



## **INTRODUCING HMI**

Founded in 1956, **The Hoist Manufacturers Institute (HMI)**, an affiliate of Material Handling Industry, is a trade association of manufacturers of overhead handling hoists. The products of its member companies include hand chain hoists, ratchet lever hoists, trolleys, air chain and air rope hoists, and electric chain and electric wire rope hoists.

HMI operates through committees with programs and policies reviewed and adopted by the membership with representation from each member company. Its many activities include an active engineering committee. HMI is represented on a number of standards developing committees and actively supports the development and certification of safety standards by the ANSI consensus method.

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### **Our Members**

HMI member companies are recognized as the leading authority and the principle resource in the Hoist Industry. The HMI members are concerned, conscientious manufacturers affiliated in an industry association to provide voluntary standards for the mechanical, structural and electrical design of hand chain hoists, ratchet lever hoists, trolleys, air chain and air rope hoists, and electric chain and electric wire rope hoists and to formulate guidelines for the proper use, operation and maintenance of that equipment.

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### **Our Association**

HMI is a member driven organization. To qualify for membership a company must manufacture or as a partial manufacturer of overhead hoists has engineered and designed its own overhead hoists and assembled continuously the major hoist components for at least a three-year period prior to its application for membership.

Member companies of HMI meet regularly to review, discuss and revise the standards for design, performance and proper operation. HMI member companies have committed to the development, maintenance and publishing of industry standard specifications.

Additionally, HMI has prepared, published and distributes Training, Inspection and Maintenance recommendations that are available to all hoist users, such as the Hoist Operators Manual, Hoist Inspection and Maintenance Personnel Manual, Manually Lever Operated Hoist Inspection and Hoist Maintenance Personnel Manual, and the Manually Lever Operated Hoist Operators Manual.

The Occupational Safety and Health Administration (OSHA) recently announced an alliance with the Monorail Manufacturers Association (MMA), the Crane Manufacturers Association of America (CMAA) and the Hoist Manufacturers Institute (HMI). The purpose of this alliance is to provide monorail systems, crane and hoists owners and operators with information, guidance, and access to education and training resources that will advance their workplace safety and health.

Member companies participate in a requisite number of regularly scheduled meetings which among other things further the ongoing process of revising and updating today's standards to meet the ever-changing demands of technology and the modern industrial environment.

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HOIST MANUFACTURERS INSTITUTE

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# Hoist Operator's Manual

**Prepared and Published by**



HOIST MANUFACTURERS INSTITUTE

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## **INTRODUCTION AND DISCLAIMER**

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The Hoist Manufacturers Institute (HMI) is an independent incorporated trade association affiliated with the Material Handling Industry of America Division of Material Handling Industry.

### **MATERIAL HANDLING INDUSTRY AND ITS MATERIAL HANDLING INDUSTRY OF AMERICA DIVISION (MHI)**

MHI provides HMI with certain services and, in connection with this Hoist Operators Manual, arranges for its production and distribution. Neither MHI, its officers, directors nor employees have any other participation in the development and preparation of the information contained in this Manual.

All inquires concerning this Hoist Operators Manual should be directed in writing to the Chairman of the HMI Engineering Committee, c/o Hoist Manufacturers Institute, 8720 Red Oak Boulevard, Suite 201, Charlotte, North Carolina 28217-3992.

### **HOIST OPERATORS MANUAL**

This Manual has been prepared by HMI and its Engineering Committee to provide information and suggestions for Hoist Operators in their operation of overhead hoists. Operation of an overhead hoist involves more than operating the controls of the hoist. The operator must consider and anticipate the motions and actions that will occur as a result of operating the controls. Therefore, it is important for the Hoist Operator to be instructed in the operation of overhead hoists and to understand the severe consequences from careless operation.

It is not intended that the recommendations in this manual take precedence over existing plant safety rules and regulations, OSHA regulations, or instructions issued by the manufacturer of the hoist. However, a thorough study of the following information should provide a better understanding of safe operation and afford a greater margin of safety for people and machinery on the plant floor.

It must be recognized that this is a Manual of recommendations for the Hoist Operator and its use is permissive not mandatory. It is the responsibility of the owner of the Hoist to make personnel aware of all federal, state and local rules, codes and plant safety rules and regulations and instructions and to make certain operators are properly trained.

## INTRODUCTION AND DISCLAIMER

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### DISCLAIMERS AND INDEMNITY

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## INTRODUCTION AND DISCLAIMER

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**Taking precedence over any specific rule, however, is the most important rule of all:**

**“USE COMMON SENSE.”**

It is a responsibility of the hoist owner/user to establish programs to:

1. train and designate hoist operators, and
2. train and designate hoist inspection and maintenance personnel.

The words **shall** and **should** are used throughout this manual in accordance with definitions in the ASME B30 standards as follows:

**shall**        this word indicates that a rule is mandatory and must be followed.

**should**      this word indicates that a rule is a recommendation, the advisability of which depends on the facts in each situation.

Hoist operator and hoist inspection and maintenance personnel training programs should be based on requirements in accordance with the latest edition of:

- ASME B30.16        Safety Standard for Overhead Hoists (Underhung)

Such training programs should also provide information for compliance with any Federal, State, or Local Code requirements, existing plant safety rules and regulations, and the instructions furnished by the manufacturer of the hoist.

If an overhead hoist is installed as part of an overhead crane or monorail system, training programs should also include requirements in accordance with the latest edition, as applicable, of:

- ASME B30.2,        Safety Standard for Overhead and Gantry Cranes, Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist
- ASME B30.11,      Safety Standard for Monorails and Underhung Cranes
- ASME B30.17,      Safety Standard for Overhead and Gantry Cranes, Top Running Bridge, Single Girder, Underhung Hoist

Overhead hoists are often referred to by the basic type of construction of the hoist. Various types of overhead hoists are covered in the HOIST TYPES section of this manual. Definitions of the various terms used to identify hoist types or hoist components can be found in Appendix A.

## INTRODUCTION AND DISCLAIMER

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### NOTICE

It is a responsibility of the owner/user to install, inspect, test, maintain, and operate a hoist in accordance with the ASME B30.16 Safety Standard, OSHA Regulations, and ANSI/NFPA 70, National Electrical Code. If the hoist is installed as part of a total lifting system, it is also the responsibility of the owner/user to comply with the applicable ASME B30 volume that addresses other types of equipment used in the system.

Further, it is the responsibility of the owner/user to require that all personnel that will install, inspect, test, maintain, and operate a hoist read the contents of the instruction manual furnished by the manufacturer of the hoist, ASME B30.16 Safety Standard for Overhead Hoists (Underhung), OSHA Regulations, and ANSI/NFPA 70, National Electrical Code. If the hoist is installed as part of a total lifting system, the applicable ASME B30 volume that addresses other types of equipment used in the system must also be read by all personnel.

### WARNING


Before installing, removing, inspecting, or performing any maintenance on a hoist; the main switch shall be de-energized. Lock and tag the main switch in the de-energized position in accordance with ANSI Z244.1. Follow other maintenance procedures outlined in the manual furnished by the manufacturer of the hoist and ASME B30.16.


### SAFETY ALERT SYMBOL

The Safety Alert Symbol is used in this manual to indicate hazards and to alert the reader to information that should be known, understood, and followed in order to avoid DEATH or SERIOUS INJURY.

Read and understand this manual before using the hoist.

Important issues to remember during operation are provided at the hoist control stations, at various locations on the hoist and in the manuals by **DANGER**, **WARNING**, or **CAUTION** instructions or placards, that alert personnel to potential hazards, proper operation, load limitations, and more.

 **DANGER:** Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

 **WARNING:** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



## INTRODUCTION AND DISCLAIMER

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### **CAUTION:**

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

### **⚠ WARNING**

Failure to read and comply with any one of the limitations noted in this manual and the instruction manual furnished by the manufacturer of the hoist can result in serious bodily injury or death, and/or property damage.

Because the manufacturer of the hoist has no direct involvement or control over the hoist's operation and application, conforming to good safety practices is the responsibility of the owner, the user, and its operating personnel.

Only those Authorized and Qualified Personnel who have shown that they have read and have understood this manual and the manufacturer's manual and that they understand the proper operation and maintenance of the hoist should be permitted to operate the hoist.

## **PLACARDS AND INSTRUCTIONS**

READ and OBEY all Danger, Warning, Caution, and Operating Instructions on the hoist and in all manufacturers' manuals and this manual. Make sure that all placards are in place and legible.

Failure to comply with safety precautions in this manual, in the manufacturer's manual, and on the hoist is a safety violation that may result in serious injury, death, or property damage.

## HOIST TYPES

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Overhead hoists are defined in the ANSI/ASME standards as a machinery unit that is used for vertical lifting service involving material handling of freely suspended (unguided) loads. Overhead hoists are a basic and versatile piece of equipment used in manufacturing, warehousing, construction, and numerous other applications to aid workers in the handling and moving of loads.

Overhead hoists are available in various types of configurations and constructions. Overhead hoist types are usually referred to using terms that define a specific configuration and construction. Three areas that further define the hoist type are:

- **LIFTING MEDIUM:** Lifting medium defines the type of component used to transmit and cause vertical motion of the hoist load hook or hoist load block. Lifting mediums include wire rope or chain.
- **OPERATION:** Operation defines the type of power used to operate the hoisting motion. Operation types include manual power, electric power, or air power.
- **SUSPENSION:** Suspension defines the type of mounting or method used to mount or suspend the hoist. Common suspension types include hook mounted, clevis mounted, lug mounted, trolley mounted, deck mounted, base mounted, wall mounted, and ceiling mounted. Other types of suspension may be designed to meet specific application requirements.

When the above various types of configurations or constructions are considered, some of the names used to refer to overhead hoists include: hook mounted manually operated hand chain hoists; electric chain hoists; air chain hoists; electric wire rope hoists; air wire rope hoists; trolley mounted wire rope hoists; etc. Manually lever operated hoists are not considered an overhead hoist and are not covered in this manual.

### LIFTING MEDIUM TYPES

As previously stated, lifting medium defines the type of component used to transmit and cause vertical motion of the hoist load hook or hoist load block. Hoist lifting mediums include:

- Welded Link Load Chain
- Roller Load Chain
- Wire Rope

## HOIST TYPES

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### WELDED LINK LOAD CHAIN

Welded link load chain consists of a series of interwoven formed and welded links. The links fit pockets of the hoist load sprocket that transmits motion to the load chain. The load sprocket may also be called load wheel, load sheave, pocket wheel, chain wheel, or lift wheel. Welded link load chain sizes are stated as the diameter of the wire used to form the link, i.e. 1/4 in., 5/16 in., etc. Welded link load chain is designed and manufactured to specific dimension and material strength requirements for a specific hoist. Welded link load chain is **not interchangeable** between different manufacturers' hoists; and is **not interchangeable** with welded link lifting chain used for other purposes such as chain slings and load securement. Only welded link load chain with specifications as originally stated by the hoist manufacturer should be used on any welded link load chain hoist.

### ROLLER LOAD CHAIN

Roller load chain consists of a series of alternately assembled roller links and pin links where the pins articulate inside bushings and the rollers are free to turn on the bushings. Pins and bushings are press fit in their respective link plates. The links fit teeth of the hoist load sprocket that transmits motion to the load chain. The load sprocket may also be called load wheel, load sheave, pocket wheel, chain wheel, or lift wheel. Roller load chain sizes are stated as the pitch or spacing between pins, i.e. 5/8 in., 3/4 in., etc. Roller load chain for use on hoists is designed and manufactured to specific material strength requirements for hoist applications. Roller load chain for hoist applications has different manufacturing specifications than roller chain for power transmission applications. Therefore, hoist roller load chain is **not interchangeable** with power transmission roller chain. Only roller load chain with specifications as originally stated by the hoist manufacturer should be used on any roller load chain hoist.

### WIRE ROPE

Wire rope consists of a core, strands, and wires that comprise a strand. The wire rope fits and wraps onto grooves on the circumference of the hoist drum that transmits motion to the wire rope. Wire rope sizes are stated as the diameter of a circle that would enclose the wire rope strands, i.e. 5/16 in., 3/8 in., etc. Each wire rope size is available in various rope constructions and materials. The construction and material strength requirements of the wire rope are selected by the hoist manufacturer in accordance with the design specification requirements of the hoist. Therefore, only wire rope with specifications as originally stated by the hoist manufacturer should be used on any wire rope hoist.

## HOIST TYPES

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### OPERATION TYPES

As previously stated, operation defines the type of power used to operate the hoisting motion. Hoist operating types include:

- Hand Chain Manual Power
- Electric Power
- Air Power

#### HAND CHAIN MANUAL POWER

The hoisting motion of hand chain manually operated hoists is achieved by the operator grasping and pulling a continuous hand chain suspended from the hoist. Hand chain consists of a series of interwoven formed welded or un-welded links according to the design specifications of the hand chain. The hand chain links fit pockets of the hoist hand chain wheel or sprocket. As the operator pulls the hand chain, the hand chain wheel turns and transmits power through the hoist gearing to the hoist load chain sprocket. Pulling the hand chain in one direction will cause the hoist load hook to travel in one direction (LIFT or LOWER); and pulling the hand chain in the opposite direction will cause the hoist load hook to travel in the opposite direction (LIFT or LOWER).

Hand chain manually operated hoists are available with only welded link load chain or roller load chain as the lifting medium. Before the advent of electric powered hoists and air powered hoists, wire rope was used as a lifting medium. However, hand chain manually operated wire rope hoists are not available in today's market unless they are specifically designed to meet the requirements of a unique and special application, and are not addressed in this manual.

Higher capacity hand chain manually operated chain hoists may have multiple hand chains suspended from the hoist. Hoists that have multiple hand chains require multiple operators, each grasping and pulling one of the hand chains.

#### **⚠ WARNING**

The hand chain of a hoist, or each hand chain of a hoist having multiple hand chains, should only be operated (GRASPED and PULLED) by a single operator. If any single hand chain is operated (GRASPED and PULLED) by more than one person, the hoist could be overloaded with subsequent damage and/or failure of hoist components, resulting in serious bodily injury or death, and/or property damage.

## **HOIST TYPES**

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### **ELECTRIC POWER**

The hoisting motion (lifting or lowering) of electric powered hoists is achieved by the operator grasping and activating a control device. The control device has push buttons or levers that energize, through a series of contactors and other electrical components, an electric motor. The electric motor transmits power through the hoist gearing to the hoist load chain sprocket or hoist drum; thereby, lifting or lowering the hoist load hook. Lifting is accomplished by actuating the lifting control; and lowering is accomplished by actuating the lowering control. The controls could be marked: LIFT/LOWER; UP/DOWN; RAISE/LOWER; ↑/↓; or a combination of such markings. Hoist lifting and lowering controls are usually push buttons mounted in a pendant control enclosure suspended from the hoist; or levers or switches mounted in a remote radio-control transmitter. Pendant control enclosures, radio-control transmitters, or other control means could also be permanently mounted on the building structure or cab of an overhead crane depending on the application.

The control device used to lift and lower hoist motion may also contain controls for other motions or functions. Such controls include: trolley travel, overhead crane travel, power on/off, emergency stop, motions associated with below-the-hook lifting devices, and other special functions associated with a specific application. Examples of such control markings may include, but are not limited to: EAST/WEST; RIGHT/LEFT; OPEN/CLOSE; START/STOP; etc.

Before the advent of pendant controls, electric powered hoists were controlled by pull controls or rod controls. Pull control consists of two pull chains or two pull cords having handles marked for hoisting direction, and suspended from the hoist. Rod control consists of a rod handle suspended from the hoist and controls motion by linear or rotary movement of the rod handle or a combination of linear and rotary motion. While pull controls or rod controls are not normally used on electric powered hoists today, such controls may be found on older type hoists.

### **AIR POWER**

The hoisting motion (lifting or lowering) of air powered hoists is achieved by the operator grasping and activating a control device. The control device has push buttons or levers that energize, through a series of valves and other air components, an air motor. The air motor transmits power through the hoist gearing to the hoist load chain sprocket or hoist drum; thereby, lifting or lowering the hoist load hook. Lifting is accomplished by actuating the lifting control; and lowering is accomplished by actuating the lowering control. The controls could be marked: LIFT/LOWER; UP/DOWN; RAISE/LOWER; ↑/↓; or a combination of such markings. Hoist lifting and lowering controls are usually push buttons or levers mounted in a pendant control enclosure suspended from the hoist; or pull controls or rod controls suspended from the hoist. Pendant control enclosures could also be permanently mounted on the building structure or cab of an overhead crane depending on the application.

## **HOIST TYPES**

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Pull control consists of two pull chains or two pull cords having handles marked for hoisting direction, and suspended from the hoist. Rod control consists of a rod handle suspended from the hoist and controls motion by linear or rotary movement of the rod handle or a combination of linear and rotary motion.

A control device of the type used to lift and lower hoisting motion of an air powered hoist may also be used for other motions or functions, such as trolley travel, overhead crane travel, etc. Examples of such control markings may include, but are not limited to: EAST/WEST; RIGHT/LEFT; OPEN/CLOSE; START/STOP; etc.

## **SUSPENSION TYPES**

As previously stated, suspension defines the type of mounting or method used to mount or suspend the hoist. Hoist suspension types include:

- Hook Mounted
- Clevis Mounted
- Lug Mounted
- Trolley Mounted
- Deck Mounted
- Base Mounted
- Wall Mounted
- Ceiling Mounted

### **HOOK MOUNTED**

Hook mounted hoists have a top hook on the hoist frame or body that can be used to suspend the hoist from the clevis or suspension pin of a trolley; or a fixed suspension device, that will accept the hook, mounted on a beam or the structural framework of a building. Hook mounted hoists normally have only welded link load chain or roller load chain as the lifting medium, because the load chain lifting medium is always in line with the top hook. Hook mounted hoists include: hand chain manually operated chain hoists, electric chain hoists, and air chain hoists. Wire rope hoists are not normally hook mounted because the loading position on the drum moves as the wire rope is wound or unwound on the drum, and therefore not in line with a top hook. Hook mounted wire rope hoists can be furnished; however, they may require multiple top hooks, and special design considerations by the hoist manufacturer.

### **CLEVIS MOUNTED**

Clevis mounted hoists are the same as hook mounted hoists except that a clevis is used in place of the top hook. A clevis is a closed hook having an eye opening to accept a suspension pin.

## **HOIST TYPES**

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### **LUG MOUNTED**

Lug mounted hoists have a lug mounting attached to the top of the hoist frame, or a lug mounting attached as an integral part of the hoist frame. Lug mounted hoists are available in all hoist types. Lug mountings are used to suspend the hoist from a trolley, or a fixed suspension device mounted on a beam or the structural framework of a building. Lug mounted hoists are suspended from a trolley, beam, or structural framework by the use of suspension pin(s) or stud(s).

### **TROLLEY MOUNTED**

Trolley mounted hoists are hook mounted, clevis mounted, or lug mounted hoists suspended from a trolley or trolleys; or a hoist having an integral trolley as part of the hoist frame, that allows travel motion on the lower flange of a monorail beam, or the lower flange of the bridge beam of an overhead crane.

### **DECK MOUNTED**

Deck mounted hoists have a mounting arrangement on the lower portion of the hoist frame that permits the hoist to be mounted on a horizontal flat or deck surface. Deck mounted hoists are normally mounted on the deck of a top running trolley for use on a double girder crane, or permanently mounted on a building structure or an overhead crane

### **BASE MOUNTED**

Base mounted hoists are similar to deck mounted hoists with the exception that instead of the lifting medium hanging down from the hoist, the lifting medium may pay or feed off of the hoist drum or load sprocket at some other point, such as horizontal, vertically upward, or some other angle with either the horizontal or vertical centerline of the hoist. In this arrangement, the hoist unit functions like a winch and is used in applications where the hoist unit cannot be suspended above where the load is to be hoisted.

### **WALL MOUNTED**

Wall mounted hoists have a mounting arrangement that permits the hoist to be mounted on a wall or vertical surface.

### **CEILING MOUNTED**

Ceiling mounted hoists have a mounting arrangement that permits the hoist to be mounted on a ceiling or horizontal surface above the hoist.

## **HOIST TYPES**

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### **TROLLEYS**

Trolleys allow traverse motion of the hoist unit, and load being handled, by traveling: on the lower flange of a monorail beam; on the lower flange of a bridge beam of an overhead crane; or on top of the bridge beams of an overhead crane. Hoist trolleys are available in several types, depending on the method used to obtain travel motion. Trolley types include:

- Plain
- Hand Chain Operated
- Electric powered or Air powered

#### **PLAIN TROLLEYS**

The travel motion of plain type trolleys is obtained by pulling or pushing the load or by some other means, such as the strain relief of a pendant control, suspended from the trolley or hoist. Plain type trolleys are recommended where trolley motion is infrequent or relatively short. Because of the force required to manually operate this type of trolley, it is recommended that the use of plain trolleys be limited to a maximum capacity load of 3 tons or 3000 kg, and that the elevation of the beam where the trolley is suspended be not more than 20 feet or 6 m above the operating floor level.

#### **HAND CHAIN OPERATED TROLLEYS**

The travel motion of hand chain manually operated trolleys is achieved by the operator grasping and pulling a continuous hand chain suspended from the trolley. Hand chain consists of a series of interwoven formed welded or un-welded links according to the design specifications of the hand chain. The hand chain links fit pockets of the trolley hand chain wheel, or sprocket. As the operator pulls the hand chain, the hand chain wheel turns and transmits power through gearing to the trolley wheels. Pulling the hand chain in one direction will cause the trolley to travel in one direction; and pulling the hand chain in the opposite direction will cause the trolley to travel in the opposite direction. Hand chain manually operated trolleys provide excellent load spotting ability.

#### **ELECTRIC POWERED OR AIR POWERED TROLLEYS**

The travel motion of electric powered or air powered trolleys is achieved by the operator grasping and activating a control device in the same manner as described under electric powered or air powered hoists. The control device used to lift and lower hoist motion may also contain controls for trolley travel. Recommendations for use of electric powered or air powered trolleys are based on frequency of operation, distance of travel, capacity of load, height of beam, and type or size of load being handled.

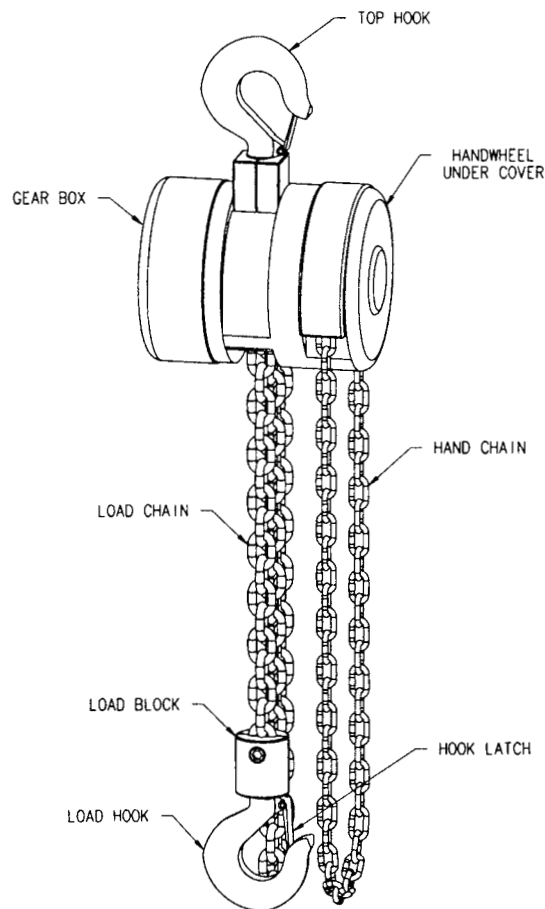


## HOIST OPERATOR'S DUTIES AND RESPONSIBILITIES

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Hoist operators are normally involved in rigging the load, attaching the load to the hoist load hook, and other tasks related to the load for which they have skills in addition to those required for operation of the hoist. Therefore, in addition to the specific information required to operate the hoist, hoist operators should be familiar with rigging procedures and practices. In many applications, a single hoist may be operated by several workers as part of their regular job responsibility.

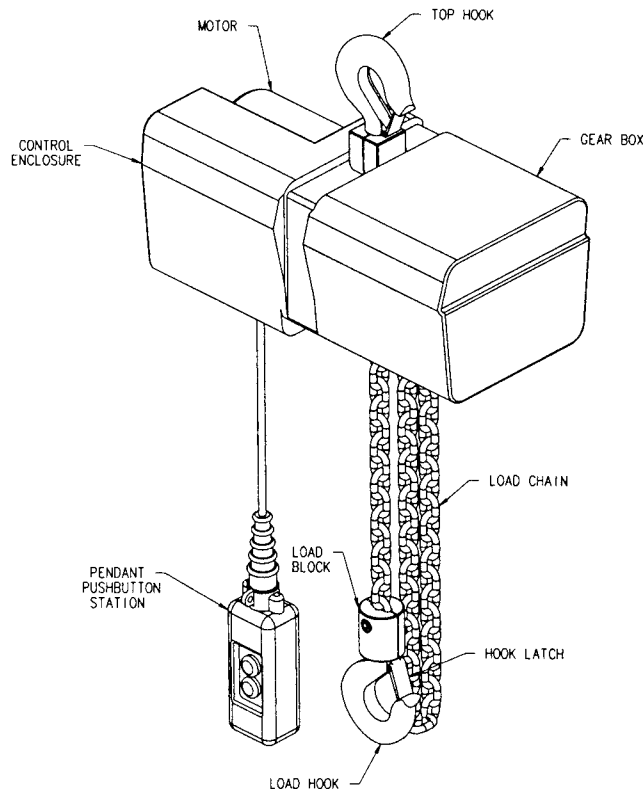
Hoist operators should be familiar with the parts of a hoist and have a thorough knowledge of hoist control device functions and movements. The principal parts of a hand chain hoist are identified and shown in Figure 1. The principal parts of an electric-powered or air-powered chain hoist are identified and shown in Figure 2. The principal parts of an electric-powered or air-powered wire rope hoist are identified and shown in Figure 3. The types of and principal parts of a trolley are identified and shown in Figures 4, 5, and 6.



**FIGURE 1**  
**Principal Parts of a Hand Chain Hoist**

## HOIST OPERATOR'S DUTIES AND RESPONSIBILITIES

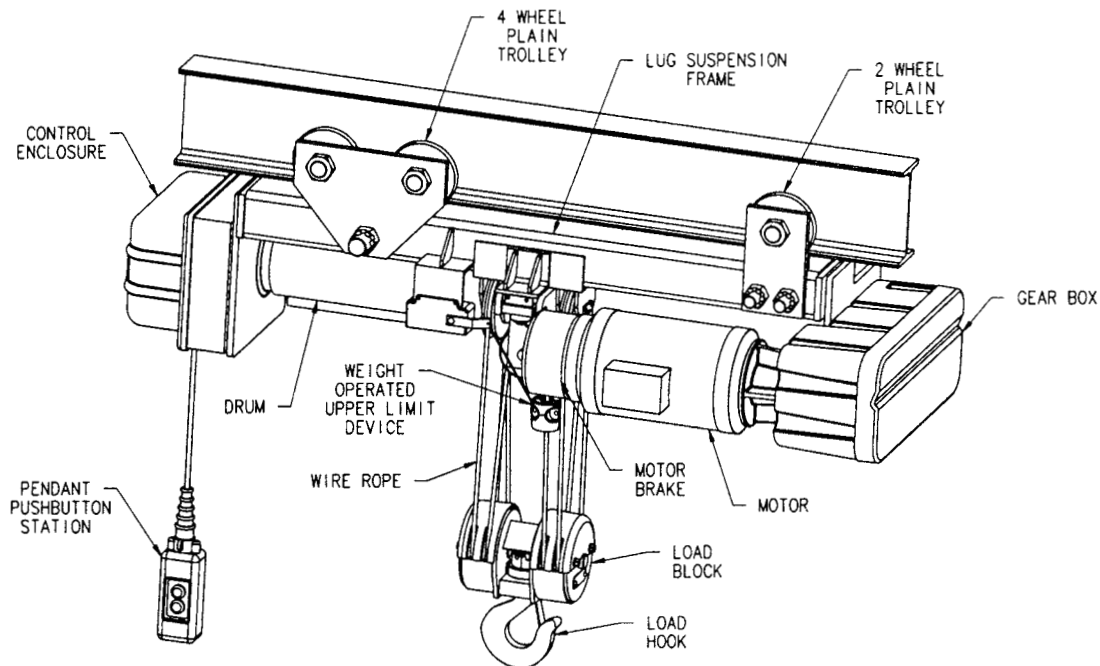
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**FIGURE 2**  
**Principal Parts of an Electric-Powered or Air-Powered Chain Hoist**  
**(Power supply not shown for clarity.)**

In some instances, when a hoist is used on an overhead crane or when a hoist is used as a component in a larger material handling system, other persons, such as a signal person, in addition to the hoist operator, may be involved. Operations that involve an operator (either hoist or crane) and a signal person (normally the rigging or hookup person) require hand signals between the signal person and the hoist or crane operator unless voice communication, such as telephone, radio, or an equivalent method, is used. Where hand signals are used, the operator must be familiar with and understand hand signals, and must respond to the signals from the signal person who is directing the lift. The operator should only respond to hand signals from the designated signal person except to obey a stop signal regardless who gives it. When voice communication between the signal person and the operator is used, a dedicated channel is required in order to eliminate any commands from other personnel in the area that could be confusing to the operator.

## HOIST OPERATOR'S DUTIES AND RESPONSIBILITIES



**FIGURE 3**  
**Principal Parts of an Electric-Powered or Air-Powered Wire Rope Hoist**  
**(Power supply not shown for clarity.)**

Standard hand signals, as shown in ASME B30.2, for use in overhead hoist, and overhead crane and gantry crane operations are shown in Figure 7. A copy of the standard hand signals should be posted where the application requires both an operator and a signal person. Special hoist or crane operations may require the use of additional hand signals or modifications of the standard hand signals. When special signals are required, they should be documented by the crane owner/user, and agreed upon, and understood, by the signal person and hoist or crane operator. Special signals should not conflict with standard signals.

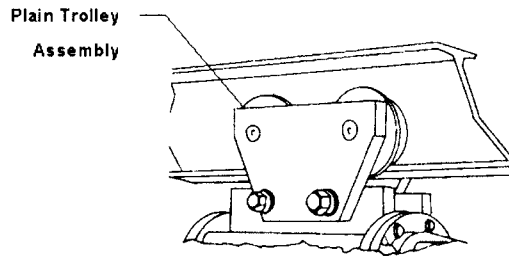
Operators, rigging personnel, signal persons, and maintenance personnel shall be required to know the location and operation of the main runway conductor disconnecting means for all hoists (and cranes, if applicable) in the area.

### **NOTICE**

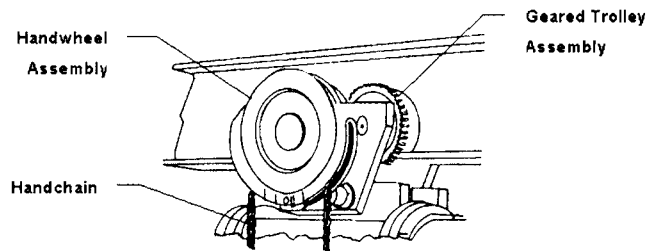
It is important that warning, control marking and other safety labels and signs are present on the hoist and that the information on the label or sign is legible.

# HOIST OPERATOR'S DUTIES AND RESPONSIBILITIES

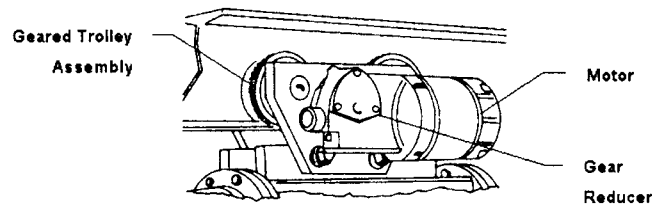
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**FIGURE 4**  
**Plain Trolley**



**FIGURE 5**  
**Hand Chain Trolley**



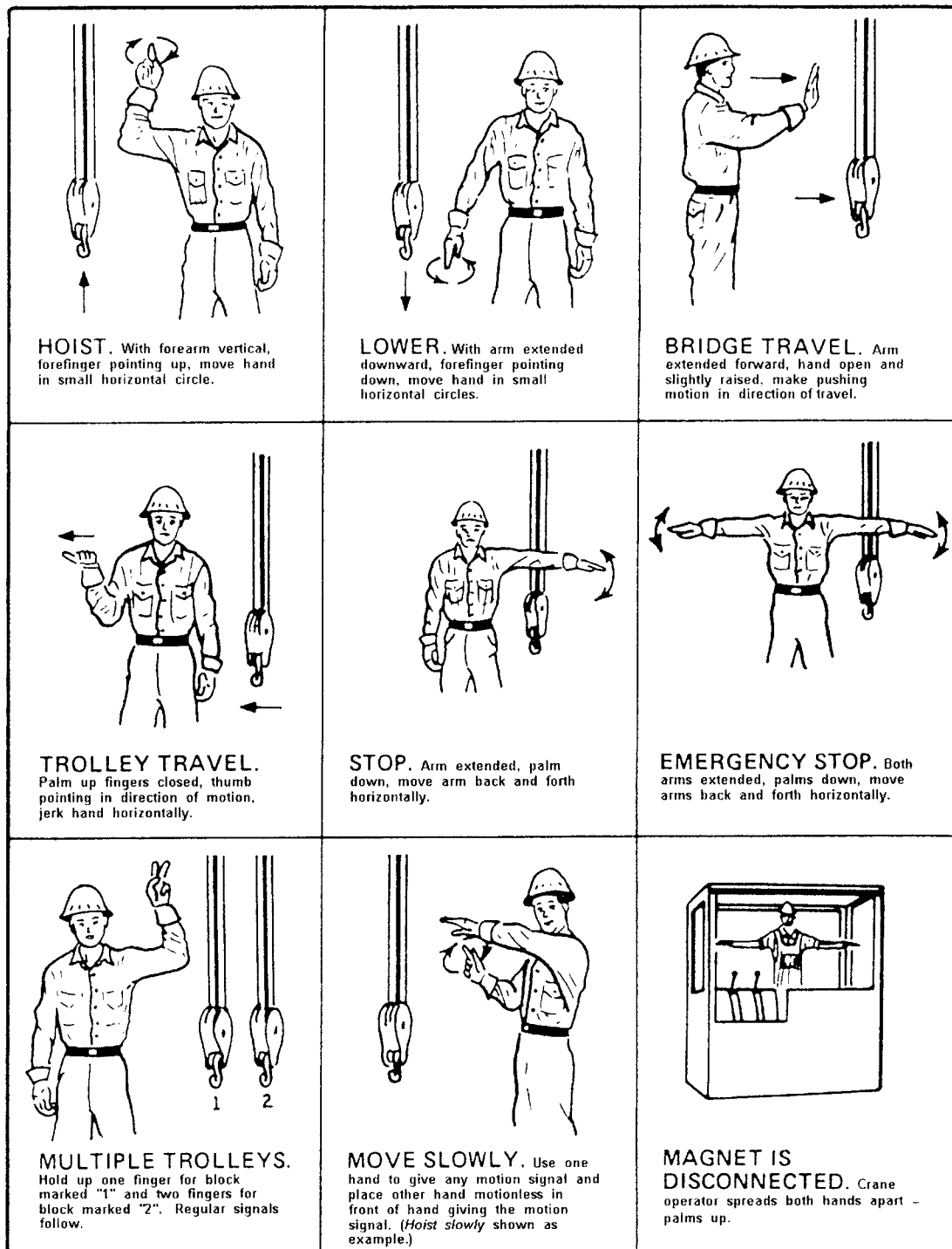
**FIGURE 6**  
**Electric-Powered or Air-Powered Trolley**

## INSPECTION

Daily inspections should be performed by the hoist operator at the start of each shift, or at the time the hoist is first used during each shift. Refer to the HOIST INSPECTIONS section of this manual for additional information on daily inspections. The hoist operator **shall not** perform frequent or periodic inspections, or perform maintenance on a hoist unless the operator has been trained to perform such inspections or maintenance, and is designated by the hoist owner/user to perform such inspections or maintenance.

The daily inspection should include a check for labels or signs that are missing or not legible.

# HOIST OPERATOR'S DUTIES AND RESPONSIBILITIES



**FIGURE 7**  
**Standard hand signals for use in overhead hoist,**  
**and overhead crane and gantry crane operations**  
 Used by permission from American Society of Mechanical Engineers (ASME)

## **HOIST OPERATOR'S DUTIES AND RESPONSIBILITIES**

---

### **HOIST OPERATOR RESPONSIBILITIES**

#### **HOIST OPERATORS SHALL:**

Be required to read the operational section of the manual furnished with the hoist.

Be required to read the warnings in the manual furnished with the hoist.

Be required to read the instructions and warning labels on the hoist.

Be required to read the operating section of ASME B30.16.

Be required to be familiar with the hoist controls before being authorized to operate the hoist.

Be trained in proper rigging procedures to be followed in the attachment of loads to the hoist load hook.

Be trained and be familiar with any below-the-hook devices that may be used in lifting of loads.

Be trained to be aware of potential malfunctions of the hoist that may require adjustment or repair.

Be instructed to stop operation if malfunctions occur, and to immediately advise their supervisor so corrective action can be taken.

#### **HOIST OPERATORS SHOULD:**

Have normal depth perception, field of vision, reaction time, manual dexterity, and coordination for the work to be performed.

**NOT** be subject to seizures, loss of physical control, physical defects, or emotional instability that could result in actions of the operator being a hazard to the operator or others.

**NOT** operate a hoist when under the influence of alcohol or drugs.

**NOT** operate a hoist when under the influence of medication that could result in actions of the operator being a hazard to the operator or others.

## **HOIST OPERATOR'S DUTIES AND RESPONSIBILITIES**

---

### **NOTICE**

HOISTS ARE INTENDED ONLY FOR VERTICAL LIFTING SERVICE OF FREELY SUSPENDED, UNGUIDED LOADS. DO NOT USE A HOIST TO LIFT LOADS THAT ARE NOT LIFTED VERTICALLY, LOADS THAT ARE NOT FREELY-SUSPENDED, OR LOADS THAT ARE GUIDED. IF SUCH CONDITIONS EXIST, THE OPERATOR SHOULD CONTACT THE SUPERVISOR FOR INSTRUCTIONS.

### **⚠ WARNING**

DO NOT LIFT PERSONNEL.  
DO NOT LIFT LOADS OVER PEOPLE.

### **NOTICE**

REFER TO HOIST OPERATION SECTION FOR OTHER WARNINGS, CAUTIONS, AND NOTICES.

## **HOIST, TROLLEY AND BRIDGE MOTIONS**

---

Overhead hoists have one axis of directional travel. This is:

- **THE HOISTING OR VERTICAL TRAVEL DIRECTION OF THE LOAD HOOK**

When overhead hoists are trolley suspended, the trolley hoist unit has two axes of directional travel. These include:

- **THE HOISTING OR VERTICAL TRAVEL DIRECTION OF THE LOAD HOOK**
- **THE TRAVERSE TRAVEL DIRECTION OF THE TROLLEY (INCLUDING THE HOIST UNIT)**

When trolley suspended overhead hoists are used on an overhead crane, the crane, including the trolley hoist unit has three axes of directional travel. These include:

- **THE HOISTING OR VERTICAL TRAVEL DIRECTION OF THE LOAD HOOK**
- **THE TRAVERSE TRAVEL DIRECTION OF THE TROLLEY (INCLUDING THE HOIST UNIT)**
- **THE TRAVERSE TRAVEL DIRECTION OF THE BRIDGE (INCLUDING THE TROLLEY AND HOIST UNIT)**

Some hoists or cranes may have power-operated rotating hooks, power-operated below-the-hook lifting devices, or other power-operated accessories that result in additional axes of directional travel.

The hoist operator should be familiar with the hoist (or crane) controls and understand what type of motion will occur when any one of the control devices is activated. The controls shall be marked, and all markings shall be legible. The daily inspection that is required to be performed by the operator at the start of each shift or at the time the hoist is first used during each shift, should include a check that all travel motions agree with control device markings.



## **HOIST, TROLLEY AND BRIDGE MOTIONS**

---

If more than one hoist or trolley hoist unit is used on an overhead crane, each hoist or trolley hoist shall have an identification marking on it or its load block, and these markings shall also appear on the controllers used by the operator. For example, if a crane has two trolley hoist units, one trolley hoist unit shall be marked “1” (or some other designation) on the trolley hoist or load block, and the other trolley hoist unit shall be marked “2” (or some other designation) on the trolley hoist or load block. The markings on the trolley hoists are to be visible to the operator and any signal person used in rigging the load. The controllers for trolley hoist 1 must be marked “1” (or other designation used on the trolley hoist), and the controllers for trolley hoist 2 must be marked “2” (or other designation used on the trolley hoist).

All motions of multi-speed powered hoists should be started in the slowest speed available for that motion, and then the speed should be increased until the desired speed is obtained. Upon hoisting motion, the load should be lifted only a few inches and stopped to check the holding brake before continuing with the lift.

The hoist should be brought directly over the load before rigging the load to the hoist load hook. Failure to center the hoist over the load could cause the load to swing when it is lifted, or could cause side pulls or other forces to be transferred into the crane. Slack should be taken out of the hoisting ropes or chains, and slings, if used, before attempting to lift the load.

### **HOIST MOTION**

Hoist motion is the vertical travel motion direction of the hoist load hook. Control device markings for this motion should be as stated in the HOIST TYPES section of this manual. Regardless of the marking designation used, the operator should be fully aware of the direction of hook motion that will occur when the control device is activated.

#### **TO LIFT OR RAISE A LOAD:**

- Bring the hoist directly over the load.
- Lower the load hook so it can be attached to the load or the slings or other device used to rig the load. The load, sling(s), or other lifting device should be fully seated in the saddle or bowl of the hook. If the load hook is equipped with a hook latch, verify that the hook latch is operational and closes the throat opening of the hook. Make sure that the hook latch is not supporting any part of the load or the slings or device used to attach the load to the hook. Verify that the weight of the load to be lifted does not exceed the rated load capacity of the hoist.

## **HOIST, TROLLEY AND BRIDGE MOTIONS**

---

- Slack should be taken out of the hoisting ropes or chains, and slings, if used, before attempting to lift the load.
- The load should be lifted only a few inches and stopped to check:
  - that the load is properly balanced;
  - that slings, if used, are properly positioned;
  - that load or sling is seated in the saddle, base, or bowl of the load hook; and
  - that the hoist holding brake stops and holds the load before continuing with the lift.

If an electric powered or air powered hoist has multiple travel speeds, always start motion with the slowest speed and then increase speed until the desired speed is obtained. Some multiple-speed hoists may have other features that affect the lifting motion and the operator should become familiar with the operation of such features. Refer to the manual furnished by the manufacturer of the hoist.

The operator must verify that all personnel are clear of the load and the path of the load, and that the load will clear all obstacles before lowering or landing a load. When lowering the load, if a powered hoist has multiple travel speeds, the lowering speed should be decreased to the slowest travel speed before stopping or landing the load. Block loads before landing if slings or other lifting devices must be removed from under the landed load.

A load should never be left suspended and unattended unless specific precautions to prevent the load from inadvertent lowering have been instituted and are in place, and guards or barriers are utilized on the floor to prevent people from entering the area affected by the suspended load. When the hoist is not in use, the empty load hook should be raised and positioned above head level for storage. Seven feet or greater above floor level is recommended.

### **TROLLEY MOTION**

When trolleys are used with a hoist, trolley motion is the traverse travel motion direction of the trolley hoist unit. Control device markings for this motion should be as stated in the HOIST TYPES section of this manual. Regardless of the marking designation used, the operator should be fully aware of the direction of trolley motion that will occur when the control device is activated.

If a load is to be lifted with the hoist hook before moving the trolley, refer to the HOIST MOTION section of this manual. If a powered trolley has multiple travel speeds, always start motion with the slowest speed and then increase speed until the desired speed is obtained. Both single-speed trolleys and multiple-speed trolleys may have electronic devices that provide controlled acceleration of the motor that offers a soft or controlled start.

## **HOIST, TROLLEY AND BRIDGE MOTIONS**

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When bringing the trolley to a stop, if a powered trolley has multiple travel speeds, it is recommended that the travel speed be decreased to the slowest travel speed before stopping the trolley to minimize load swing.

### **HOIST LIMIT DEVICES**

Powered hoists must be equipped with an upper limit device that will prevent the hoist load block from exceeding the upper limit of travel. Depending on the shape or size of the load being lifted, it may be possible for some part of the load to come into contact with some part of the hoist, trolley, crane, or building structure before the load block reaches the upper limit of travel. The operator must consider this possibility when it is required to lift the load to a level of close proximity to the hoist.

Powered hoists may have additional travel limit devices depending on the specific purchase specifications of the hoist. However, in such cases, the upper limit device that is activated to stop the upper limit of travel is considered the primary upper limit device.

Operation of the primary upper limit device, on powered hoists, is one of the items the hoist operator must check during the daily inspection to be performed at the start of each shift, or at the time the hoist is first used during each shift.

### **⚠ CAUTION**

The primary limit device that controls the upper limit of travel is an emergency device only. It shall not be used as an operational means to stop travel during normal operations.

# HOIST INSPECTIONS

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## DAILY OR PRESTART HOIST INSPECTIONS

In accordance with the requirements of ASME B30.16, the hoist operator should perform daily (prestart) inspections at the start of each shift, or at the time the hoist is first used during each shift. The daily inspection is a visual and audible examination of the hoist. Records of the daily inspection are not required except as required by the hoist owner/user. Daily inspection items that should be performed by the operator at the start of each shift, or at the time the hoist is first used during each shift, include the following outlined in Table 1 for hand chain manually operated hoists; and in Table 2 for electric powered or air powered hoists. Also, refer to the manual furnished by the manufacturer of the hoist for additional information on daily inspections.

**TABLE 1  
HAND CHAIN MANUALLY OPERATED HOISTS  
DAILY INSPECTION  
(REFER ALSO TO THE MANUAL FURNISHED BY THE HOIST MANUFACTURER)**

<b><u>INSPECTION ITEM</u></b>	<b><u>DESCRIPTION OF INSPECTION CHECK POINTS</u></b>
Tagged Hoist	Check that hoist is not tagged with an out-of-order sign.
Hand Chain Control	Check that all travel direction motions agree with hand chain pull.
Hook	Check for damage, cracks, nicks, gouges, deformation of the throat opening, wear on saddle or load bearing point, and twist.
Hook Latch	Check that hook latch, if provided, is not missing and that it operates properly.
Load Chain	Check for nicks, gouges, and any type of deformation or damage to the chain. Check for lubrication of load chain.
Hand Chain	Check for nicks, gouges, and any type of deformation or damage to the chain. Check for open links or open connecting links.
Reeving	Check that load chain is properly reeved and that load chain is not kinked or twisted, and that load chain parts are not twisted about each other.
Brakes	Check that hoist motion does not have excessive drift and that stopping distance is normal.
Oil or Grease Leakage	Check for any sign of oil or grease leakage on the hoist and on the floor area beneath the hoist.
Unusual Sounds	Check for any unusual sounds from the hoist and hoist mechanism while operating the hoist.
Warning and Safety Labels	Check that warning and other safety labels are not missing and that they are legible.

## HOIST INSPECTIONS

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**TABLE 2**  
**ELECTRIC POWERED AND AIR POWERED HOISTS**  
**DAILY INSPECTION**  
**(REFER ALSO TO THE MANUAL FURNISHED BY THE HOIST MANUFACTURER)**

<u>INSPECTION ITEM</u>	<u>DESCRIPTION OF INSPECTION CHECK POINTS</u>
Tagged Hoist	Check that hoist is not tagged with an out-of-order sign.
Control Devices	Check that all travel motions agree with control device markings. When checking hoist travel motion, always use the lifting or up control first.
Brakes	Check that all travel motions do not have excessive drift and that stopping distances are normal.
Hook	Check for damage, cracks, nicks, gouges, deformation of the throat opening, wear on saddle or load bearing point, and twist.
Hook Latch	Check that hook latch, if provided, is not missing and that it operates properly.
Load Chain (If applicable)	Check for nicks, gouges, and any type of deformation or damage to the chain. Check for lubrication of load chain.
Wire Rope (If applicable)	Check for broken wires, broken strands, kinks, and any deformation or damage to the rope structure.
Reeving	Check that load chain or wire rope is properly reeved, that load chain is not kinked or twisted, and that load chain or wire rope parts are not twisted about each other.
Limit Devices	Check that the primary upper limit device stops lifting motion of the hoist load block at the upper limit of travel.  If furnished, check that the lower limit device stops lowering motion of the hoist load block at the lower limit of travel. Note: On wire rope hoists, two wraps of wire rope must remain at each anchorage on the drum. One wrap of wire rope at each anchorage on the hoist drum is permitted if a lower limit device is present.
Oil Leakage	Check for any sign of oil or grease leakage on the hoist and on the floor area beneath the hoist.
Unusual Sounds	Check for any unusual sounds from the hoist and hoist mechanism while operating the hoist.
Warning and Safety Labels	Check that warning and other safety labels are not missing and that they are legible.

## HOIST INSPECTIONS

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### **⚠ WARNING**

IF ANY DAMAGE OR MALFUNCTIONS ARE NOTED BY THE DAILY INSPECTION ITEMS, THE OPERATOR SHALL NOT OPERATE THE HOIST, AND SHALL IMMEDIATELY ADVISE THE SUPERVISOR SO CORRECTIVE ACTION CAN BE TAKEN. IF THE HOIST IS TAGGED WITH AN OUT-OF-ORDER SIGN, THE OPERATOR SHALL NOT OPERATE THE HOIST.

HOIST OPERATORS SHOULD BE AWARE OF MALFUNCTIONS OF THE EQUIPMENT THAT COULD OCCUR DURING OPERATION, AND SHOULD IMMEDIATELY STOP OPERATION IF SUCH MALFUNCTIONS OCCUR, AND SHOULD IMMEDIATELY ADVISE THE SUPERVISOR SO CORRECTIVE ACTION CAN BE TAKEN.

IF CORRECTIVE ACTION HAS NOT BEEN COMPLETED BY THE END OF THE SHIFT, THE OPERATOR SHALL ADVISE THE OPERATOR OR OPERATORS ON THE NEXT SHIFT THAT CORRECTIVE ACTION IS REQUIRED ON THE HOIST AND VERIFY THAT THE HOIST IS TAGGED WITH AN OUT-OF-ORDER SIGN.

### **FREQUENT AND PERIODIC HOIST INSPECTIONS**

Frequent and periodic inspections of the hoist in accordance with the requirements of the ASME B30.16 standard and as outlined in the manual furnished by the hoist manufacturer are required.

Frequent and periodic inspections are to be performed by trained, experienced, and qualified hoist inspection and hoist maintenance personnel.

Refer to the HOIST INSPECTION, MAINTENANCE AND REPAIR section of this manual.

### **NOTICE**

THE HOIST OPERATOR SHALL NOT PERFORM FREQUENT OR PERIODIC INSPECTIONS, OR PERFORM MAINTENANCE ON A HOIST UNLESS THE OPERATOR HAS BEEN TRAINED TO PERFORM SUCH INSPECTIONS OR MAINTENANCE, AND IS DESIGNATED BY THE HOIST OWNER/USER TO PERFORM SUCH INSPECTIONS OR MAINTENANCE.

## HOIST OPERATION - MANUALLY OPERATED CHAIN HOISTS

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Operation of an overhead hand chain manually operated chain hoist involves more than operating the hand chain controls of the hoist. The operator must consider and anticipate the motions and actions that will occur as a result of operating the controls.

**Taking precedence over any specific rule, however, is the most important rule of all:**

**“USE COMMON SENSE.”**

### **⚠ WARNING**

HOIST OPERATORS SHOULD READ THE OPERATION SECTION OF THE MANUAL FURNISHED BY THE MANUFACTURER OF THE HOIST AND THE WARNINGS CONTAINED IN THAT MANUAL; INSTRUCTION AND WARNING LABELS ON THE HOIST; AND THE OPERATION SECTION OF ASME B30.16. HOIST OPERATORS ARE TO BE FAMILIAR WITH THE HOIST, AND HOIST CONTROLS BEFORE BEING AUTHORIZED TO OPERATE THE HOIST.

HOIST OPERATORS ARE TO BE FAMILIAR WITH PROPER RIGGING PROCEDURES TO BE FOLLOWED IN THE ATTACHMENT OF LOADS TO THE HOIST HOOK.

HOIST OPERATORS MUST BE AWARE OF POTENTIAL MALFUNCTIONS OF THE EQUIPMENT THAT REQUIRE ADJUSTMENT OR REPAIR, AND STOP THE OPERATION IF SUCH MALFUNCTIONS OCCUR, AND IMMEDIATELY ADVISE THEIR SUPERVISOR SO CORRECTIVE ACTION CAN BE TAKEN.

HOIST OPERATORS ARE NOT TO OPERATE A HOIST WHEN UNDER THE INFLUENCE OF ALCOHOL OR DRUGS; OR UNDER THE INFLUENCE OF MEDICATION THAT COULD RESULT IN ACTIONS BY THE OPERATOR WHICH MAY CAUSE A HAZARD TO THE OPERATOR OR OTHERS.

HOISTS ARE INTENDED ONLY FOR VERTICAL LIFTING SERVICE OF FREELY SUSPENDED, UNGUIDED LOADS; AND ARE NOT INTENDED TO LIFT LOADS THAT ARE NOT LIFTED VERTICALLY, LOADS THAT ARE NOT FREELY-SUSPENDED, OR LOADS THAT ARE GUIDED. IF SUCH CONDITIONS EXIST, THE OPERATOR SHOULD CONTACT THE SUPERVISOR FOR INSTRUCTIONS OR THE MANUFACTURER OF THE HOIST.

DO NOT LIFT PERSONNEL OR LOADS OVER PEOPLE.

## **HOIST OPERATION - MANUALLY OPERATED CHAIN HOISTS**

---

### **BEFORE EACH SHIFT OR BEFORE THE FIRST TIME THE HOIST IS TO BE USED EACH SHIFT**

It is recommended that  
**THE OPERATOR:**

- **SHALL** perform a daily inspection. Refer to Table 1 in the HOIST INSPECTIONS section of this manual.
- **SHALL** visually inspect chain for nicks, gouges, and any type of deformation or damage, and check load chain for lubrication.
- **SHALL** visually inspect hooks for nicks, gouges, deformation of the throat opening, wear on saddle or load bearing point, and twisting.
- **SHALL** visually inspect hook latches for proper operation or damage that does not allow proper operation.
- **SHALL** report if warning label or labels are missing or illegible to the supervisor.
- **SHALL** report any damage or malfunctions to the supervisor.
- **SHALL NOT** operate hoist if any damage or malfunctions exist.
- **SHALL NOT** operate hoist if it is tagged with an out-of-order sign.

### **BEFORE OPERATING THE HOIST AND APPLYING THE LOAD**

It is recommended that  
**THE OPERATOR:**

- **SHALL** be familiar with all operating controls of the hoist.
- **SHALL** be familiar with the OPERATION Section of the manual furnished by the manufacturer of the hoist; instruction and WARNING labels on the hoist; and the OPERATION section of ASME B30.16.
- **SHALL** be familiar with the operations to be performed.



## **HOIST OPERATION - MANUALLY OPERATED CHAIN HOISTS**

---

- **SHALL NOT** operate hoist if any damage or malfunctions exist.
- **SHALL** report any damage or malfunctions to the supervisor.
- **SHALL NOT** operate hoist if it is tagged with an out-of-order sign.
- **SHALL** center hoist over load.
- **SHALL NOT** operate hoist when the hoist is restricted from forming a straight line from top hook to load hook in the direction of loading.
- **SHALL NOT** use the hoist load chain as a sling to wrap around the load.
- **SHALL** attach the load to the hoist load hook by suitable means such as slings or lifting devices.
- **SHALL** verify that the size of the attachment part of the sling or other lifting device to be used is compatible with the size of the hoist load hook.
- **SHALL** verify that the capacity of the attachment part of the sling or other lifting device to be used is compatible with the capacity of the hoist load hook and the weight of the load to be lifted.
- **SHALL** only attach loads to the hoist load hook that do not exceed the rated load capacity of the hoist.
- **SHALL** verify that the attachment part of the sling or other lifting device is properly seated in the base, bowl, or saddle of the hoist load hook.
- **SHALL** verify that the hook latch operates properly and that the hook latch properly bridges and closes the hook throat opening.
- **SHALL** verify that the latch of the hoist hook will not support any part of the load.
- **SHALL** verify that the load or any part of the load will not be applied to and/or not supported by the tip or point of the hook.
- **SHALL** verify that load will be properly balanced when it is lifted.
- **SHALL** verify that side loads will not be applied to the hoist when the load is lifted.

## **HOIST OPERATION - MANUALLY OPERATED CHAIN HOISTS**

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- **SHALL** verify that hoist load chain is not kinked or twisted, and that load chain parts are not twisted about each other.
- **SHALL** verify that hoist load chain and hand chain are properly seated in the chain sprockets.
- **SHALL NOT** use the hoist load limiting device or load warning device (if provided) to measure the load to be lifted.
- **SHALL NOT** permit more than one operator to pull on a single hand chain at the same time.
- **SHALL NOT** use means other than manual power to operate hoist.
- **SHALL** notify personnel in the area that a load will be lifted and verify that all personnel are clear of the load.
- **SHALL** verify that when the load is lifted, it will clear all material, machinery, or other obstructions in the area.

### **WHILE OPERATING THE HOIST AND MOVING THE LOAD**

It is recommended that  
**THE OPERATOR:**

- **SHALL NOT** engage in any activity that will divert the attention of the operator.
- **SHALL NOT** lift, lower, or transport a load with the hoist until the operator and all other personnel are clear of the load and the path of the load.
- **SHALL** verify that the load and hoist will clear all obstacles before moving or rotating the load.
- **SHALL** avoid moving loads over personnel.
- **SHALL NOT** lift, lower, or transport personnel by means of the hoist, trolley, hoist hook, or load.
- **SHALL** slowly inch the load hook into engagement with the load to eliminate load chain slack and minimize impact loading of the hoist.

## **HOIST OPERATION - MANUALLY OPERATED CHAIN HOISTS**

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- **SHALL** avoid unnecessary inching and quick reversals of direction.
- **SHALL** only lift the load a few inches to verify that the load is properly balanced before continuing with the lift.
- **SHALL** only lift the load a few inches to verify that the hoist braking system is functioning properly before continuing with the lift.
- **SHALL** avoid swinging of the load or hoist load hook when the trolley (if applicable) or hoist is traveling.
- **SHALL** avoid sharp contact between trolleys or between trolleys and stops (if applicable).
- **SHALL NOT** use the hoist load limiting device or load warning device (if provided) to measure the load to be lifted.
- **SHALL NOT** permit more than one operator to pull on a single hand chain at the same time.
- **SHALL NOT** use means other than manual power to operate hoist.

### **PARKING THE LOAD**

It is recommended that

#### **THE OPERATOR:**

- **SHALL NOT** lower a load with the hoist until the operator and all other personnel are clear of the load and the path of the load.
- **SHALL** verify that the load will clear all obstacles before lowering the load.
- **SHALL** block loads before landing if slings or other lifting devices must be removed from under the landed load.
- **SHALL** exercise care when removing a sling from under a landed and blocked load.
- **SHALL NOT** leave a suspended load unattended unless specific precautions to prevent the load from inadvertent lowering have been instituted and are in place.

## **HOIST OPERATION - MANUALLY OPERATED CHAIN HOISTS**

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- **SHALL** position the hoist load block and load hook above head level for storage when the hoist is not in use. Seven feet or greater above floor level is recommended

### **GENERAL**

It is recommended that

#### **THE OPERATOR:**

- **SHALL** know hand signals used for hoist and crane operations if a signalperson is used in the operation, and accept signals of only persons authorized to give hand signals. **EXCEPT**
- **SHALL** obey a stop signal regardless who gives it.
- **SHALL NOT** adjust or repair a hoist unless qualified and authorized to perform maintenance.
- **SHALL NOT** use the hoist load limiting device or load warning device (if provided) to measure the load to be lifted.

### **RECOMMENDED GENERAL DO NOT'S:**

- **DO NOT** operate a hoist that is damaged or has any actual or suspected mechanical malfunction.
- **DO NOT** attempt to lengthen load chain or repair damaged load chain.
- **DO NOT** use the load chain, any part of the hoist, or the load block and hook as a ground for welding.
- **DO NOT** allow a welding electrode to be touched to the load chain or load hook.
- **DO NOT** remove or obscure any instructions, warnings or warning labels on the hoist.
- **DO NOT** walk under a suspended load or allow other personnel to walk under a suspended load.

## HOIST OPERATION - MANUALLY OPERATED CHAIN HOISTS

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- **DO NOT** perform or allow any other person to perform **ANY** work on a suspended load that requires a worker to be positioned under the suspended load.

### **WARNING**

DO NOT WALK UNDER A SUSPENDED LOAD.

DO NOT PERFORM ANY WORK ON A SUSPENDED LOAD THAT REQUIRES A WORKER TO BE POSITIONED UNDER THE SUSPENDED LOAD.

IF IT IS ESSENTIAL THAT A WORKER BE POSITIONED UNDER A SUSPENDED LOAD TO PERFORM WORK ON THE SUSPENDED LOAD; SUCH WORK SHALL NOT BE STARTED OR PERFORMED UNTIL OTHER AUXILIARY SUPPORTING MEANS ARE PLACED UNDER THE SUSPENDED LOAD. FAILURE TO USE OTHER AUXILIARY SUPPORTING MEANS COULD RESULT IN SERIOUS BODILY INJURY OR DEATH, AND/OR PROPERTY DAMAGE.

Refer to Appendix C for a copy, in English, of the **HMI Recommended Practices - Hand Chain Manually Operated Chain Hoists**. Additional copies, 8.5 x 11 inches, in English, Spanish, or French, suitable for posting in the workplace or for distribution to hoist operators, are available from:

Hoist Manufacturers Institute  
8720 Red Oak Blvd., Suite 201  
Charlotte, NC 28217

## **HOIST OPERATION – ELECTRIC AND AIR POWERED HOISTS**

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Operation of an overhead electric powered or air powered chain or wire rope hoist involves more than operating the controls of the hoist. The operator must consider and anticipate the motions and actions that will occur as a result of operating the controls.

**Taking precedence over any specific rule, however, is the most important rule of all:**

**“USE COMMON SENSE.”**

### **⚠ WARNING**

HOIST OPERATORS SHOULD READ THE OPERATION SECTION OF THE MANUAL FURNISHED BY THE MANUFACTURER OF THE HOIST AND THE WARNINGS CONTAINED IN THAT MANUAL; INSTRUCTION AND WARNING LABELS ON THE HOIST; AND THE OPERATION SECTION OF ASME B30.16. HOIST OPERATORS ARE TO BE FAMILIAR WITH THE HOIST, AND HOIST CONTROLS BEFORE BEING AUTHORIZED TO OPERATE THE HOIST.

HOIST OPERATORS ARE TO BE FAMILIAR WITH PROPER RIGGING PROCEDURES TO BE FOLLOWED IN THE ATTACHMENT OF LOADS TO THE HOIST HOOK.

HOIST OPERATORS MUST BE AWARE OF POTENTIAL MALFUNCTIONS OF THE EQUIPMENT THAT REQUIRE ADJUSTMENT OR REPAIR, AND STOP THE OPERATION IF SUCH MALFUNCTIONS OCCUR, AND IMMEDIATELY ADVISE THEIR SUPERVISOR SO CORRECTIVE ACTION CAN BE TAKEN.

HOIST OPERATORS ARE NOT TO OPERATE A HOIST WHEN UNDER THE INFLUENCE OF ALCOHOL OR DRUGS; OR UNDER THE INFLUENCE OF MEDICATION THAT COULD RESULT IN ACTIONS BY THE OPERATOR WHICH MAY CAUSE A HAZARD TO THE OPERATOR OR OTHERS.

HOISTS ARE INTENDED ONLY FOR VERTICAL LIFTING SERVICE OF FREELY SUSPENDED UNGUIDED LOADS; AND ARE NOT INTENDED TO LIFT LOADS THAT ARE NOT LIFTED VERTICALLY, LOADS THAT ARE NOT FREELY-SUSPENDED, OR LOADS THAT ARE GUIDED. IF SUCH CONDITIONS EXIST, THE OPERATOR SHOULD CONTACT THE SUPERVISOR FOR INSTRUCTIONS OR THE MANUFACTURER OF THE HOIST.

DO NOT LIFT PERSONNEL OR LOADS OVER PEOPLE.

## **HOIST OPERATION – ELECTRIC AND AIR POWERED HOISTS**

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### **BEFORE EACH SHIFT OR BEFORE THE FIRST TIME THE HOIST IS TO BE USED EACH SHIFT**

It is recommended that

#### **THE OPERATOR:**

- **SHALL** perform a daily inspection. Refer to Table 2 in the HOIST INSPECTIONS section of this manual.
- **SHALL** visually inspect wire rope (if applicable) for broken wires, broken strands, kinks, and any type of deformation or damage of the rope structure; or visually inspect load chain (if applicable) for nicks, gouges, and any type of deformation or damage, and check for lubrication of load chain.
- **SHALL** visually inspect hooks for nicks, gouges, deformation of the throat opening, wear on saddle or load bearing point, and twisting.
- **SHALL** visually inspect hook latches for proper operation or damage that does not allow proper operation.
- **SHALL** test operation of the primary upper limit device of the hoisting motion.
- **SHALL** report if warning label or labels are missing or illegible to the supervisor.
- **SHALL** report any damage or malfunctions to the supervisor.
- **SHALL NOT** operate hoist if any damage or malfunctions exist.
- **SHALL NOT** operate hoist if it is tagged with an out-of-order sign.

### **BEFORE OPERATING THE HOIST AND APPLYING THE LOAD**

It is recommended that

#### **THE OPERATOR:**

- **SHALL** be familiar with all operating controls of the hoist.

## **HOIST OPERATION – ELECTRIC AND AIR POWERED HOISTS**

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- **SHALL** be familiar with the OPERATION Section of the manual furnished by the manufacturer of the hoist; instruction and WARNING labels on the hoist; and the OPERATION section of ASME B30.16.
- **SHALL** be familiar with the operations to be performed.
- **SHALL NOT** operate hoist if any damage or malfunctions exist.
- **SHALL** report any damage or malfunctions to the supervisor.
- **SHALL NOT** operate hoist if it is tagged with an out-of-order sign.
- **SHALL** center hoist over load.
- **SHALL NOT** operate a hook mounted hoist when the hoist is restricted from forming a straight line from top hook to load hook in the direction of loading.
- **SHALL NOT** use the hoist wire rope or load chain as a sling to wrap around the load.
- **SHALL** attach the load to the hoist load hook by suitable means such as slings or lifting devices.
- **SHALL** verify that the size of the attachment part of the sling or other lifting device to be used is compatible with the size of the hoist load hook.
- **SHALL** verify that the capacity of the attachment part of the sling or other lifting device to be used is compatible with the capacity of the hoist load hook and the weight of the load to be lifted.
- **SHALL** only attach loads to the hoist load hook that do not exceed the rated load capacity of the hoist.
- **SHALL** verify that the attachment part of the sling or other lifting device is properly seated in the base, bowl, or saddle of the hoist load hook.
- **SHALL** verify that the hook latch operates properly and that the hook latch properly bridges and closes the hook throat opening.
- **SHALL** verify that the latch of the hoist hook will not support any part of the load.
- **SHALL** verify that the load or any part of the load will not be applied to and/or not supported by the tip or point of the hook.
- **SHALL** verify that load will be properly balanced when it is lifted.



## **HOIST OPERATION – ELECTRIC AND AIR POWERED HOISTS**

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- **SHALL** verify that side loads will not be applied to the hoist when the load is lifted.
- **SHALL** verify that hoist wire rope or load chain is not kinked or twisted, and that wire rope or load chain parts are not twisted about each other.
- **SHALL** verify that hoist wire rope (if applicable) is properly seated in the drum grooves and sheaves.
- **SHALL** verify that hoist load chain (if applicable) is properly seated in the chain sprockets.
- **SHALL NOT** use the hoist load limiting device or load warning device (if provided) to measure the load to be lifted.
- **SHALL** notify personnel in the area that a load will be lifted and verify that all personnel are clear of the load.
- **SHALL** verify that when the load is lifted, it will clear all material, machinery, or other obstructions in the area.

### **WHILE OPERATING THE HOIST AND MOVING THE LOAD**

It is recommended that

#### **THE OPERATOR:**

- **SHALL NOT** engage in any activity that will divert the attention of the operator.
- **SHALL NOT** lift, lower, or transport a load with the hoist until the operator and all other personnel are clear of the load and the path of the load.
- **SHALL** verify that the load and hoist will clear all obstacles before moving or rotating the load.
- **SHALL** avoid moving loads over personnel.
- **SHALL NOT** lift, lower, or transport personnel by means of the hoist, trolley, hoist hook, or load.
- **SHALL** slowly inch the load hook into engagement with the load to eliminate wire rope or load chain slack and minimize impact loading of the hoist.

## **HOIST OPERATION – ELECTRIC AND AIR POWERED HOISTS**

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- **SHALL** avoid unnecessary inching and quick reversals of direction.
- **SHALL** only lift the load a few inches to verify that the load is properly balanced before continuing with the lift.
- **SHALL** only lift the load a few inches to verify that the hoist braking system is functioning properly before continuing with the lift.
- **SHALL** avoid swinging of the load or hoist load hook when the trolley (if applicable) or hoist is traveling.
- **SHALL** avoid sharp contact between trolleys or between trolleys and stops (if applicable).
- **SHALL NOT** use the hoist load limiting device or load warning device (if provided) to measure the load to be lifted.
- **SHALL NOT** use hoist limit devices as a normal means of stopping the hoist.
- **SHALL NOT** lower the load, on wire rope hoists, beyond the point where less than two wraps of wire rope remain at each anchorage on the drum, unless a lower limit device is provided, in which case no less than one wrap of wire rope shall remain at each anchorage on the drum.

### **PARKING THE LOAD**

It is recommended that

#### **THE OPERATOR:**

- **SHALL NOT** lower a load with the hoist until the operator and all other personnel are clear of the load and the path of the load.
- **SHALL** verify that the load will clear all obstacles before lowering the load.
- **SHALL** block loads before landing if slings or other lifting devices must be removed from under the landed load.
- **SHALL** exercise care when removing a sling from under a landed and blocked load.
- **SHALL NOT** leave a suspended load unattended unless specific precautions to prevent the load from inadvertent lowering have been instituted and are in place.

## HOIST OPERATION – ELECTRIC AND AIR POWERED HOISTS

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- **SHALL** position the hoist load block and load hook above head level for storage when the hoist is not in use. Seven feet or greater above floor level is recommended

### GENERAL

It is recommended that

#### **THE OPERATOR:**

- **SHALL** know hand signals used for hoist and crane operations if a signalperson is used in the operation, and accept signals of only persons authorized to give hand signals.
- **SHALL** obey a stop signal regardless who gives it.
- **SHALL NOT** adjust or repair a hoist unless qualified and authorized to perform maintenance.
- **SHALL NOT** use the hoist load limiting device or load warning device (if provided) to measure the load to be lifted.

### RECOMMENDED GENERAL DO NOT'S:

- **DO NOT** operate a hoist that is damaged or has any actual or suspected mechanical or electrical malfunction.
- **DO NOT** attempt to lengthen wire rope or repair damaged wire rope.
- **DO NOT** attempt to lengthen load chain or repair damaged load chain.
- **DO NOT** use the wire rope, the load chain, any part of the hoist, or the load block and hook as a ground for welding.
- **DO NOT** allow a welding electrode to be touched to the wire rope, load chain or load hook.
- **DO NOT** remove or obscure any instructions, warnings or warning labels on the hoist.

## **HOIST OPERATION – ELECTRIC AND AIR POWERED HOISTS**

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- **DO NOT** walk under a suspended load or allow other personnel to walk under a suspended load.
- **DO NOT** perform or allow any other person to perform **ANY** work on a suspended load that requires a worker to be positioned under the suspended load.

### **⚠ WARNING**

DO NOT WALK UNDER A SUSPENDED LOAD.

DO NOT PERFORM ANY WORK ON A SUSPENDED LOAD THAT REQUIRES A WORKER TO BE POSITIONED UNDER THE SUSPENDED LOAD.

IF IT IS ESSENTIAL THAT A WORKER BE POSITIONED UNDER A SUSPENDED LOAD TO PERFORM WORK ON THE SUSPENDED LOAD; SUCH WORK SHALL NOT BE STARTED OR PERFORMED UNTIL OTHER AUXILIARY SUPPORTING MEANS ARE PLACED UNDER THE SUSPENDED LOAD. FAILURE TO USE OTHER AUXILIARY SUPPORTING MEANS COULD RESULT IN SERIOUS BODILY INJURY OR DEATH, AND/OR PROPERTY DAMAGE.

Refer to Appendix D for a copy, in English, of the **HMI Recommended Practices – Electric and Air Powered Hoists**. Additional copies, 8.5 x 11 inches, in English, Spanish, or French, suitable for posting in the workplace or for distribution to hoist operators, are available from:

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8720 Red Oak Blvd., Suite 201  
Charlotte, NC 28217

## **HOIST INSPECTION, MAINTENANCE AND REPAIR**

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Overhead hoist inspection, maintenance, and repair can be performed in various manners depending on the conditions, policies, and practices of a particular owner/user. Maintenance policies and practices are determined by the size of the operation and number of employees, the availability of trained and experienced in-house maintenance persons, and the type of hoists and extent of sophisticated performance characteristics.

Regardless of the manner used to perform hoist inspections, maintenance, and repairs, they should only be performed by trained, experienced, and qualified hoist inspection, maintenance, and repair personnel. For information on hoist inspection, maintenance, and repair; refer to the manual furnished by the manufacturer of the hoist.

### **NOTICE**

THE HOIST OPERATOR SHOULD NOT PERFORM INSPECTIONS, MAINTENANCE, OR REPAIR ON A HOIST, UNLESS THE OPERATOR HAS BEEN TRAINED TO PERFORM SUCH INSPECTIONS, MAINTENANCE, OR REPAIR ON A HOIST, AND IS DESIGNATED BY THE HOIST OWNER/USER TO PERFORM SUCH INSPECTIONS, MAINTENANCE, AND REPAIR.

### **MAINTENANCE AND INSPECTION PROCEDURES**

Hoists shall be maintained, inspected, and tested in accordance with the manual furnished by the manufacturer of the hoist and in accordance with the intervals and requirements of ASME B30.16.

Before maintenance or inspections are performed on a hoist, (or trolley, crane, crane runway, crane runway support, or crane runway conductors, as applicable), as applicable, some precautions shall be taken such as listed below. While the hoist operator should not perform inspection, maintenance, or repair on a hoist, unless trained, qualified, and authorized to do so, the operator may be involved in performing these precautions before maintenance or inspections are performed by others.

1. The hoist, if on a trolley, or crane, to be inspected, tested, or repaired shall be run to a location where it will cause the least interference with other hoists, cranes, and operations in the area. If the hoist is suspended from a fixed location, maintenance and inspections can be performed in place, or the hoist can be removed to a repair area, as required.
2. If a load is attached to the hoist, it shall be landed.
3. All electric and air controllers shall be placed in the off position.

## **HOIST INSPECTION, MAINTENANCE AND REPAIR**

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4. If a trolley hoist is installed on a monorail or crane, the trolley shall be blocked to prevent trolley movement.
5. If the hoist is mounted on a crane, the crane shall be blocked to prevent crane movement. Refer also to item 9.
6. The main switch (disconnect) of an electric hoist, crane or lifting system shall be de-energized. Lock and tag the main switch in the de-energized position in accordance with ANSI Z244.1.

### **DANGER**

ON ELECTRIC POWERED HOISTS, HAZARDOUS VOLTAGES ARE PRESENT IN THE CONTROL BOX, OTHER ELECTRICAL COMPONENTS, AND CONNECTIONS BETWEEN THESE COMPONENTS.

7. The main air supply of an air hoist, crane or lifting system shall be disconnected and vented. Lock and tag the main switch in the de-energized position in accordance with ANSI Z244.1.
8. Warning signs and barriers shall be utilized on the floor beneath the hoist, crane, or lifting system where overhead maintenance, repair, or inspection work creates a hazardous area on the floor beneath the hoist crane, or lifting system.
9. If a trolley hoist is installed on a crane, and the crane runway remains energized because other cranes on the same runway are in operation, rail stops or a signal person(s), located full-time at a visual vantage point for observing the approach of an active crane(s), shall be provided to prohibit contact by the active crane(s) with the idle crane; with persons performing maintenance, repair, or inspection; and with equipment used in performing the maintenance, repair, or inspection.
10. If a trolley hoist is installed on a crane, a guard or barrier shall be installed between adjacent runways for the length of the established work area to prevent contact between persons performing maintenance, repair, or inspection and a crane on the adjacent runway.
11. Safe access to the hoist, trolley, crane, or lifting system, such as scaffolding, work platforms, etc., shall be provided for personnel that will perform maintenance, repair, or inspection. If personnel are required to work at elevations in excess of 6 feet above floor or ground level, a fall prevention policy and procedure shall be developed, documented, and implemented by the owner/user.

## **HOIST INSPECTION, MAINTENANCE AND REPAIR**

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12. After maintenance, repair, or inspection work is completed, and before the hoist, crane, or lifting system is returned to normal operation:
  - Any guards on the hoist, trolley, crane, or lifting system that were removed to perform maintenance, repair, or inspection work shall be reinstalled.
  - Any safety devices on the hoist, trolley, crane, runway, or lifting system that were deactivated to perform maintenance, repair, or inspection work shall be reactivated.
  - Any parts that were replaced and other loose material shall be removed.
  - All equipment used in the maintenance, repair, or inspection work shall be removed.
13. Warning signs, barriers, and guards shall be removed only by authorized personnel.
14. Lock and tag on the main switch (disconnect) or main air supply of the hoist, crane, or lifting system shall be removed only by the person that locked and tagged the main switch or main air supply originally, or an authorized person in accordance with ANSI Z244.1.
15. If the extent of the maintenance or repair work requires any testing as outlined in ASME B30.16 or any other applicable ASME B30 volume; such tests shall be conducted before the hoist, crane, or lifting system is returned to normal operation.

**NOTE:** Strict execution and observation of ALL procedures in this manual will better qualify personnel to operate the hoist in a safe manner, but do not release operators and users from the responsibility of obtaining, reading and fully understanding the specific manufacturer's manual and instructions.

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## APPENDIX A

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### DEFINITIONS OF VARIOUS HOIST TERMS

**abnormal operating conditions** - Environmental conditions that are unfavorable, harmful, or detrimental to or for the operation of a hoist, such as excessively high or low ambient temperatures, exposure to weather, corrosive fumes, dust laden or moisture laden atmospheres, and hazardous locations.

**below-the-hook lifting devices** – Devices that are not normally reeved onto the hoist rope or chain, such as hook-on buckets, magnets, grabs, and other supplemental devices used for ease of handling certain types of loads. The weight of these devices is to be considered part of the load to be lifted.

**block loads** – An action that facilitates the removal of slings or other lifting devices from under the load, accomplished by bringing the load to rest on wood, metal, or other spacers between the floor and load.

**brake** - A device, other than a motor, used for retarding or stopping motion by friction or power means.

**brake, holding** - A friction brake for a hoist that is automatically applied and prevents motion when power to the brake is de-energized.

**brake, mechanical load** - An automatic type of friction brake used for controlling loads in a lowering direction. This unidirectional device requires torque from the motor or hand chain wheel to lower a load but does not impose any additional load on the motor or hand chain wheel when the hoist is lifting a load. A mechanical load brake is a mechanical control braking means.

**braking means** – A method or device used for stopping or holding motion by friction or power.

**braking means, control** - A method of controlling speed by removing energy from the moving body or by imparting energy in the opposite direction.

**braking means, countertorque (plugging)** - A method of control by which the power to the motor is reversed to develop torque in the direction opposite to the rotation of the motor.

**braking means, dynamic** - A method of controlling speed by using the motor as a generator, with the energy being dissipated by resistance.

**braking means, eddy current** - A method of controlling or reducing speed by means of an energy induction load brake.

**braking means, mechanical** - A method of controlling or reducing speed by friction.



## APPENDIX A

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**braking means, pneumatic** - A method of controlling or reducing speed by means of a compressed gas.

**braking means, regenerative** - A method of controlling speed in which the electrical energy generated by the motor is fed back into the power system.

**chain guide** – See **guide, chain**.

**chain, hand** - The chain grasped by a person to apply force required for the lifting or lowering motion.

**chain, load** - The load-bearing chain in a hoist.

**chain, roller** - A series of alternately assembled roller links and pin links in which the pins articulate inside the bushings and the rollers are free to turn on the bushings. Pins and bushings are press fit in their respective link plates.

**chain, welded link** - A chain consisting of a series of interwoven links formed and welded.

**designated person** – A person selected or assigned by the employer or the employer's representative as being competent to perform specific duties.

**guide, chain** - A means to guide the load chain at the load sprocket.

**hand chain wheel** - See **wheel, hand chain**.

**hoist** - A machinery unit that is used for lifting or lowering a freely suspended (unguided) load.

**lifting devices** - Devices that are not normally reeved onto the hoist ropes or chain, such as hook-on buckets, magnets, grabs, and other supplemental devices used for ease of handling certain types of loads. The weight of these devices is to be considered part of the load to be lifted.

**limit device** - A device that is operated by some part or motion of a power driven hoist to limit motion.

**limit device, primary upper-** – See **primary upper-limit device**.

**load** - The total superimposed weight on the load block or hook.

**load, rated** - The maximum load for which a hoist is designated by the manufacturer or a qualified person.

## APPENDIX A

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**load block** - The assembly of hook or shackle, swivel, bearing, sheaves, sprockets, pins, and frame suspended by the hoisting rope or load chain. This shall include any appurtenances reeved in the hoisting rope or load chain.

**load chain** – See **chain, load**.

**load suspension parts** - The load suspension parts of the hoist are the means of suspension (hook or lug), the structure or housing which supports the drum or load sprocket, the drum or load sprocket, the rope or load chain, the sheaves or sprockets, and the load block or hook.

**normal operating conditions** - Conditions during which a hoist is performing functions within the scope of the original design.

**overload** - Any load greater than the rated load.

**overtravel restraint** - A device used to prevent the slack load chain from inadvertently being lowered out of the load sprocket.

**parts (lines)** - Number of lines of rope or chain supporting the load block or hook.

**pendant station** - Controls suspended from the hoist for operating the unit from the floor.

**power transmission parts** - The machinery components including the gears, shafts, clutches, couplings, bearings, motors, and brakes.

**primary upper-limit device** – The primary upper-limit device is the first limit device that will be activated to control the upper limit of travel of the load block when a hoist is equipped with more than one upper-limit device

**qualified person** - A person who, by possession of a recognized degree in an applicable field or a certificate of professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work.

**rated load** – See **load, rated**.

**reeving** – A system in which a rope or chain travels around drums, sheaves or sprockets.

**roller chain** – See **chain, roller**.

**sheave** - A grooved wheel or pulley used with a rope or chain to change direction and point of application of a pulling force.

## APPENDIX A

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**sheave, nonrunning** - A sheave used to equalize tension in opposite parts of the rope or chain. Because of its slight movement, it is not termed a running sheave.

**sheave, running** - A sheave that rotates as the load block is lifted or lowered.

**side pull** - The component of the hoist pull acting horizontally when the hoist lines are not operated vertically.

**sprocket, idler** - A freely rotating device that changes the direction of the load chain.

**sprocket, load** - A hoist component that transmits motion to the load chain. This component is sometimes called **load wheel**, **load sheave**, **pocket wheel**, or **chain wheel**.

**switch** - A device for making, breaking, or changing the connections in an electric or pneumatic circuit (valve).

**trolley** - A machine unit that travels on a monorail track or crane bridge girder.

**trolley hoist** - A hoist and trolley unit consisting of a hoist suspended from or mounted to a trolley, or a hoist with an integral trolley.

**welded link chain** - See **chain, welded link**.

**wheel, hand chain** - A wheel with formed pockets on its periphery to allow torque to be transmitted when a force is applied to the hand chain.

## APPENDIX B

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### HOIST REFERENCE DOCUMENTS AND STANDARDS

NOTE: The current edition date of a listed document or standard, in effect at the time of publication of this manual, is shown. It is recommended that the reader refer to the latest edition.

HMI Recommended Practices - Hand Chain Manually Operated Chain Hoists

HMI Recommended Practices - Electric And Air Powered Hoists

HMI Consensus of the NEC

Publisher: Hoist Manufacturers Institute  
8720 Red Oak Blvd., Suite 201  
Charlotte, NC 28217

ASME HST-1-1999 Performance Standard for Electric Chain Hoists

ASME HST-2-1999 Performance Standard for Hand Chain Manually Operated Chain Hoists

ASME HST-4-1999 Performance Standard for Overhead Electric Wire Rope Hoists

ASME HST-5-1999 Performance Standard for Air Chain Hoists

ASME HST-6-1999 Performance Standard for Air Wire Rope Hoists

ASME B30.2-1996 Safety Standard, Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)

ASME B30.9-1996 Safety Standard, Slings

ASME B30.10-1999 Safety Standard, Hooks

ASME B30.11-1998 Safety Standard, Monorails and Underhung Cranes

ASME B30.16-1998 Safety Standard, Overhead Hoists (Underhung)

ASME B30.17-1998 Safety Standard, Overhead and Gantry Cranes (Top Running Bridge, Single Girder, Underhung Hoist)

## **APPENDIX B**

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ASME B30.20-1999 Safety Standard, Below-the-Hook Lifting Devices

ASME B29.24M-1995 Roller Load Chains for Overhead Hoists

Publisher: The American Society of Mechanical Engineers  
Three Park Avenue  
New York, NY 10016

ASME Order Department  
22 Law Drive  
Box 2900  
Fairfield, NJ 07007-2900

CMAA Specification No. 70, Revised 1999 Specifications for Top Running Bridge and Gantry Type Multiple Girder Electric Overhead Traveling Cranes

CMAA Specification No. 74, Revised 1999 Specifications for Top Running & Under Running Single Girder Electric Overhead Traveling Cranes Utilizing Under Running Trolley Hoist

CMAA Crane Operators Manual

Publisher: Crane Manufacturers Association of America, Inc.  
8720 Red Oak Blvd., Suite 201  
Charlotte, NC 28217

ANSI/MMA MH27.1-1996 Specifications for Patented Track Underhung Cranes and Monorail Systems

MMA MH27.2-1997 Specifications for Enclosed Track Underhung Cranes and Monorail Systems

Publisher: Monorail Manufacturers Association, Inc.  
8720 Red Oak Blvd., Suite 201  
Charlotte, NC 28217

## **APPENDIX B**

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NFPA 70-1999 National Electrical Code

Publisher: National Fire Protection Association  
Batterymarch Park  
Quincy, MA 02269

ANSI Z241.2-1999 Safety Requirements for Melting and Pouring of Metals in the Metalcasting Industry

Publisher: American Foundrymen's Society  
505 State Street  
Des Plaines, IL 60016

ANSI Z244.1-1982(R1993) Safety Requirements for the Lockout / Tagout of Energy Sources

Publisher: American National Standards Institute  
11 West 42nd Street  
New York, NY 10036

## APPENDIX C

### RECOMMENDED PRACTICES HAND CHAIN MANUALLY OPERATED CHAIN HOISTS

Because the manufacturer has no direct control over the hoist and its operation, conformance with good safety practice is the responsibility of the user and operating personnel. ANSI/ASME B30.16 has been used as a guide in preparing this list of SHALL's and SHALL NOT's. Ask your supervisor for a copy. Each is identified according to ANSI/NEMA Z535.4 with either the signal word CAUTION or WARNING to indicate the degree of seriousness.



#### WARNING

Improper operation of a hoist can create a potentially hazardous situation which, if not avoided, could result in death or serious injury. To avoid such a potentially hazardous situation, the operator shall:

1. **NOT** operate a malfunctioning or unusually performing hoist.
2. **NOT** operate the hoist until you have thoroughly read and understood the manufacturer's Operating and Maintenance Instructions or Manuals.
3. **NOT** operate a hoist which has been modified without the manufacturer's approval or certification to be in conformity with applicable OSHA regs.
4. **NOT** lift or pull more than rated load for the hoist.
5. **NOT** use damaged hoist or hoist that is **Not** working properly.
6. **NOT** use hoist with twisted, kinked, damaged, or worn load chain.
7. **NOT** use the hoist to lift, support, or transport people.
8. **NOT** lift loads over people and make sure all personnel remain clear of the supported load.
9. **NOT** attempt to lengthen the load chain or repair damaged load chain.
10. Protect the hoist's load chain from weld splatter or other damaging contaminants.
11. **NOT** use load chain as a sling or wrap load chain around load.
12. **NOT** apply the load to the tip of the hook or to the hook latch.
13. **NOT** apply load unless load chain is properly seated in the chain wheel(s) or sprocket(s).
14. **NOT** apply load if bearing prevents equal loading on all load supporting chains.
15. **NOT** operate beyond the limits of the load chain travel.
16. **NOT** leave load supported by the hoist unattended unless specific precautions have been taken.
17. **NOT** allow the chain or hook to be used as an electrical or welding ground.
18. **NOT** allow the chain or hook to be touched by a live welding electrode.
19. **NOT** remove or obscure the warnings on the hoist.
20. **NOT** operate a hoist which has **Not** been securely attached to a suitable support.
21. **NOT** operate a hoist unless load slings or other approved single attachments are properly sized and seated in the hook saddle.
22. **NOT** operate a hoist when it is restricted from forming a straight line from hook to hook in the direction of loading.
23. **NOT** lift loads that are **Not** balanced and that the holding action is **Not** secure, taking up slack carefully.
24. **NOT** operate a hoist unless all persons are and remain clear of the supported load.
25. Report malfunctions or unusual performances of a hoist, after it has been shut down until repaired.
26. **NOT** operate a hoist on which the safety placards or decals are missing or illegible.
27. Be familiar with operating controls, procedures, and warnings.



#### CAUTION

Improper operation of a hoist can create a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. To avoid such a potentially hazardous situation, the operator shall:

1. Maintain a firm footing or be otherwise secured when operating the hoist.
2. Check brake function by tensioning the hoist prior to each lift or pulling operation.
3. Use hook latches. Latches are to retain slings, chains, etc. under slack conditions only.
4. Make sure the hook latches are closed and not supporting any parts of the load.
5. Make sure the load is free to move and will clear all obstructions.
6. Avoid swinging the load or hook.
7. Inspect the hoist regularly, replace damaged or worn parts, and keep appropriate records of maintenance.
8. Use the hoist manufacturer's recommended parts when repairing the unit.
9. Lubricate load chain per hoist manufacturer's recommendations.
10. **NOT** use the hoist load limiting or warning device to measure load.
11. **NOT** operate except with manual power.
12. **NOT** permit more than one operator to pull on a single hand chain at the same time. More than one operator is likely to cause hoist overload.
13. **NOT** allow your attention to be diverted from operating the hoist.
14. **NOT** allow the hoist to be subjected to sharp contact with other hoists, structures, or objects through misuse.
15. **NOT** adjust or repair the hoist unless qualified to perform such adjustments or repairs.

### DISCLAIMER

Under no circumstances does the Hoist Manufacturers Institute (HMI) assume any liability for the use of these voluntary recommendations, and no warranty whatsoever is made in connection with them. The recommendations do not take precedence over existing plant safety rules and regulations, OSHA regulations or instructions issued by the Hoist Manufacturer. It is the user's intent to absolve and protect HMI from any and all liability, in tort or otherwise.

## APPENDIX D

### RECOMMENDED PRACTICES ELECTRIC AND AIR POWERED HOISTS

Because the manufacturer has no direct control over the hoist and its operation, conformance with good safety practice is the responsibility of the user and operating personnel. ANSI/ASME B30.16 has been used as a guide in preparing this list of SHALL's and SHALL NOT's. Ask your supervisor for a copy. Each is identified according to ANSI/NEMA Z535.4 with either the signal word CAUTION or WARNING to indicate the degree of seriousness.



#### WARNING

Improper operation of a hoist can create a potentially hazardous situation which, if not avoided, could result in death or serious injury. To avoid such a potentially hazardous situation, the operator shall:

1. **NOT** operate a damaged, malfunctioning or unusually performing hoist.
2. **NOT** operate the hoist until you have thoroughly read and understood the manufacturer's Operating and Maintenance Instructions or Manuals.
3. **NOT** operate a hoist which has been modified without the manufacturer's approval or without certification that it is in conformity with ANSI/AMSE B30 volumes.
4. **NOT** lift more than rated load for the hoist.
5. **NOT** use hoist with twisted, kinked, damaged, or worn load chain or wire rope.
6. **NOT** use the hoist to lift, support, or transport people.
7. **NOT** lift loads over people.
8. **NOT** operate a hoist unless all persons are and remain clear of the supported load.
9. **NOT** operate unless load is centered under hoist.
10. **NOT** attempt to lengthen the load wire rope or chain or repair damaged load wire rope or chain.
11. Protect the hoist's load wire rope or chain from weld splatter or other damaging contaminants.
12. **NOT** operate hoist when it is restricted from forming a straight line from hook to hook in the direction of loading.
13. **NOT** use load wire rope or chain as a sling, or wrap load wire rope or chain around load.
14. **NOT** apply the load to the tip of the hook or to the hook latch.
15. **NOT** apply load unless load chain is properly seated in the chain wheel(s) or sprocket(s) or wire rope is properly seated in its groove(s).
16. **NOT** apply load if bearing prevents equal loading on all load supporting ropes or chains.
17. **NOT** operate beyond the limits of the load wire rope or chain travel.
18. **NOT** leave load supported by the hoist unattended unless specific precautions have been taken.
19. **NOT** allow the load wire rope, chain or hook to be used as an electrical or welding ground.
20. **NOT** allow the load wire rope, chain or hook to be touched by a live welding electrode.
21. **NOT** remove or obscure the warnings on the hoist.
22. **NOT** operate a hoist on which the safety placards or decals are missing or illegible.
23. **NOT** operate a hoist unless it has been securely attached to a suitable support.
24. **NOT** operate a hoist unless load slings or other approved single attachments are properly sized and seated in the hook saddle.
25. Take up slack carefully - make sure load is balanced and load holding action is secure before continuing.
26. Shut down a hoist that malfunctions or performs unusually and report such malfunction.
27. Make sure hoist limit switches function properly.
28. Warn personnel of an approaching load.



#### CAUTION

Improper operation of a hoist can create a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. To avoid such a potentially hazardous situation, the operator shall:

1. Maintain a firm footing or be otherwise secured when operating the hoist.
2. Check brake function by tensioning the hoist prior to each lift operation.
3. Use hook latches. Latches are to retain slings, chains, etc. under slack conditions only.
4. Make sure the hook latches are closed and not supporting any parts of the load.
5. Make sure the load is free to move and will clear all obstructions.
6. Avoid swinging the load or hook.
7. Make sure hook travel is in the same direction as shown on the controls.
8. Inspect the hoist regularly, replace damaged or worn parts, and keep appropriate records of maintenance.
9. Use the hoist manufacturer's recommended parts when repairing the unit.
10. Lubricate load wire rope or chain per hoist manufacturer's recommendations.
11. **NOT** use the hoist load limiting or warning device to measure load.
12. **NOT** use limit switches as routine operating stops unless allowed by manufacturer. They are emergency devices only.
13. **NOT** allow your attention to be diverted from operating the hoist.
14. **NOT** allow the hoist to be subjected to sharp contact with other hoists, structures, or objects through misuse.
15. **NOT** adjust or repair the hoist unless qualified to perform such adjustments or repairs.

### DISCLAIMER

Under no circumstances does the Hoist Manufacturers Institute (HMI) assume any liability for the use of these voluntary recommendations, and no warranty whatsoever is made in connection with them. The recommendations do not take precedence over existing plant safety rules and regulations, OSHA regulations or instructions issued by the Hoist Manufacturer. It is the user's intent to absolve and protect HMI from any and all liability, in tort or otherwise.



## **NOTES**

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