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Standards for the Use, Maintenance

and Operation of

INDUSTRIAL TRUCKS

MAY

1955

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The National Fire Protection Association was organized in 1896 to promote the science and improve the methods of fire protection and prevention, to obtain and circulate information on these subjects and to secure the cooperation of its members in establishing proper safeguards against loss of life and property by fire. Its membership includes over a hundred and ninety national and regional societies and associations (list on outside back cover) and more than fifteen thousand individuals, corporations, and organizations. Anyone interested may become a member; membership information is available on request.

This pamphlet is one of a large number of publications on fire safety issued by the Association including periodicals, books, posters and other publications; a complete list is available without charge on request. All NFPA standards adopted by the Association are published in six volumes of the **National Fire Codes** which are re-issued annually and which are available on an annual subscription basis. The standards, prepared by the technical committees of the National Fire Protection Association and adopted in the annual meetings of the Association, are intended to prescribe reasonable measures for minimizing losses of life and property by fire. All interests concerned have opportunity through the Association to participate in the development of the standards and to secure impartial consideration of matters affecting them.

NFPA standards are purely advisory as far as the Association is concerned, but are widely used by law enforcing authorities in addition to their general use as guides to fire safety.

Definitions

The official NFPA definitions of shall, should and approved are:

SHALL is intended to indicate requirements.

SHOULD is intended to indicate recommendations, or that which is advised but not required.

APPROVED refers to approval by the authority having jurisdiction.

Units of measurements used here are U. S. standard. 1 U. S. gallon = 0.83 Imperial gallons = 3.785 liters.

Approved Equipment

The National Fire Protection Association does not "approve" individual items of fire protection equipment, materials or services. The standards are prepared, as far as practicable, in terms of required performance, avoiding specifications of materials, devices or methods so phrased as to preclude obtaining the desired results by other means. The suitability of devices and materials for installation under these standards is indicated by the listings of nationally recognized testing laboratories, whose findings are customarily used as a guide to approval by agencies applying these standards. Underwriters' Laboratories, Inc., Underwriters' Laboratories of Canada and the Factory Mutual Laboratories test devices and materials for use in accordance with the appropriate standards, and publish lists which are available on request.

Standards for the Use, Maintenance and Operation of Industrial Trucks

NFPA No. 505-1955

These recommendations covering the use, maintenance and safe operation of industrial trucks were adopted by the Association by official action at its 1955 Annual Meeting held in Cincinnati, Ohio, May 16-20.

Part A covering "Types of Industrial Trucks for Use in Various Locations" is a revision of a Tentative Standard originally designated NFPA No. 505A-T on which action was taken in 1951. The text printed herein replaces this text in toto as well as other drafts which were published in the 1953 and 1954 NFPA Advance Reports but which were not acted upon favorably by the Association.

Parts B and C covering "Maintenance of Industrial Trucks" and "Safe Operation of Industrial Trucks" respectively are revised versions of texts originally adopted in 1952 and formerly published by the NFPA under the designation NFPA No. 505 B, C. The combining of these three texts into one pamphlet has been accomplished for the convenience of users.

Standards for the Use, Maintenance and Operation of Industrial Trucks

NFPA No. 505

PART A

Recommendations For Types of Industrial Trucks For Use in Various Locations

100. Introduction:

110. General:

111. These Standards on industrial trucks apply to tractors, platform lift trucks, fork trucks and other specialized vehicles for industrial use. The equipment classifications are based upon standards which have been developed by Underwriters' Laboratories, Inc., Subject 583.*

112. Approved devices and materials are those which have been investigated by Underwriters' Laboratories, Inc., Factory Mutual Laboratories or other recognized testing agencies and are certified by such testing agencies as complying with established standards of Underwriters' Laboratories, Inc., Subject 583.*

NOTE: In order to prevent confusion it is intended that all testing agencies should use the same designations to identify the various type industrial trucks as are used in the standards of Underwriters' Laboratories, Inc., Subject 583.*

113. The authority having jurisdiction shall determine the classification of any particular location. The location shall have been classified as to whether it is hazardous or non-hazardous prior to the consideration of industrial trucks being used therein and the type of industrial truck required shall be as recommended in Article 200 of this standard for such location. Hazardous locations shall be classified as defined in accordance with Article 500 of the National Electrical Code (NFPA No. 70)†, Classes I, II and III, Division 1 and 2 in each class.

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* "Standard for Power-Operated Industrial Trucks (Electric Battery-Powered and Gasoline-Powered)", Subject 583, available from Underwriters' Laboratories, Inc., 207 East Ohio St., Chicago, Ill.

†Published in National Fire Codes, Vol. V and in separate pamphlet form.

114. Any one plant or building may have several areas of different hazard classification. The authority having jurisdiction may limit the use of industrial trucks in certain hazardous areas in a plant or building in accordance with the hazard classification of such areas. The responsibility for enforcement of restricted use in such areas will rest on management.

115. The type of industrial truck as specified under Article 200 is the minimum type required and an industrial truck having greater safeguards may be used if desired.

200. Recommendations:

210. Class I, Divisions 1 and 2 Locations:

211. Class I, Groups A, B and C: No power-operated industrial trucks shall be used in atmospheres defined under Group A, B and C in Paragraph 5002 of the National Electrical Code.

212. Class I, Division 1: In all Class I, Division 1 locations, with the exceptions enumerated in Paragraph 211, only approved electrically-driven industrial trucks constructed in accordance with the minimum safeguards for Type EX, as specified in Underwriters' Laboratories, Inc. Standard for Power-Operated Industrial Trucks, Subject 583, Part 2, shall be used.

213. Class I, Division 2: In Class I, Division 2 locations, if permitted by the authority having jurisdiction, approved electrically-driven industrial trucks constructed in accordance with the minimum safeguards for Type EE, as specified in Underwriters' Laboratories, Inc. Standard for Power-Operated Industrial Trucks, Subject 583, Part 4, may be used.

214. In locations used only for the storage of hazardous liquids or liquefied or compressed gases in closed containers, approved type GS trucks constructed as specified in Underwriters' Laboratories, Inc. Standard for Power-Operated Industrial Trucks, Subject 583, Part 6, may be used with the approval of the authority having jurisdiction.

220. Class II, Divisions 1 and 2 Locations:

221. Class II, Groups E and F: No power-operated industrial trucks shall be used in atmospheres, as defined in Group E and F in Paragraph 5002 of the National Electrical Code, except that approved electrically-driven industrial trucks constructed in accordance with minimum safeguards for Type EX as specified in Underwriters' Laboratories, Inc. Standard for Power-Operated Industrial Trucks, Subject 583, Part 3, may be used subject to special investigation by the authority having jurisdiction. In locations where dust from magnesium, aluminum or aluminum bronze may be present, fuses, switches, motor controllers, and circuit breakers shall have enclosures specifically approved for such locations.

222. Class II, Division 1: In all Class II, Division 1 locations, except as enumerated in Paragraph 221, only approved electrically-driven industrial trucks constructed in accordance with minimum safeguards for Type EX as specified in Underwriters' Laboratories, Inc. Standard for Power-Operated Industrial Trucks, Subject 583, Part 3, shall be used.

223. Class II, Division 2: In Class II, Division 2 locations, only approved electrically-driven industrial trucks constructed in accordance with the minimum safeguards for Type EE as specified in Underwriters' Laboratories, Inc. Standard for Power-Operated Industrial Trucks, Subject 583, Part 4, shall be used, except that approved gasoline-powered trucks constructed in accordance with minimum safeguards for Type GS, as specified in Underwriters' Laboratories, Inc. Standard for Power-Operated Industrial Trucks, Subject 583, Part 6, may be used if permitted by the authority having jurisdiction.

230. Class III, Divisions 1 and 2 Locations:

231. Class III, Division 1: In Class III, Division 1 locations, only approved electrically-driven industrial trucks constructed in accordance with the minimum safeguards for Type EE as specified in Underwriters' Laboratories, Inc. Standard for Power-Operated Industrial Trucks, Subject 583, Part 4, shall be used.

NOTE: For the purpose of determining the acceptability of types of industrial trucks, woodworking plants (except wood flour mills) shall not be considered as Class III, Division 1, locations.

232. **Class III, Division 2:** In Class III, Division 2 locations, only approved electrically-driven or gasoline-driven industrial trucks constructed in accordance with the minimum safeguards for Types EE and GS respectively as specified in Underwriters' Laboratories, Inc. Standard for Power-Operated Industrial Trucks, Subject 583, Parts 4 and 6, shall be used except where the authority having jurisdiction permits, in consideration of the relative degree of fire hazard, the use of an approved Type E industrial truck constructed in accordance with the minimum safeguards as specified in Underwriters' Laboratories, Inc. Standard for Power-Operated Industrial Trucks, Subject 583, Part 5.

240. Piers and Wharves.*

241. In piers and wharves handling general cargo, only approved electrically-driven or gasoline-driven industrial trucks constructed in accordance with the minimum safeguards for Type E and G, respectively, as specified in Underwriters' Laboratories, Inc. Standard of Power-Operated Industrial Trucks, Subject 583, Parts 5 and 7, may be used unless such locations are classified as hazardous in accordance with Article 500 of the National Electrical Code. If classified as hazardous, the type of truck recommended for such location in the preceding paragraphs shall be used.

250. Combustible Fibres Storage.**

251. Combustible fibres storage locations, including outside storage, shall be classified as Class III, Division 2.

260. General Inside and Outside Storage.†

261. The authority having jurisdiction shall determine the classification of hazard for storage warehouses and outside storage locations. If classified as hazardous, the type of truck as recommended for such locations shall be used.

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* See also NFPA Standards for the Construction and Protection of Piers and Wharves (NFPA No. 87) and NFPA Recommendations for Operation of Marine Terminals (NFPA No. 307) published in National Fire Codes, Vol. VI and in separate pamphlet form.

** See also NFPA Standards for the Storage and Handling of Combustible Fibres (NFPA No. 44) published in National Fire Codes, Vol. II and in separate pamphlet form.

† See also NFPA General Storage Standards (NFPA No. 231) published in National Fire Codes, Vol. III and in separate pamphlet form.

PART B

Recommendations For Maintenance of Industrial Trucks

300. Maintenance Recommendations:

301. It is essential that the safety built into power-operated industrial trucks be maintained. Deterioration due to usage should be compensated for properly and as frequently as may be indicated.

302. Any power-operated industrial truck that shows any wear or part failure that may affect the safe operation of the vehicle shall be immediately withdrawn from service and not again used until proper repairs have been completed.

303. Industrial trucks requiring repairs to fuel or electrical systems shall be removed to a location designated as safe for their storage and repair. For gasoline, diesel fuel and liquefied petroleum gas-powered equipment, such location should preferably be a separate garage building, otherwise it shall be in a section cut off from the balance of the building in accordance with NFPA Standards on Garages (NFPA No. 88)†.

304. 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.

305. Except as approved by the authority having jurisdiction, 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 314. Additional counterweighing of fork trucks shall not be done unless approved by the truck manufacturer.

306. Industrial trucks shall be examined thoroughly 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

† Published in National Fire Codes, Vol. III and in separate pamphlet form.

made at least daily and preferably before the day's work has started. 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.

307. Water mufflers shall be filled daily or as frequently as is necessary to prevent depletion of the supply of water below 75 per cent 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 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.

308. When the temperature of any part of any truck is found to be in excess of its normal operating temperature, the vehicle shall be removed from service and not returned to service until the cause for such overheating has been eliminated.

309. Industrial trucks shall be kept free of lint, excess oil and grease and should be thoroughly cleaned, preferably with steam. When possible trucks should be cleaned once weekly and more frequently if necessary. Flammable liquids shall not be used for cleaning.

310. At no time shall the gasoline, diesel fuel or liquefied petroleum gas supply of vehicles be replenished inside of buildings or the vehicles otherwise serviced, unless a special area for such work is provided. Engines must definitely be stopped during any refueling operation. It is suggested that lock type gas tank caps be provided for all gasoline fueled vehicles not so equipped, with key to cap in possession of responsible party.

311. Battery charging installation shall be located in areas designated for that purpose. When a room is required as specified in the National Electrical Code (NFPA No. 70)*, it shall conform to the requirements of that Code.

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* See NFPA Standards for the Installation, Maintenance and Use of First Aid Fire Appliances (NFPA No. 10) published in National Fire Codes, Vol. IV and in separate pamphlet form.

* Published in National Fire Codes, Vol. V and in separate pamphlet form.

Battery charging shall be under the supervision of a competent attendant.

312. Trucks should be equipped with a fire extinguisher approved for use on Class B and C fires,* maintained in operable condition and located where it will be accessible at all times.

313. Where it is necessary to use anti-freeze during winter months, only those products having a glycol base shall be used.

314. Industrial trucks originally approved (see Part A, Paragraph 112) for the use of gasoline for fuel may be converted to liquefied petroleum gas fuel provided the complete conversion is made in conformance with NFPA Standards for the Storage and Handling of Liquefied Petroleum Gases (NFPA No. 58).† The complete conversion shall be acceptable to the authority having jurisdiction.

† Published in National Fire Codes, Vol. I and in separate pamphlet form.

PART C

Recommendations for Operation of Industrial Trucks

400. General:

410. Experience indicates that a large percentage of the fires involving gasoline-powered industrial trucks occur during refueling. This shows the need for particular caution in carrying out all refueling operations of internal combustion engine-powered trucks.

420. For the safe operation of industrial trucks, measures must be taken to minimize the chances of overturning or involving them in collisions with fire protective equipment or other building fixtures and with commodities. Fuel may escape from an overturned truck and become involved in a fire. Wide-spread damage is likely if water is released from sprinkler pipes or fittings broken by careless truck operation. Fire doors intended to limit the spread of fire may be made inoperative if struck by a truck. Guards or curbs to prevent too close an approach, or tell-tales to warn operators, shall be provided to protect building features, such as sprinkler piping, if prominently exposed to injury by projecting into or being located over trucking aisles.

500. Driver Qualifications and Training:

510. Only trained and authorized operators shall be permitted to operate power-operated industrial trucks. Training methods should be developed to instruct operators in safe and efficient operating procedures.

600. Fuel Handling and Storage:

610. Gasoline and diesel fuel shall be stored and handled as outlined in the NFPA Suggested Ordinance for the Storage, Handling and Use of Flammable Liquids (NFPA No. 30-L).* Liquefied petroleum gas fuel shall be stored and handled as recommended by the NFPA Standards for the Storage and Handling of Liquefied Petroleum Gases (NFPA No. 58)*.

† Published in National Fire Codes Vol. I and in separate pamphlet form.

620. Gasoline- and diesel fuel-powered trucks shall be refueled only at locations specially designated for that purpose. Safe outdoor locations are preferable to those indoors. The NFPA Suggested Ordinance (No. 30-L),* Paragraph 503-04 outlines recommendations for arranging safe indoor fueling facilities. Liquified Petroleum gas-powered trucks shall be refueled only as provided in the NFPA Standards for the Storage and Handling of Liquefied Petroleum Gases (NFPA No. 58)*.

630. Exchange of removable liquefied petroleum gas truck fuel containers, recharging non-removable containers and storage of extra containers shall be done only in accordance with the NFPA Standards for Storage and Handling of Liquefied Petroleum Gases (NFPA No. 58)*.

700. **Hazardous Areas:**

710. Industrial trucks shall not be used in hazardous areas except as specified in Part A of this Standard.

800. **Safety Operating Rules:** Industrial trucks shall be operated in accordance with the following rules:

801. Lighting of adequate intensity should be provided in operating areas.

802. Operators or authorized personnel shall return trucks for refueling to locations designated for that purpose. Vehicles that run out of fuel elsewhere shall be towed to a designated safe area for refueling.

803. Engines shall be stopped before refueling.

804. Reasonable care shall be exercised to prevent the spillage of fuel. Spilled fuel shall be dissipated before an attempt is made to start the engine.

805. Metal contact shall be maintained between the side of the fill opening of the tank and the refueling can or hose nozzle to prevent the accumulation of a hazardous charge of static electricity.

806. Operators shall avoid striking sprinkler heads, pipes, fire doors, elevator gates, walls, columns and other

* Published in National Fire Codes Vol. I and in separate pamphlet form.

obstructions. Accidents shall be reported to a foreman or supervisor.

807. Operators shall exercise particular care while high tiering loads in storage to avoid breaking sprinkler piping or fittings. Fire aisles and access space to fire equipment and exit doors shall be kept clear.

808. Operators shall report leaky containers or broken packages to a foreman or supervisor.

809. Operators shall not make any truck repairs or adjustments unless specifically authorized to do so.

810. When leaving an industrial truck unattended, controls shall be neutralized, power shut off, brake set, key or battery connector removed, and the forks of a fork truck left flat on the floor.

811. Trucks shall be garaged only in a location acceptable to the authority having jurisdiction.

812. Fork trucks shall be driven at all times with the fork as low as local conditions permit.

813. The authorized speed limit shall not be exceeded and dangerous intersections or slippery floors shall be negotiated at a safely lower speed. Operators shall also slow down at cross aisles and when vision is obstructed by doors, corners, elevators or loads.

814. Operators shall keep trucks under control at all times so that a quick stop can be made in the event of an emergency.

815. The operator of a moving truck should always look in the direction of travel.

816. Bridge plates shall be properly secured and negotiated carefully and slowly.

817. Parking on an incline shall be avoided whenever possible. Otherwise, the brake shall be set and chocks placed under the drive wheels.

818. Operators shall avoid stunt driving and horseplay.

819. It should always be ascertained that positive protection has been provided to prevent railroad cars from