

**ADVISORY
STANDARDS**

111

**ADVISORY STANDARDS
FOR
HOISTING MACHINES USED FOR SUSPENDED SCAFFOLDS**

Effective

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**NEW YORK STATE
DEPARTMENT OF LABOR**

**ADVISORY STANDARDS FOR CONSTRUCTION, OPERATION, AND MAINTENANCE OF
HOISTING MACHINES
USED FOR SUSPENDED SCAFFOLDS
AS-111-1 PREFACE**

AS-111.1 INTRODUCTION. (a) These advisory standards may be used in all matters in the consideration of applications for approval of hoisting machines used for suspended scaffolds which are required to be approved by the provisions of Industrial Code Part (Rule No.) 22, (12 NYCRR 22), relating to “Protection in Construction, Demolition and Excavation Work”, Subpart 23-5, Section 22-5.8, Subdivision (d), Paragraph (1), herein quoted: “(1) Any manual or power-operated hoisting machine used for suspended scaffolds shall be approved.”

(b) These advisory standards are minimum standards and the Department in its discretion may at any time mend them or take other appropriate action in regard thereto to assure safety.

(c) In regard to any deviation from these advisory standards, the applicant should submit such a proposal to the Engineering Services Unit (ESU) along with an application for approval before proceeding with the design of any such deviation.

111-1.2 APPLICATION FOR APPROVAL. (a) **Procedure and data required.** The following data should be submitted in duplicate with any application for approval of a hoisting machine to be used for a suspended scaffold.

(1) **Application form.** An applicant should file a General Approval Application (SH-753) with the New York State Department of Labor, Building 12, Room 154, Albany, New York 12240. These forms may be obtained from the New York State Department of Labor offices located at the above address.

(2) **Hoisting machine drawings.** An applicant should file a complete set of engineering drawings for the hoisting machine. Such drawings should contain dimensions as well as complete delineation and material specifications.

(3) **Design calculations.** An applicant should file a complete stress analysis for the hoisting machine to substantiate the ability of the hoist to raise and hold its maximum design load with stresses that will not exceed those established by recognized national standards when considering impact loading. Maximum loading should be determined by doubling the sum of the live load plus the dead load imposed on the hoist’s suspension rope.

NOTE: For a list of recognized national standards acceptable to the ESU see Subpart 111-4 of these advisory standards.

(d) **Test reports.** An applicant may file with the ESU a report of tests made by an independent laboratory acceptable to the ESU or certified by a professional engineer

licensed to practice in the State of New York as an alternative to providing the design calculations required by Paragraph (3) above. Such tests should be made on prototype models only to determine the safety of the hoisting machine and to insure that such machine meets all the requirements of these advisory standards.

(e) **Description.** An applicant should file with the ESU a word description of the construction, use, operation and safety features of the hoisting machine.

111-1.3 MODIFICATION OF APPROVED HOISTING MACHINES. Prior approval by the ESU is required before any modification or alteration of a previously approved hoisting machine is made. When any modification or alteration is anticipated, the applicant should submit a proposal to the ESU for its consideration. Such a proposal should include substantiating data.

AS-111-2.1 GENERAL STANDARDS

111-2.1 DEFINITION OF TERMS. Whenever used in these advisory standards, the following terms mean:

(a) *Approved.* In respect to a device or a material: in compliance with a subsisting resolution of approval adopted by the Board. In respect to action by the Board: made the subject of a resolution of approval.

(b) *Hoisting machine.* A device intended to be used to raise or lower a suspended scaffold. The term includes the following:

(1) All parts, materials, components, assemblies and devices of the hoisting machine.

(2) The method of attachment of the hoisting machine to the suspended scaffold.

(3) The means of suspension of the hoisting machine.

(c) *Prime mover.* The source of power for the hoisting machine.

(d) *Speed reducer.* A gearing device used to reduce the output speed of the prime mover to the desired speed of the hoist.

(e) *Primary brake.* A brake used to stop the hoisting machine and its load under normal operating conditions.

(f) *Secondary brake.* A brake that is intended to stop the hoist and its load under emergency conditions only.

(g) *Traction drum.* A type of drum that does not accumulate the suspension rope but is designed to climb the rope by the application of a friction force between the rope and the drum.

(h) *Winding drum.* A drum that accumulates the suspension rope.

(i) *Single wrap drum.* A winding drum that accumulates the suspension rope in a single layer in spiral grooves on the surface of the drum.

(j) *Multiple wrap drum.* A winding drum that accumulates the suspension rope in more than one layer on the surface of the drum.

AS-111-3 DETAILED STANDARDS

113.1 HOISTING MACHINE MINIMUM STANDARDS. The following are the minimum standards for a hoisting machine to be considered for approval:

(a) **Prime mover.** (1) Any powered type hoisting machine should have a prime mover of sufficient capacity to raise 125 per cent of the design load.

(2) **Electric motors.** Each electric motor of any hoist should be provided with a thermal overload device or a circuit protected by a current limiting device and should be of a weather-proof type construction. Each such motor should bear the manufacturer's name plate which lists the rating and other characteristics of the motor.

(3) **Gasoline motors.** Gasoline motors will not be considered for approval.

(4) **Liquid propane gas motors.** Liquid propane gas motors may be considered for approval provided such motors are in compliance with all the provisions of these advisory standards.

(5) **Air motors.** Air motors may be considered for approval provided such motors are in compliance with all the provisions of these advisory standards.

(b) **Speed reducers.** (1) A hoisting machine should have a speed reducer or an equivalent device to obtain a mechanical advantage. Such speed reducer or other device should contain positive type gearing such as a worm and gear, spur gears or bevel gears.

(2) The speed reducer or other device should be directly connected to the drum of the hoisting machine. Connection by means of belts, clutches or roller chains will not be considered as direct connections.

(3) All gearing should conform to the standards as established by the American Gear Manufacturers' Association in effect on the date that the application for approval is filed with the ESU.

(c) **Primary brake.** (1) Every manually-powered hoisting machine should be provided with a primary brake that automatically engages upon the release of effort by the operator on the crank or other operating device.

(2) Every power-operated hoisting machine should be provided with a primary brake that automatically engages whenever power to the prime mover is interrupted.

(3) Any primary brake should be rated to stop and hold 125 per cent of the rated load of the hoisting machine.

(4) Any primary brake should be capable of preventing downward drift of the hoisting machine and its rated load.

(5) Any primary brake should be directly connected to the drive train of the hoisting machine and should not be connected through belts, roller chains or clutches.

(d) Secondary brakes. (1) Every hoisting machine should be provided with an automatic emergency-type secondary brake that will stop and hold 125 per cent of the rated load of the hoist. If such a secondary brake is of the instantaneous stopping type it should stop and hold the hoist and its rated load before the hoist travels a vertical distance of 18 inches. If such a secondary brake is of the decelerating type it should stop and hold the hoist and its rated load before the hoist travels a vertical distance of 48 inches.

(2) The secondary brake should act directly on the wire suspension rope on a traction type hoist or winding drum type hoist and may act directly on the drum or drum extension on a winding drum type hoist. Secondary brakes should be independent of the drive trains on all hoists. The actuating mechanism of a secondary brake may be separate from the brake.

(3) Every secondary brake should be so designed, installed and maintained to stop and hold 125 per cent of the rated load of the hoist when any of the following emergency conditions occur:

(i) An instantaneous change in momentum (free fall).

(ii) An accelerating overspeed.

(4) The secondary brake should not be used to stop and hold the hoist except under emergency conditions. Such a brake should not engage before the hoist is stopped by the primary brake in normal operation.

(5) The design of every secondary brake should include a provision for periodic testing under simulated overspeed conditions.

(6) The design, installation and maintenance of every secondary brake should be such that the brake is prevented from being made defective or inoperative by outside contamination.

(e) Hoisting machine lubrication. Each separate compartment of every hoisting machine should be provided with a separate means of lubrication to assure that all moving parts of the hoist are adequately lubricated at all times.

(f) Hoisting drums. (1) General. (i) The drums of all hoisting machines used for suspended scaffolds should be designed for use with a suspension wire rope of not less than five-sixteenths inch diameter.

(ii) Each winding drum should be provided with a positive means of attachment of the suspension rope. Such attachment should develop a minimum of 80 per cent of the rated breaking strength of the suspension rope.

(2) **Traction drums.** Every traction drum should contain a minimum of four turns or the suspension rope at all times. The diameter of any traction drum should not be less than 18 times the diameter of the suspension rope used.

(3) **Single-wrap winding drums.** (i) Every single—wrap winding drum hoisting machine should be provided with a means of level winding of the Suspension rope.

(ii) Every single-wrap winding drum should be so designed that the drum will contain a minimum of four wraps of the suspension rope at all times.

(iii) The minimum diameter of every single-wrap winding drum should not be less than 25 times the diameter of the suspension rope used.

(4) **Multiple-wrap winding drums.** (i) Every multiple-wrap winding drum hoisting machine should be provided with a means for level winding of the suspension rope.

(ii) Every multiple-wrap winding drum should contain not less than four wraps of the suspension rope at all times.

(iii) The minimum diameter of every multiple-wrap winding drum should not be less than 10 times the diameter of the suspension rope used.

(g) **Electrical wiring and equipment.** (1) The electrical wiring and equipment contained on a hoisting machine should comply with the standards established by the National Fire Protection Association in the National Electrical Code and which are in effect on the date the application for approval is filed with the ESU.

(2) All electrically-powered hoisting machines used in construction should be powered by motors rated at not more than 220 volts.

(3) The power supply cable to any hoisting machine should contain a separate conductor which will serve as a ground connection for the hoist.

(4) Strain relief devices should be provided for cables supplying power to hoisting machines. Such devices should be located at the receptacles where the cables are plugged in at well as at the cable connections on the hoists.

(h) **Hoisting machine controls.** Controls for all hoisting machines should be of the momentary contact type (dead man controls) which requires the maintenance of constant pressure in order for the hoisting machines to operate.

(i) **Welding.** (1) All welds used in the manufacture of any hoisting machine, its associated parts or components should be made only by welders certified to American Welding Society standards and all welds should be made in compliance with such standards.

(2) All welds that provide structural support for a hoisting machine or the scaffolds to be suspended should be subjected to non-destructive tests and the reports of such tests should be submitted to the ESU.

**AS-111-4 RECOGNIZED DESIGN STANDARDS
ACCEPTABLE TO THE ESU**

111-4.1 The following list of recognized design standards are acceptable to the ESU in all matters relating to the applications for approval of hoisting machines used for suspended scaffolds.

- (a) AISC American Institute of Steel Construction
- (b) ASCE American Society of Civil Engineers
- (c) ASME American Society of Mechanical Engineers
- (d) ASTM American Society for Testing Machines
- (e) AGMA American Gear Manufacturers' Association
- (f) AWS American Welding Society
- (g) Structural Aluminum Design Reynolds Aluminum Company
- (h) ALCOA Structural Handbook Aluminum Company of America

111-4.2 When submitting design data from such recognized standards in an application for approval of a hoisting machine used for a suspended scaffold, the applicant should refer to the standard and section used in obtaining such data.