and locked to eliminate the hook throat opening; an alloy anchor-type shackle with a bolt, nut, and retaining pin may be used as an alternative. "Mousing" (wrapping wire around a hook to cover the hook opening) is not permitted.

Inspecting and Testing. A trial lift of the unoccupied personnel platform must be made before any employees are allowed to be hoisted. During the trial lift, the personnel platform must be loaded at least to its anticipated lift weight. The lift must start at ground level or at the location where employees will enter the platform and proceed to each location where the personnel platform is to be hoisted and positioned. The trial lift must be performed immediately prior to placing personnel on the platform.

The crane or derrick operator must check all systems, controls, and safety devices to ensure the following:

(1) They are functioning properly.
(2) There are no interferences.
(3) All boom or hoisting configurations necessary to reach work locations will allow the operator to remain within the 50-percent load limit of the hoist's rated capacity.

If a crane or derrick is moved to a new location or returned to a previously used one, the trial lift must be repeated before hoisting personnel.

After the trial lift, the personnel platform must be hoisted a few inches and inspected to ensure that it remains secured and is properly balanced.

Before employees are hoisted, a check must be made to ensure the following:

(1) Hoist ropes are free of kinks.
(2) Multiple part lines are not twisted around each other.
(3) The primary attachment is centered over the platform.
(4) There is no slack in the wire rope.
(5) All ropes are properly seated on drums and in sheaves.

Immediately after the trial lift, a thorough visual inspection of the crane or derrick, the personnel platform, and the crane or derrick base support or ground must be conducted by a Competent Person to determine if the lift test exposed any defects or produced any adverse effects on any component or structure. Any defects found during inspections must be corrected before hoisting personnel.

When initially brought to the job site and after any repair or modification, and prior to hoisting personnel, the platform and rigging must be proof tested to 125 percent of the platform's rated capacity. This is achieved by holding the loaded platform-with the load evenly distributed-in a suspended position for 5 minutes. A Competent Person must inspect the platform and rigging for defects. If any problems are detected, they must be corrected and another proof test must be conducted. Personnel hoisting must not be conducted until the proof testing requirements are satisfied.

Pre-Lift Meeting. The employer must hold a meeting with all employees involved in personnel hoisting operations (crane or derrick operator, signal person(s), employees to be lifted, and the person responsible for the hoisting operation) to review the provisions of 29 CFR 1926.550(g)(3), (4), (5), (6), (7), (8), 520 CMR 6.09, and the procedures to be followed before any lift operations are performed.

This meeting must be held before the trial lift at each new work site and must be repeated for any employees newly assigned to the operation.

Safe Work Practices. Employees must follow these safe work practices:

(1) Use tag lines unless their use creates an unsafe condition.
(2) Keep all body parts inside the platform during raising, lowering, and positioning.
(3) Make sure a platform is secured to the structure where work is to be performed before entering or exiting it, unless such securing would create an unsafe condition.

(4) Wear a body belt or body harness system with a lanyard. The lanyard must be attached to the lower load block or overhaul ball or to a structural member within the personnel platform. If the hoisting operation is performed over water, the requirements 29 CFR 1926.106—Working over or near water—must apply.
(5) Stay in view of, or in direct communication with, the operator or signal person.

Crane and derrick operators must follow these safe work practices:

(1) Never leave crane or derrick controls when the engine is running or when the platform is occupied.
(2) Stop all hoisting operations if there are indications of any dangerous weather conditions or other impending danger.
(3) Do not make any lifts on another load line of a crane or derrick that is being used to hoist personnel.

Movement of Cranes. Personnel hoisting is prohibited while the crane is traveling except when the employer demonstrates that this is the least hazardous way to accomplish the task or when portal, tower, or locomotive cranes are used.

When cranes are moving while hoisting personnel, the following rules apply:

(1) Travel must be restricted to a fixed track or runway.
(2) Travel also must be limited to the radius of the boom during the lift.
(3) The boom must be parallel to the direction of travel.
(4) There must be a complete trial run before employees occupy the platform.
(5) If the crane has rubber tires, the condition and air pressure of the tires must be checked and the chart capacity for lifts must be applied to remain under the 50-percent limit of the hoist's rated capacity. Outriggers may be partially retracted as necessary for travel.

6.10: Classification of Licenses; Qualifications

(1) CLASS 1 - HOISTING
(a) 1A Prerequisites:
1. The applicant shall meet the prerequisites as listed in 520 CMR 6.02.
2. The applicant shall display knowledge of the crane operator ASME hand signals.
3. The applicant must be able to read and comprehend load charts and manufacturer’s specifications.

(b) 1A Operators may operate:
1. All friction clutch machines and all derricks (including guy derricks, stiff legs, Chicago booms, gin poles);

2. Lattice boom machinery and may also require a 3A License in accordance with 6.10 (3);
3. All wire rope machines;
4. All equipment listed in classes 1B,1C, and 1D;

(c) 1B Prerequisites:
1. The applicant must meet the prerequisites as listed in 520 CMR 6.02. The applicant shall display knowledge of the crane operator hand signals. The applicant must be able to read and comprehend load charts and manufacturers specifications.

(d) 1B Operators may operate:
1. All equipment having telescoping boom and wire rope;
2. All equipment listed in class 1C and class 1D;

(e) 1C Prerequisites:
1. The applicant must meet the prerequisites as listed in 520 CMR 6.02.
2. The applicant must be able to read and comprehend load charts and manufacturer's specifications.

(f) 1C Operators may operate:
1. Equipment with hydraulic telescoping booms and any other hydraulic equipment designed for the purpose of hoisting, excluding those with wire rope hoist lines; all equipment listed in class 1D.

(g) 1D Prerequisites: The applicant must meet the prerequisites as listed in 520 CMR 6.02.

(h) 1D Operators may operate:
1. General industrial warehouse Fork Lift equipment primarily used in indoor facilities.

(2) CLASS 2 – EXCAVATING

(a) 2A Prerequisites:
1. The applicant must meet the prerequisites as listed in 520 CMR 6.02.
2. Knowledge of hand signals for controlling crawler/excavator operations

(b) 2A Operators may operate:
1. All crawler and rubber tired excavators and backhoes;
2. Equipment listed in classes 2B, 2C and 2D.;

(c) 2B Prerequisites:
1. The applicant must meet the prerequisites as listed in 520 CMR 6.02.

2B Operators may operate:

1. Combination loader/backhoe machines;
2. Equipment listed in Class 2C and class 2D;

(d) 2C Prerequisites:

1. The applicant must meet the prerequisites as listed in 520 CMR 6.02.

2C Operators may operate:

1. Front end loaders;
2. Equipment listed in Class 2D

(e) 2D Prerequisites:

1. The applicant must meet the prerequisites as listed in 520 CMR 6.02.

2D Operators may operate:

1. Compact Hoisting Machinery with a gross vehicle weight not exceeding 10,000 pounds, excluding Class 1, Class 3, and Class 4 Hoisting Machinery as listed in 520 CMR 6.10.

(3) CLASS 3 – TOWER/ELECTRIC AND AIR.

(a) 3A Operators Prerequisites:

1. The applicant must meet the prerequisites as listed in 520 CMR 6.02.
2. The applicant must be able to read and comprehend load charts and manufacturer's specifications.

(b) 3A Operators may operate:

1. Tower – Derricks and Self-erecting Tower Cranes
2. Persons holding a 1A3A may also operate a tower/derrick crane.

(4) CLASS 4 - SPECIALTY. Operators may operate the equipment listed in 4(a)-(g) below:

(a) 4A: 4B- 4G
(b) 4B: Drill Rigs
(c) 4C: Pipeline Side booms
(d) 4D: Concrete Pumps
(e) 4E: Catch Basin Cleaner
(f) 4F: Sign Hanging Equipment
(g) 4G: Specialty Lawn Mower

6.11: Operation of Hoisting Machinery; Accident Reporting

(1) Operators of Hoisting Machinery shall cease operating if ordered by the Department to do so. Conditions which shall warrant immediate cessation of operation may include but not limited to:

(a) Serious Injury; or
(b) Any condition that is necessary for the preservation of the public health or safety as determined by the Inspector.

(2) Operators of Hoisting Machinery shall immediately surrender their Hoisting License or Temporary Permit if ordered by the Department to do so pursuant to M.G.L. 146 §53.

(3) Any person found operating Hoisting Machinery without a License, Temporary Permit, Apprentice License or proper classification of Hoisting License according to 520 CMR 6.00 *et seq.* shall immediately cease operating. Said person shall make his identity known to the Department with a valid government-issued form of photographic identification.

(4) Notification/Investigation.

(a) Notification. Any Incident which results in Serious Injury, Property Damage, or any condition that is necessary for the preservation of the public health or safety at a site where Hoisting Machinery is operational must be reported by the Licensee operating the Hoisting Machinery or owner or owner's representative to the Department through the Department Incident Hotline at (508) 820-1444 within one (1) hour from the time that the Incident occurred or was discovered. The Hoisting Machinery shall not be moved or dismantled from the site of the Incident until the Department has investigated the Incident and approval is granted by an Inspector. The only exception to this requirement is for preservation of life and property, the removal of injured persons or bodies or to permit the flow of emergency vehicles. The Hoisting Machinery and area surrounding the Hoisting Machinery shall not be disturbed, cleaned, or altered in any way that will impede the investigation. The Department shall investigate the Incident pursuant to M.G.L. c. 146, §§53, 54A and 55.

(b) Investigation. In the event that an Incident occurs in accordance to the provisions of 6.11(4)(a), the Hoisting Machinery shall be immediately shut down and secured by the operator until an Inspector has completed an investigation. No person shall move or alter the Incident scene or the Hoisting Machinery, except to remove the victim(s), until the Inspector has completed the investigation and determined that the Hoisting Machinery is safe. Incidents shall be reported within one (1) hour to the Department through the Department Incident Hotline at (508) 820-1444 and a written report shall be submitted to the Department within 48 hours. The Hoisting Machinery, operator, and owner of the Hoisting Machinery shall be accessible to the Department.

6.12: Suspension, Revocation, and Appeals of Licensing, Certification, and Temporary Permitting

(1) Where the Commissioner, Chief, or any Inspector determines that circumstances indicate the denial or immediate suspension or revocation of a License or Temporary Permit or Company certificate of approval to operate Hoisting Machinery is necessary for the preservation of the public health or safety, they may deny, revoke or suspend depending on the severity of the offense. Any License covered under 520 CMR 6.00 may be revoked or suspended for the following reasons:

(a) False or misleading information on application for examination or License renewal.
(b) Operating Hoisting Machinery under the influence of alcohol or drugs.
(c) Failure to pay excise tax or other taxes.
(d) Failure to report Accidents as required by the Department of Public Safety.
(e) Failure to report a Serious Injury as required by the Department of Public Safety.
(f) Operating in an unsafe manner.
(g) Failure to comply with any provision of this regulation;
(h) Failure to comply with 520 CMR 14.00.
(i) Failure to comply with M.G.L. c. 146, §§53-56.
(j) The fraudulent or otherwise improper issuance of Temporary Permits.
(k) The fraudulent or otherwise improper issuance of any Company License.

(2) A Licensee aggrieved by the action taken by the Commissioner, Chief or an Inspector, pursuant to Chapter 146, § 53 in suspending or revoking their License or Temporary Permit to operate Hoisting Machinery may, within one week, appeal from such decision to the Chief who shall appoint three Inspectors of the Department, or himself and two Inspectors, to act together as a board of appeal. The decision of a majority of the members of the board of appeal shall be final and may be appealed in accordance with M.G.L. c. 30A. All hearings will be held in accordance with M.G.L. c. 30A and 801 CMR 1.02.

6.13: Variance Procedure

Variance.

(a) Any person who believes that full compliance with 520 CMR 6.00 is overly burdensome may apply to the Department for a variance from 520 CMR 6.00.

The burden is on the applicant to demonstrate in writing to the Department that the granting of the variance would not compromise public safety or otherwise undermine the purpose of 520 CMR 6.00. Applications for a variance shall be made on a form provided by the Department for this purpose and shall contain such information as is required by the Department, and shall be signed by the applicant.

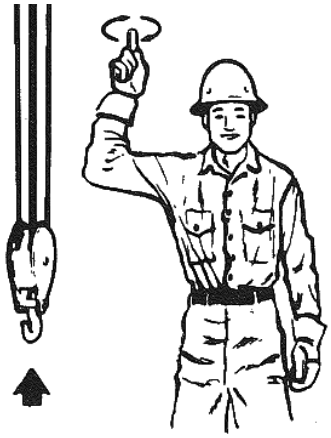
(b) Upon receipt of an application for a variance, the Commissioner, or his designee may:

1. Grant the application with whatever conditions are deemed appropriate; or
2. Deny the application without a hearing;

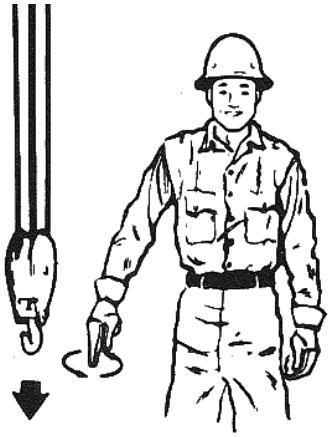
(c) Any person aggrieved by this decision may file a request for an adjudicatory hearing with the Department within 30 days of receipt of the decision. All adjudicatory hearings shall be held in accordance with the provisions of M.G.L. c. 30A and 801 CMR 1.02. Any person aggrieved by a decision made after an adjudicatory hearing may appeal to the Superior Court in accordance with M.G.L. c. 30A, § 14.

REGULATORY AUTHORITY
520 CMR 6.00: M.G.L. c. 146, 53 through 54A.
Appendix A
CRANE HAND SIGNALS

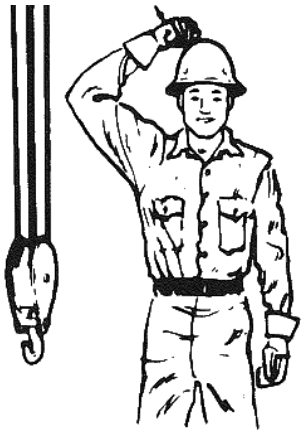
1. ANSI/ASME B30.5-2011 Mobile and Locomotive Cranes



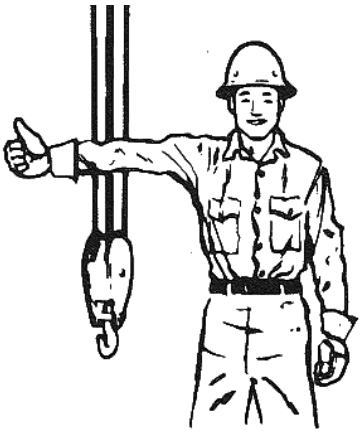
Hoist
With forearm vertical, forefinger pointing up, move hand in small horizontal circle.



Lower
With arm extended downward, forefinger pointing down, move hand in small horizontal circle.

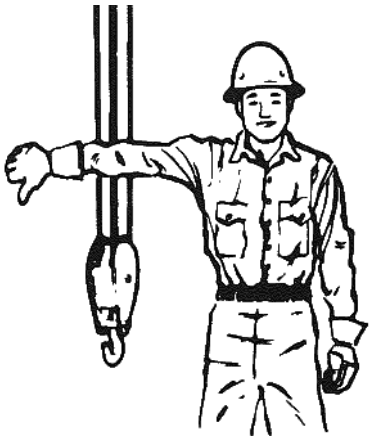


Use Main Hoist
Tap fist on head; then use regular signals.

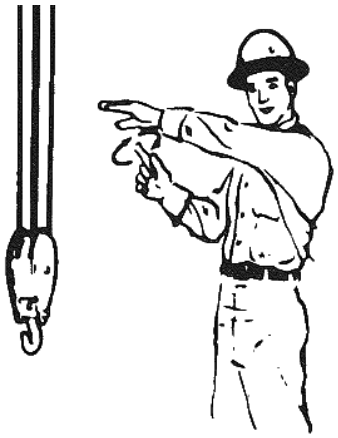


Raise Boom
Arm extended, fingers closed, thumb pointing upward.

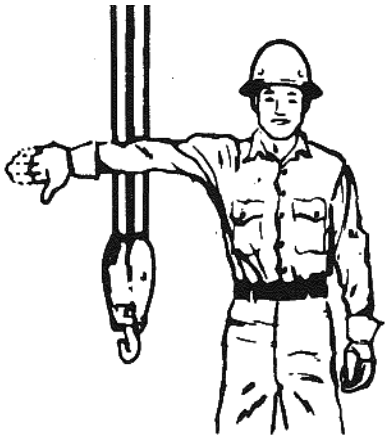
Use Whipline (Auxiliary Hoist)
Tap elbow with one hand; then use regular signals.



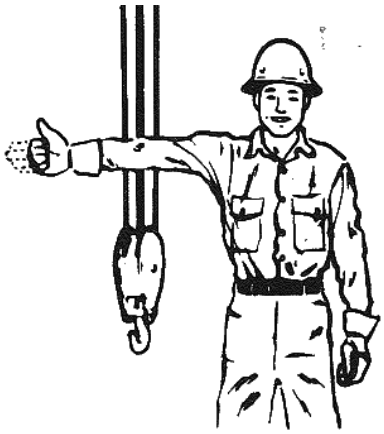
Lower Boom
Arm extended, fingers closed, thumb pointing downward.



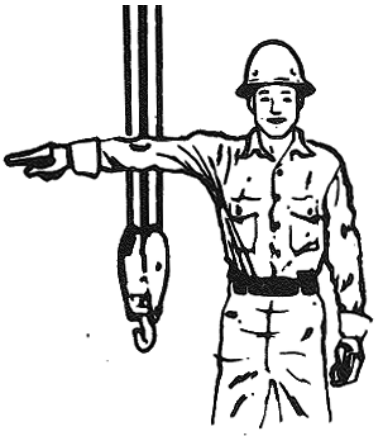
Move Slowly
Use one hand to give any motion signal and place other hand motionless in front of hand giving the motion signal. (Hoist slowly shown as example.)



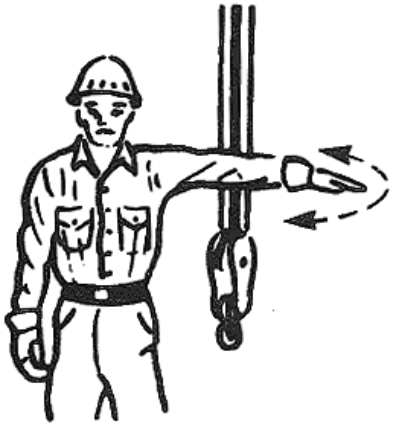
Lower the Boom and Raise the Load
With arm extended, thumb pointing down, flex fingers in and out as long as load movement is desired.



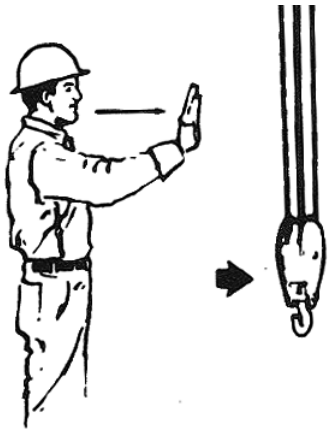
Raise the Boom and Lower the Load
With arm extended, thumb pointing up, flex fingers in and out as long as the load movement is desired.



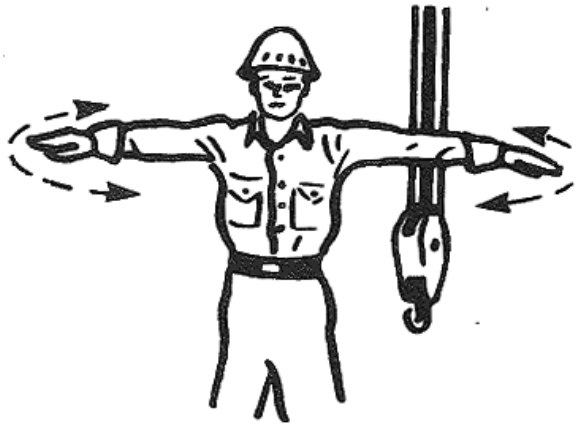
Swing
Arm extended, point with finger in direction of swing of boom.



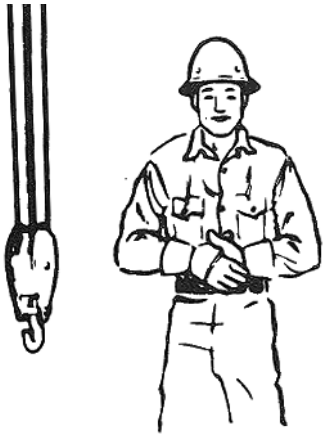
Stop
Arm extended, palm down, move arm back and forth horizontally.



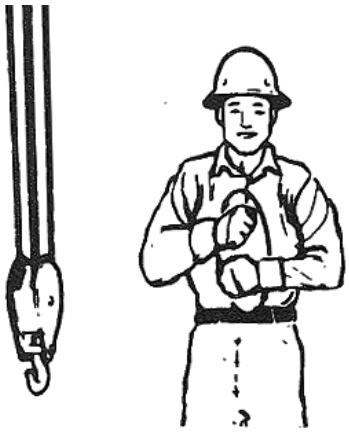
Travel
Arm extended forward, hand open and slightly raised, make pushing motion in direction of travel.



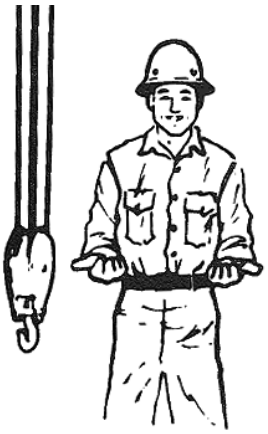
Emergency Stop
Both arms extended, palms down, move arms back and forth horizontally.



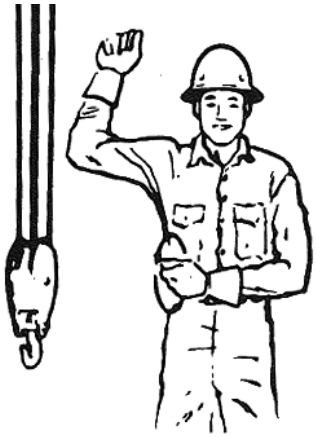
Dog Everything
Clasp hands in front of body.



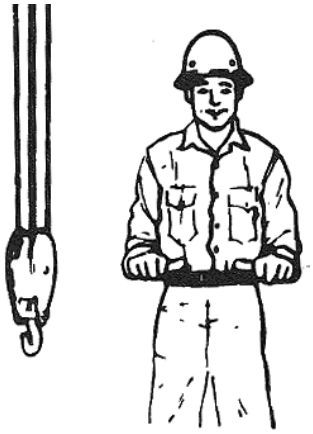
Travel (Both Tracks)
Use both fists in front of body, making a circular motion about each other, indicating direction of travel, forward or backward. (For land cranes only.)



Extend Boom (Telescoping Booms)
Both fists in front of body with thumbs pointing outward.

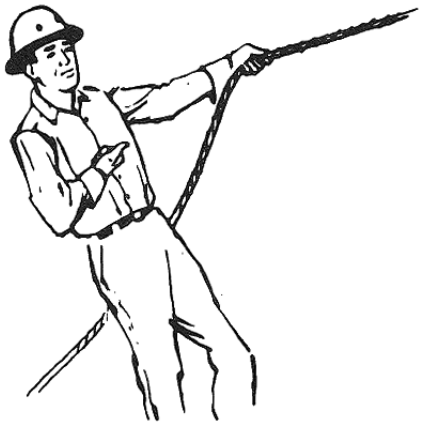


Travel (One Track)
Lock the track on side indicated by raised fist. Travel opposite track in direction indicated by circular motion of other fist, rotated vertically in front of body. (For land cranes only.)



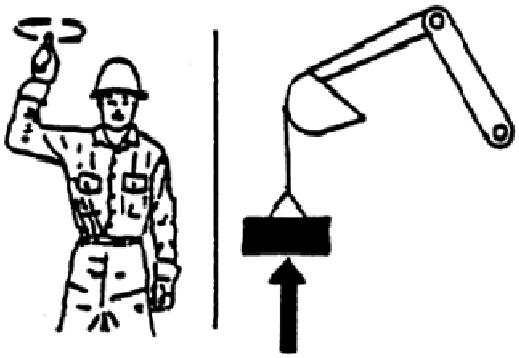
Retract Boom (Telescoping Booms)
Both fists in front of body with thumbs pointing toward each other.

Extend Boom (Telescoping Boom)
One Hand Signal. One fist in front of chest with thumb tapping chest.

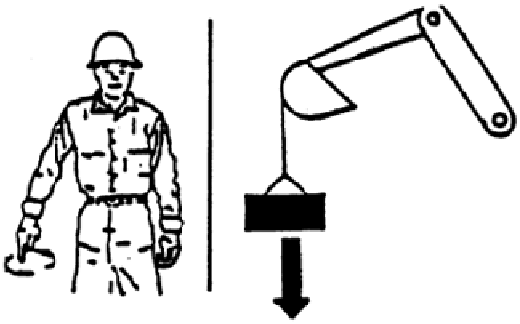


Retract Boom (Telescoping Boom)
One Hand Signal. One fist in front of chest, thumb pointing outward and heel of fist tapping chest.

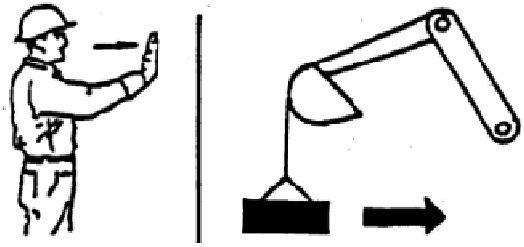
Appendix B
EXCAVATOR AND BACKHOE HAND SIGNALS
(2) SAE Excavator and Backhoe Hand Signals



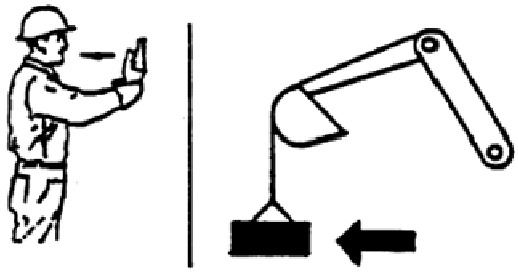
Raise Load Vertically
With either forearm vertical, forefinger pointing up, move hand in small horizontal circle.



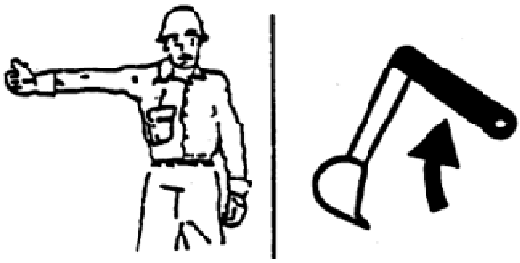
Lower Load Vertically
With either arm extended downward, forefinger pointing down, move hand in small horizontal circle.



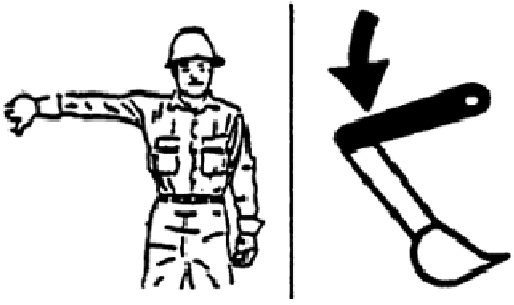
Move Load In Horizontally
With either arm extended, hand raised and open toward direction of movement, move hand in direction of required movement.



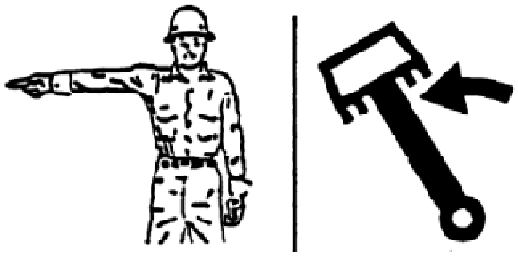
Move Load Out Horizontally
With either arm extended, hand raised and open toward direction of movement, movehand in direction of required movement.



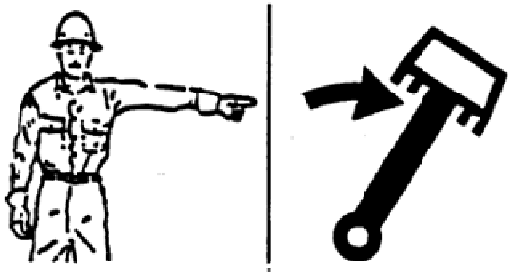
Raise Boom
With either arm extended horizontally, fingers closed, point thumb upward.



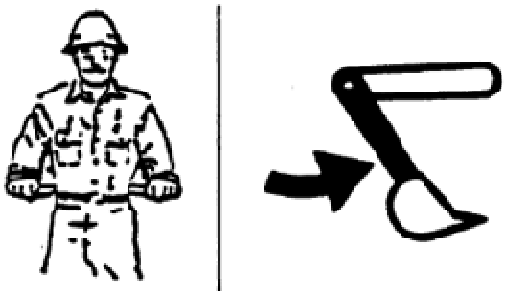
Lower Boom
With either arm extended horizontally, fingers closed, point thumb downward.



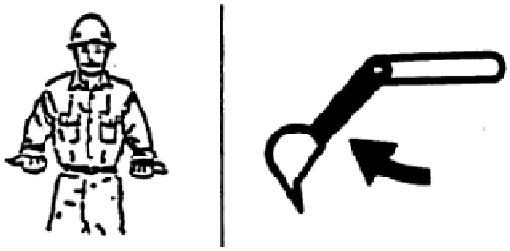
Swing
With either arm extended horizontally, point with forefinger to direction of swing rotation.



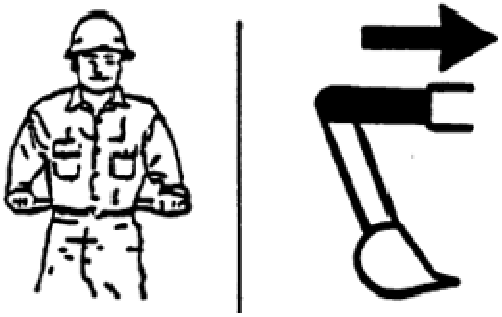
Swing
With either arm extended horizontally, point with forefinger to direction of swing rotation.



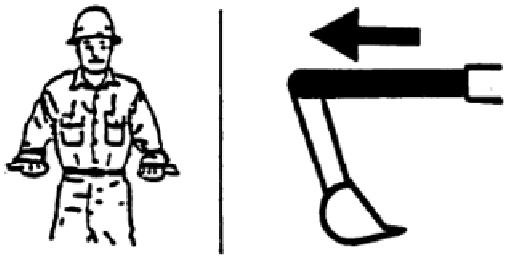
Arm/Dipperstick Inward
With both hands clenched, point thumbs inward.



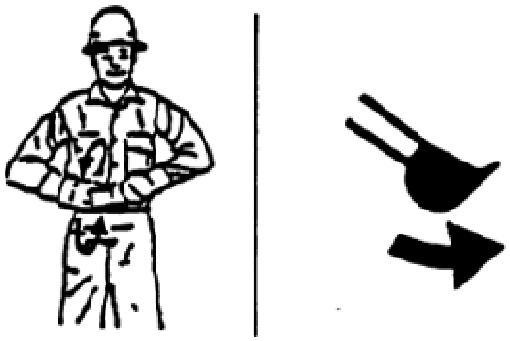
Arm/Dipperstick Outward
With both hands clenched, point thumbs outward.



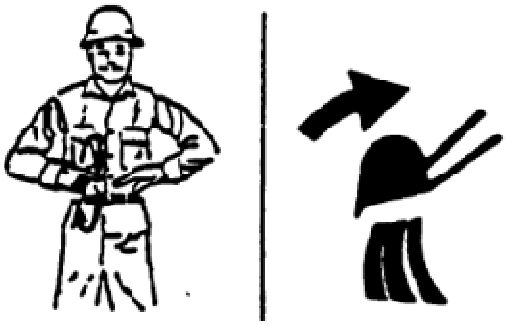
Retract Telescopic Boom
With both hands clenched, point thumbs inward.



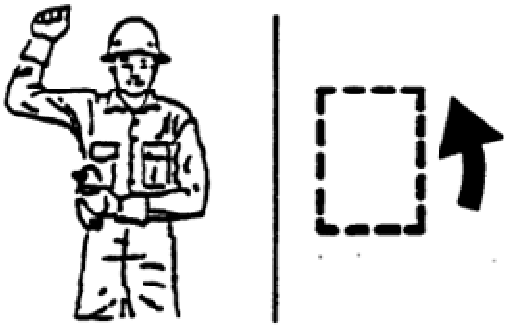
Extend Telescopic Boom
With both hands clenched, point thumbs outward.



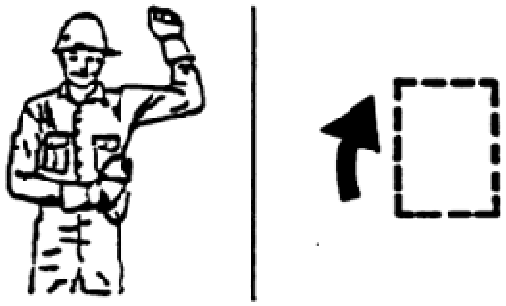
Close Bucket
Hold one hand closed and stationary. Rotate other hand in small vertical circle with forefinger pointing horizontally at closed hand.



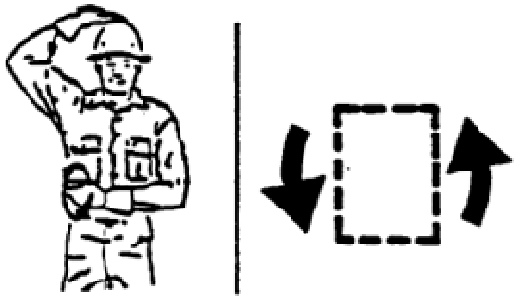
Open Bucket
Hold one hand open and stationary. Rotate other hand in small vertical circle with forefinger pointing horizontally at open hand.



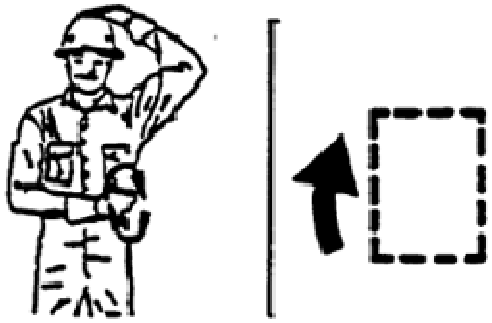
Turn
Raise forearm with closed fist indicating inside of turn. Move other fist in vertical circle indicating direction of track or wheel rotation.



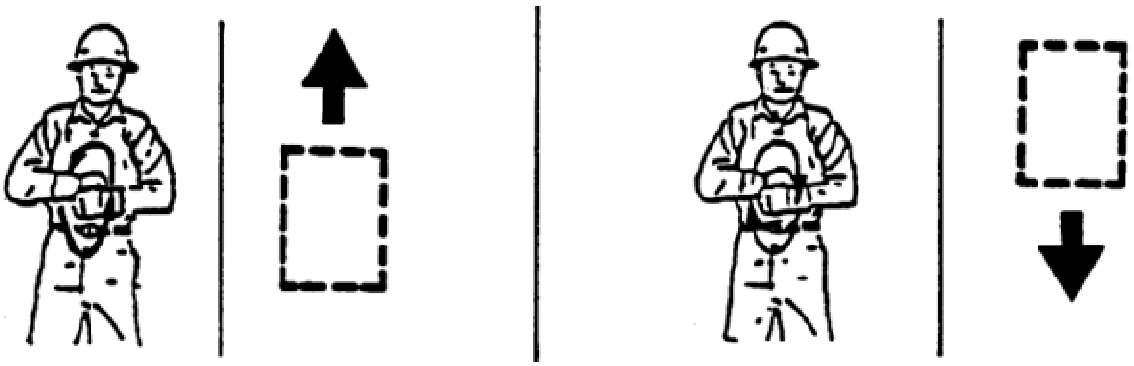
Turn
Raise forearm with closed fist indicating inside of turn. Move other fist in vertical circle indicating direction of track or wheel rotation.



Counter Rotate
Place hand on head indicating side or reverse track or wheel rotation. Move other hand in vertical circle indicating forward rotation of other track or wheel.

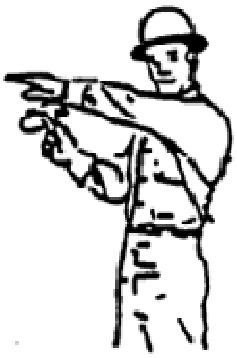


Counter Rotate
Place hand on head indicating side or reverse track or wheel rotation. Move other hand in vertical circle indicating forward rotation of other track or wheel.

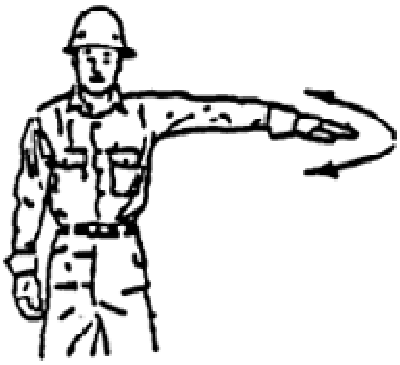


Travel
Move fists in vertical circle about each other in direction of track or wheel rotation.

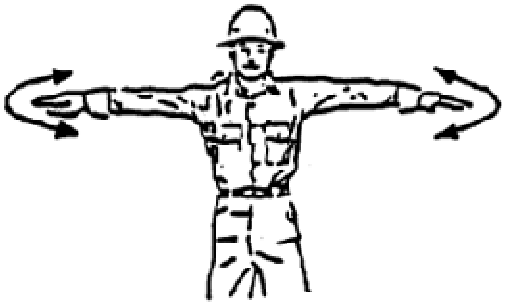
This Far to Go
With hands raised and open inward, move hands laterally, indicating distance to go.



Move Slowly
Place one hand motionless in front of hand giving motion signal. (Raise load slowly is shown)

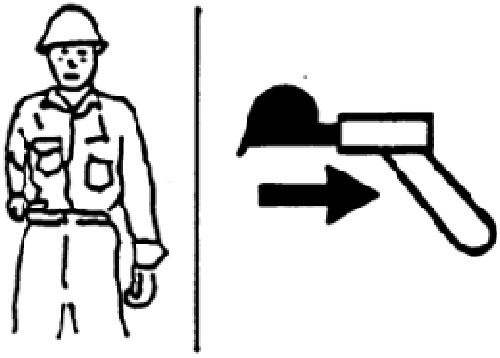


Stop
With either arm extended laterally, hand open downward, move arm back and forth.

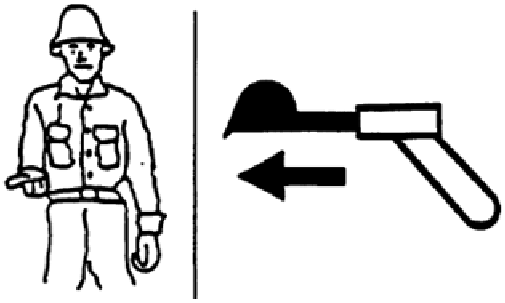


Emergency Stop
With both arms extended laterally, hands open downward, wave arms back and forth.

Stop Engine
Draw thumb or forefinger across throat.



Retract Telescopic Arm/Dipperstick
With either arm outstretched horizontally in front of body, close fingers and point thumb in direction of required movement.



Extend Telescopic Arm/Dipperstick
With either arm outstretched horizontally in front of body, close fingers and point thumb in direction of required movement.

Title 29: Labor
PART 1910—OCCUPATIONAL SAFETY AND HEALTH STANDARDS
Subpart N—Materials Handling and Storage

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§1910.178 Powered industrial trucks.

(a) *General requirements.* (1) This section contains safety requirements relating to fire protection, design, maintenance, and use of fork trucks, tractors, platform lift trucks, motorized hand trucks, and other specialized industrial trucks powered by electric motors or internal combustion engines. This section does not apply to compressed air or nonflammable compressed gas-operated industrial trucks, nor to farm vehicles, nor to vehicles intended primarily for earth moving or over-the-road hauling.

(2) All new powered industrial trucks acquired and used by an employer shall meet the design and construction requirements for powered industrial trucks established in the "American National Standard for Powered Industrial Trucks, Part II, ANSI B56.1-1969", which is incorporated by reference as specified in §1910.6, except for vehicles intended primarily for earth moving or over-the-road hauling.

(3) Approved trucks shall bear a label or some other identifying mark indicating approval by the testing laboratory. See paragraph (a)(7) of this section and paragraph 405 of "American National Standard for Powered Industrial Trucks, Part II, ANSI B56.1-1969", which is incorporated by reference in paragraph (a)(2) of this section and which provides that if the powered industrial truck is accepted by a nationally recognized testing laboratory it should be so marked.

(4) Modifications and additions which affect capacity and safe operation shall not be performed by the customer or user without manufacturers prior written approval. Capacity, operation, and maintenance instruction plates, tags, or decals shall be changed accordingly.

(5) If the truck is equipped with front-end attachments other than factory installed attachments, the user shall request that the truck be marked to identify the attachments and show the approximate weight of the truck and attachment combination at maximum elevation with load laterally centered.

(6) The user shall see that all nameplates and markings are in place and are maintained in a legible condition.

(7) As used in this section, the term, *approved truck* or *approved industrial truck* means a truck that is listed or approved for fire safety purposes for the intended use by a nationally recognized testing laboratory, using nationally recognized testing standards. Refer to §1910.155(c)(3)(iv)(A) for definition of listed, and to §1910.7 for definition of nationally recognized testing laboratory.

(b) *Designations.* For the purpose of this standard there are eleven different designations of industrial trucks or tractors as follows: D, DS, DY, E, ES, EE, EX, G, GS, LP, and LPS.

(1) The D designated units are units similar to the G units except that they are diesel engine powered instead of gasoline engine powered.

(2) The DS designated units are diesel powered units that are provided with additional safeguards

to the exhaust, fuel and electrical systems. They may be used in some locations where a D unit may not be considered suitable.

(3) The DY designated units are diesel powered units that have all the safeguards of the DS units and in addition do not have any electrical equipment including the ignition and are equipped with temperature limitation features.

(4) The E designated units are electrically powered units that have minimum acceptable safeguards against inherent fire hazards.

(5) The ES designated units are electrically powered units that, in addition to all of the requirements for the E units, are provided with additional safeguards to the electrical system to prevent emission of hazardous sparks and to limit surface temperatures. They may be used in some locations where the use of an E unit may not be considered suitable.

(6) The EE designated units are electrically powered units that have, in addition to all of the requirements for the E and ES units, the electric motors and all other electrical equipment completely enclosed. In certain locations the EE unit may be used where the use of an E and ES unit may not be considered suitable.

(7) The EX designated units are electrically powered units that differ from the E, ES, or EE units in that the electrical fittings and equipment are so designed, constructed and assembled that the units may be used in certain atmospheres containing flammable vapors or dusts.

(8) The G designated units are gasoline powered units having minimum acceptable safeguards against inherent fire hazards.

(9) The GS designated units are gasoline powered units that are provided with additional safeguards to the exhaust, fuel, and electrical systems. They may be used in some locations where the use of a G unit may not be considered suitable.

(10) The LP designated unit is similar to the G unit except that liquefied petroleum gas is used for fuel instead of gasoline.

(11) The LPS designated units are liquefied petroleum gas powered units that are provided with additional safeguards to the exhaust, fuel, and electrical systems. They may be used in some locations where the use of an LP unit may not be considered suitable.

(12) The atmosphere or location shall have been classified as to whether it is hazardous or nonhazardous prior to the consideration of industrial trucks being used therein and the type of industrial truck required shall be as provided in paragraph (d) of this section for such location.

(c) *Designated locations.* (1) The industrial trucks specified under subparagraph (2) of this paragraph are the minimum types required but industrial trucks having greater safeguards may be used if desired.

(2) For specific areas of use, see Table N-1 which tabulates the information contained in this section. References are to the corresponding classification as used in subpart S of this part.

(i) Power-operated industrial trucks shall not be used in atmospheres containing hazardous concentration of acetylene, butadiene, ethylene oxide, hydrogen (or gases or vapors equivalent in hazard to hydrogen, such as manufactured gas), propylene oxide, acetaldehyde, cyclopropane, diethyl ether, ethylene, isoprene, or unsymmetrical dimethyl hydrazine (UDMH).

(ii)(*a*) Power-operated industrial trucks shall not be used in atmospheres containing hazardous concentrations of metal dust, including aluminum, magnesium, and their commercial alloys, other metals of similarly hazardous characteristics, or in atmospheres containing carbon black, coal or coke dust except approved power-operated industrial trucks designated as EX may be used in such atmospheres.

(*b*) In atmospheres where dust of magnesium, aluminum or aluminum bronze may be present,

fuses, switches, motor controllers, and circuit breakers of trucks shall have enclosures specifically approved for such locations.

(iii) Only approved power-operated industrial trucks designated as EX may be used in atmospheres containing acetone, acrylonitrile, alcohol, ammonia, benzine, benzol, butane, ethylene dichloride, gasoline, hexane, lacquer solvent vapors, naphtha, natural gas, propane, propylene, styrene, vinyl acetate, vinyl chloride, or xylenes in quantities sufficient to produce explosive or ignitable mixtures and where such concentrations of these gases or vapors exist continuously, intermittently or periodically under normal operating conditions or may exist frequently because of repair, maintenance operations, leakage, breakdown or faulty operation of equipment.

(iv) Power-operated industrial trucks designated as DY, EE, or EX may be used in locations where volatile flammable liquids or flammable gases are handled, processed or used, but in which the hazardous liquids, vapors or gases will normally be confined within closed containers or closed systems from which they can escape only in case of accidental rupture or breakdown of such containers or systems, or in the case of abnormal operation of equipment; also in locations in which hazardous concentrations of gases or vapors are normally prevented by positive mechanical ventilation but which might become hazardous through failure or abnormal operation of the ventilating equipment; or in locations which are adjacent to Class I, Division 1 locations, and to which hazardous concentrations of gases or vapors might occasionally be communicated unless such communication is prevented by adequate positive-pressure ventilation from a source of clear air, and effective safeguards against ventilation failure are provided.

TABLE N-1—SUMMARY TABLE ON USE OF INDUSTRIAL TRUCKS IN VARIOUS LOCATIONS

Classes	**Unclassified**	**Class I locations**		**Class II locations**		**Class III locations**			
Description of classes	Locations not possessing atmospheres as described in other columns	Locations in which flammable gases or vapors are, or may be, present in the air in quantities sufficient to produce explosive or ignitible mixtures		Locations which are hazardous because of the presence of combustible dust		Locations where easily ignitible fibers or flyings are present but not likely to be in suspension in quantities sufficient to produce ignitible mixtures.			
Groups in classes	**None**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**None**
Examples of locations or atmospheres in classes and groups	Piers and wharves inside and outside general storage, general industrial or commercial properties	Acetylene	Hydrogen	Ethyl ether	Gasoline Naphtha Alcohols Acetone Lacquer solvent Benzene	Metal dust	Carbon black coal dust, coke dust	Grain dust, flour dust, starch dust, organic dust	Baled waste, cocoa fiber, cotton, excelsior, hemp, istle, jute, kapok, oakum, sisal, Spanish moss, synthetic fibers, tow.

TABLE N-1—SUMMARY TABLE ON USE OF INDUSTRIAL TRUCKS IN VARIOUS LOCATIONS—CONTINUED

		1	**2**	**1**	**2**	**1**	**2**
Divisions	None	Above	Above	Explosive	Explosive	Locations in	Locations in

(nature of hazardous conditions)		condition exists continuously, intermittently, or periodically under normal operating conditions	condition may occur accidentally as due to a puncture of a storage drum	mixture may be present under normal operating conditions, or where failure of equipment may cause the condition to exist simultaneously with arcing or sparking of electrical equipment, or where dusts of an electrically conducting nature may be present	mixture not normally present, but where deposits of dust may cause heat rise in electrical equipment, or where such deposits may be ignited by arcs or sparks from electrical equipment	which easily ignitible fibers or materials producing combustible flyings are handled, manufactured, or used	which easily ignitible fibers are stored or handled (except in the process of manufacture).

Authorized uses of trucks by types in groups of classes and divisions

Groups in classes	**None**	**A**	**B**	**C**	**D**	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**E**	**F**	**G**	**None**	**None**
Type of truck authorized:																	
Diesel:																	
Type D	D**																
Type DS									DS						DS		DS
Type DY									DY						DY	DY	DY
Electric:																	
Type E	E**																E
Type ES									ES						ES		ES
Type EE									EE						EE	EE	EE
Type EX					EX				EX		EX	EX			EX	EX	EX
Gasoline:																	
Type G	G**																
Type GS									GS						GS		GS
LP-Gas:																	
Type LP	LP**																
Type LPS									LPS						LPS		LPS
Paragraph Ref. in No. 505	210.211		201 (a)		203 (a)		209 (a)		204 (a), (b)		202 (a)	205 (a)		209 (a)	206 (a), (b)	207(a)	208 (a)

**Trucks conforming to these types may also be used—see subdivision (c)(2)(x) and (c)(2)(xii) of this section.

(v) In locations used for the storage of hazardous liquids in sealed containers or liquefied or compressed gases in containers, approved power-operated industrial trucks designated as DS, ES, GS, or LPS may be used. This classification includes locations where volatile flammable liquids or flammable gases or vapors are used, but which, would become hazardous only in case of an accident or of some unusual operating condition. The quantity of hazardous material that might escape in case of accident, the adequacy of ventilating equipment, the total area involved, and the record of the industry or business with respect to explosions or fires are all factors that should receive consideration in determining whether or not the DS or DY, ES, EE, GS, LPS designated truck possesses sufficient safeguards for the location. Piping without valves, checks, meters and similar devices would not ordinarily be deemed to introduce a hazardous condition even though used for hazardous liquids or gases. Locations used for the storage of hazardous liquids or of liquified or compressed gases in sealed containers would not normally be considered hazardous unless subject to other hazardous conditions also.

(vi)(*a*) Only approved power operated industrial trucks designated as EX shall be used in atmospheres in which combustible dust is or may be in suspension continuously, intermittently, or periodically under normal operating conditions, in quantities sufficient to produce explosive or ignitable mixtures, or where mechanical failure or abnormal operation of machinery or equipment might cause such mixtures to be produced.

(*b*) The EX classification usually includes the working areas of grain handling and storage plants, room containing grinders or pulverizers, cleaners, graders, scalpers, open conveyors or spouts, open bins or hoppers, mixers, or blenders, automatic or hopper scales, packing machinery, elevator heads and boots, stock distributors, dust and stock collectors (except all-metal collectors vented to the outside), and all similar dust producing machinery and equipment in grain processing plants, starch plants, sugar pulverizing plants, malting plants, hay grinding plants, and other occupancies of similar nature; coal pulverizing plants (except where the pulverizing equipment is essentially dust tight); all working areas where metal dusts and powders are produced, processed, handled, packed, or stored (except in tight containers); and other similar locations where combustible dust may, under normal operating conditions, be present in the air in quantities sufficient to produce explosive or ignitable mixtures.

(vii) Only approved power-operated industrial trucks designated as DY, EE, or EX shall be used in atmospheres in which combustible dust will not normally be in suspension in the air or will not be likely to be thrown into suspension by the normal operation of equipment or apparatus in quantities sufficient to produce explosive or ignitable mixtures but where deposits or accumulations of such dust may be ignited by arcs or sparks originating in the truck.

(viii) Only approved power-operated industrial trucks designated as DY, EE, or EX shall be used in locations which are hazardous because of the presence of easily ignitable fibers or flyings but in which such fibers or flyings are not likely to be in suspension in the air in quantities sufficient to produce ignitable mixtures.

(ix) Only approved power-operated industrial trucks designated as DS, DY, ES, EE, EX, GS, or LPS shall be used in locations where easily ignitable fibers are stored or handled, including outside storage, but are not being processed or manufactured. Industrial trucks designated as E, which have been previously used in these locations may be continued in use.

(x) On piers and wharves handling general cargo, any approved power-operated industrial truck designated as Type D, E, G, or LP may be used, or trucks which conform to the requirements for these types may be used.

(xi) If storage warehouses and outside storage locations are hazardous only the approved power-operated industrial truck specified for such locations in this paragraph (c)(2) shall be used. If not classified as hazardous, any approved power-operated industrial truck designated as Type D, E, G, or LP may be used, or trucks which conform to the requirements for these types may be used.

(xii) If general industrial or commercial properties are hazardous, only approved power-operated industrial trucks specified for such locations in this paragraph (c)(2) shall be used. If not classified as hazardous, any approved power-operated industrial truck designated as Type D, E, G, or LP may be used, or trucks which conform to the requirements of these types may be used.

(d) *Converted industrial trucks.* Power-operated industrial trucks that have been originally approved for the use of gasoline for fuel, when converted to the use of liquefied petroleum gas fuel in accordance with paragraph (q) of this section, may be used in those locations where G, GS or LP, and LPS designated trucks have been specified in the preceding paragraphs.

(e) *Safety guards.* (1) High Lift Rider trucks shall be fitted with an overhead guard manufactured in accordance with paragraph (a)(2) of this section, unless operating conditions do not permit.

(2) If the type of load presents a hazard, the user shall equip fork trucks with a vertical load backrest extension manufactured in accordance with paragraph (a)(2) of this section.

(f) *Fuel handling and storage.* (1) The storage and handling of liquid fuels such as gasoline and diesel fuel shall be in accordance with NFPA Flammable and Combustible Liquids Code (NFPA No. 30-

1969), which is incorporated by reference as specified in §1910.6.

(2) The storage and handling of liquefied petroleum gas fuel shall be in accordance with NFPA Storage and Handling of Liquefied Petroleum Gases (NFPA No. 58-1969), which is incorporated by reference as specified in §1910.6.

(g) *Changing and charging storage batteries.* (1) Battery charging installations shall be located in areas designated for that purpose.

(2) Facilities shall be provided for flushing and neutralizing spilled electrolyte, for fire protection, for protecting charging apparatus from damage by trucks, and for adequate ventilation for dispersal of fumes from gassing batteries.

(3) [Reserved]

(4) A conveyor, overhead hoist, or equivalent material handling equipment shall be provided for handling batteries.

(5) Reinstalled batteries shall be properly positioned and secured in the truck.

(6) A carboy tilter or siphon shall be provided for handling electrolyte.

(7) When charging batteries, acid shall be poured into water; water shall not be poured into acid.

(8) Trucks shall be properly positioned and brake applied before attempting to change or charge batteries.

(9) Care shall be taken to assure that vent caps are functioning. The battery (or compartment) cover(s) shall be open to dissipate heat.

(10) Smoking shall be prohibited in the charging area.

(11) Precautions shall be taken to prevent open flames, sparks, or electric arcs in battery charging areas.

(12) Tools and other metallic objects shall be kept away from the top of uncovered batteries.

(h) *Lighting for operating areas.* (1) [Reserved]

(2) Where general lighting is less than 2 lumens per square foot, auxiliary directional lighting shall be provided on the truck.

(i) *Control of noxious gases and fumes.* (1) Concentration levels of carbon monoxide gas created by powered industrial truck operations shall not exceed the levels specified in §1910.1000.

(j) *Dockboards (bridge plates).* See §1910.30(a).

(k) *Trucks and railroad cars.* (1) The brakes of highway trucks shall be set and wheel chocks placed under the rear wheels to prevent the trucks from rolling while they are boarded with powered industrial trucks.

(2) Wheel stops or other recognized positive protection shall be provided to prevent railroad cars from moving during loading or unloading operations.

(3) Fixed jacks may be necessary to support a semitrailer and prevent upending during the loading or unloading when the trailer is not coupled to a tractor.

(4) Positive protection shall be provided to prevent railroad cars from being moved while dockboards or bridge plates are in position.

(l) Operator training. (1) *Safe operation.* (i) The employer shall ensure that each powered industrial

truck operator is competent to operate a powered industrial truck safely, as demonstrated by the successful completion of the training and evaluation specified in this paragraph (l).

(ii) Prior to permitting an employee to operate a powered industrial truck (except for training purposes), the employer shall ensure that each operator has successfully completed the training required by this paragraph (l), except as permitted by paragraph (l)(5).

(2) *Training program implementation.* (i) Trainees may operate a powered industrial truck only:

(A) Under the direct supervision of persons who have the knowledge, training, and experience to train operators and evaluate their competence; and

(B) Where such operation does not endanger the trainee or other employees.

(ii) Training shall consist of a combination of formal instruction (e.g., lecture, discussion, interactive computer learning, video tape, written material), practical training (demonstrations performed by the trainer and practical exercises performed by the trainee), and evaluation of the operator's performance in the workplace.

(iii) All operator training and evaluation shall be conducted by persons who have the knowledge, training, and experience to train powered industrial truck operators and evaluate their competence.

(3) *Training program content.* Powered industrial truck operators shall receive initial training in the following topics, except in topics which the employer can demonstrate are not applicable to safe operation of the truck in the employer's workplace.

(i) Truck-related topics:

(A) Operating instructions, warnings, and precautions for the types of truck the operator will be authorized to operate;

(B) Differences between the truck and the automobile;

(C) Truck controls and instrumentation: where they are located, what they do, and how they work;

(D) Engine or motor operation;

(E) Steering and maneuvering;

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

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

(H) Vehicle capacity;

(I) Vehicle stability;

(J) Any vehicle inspection and maintenance that the operator will be required to perform;

(K) Refueling and/or charging and recharging of batteries;

(L) Operating limitations;

(M) Any other operating instructions, warnings, or precautions listed in the operator's manual for the types of 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 loads to be carried and load stability;

(C) Load manipulation, stacking, and unstacking;

(D) Pedestrian traffic in areas where the vehicle will be operated;

(E) Narrow aisles and other restricted places where the vehicle will be operated;

(F) Hazardous (classified) locations where the vehicle will be operated;

(G) Ramps and other sloped surfaces that could affect the vehicle's stability;

(H) Closed environments and other areas where insufficient ventilation or poor vehicle maintenance could cause a buildup of carbon monoxide or diesel exhaust;

(I) Other unique or potentially hazardous environmental conditions in the workplace that could affect safe operation.

(iii) The requirements of this section.

(4) *Refresher training and evaluation.* (i) Refresher training, including an evaluation of the effectiveness of that training, shall be conducted as required by paragraph (l)(4)(ii) to ensure that the operator has the knowledge and skills needed to operate the powered industrial truck safely.

(ii) Refresher training in relevant topics shall be provided to the operator when:

(A) The operator has been observed to operate the vehicle in an unsafe manner;

(B) The operator has been involved in an accident or near-miss incident;

(C) The operator has received an evaluation that reveals that the operator is not operating the truck safely;

(D) The operator is assigned to drive a different type of truck; or

(E) A condition in the workplace changes in a manner that could affect safe operation of the truck.

(iii) An evaluation of each powered industrial truck operator's performance shall be conducted at least once every three years.

(5) *Avoidance of duplicative training.* If an operator has previously received training in a topic specified in paragraph (l)(3) of this section, and such training is appropriate to the truck and working conditions encountered, additional training in that topic is not required if the operator has been evaluated and found competent to operate the truck safely.

(6) *Certification.* The employer shall certify that each operator has been trained and evaluated as required by this paragraph (l). The certification shall include the name of the operator, the date of the training, the date of the evaluation, and the identity of the person(s) performing the training or evaluation.

(7) *Dates.* The employer shall ensure that operators of powered industrial trucks are trained, as appropriate, by the dates shown in the following table.

If the employee was hired:	**The initial training and evaluation of that employee must be completed:**
Before December 1, 1999	By December 1, 1999.
After December 1, 1999	Before the employee is assigned to operate a powered industrial truck.

(8) Appendix A to this section provides non-mandatory guidance to assist employers in implementing this paragraph (l). This appendix does not add to, alter, or reduce the requirements of this section.

(m) *Truck operations.* (1) Trucks shall not be driven up to anyone standing in front of a bench or

other fixed object.

(2) No person shall be allowed to stand or pass under the elevated portion of any truck, whether loaded or empty.

(3) Unauthorized personnel shall not be permitted to ride on powered industrial trucks. A safe place to ride shall be provided where riding of trucks is authorized.

(4) The employer shall prohibit arms or legs from being placed between the uprights of the mast or outside the running lines of the truck.

(5)(i) When a powered industrial truck is left unattended, load engaging means shall be fully lowered, controls shall be neutralized, power shall be shut off, and brakes set. Wheels shall be blocked if the truck is parked on an incline.

(ii) A powered industrial truck is unattended when the operator is 25 ft. or more away from the vehicle which remains in his view, or whenever the operator leaves the vehicle and it is not in his view.

(iii) When the operator of an industrial truck is dismounted and within 25 ft. of the truck still in his view, the load engaging means shall be fully lowered, controls neutralized, and the brakes set to prevent movement.

(6) A safe distance shall be maintained from the edge of ramps or platforms while on any elevated dock, or platform or freight car. Trucks shall not be used for opening or closing freight doors.

(7) Brakes shall be set and wheel blocks shall be in place to prevent movement of trucks, trailers, or railroad cars while loading or unloading. Fixed jacks may be necessary to support a semitrailer during loading or unloading when the trailer is not coupled to a tractor. The flooring of trucks, trailers, and railroad cars shall be checked for breaks and weakness before they are driven onto.

(8) There shall be sufficient headroom under overhead installations, lights, pipes, sprinkler system, etc.

(9) An overhead guard shall be used as protection against falling objects. It should be noted that an overhead guard is intended to offer protection from the impact of small packages, boxes, bagged material, etc., representative of the job application, but not to withstand the impact of a falling capacity load.

(10) A load backrest extension shall be used whenever necessary to minimize the possibility of the load or part of it from falling rearward.

(11) Only approved industrial trucks shall be used in hazardous locations.

(12)-(13) [Reserved]

(14) Fire aisles, access to stairways, and fire equipment shall be kept clear.

(n) *Traveling.* (1) All traffic regulations shall be observed, including authorized plant speed limits. A safe distance shall be maintained approximately three truck lengths from the truck ahead, and the truck shall be kept under control at all times.

(2) The right of way shall be yielded to ambulances, fire trucks, or other vehicles in emergency situations.

(3) Other trucks traveling in the same direction at intersections, blind spots, or other dangerous locations shall not be passed.

(4) The driver shall be required to slow down and sound the horn at cross aisles and other locations where vision is obstructed. If the load being carried obstructs forward view, the driver shall be required to travel with the load trailing.

(5) Railroad tracks shall be crossed diagonally wherever possible. Parking closer than 8 feet from the center of railroad tracks is prohibited.

(6) The driver shall be required to look in the direction of, and keep a clear view of the path of travel.

(7) Grades shall be ascended or descended slowly.

(i) When ascending or descending grades in excess of 10 percent, loaded trucks shall be driven with the load upgrade.

(ii) [Reserved]

(iii) On all grades the load and load engaging means shall be tilted back if applicable, and raised only as far as necessary to clear the road surface.

(8) Under all travel conditions the truck shall be operated at a speed that will permit it to be brought to a stop in a safe manner.

(9) Stunt driving and horseplay shall not be permitted.

(10) The driver shall be required to slow down for wet and slippery floors.

(11) Dockboard or bridgeplates, shall be properly secured before they are driven over. Dockboard or bridgeplates shall be driven over carefully and slowly and their rated capacity never exceeded.

(12) Elevators shall be approached slowly, and then entered squarely after the elevator car is properly leveled. Once on the elevator, the controls shall be neutralized, power shut off, and the brakes set.

(13) Motorized hand trucks must enter elevator or other confined areas with load end forward.

(14) Running over loose objects on the roadway surface shall be avoided.

(15) 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.

(o) *Loading.* (1) Only stable or safely arranged loads shall be handled. Caution shall be exercised when handling off-center loads which cannot be centered.

(2) Only loads within the rated capacity of the truck shall be handled.

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

(4) Trucks equipped with attachments shall be operated as partially loaded trucks when not handling a load.

(5) 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.

(6) 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.

(p) *Operation of the truck.* (1) If at any time a powered industrial truck is found to be in need of repair, defective, or in any way unsafe, the truck shall be taken out of service until it has been restored to safe operating condition.

(2) Fuel tanks shall not be filled while the engine is running. Spillage shall be avoided.

(3) Spillage of oil or fuel shall be carefully washed away or completely evaporated and the fuel tank cap replaced before restarting engine.

(4) No truck shall be operated with a leak in the fuel system until the leak has been corrected.

(5) Open flames shall not be used for checking electrolyte level in storage batteries or gasoline level in fuel tanks.

(q) *Maintenance of industrial trucks.* (1) Any power-operated industrial truck not in safe operating condition shall be removed from service. All repairs shall be made by authorized personnel.

(2) No repairs shall be made in Class I, II, and III locations.

(3) Those repairs to the fuel and ignition systems of industrial trucks which involve fire hazards shall be conducted only in locations designated for such repairs.

(4) Trucks in need of repairs to the electrical system shall have the battery disconnected prior to such repairs.

(5) All parts of any such industrial truck requiring replacement shall be replaced only by parts equivalent as to safety with those used in the original design.

(6) Industrial trucks shall not be altered so that the relative positions of the various parts are different from what they were when originally received from the manufacturer, nor shall they be altered either by the addition of extra parts not provided by the manufacturer or by the elimination of any parts, except as provided in paragraph (q)(12) of this section. Additional counterweighting of fork trucks shall not be done unless approved by the truck manufacturer.

(7) Industrial trucks shall be examined before being placed in service, and shall not be placed in service if the examination shows any condition adversely affecting the safety of the vehicle. Such examination shall be made at least daily.

Where industrial trucks are used on a round-the-clock basis, they shall be examined after each shift. Defects when found shall be immediately reported and corrected.

(8) Water mufflers shall be filled daily or as frequently as is necessary to prevent depletion of the supply of water below 75 percent of the filled capacity. Vehicles with mufflers having screens or other parts that may become clogged shall not be operated while such screens or parts are clogged. Any vehicle that emits hazardous sparks or flames from the exhaust system shall immediately be removed from service, and not returned to service until the cause for the emission of such sparks and flames has been eliminated.

(9) When the temperature of any part of any truck is found to be in excess of its normal operating temperature, thus creating a hazardous condition, the vehicle shall be removed from service and not returned to service until the cause for such overheating has been eliminated.

(10) Industrial trucks shall be kept in a clean condition, free of lint, excess oil, and grease. Noncombustible agents should be used for cleaning trucks. Low flash point (below 100 °F.) solvents shall not be used. High flash point (at or above 100 °F.) solvents may be used. Precautions regarding toxicity, ventilation, and fire hazard shall be consonant with the agent or solvent used.

(11) [Reserved]

(12) Industrial trucks originally approved for the use of gasoline for fuel may be converted to liquefied petroleum gas fuel provided the complete conversion results in a truck which embodies the features specified for LP or LPS designated trucks. Such conversion equipment shall be approved. The description of the component parts of this conversion system and the recommended method of installation on specific trucks are contained in the “Listed by Report.”

PARAGRAPH (l) OF THIS SECTION)

A-1. Definitions.

The following definitions help to explain the principle of stability:

Center of gravity is the point on an object at which all of the object's weight is concentrated. For symmetrical loads, the center of gravity is at the middle of the load.

Counterweight is the weight that is built into the truck's basic structure and is used to offset the load's weight and to maximize the vehicle's resistance to tipping over.

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

Grade is the slope of a surface, which is usually measured as the number of feet of rise or fall over a hundred foot horizontal distance (the slope is expressed as a percent).

Lateral stability is a truck's resistance to overturning sideways.

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

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

Longitudinal stability is the truck's resistance to overturning forward or rearward.

Moment is the product of the object's weight times the distance from a fixed point (usually the fulcrum). In the case of a powered industrial truck, the distance is measured from the point at which the truck will tip over to the object's line of action. The distance is always measured perpendicular to the line of action.

Track is the distance between the wheels on the same axle of the truck.

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

A-2. *General.*

A-2.1. Determining the stability of a powered industrial truck is simple once a few basic principles are understood. There are many factors that contribute to a vehicle's stability: the vehicle's wheelbase, track, and height; the load's weight distribution; and the vehicle's counterweight location (if the vehicle is so equipped).

A-2.2. The “stability triangle,” used in most stability discussions, demonstrates stability simply.

A-3. *Basic Principles.*

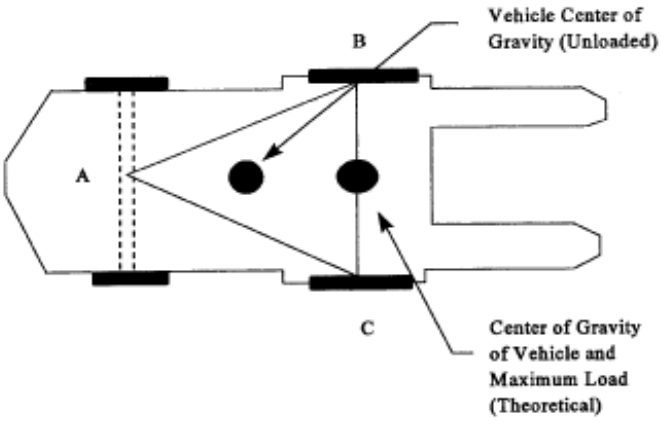
A-3.1. Whether an object is stable depends on the object's moment at one end of a system being greater than, equal to, or smaller than the object's moment at the system's other end. This principle can be seen in the way a see-saw or teeter-totter works: that is, if the product of the load and distance from the fulcrum (moment) is equal to the moment at the device's other end, 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.

A-3.2. The longitudinal stability of a counterbalanced powered industrial truck depends on the vehicle's moment and the load's moment. In other words, if the mathematic product of the load moment (the distance from the front wheels, the approximate point at which the vehicle would tip forward) to the load's center of gravity times the load's weight is less than the vehicle's moment, the system is balanced and will not tip forward. However, if the load's moment is greater than the vehicle's moment, the greater load-moment will force the truck to tip forward.

A-4. *The Stability Triangle.*

A-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 the vehicle has four wheels. The truck's steer axle is attached to the truck by a pivot pin in the axle's center. When the points are connected with imaginary lines, this three-point support forms a triangle called the stability triangle. Figure 1 depicts the stability triangle.

Figure 1.



Notes:

1. When the vehicle is loaded, the combined center of gravity (CG) shifts toward line B-C. Theoretically the maximum 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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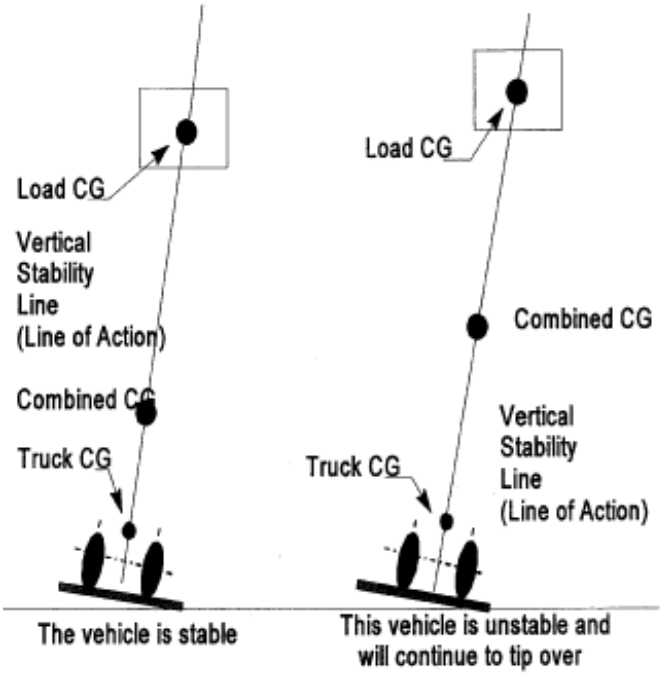
A-4.2. When the vehicle's line of action, or load center, falls within the stability triangle, the vehicle is stable and will not tip over. However, when the vehicle's line of action or the vehicle/load combination falls outside the stability triangle, the vehicle is unstable and may tip over. (See Figure 2.)

Figure 2.



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A-5. *Longitudinal Stability.*

A-5.1. The axis of rotation when a truck tips forward is the front wheels' points of contact with the pavement. When a powered industrial truck tips forward, the truck will rotate about this line. 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 to tip forward, thereby causing the rear to lose contact with the floor or ground and resulting in loss of steering control. If the load-moment greatly exceeds the vehicle moment, the truck will tip forward.

A-5.2. 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 the load center. Because larger trucks normally handle loads that are physically larger, these vehicles have greater load centers. Trucks with a capacity of 30,000 pounds or less are normally rated at a given load weight at a 24-inch load center. Trucks with a capacity greater than 30,000 pounds are normally rated at a given load weight at a 36- or 48-inch load center. To safely operate the vehicle, the operator should always check the data plate to determine the maximum allowable weight at the rated load center.

A-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. Calculating 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) or that have an offset center of gravity, etc., a maximum allowable load-moment should be calculated and used to determine whether a load can be safely 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 load is 60 inches long (30-inch load center), then the maximum that this load can weigh is 2,400 pounds (72,000 divided by 30).

A-6. *Lateral Stability.*

A-6.1. The vehicle's lateral stability is determined by the line of action's position (a vertical line that passes through the combined vehicle's and load's center of gravity) relative to the stability triangle. When the vehicle is not loaded, the truck's center of gravity location is the only factor to be considered in determining the truck's stability. As long as the line of action of the combined vehicle's and load's center of gravity 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. Refer to Figure 2.

A-6.2. Factors that affect the vehicle's lateral stability include the load's placement on the truck, the height of the load above the surface on which the vehicle is operating, and the vehicle's degree of lean.

A-7. *Dynamic Stability.*

A-7.1. Up to this point, the stability of a powered industrial truck has been discussed without considering the dynamic forces that result when the vehicle and load are put into motion. The weight's transfer 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.

A-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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