

# **Manually Lever Operated Hoist Operators Manual**

**Prepared and Published by**



**HOIST MANUFACTURERS INSTITUTE<sup>SM</sup>**

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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 (MHI).

### **MATERIAL HANDLING INDUSTRY AND ITS MATERIAL HANDLING INDUSTRY OF AMERICA DIVISION**

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

All inquiries concerning this Manually Lever Operated 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.

### **MANUALLY LEVER OPERATED HOIST OPERATORS MANUAL**

This Manual has been prepared by HMI and its Engineering Committee with the sole intent of offering information and suggestions to parties engaged with Manually Lever Operated Hoist Operators in their operation of manually lever operated hoists. This Manual is advisory only and should be regarded as a guide that the User may or may not choose to adopt, modify or reject. The information does not constitute a comprehensive safety program and should not be relied upon as such. Such a program should be developed and an independent safety adviser consulted to do so. At times, hoist inspection and maintenance personnel may be required to operate a manually lever operated hoist in the performance of their inspection and maintenance duties. Operation of a manually lever operated hoist involves more than operating the controls of the hoist. The operator must consider and anticipate the motions, actions, and loads that will occur as a result of operating the hoist.

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Therefore, it is important for the Manually Lever Operated Hoist Operator's Personnel to be instructed in the operation of manually lever operated hoists and to understand the severe consequences that may result from careless operation.

The acceptance or use of this Manual is completely voluntary. Its existence does not preclude anyone from using information not conforming to it.

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 manually lever operated 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 Manually Lever Operated 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.

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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 manually lever operated 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.

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Training programs for operating and maintaining manually lever operated hoists should be based on the latest edition of:

- ASME B30.21 Safety Standard for Manually Lever Operated Hoists

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

Manually lever operated hoists can be used as an overhead hoist. For such applications where the load is freely suspended and moved vertically reference should also be made to the latest Hoist Operator's Manual as published by Hoist Manufacturers Institute for handling of the load.

Additionally, if a manually lever operated hoist is used as an overhead hoist and 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

Manually lever operated hoists are often referred to as come-alongs, lever tools, or pullers and may vary in type by the kind of construction and lifting medium employed. Various types of lever operated hoists are covered in the Lever Operated HOIST TYPES section of this Manual, page 10. Definitions of the various terms used to identify hoist types and hoist components can be found in Appendix A.

### **NOTICE**

IT IS A RESPONSIBILITY OF THE OWNER/USER TO INSTALL, INSPECT, TEST, MAINTAIN, AND OPERATE A MANUALLY LEVER OPERATED HOIST IN ACCORDANCE WITH THE ASME B30.21 SAFETY STANDARD AND OSHA REGULATIONS. 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.

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FURTHER, IT IS THE RESPONSIBILITY OF THE OWNER/USER TO REQUIRE THAT ALL PERSONNEL THAT WILL INSTALL, INSPECT, TEST, MAINTAIN, AND OPERATE A MANUALLY LEVER OPERATED HOIST READ THE CONTENTS OF THE INSTRUCTION MANUAL FURNISHED BY THE MANUFACTURER, THE ASME B30.21 SAFETY STANDARD FOR LEVER OPERATED HOISTS AND OSHA REGULATIONS. 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.

### 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.



**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.

## INTRODUCTION AND DISCLAIMER

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### **⚠ 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 manually lever operated 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.



## MANUALLY LEVER OPERATED HOIST TYPES

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Manually lever operated hoists are defined in ASME B30.21 as a manually lever operated manual device used to lift, lower, or pull a load and to apply or release tension. Manually lever operated hoists are a basic and versatile piece of equipment used in manufacturing, warehousing, construction, and numerous other applications to aid workers in the handling, moving, and tensioning of loads.

Manually lever operated hoists are generally available in three types as defined by the medium used to tension or move the load. The three types are chain, wire rope, and web strap. All three types share in common the features of a hook at the hoist frame, a hook at the load block and a lever to apply a load between the two hoist hooks. These three types may use ratchet and pawl or friction brake operating mechanisms.

Chain type – uses welded link load chain or roller chain as a tensioning medium

Wire rope type – uses wire rope (cable) as a tensioning medium

Web strap type – uses a web strap of nylon, polyester, or similar synthetic material as a tensioning medium

### MANUALLY LEVER OPERATED HOIST TENSIONING MEDIUM TYPES

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

## 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.

## MANUALLY LEVER OPERATED HOIST TYPES

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### 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.

### WEB STRAP

Web strap consists of nylon or polyester (or other synthetic) woven material. The web strap fits and wraps onto the circumference of the drum that transmits motion to the web strap. Web strap sizes are stated as the material width. Each web strap size is available in various constructions and materials. The construction and material strength requirements of the web strap are selected by the hoist manufacturer in accordance with the design specification requirements of the hoist. Therefore, only web strap with specifications as originally stated by the hoist manufacturer should be used on any web strap hoist.

## MANUALLY LEVER OPERATED HOIST TYPES

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### LEVER OPERATED HOIST OPERATION TYPES

As previously stated, operation defines the type of mechanism used to apply the load. Operation types include:

- Ratchet and pawl operation
- Friction brake operation

Ratchet and pawl type manually lever operated hoists operate using a ratchet which is driven by the lever. The ratchet is integral or attached to a pocket wheel for chain type hoists or a drum for wire rope and web strap type. The ratchet is typically controlled by a driving pawl and a holding pawl. The driving pawl is driven by the lever and imparts motion to the ratchet which tensions or releases the load with the load alternately coming to rest on the holding pawl when the lever is released by the operator. A directional lever or switch permits the operator to select tension or release (directions). Successive repeated operation of the lever serves to either apply more tension or release tension until the load tension is zero.

Friction brake type manually lever operated hoists operate by using a brake mechanism which may be directly connected or connected via a gear train to a pocket wheel for chain type hoists or a drum for wire rope and web strap type. The lever drives the locked brake over a one way ratchet mechanism thus imparting tension to the chain wire rope or web strap. To release tension, the lever driving direction is reversed and the lever force applied to open the brake which allows the load to release in a controlled manner. When the lever force is released the brake automatically closes in response to the load. Successive repeated operation of the lever serves to either apply more tension or release tension until the load tension is zero.

## **MANUALLY LEVER OPERATED HOIST OPERATOR'S DUTIES AND RESPONSIBILITIES**

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Manually lever hoist operators are normally involved in rigging the load, attaching the load to the hoist 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.

When rigging a lever hoist make certain that the suspension hook and load hook form a straight line and that the frame is free to swivel and does not bear against anything. Also make certain that the load is applied to the base (bowl) of the hooks and does not bear against the hook tips or hook latches.

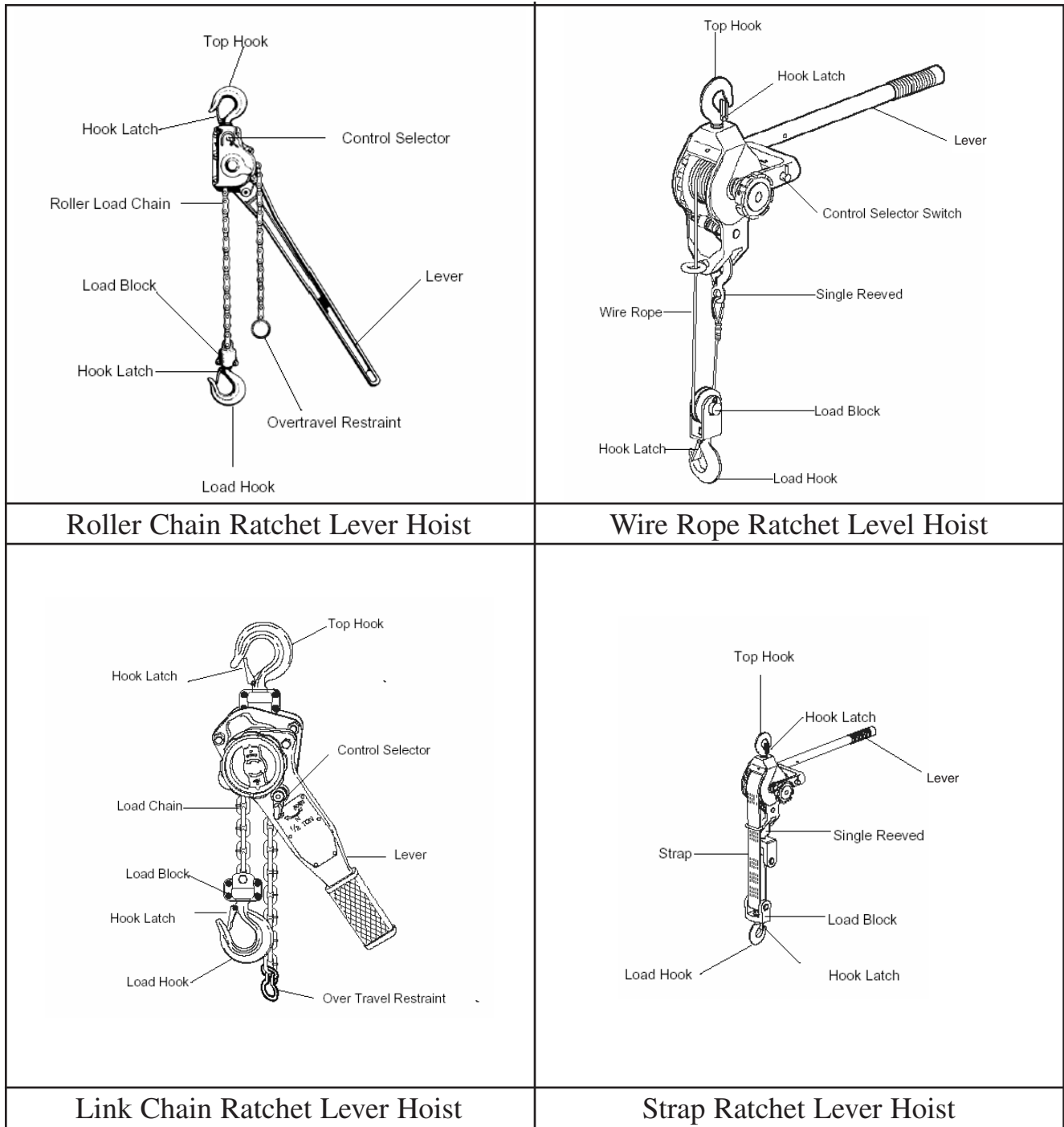
### **⚠ WARNING**

IF THE UNIT IS NOT RIGGED IN A STRAIGHT LINE HOOK TO HOOK MANNER, AND IF THE FRAME IS NOT FREE TO SWIVEL, LEVER PULL MAY BREAK FRAME AND CAUSE PHYSICAL INJURY AND LOSS OF LOAD.

### **⚠ WARNING**

ALLOWING THE LOAD TO BEAR AGAINST THE HOOK LATCH AND/OR HOOK TIP CAN RESULT IN LOSS OF LOAD.

Hoist operators should be familiar with the parts of a manually lever operated 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.



**FIGURE 1**  
Principal Parts of Manually Operated Lever Hoists

## **MANUALLY LEVER OPERATED HOIST OPERATOR'S DUTIES AND RESPONSIBILITIES**

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### **INSPECTIONS**

Daily inspections should be performed by the manual lever 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, page 26 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.

### **MANUALLY LEVER OPERATED HOIST OPERATOR RESPONSIBILITIES**

It is recommended that

#### **MANUAL LEVER 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 B30.21.

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 hooks.

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.

## MANUALLY LEVER OPERATED HOIST OPERATOR RESPONSIBILITIES

It is recommended that

### **MANUAL LEVER 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.

### **NOTICE**

HOISTS ARE INTENDED ONLY FOR MOVING OR TENSIONING OF FREE UNGUIDED LOADS. DO NOT USE A HOIST TO MOVE OR TENSION LOADS THAT ARE NOT FREE OR 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 LEVER HOIST OPERATION SECTION FOR OTHER WARNINGS, CAUTIONS AND NOTICES.

# MANUALLY LEVER OPERATED HOIST INSPECTION

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## DAILY OR PRESTART HOIST INSPECTIONS

In accordance with the requirements of ASME B30.21 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 which are recommended 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.

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

<b>INSPECTION ITEM</b>	<b>DESCRIPTION OF INSPECTION CHECKPOINTS</b>
Tagged Hoist	Check that hoist is not tagged with an out-of-order sign.
All Functional Mechanisms	Check for proper operation and adjustment directional selection.
Controls	Check that all direction motions agree with directional selection setting when lever is actuated.
Hook	Check for damage, cracks, nicks, gouges, deformation of the throat opening, wear on the saddle or load bearing point, and twist.
Hook Latch	Check that hook latch, if provided, is not missing and that it operates properly.
Operating Lever	Check for bends, cracks, and other damage.
Tensioning Medium - Chain	Check for nicks, gouges, and any type of deformation or damage to the chain. Check for proper lubrication of load chain.
Wire Rope	Check for distortion, kinking, crushing, unstranding, birdcaging, main strand displacement and core protrusion; general corrosion; broken and cut strands; number, distributions and type of visible broken wires (12 randomly distributed broken wires in one lay or four broken wires in one strand and one outer wire broken at the contact point with the core which has worked its way out and protrudes or loops out is cause for removal from service).



## MANUALLY LEVER OPERATED HOIST INSPECTIONS

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

<b>INSPECTION ITEM</b>	<b>DESCRIPTION OF INSPECTION CHECKPOINTS</b>
Web Strap	Check for gross damage from melting and charring; acid or caustic burns; weld spatter; broken stitching; cuts or tears; damaged eyes or fittings; abrasive wear; and knots.
Reeving	Check that tensioning medium is properly reeved and that it is not kinked or twisted, and that parts are not twisted about each other.
Brakes (if equipped)	Check that hoist motion does not have excessive drift and that stopping distance is normal.
Ratchet and pawl (if equipped)	Check for proper operation of springs and pawls. Make sure pawls operate freely and that load is controlled during operation
Oil or Grease Leakage	Check for any sign of oil or grease leakage on 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.

### **⚠ WARNING**

IF ANY DAMAGE OR MALFUNCTIONS ARE NOTED BY THE DAILY INSPECTION ITEMS, THE OPERATOR SHALL NOT OPERATE THE LEVER 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.

MANUAL LEVER 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.

## MANUALLY LEVER OPERATED HOIST INSPECTIONS

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### FREQUENT AND PERIODIC HOIST INSPECTIONS

Frequent and periodic inspections of the hoist in accordance with the requirements of the ASME B30.21 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 MANUALLY LEVER OPERATED HOIST INSPECTION, MAINTENANCE AND REPAIR section of this Manual.

### NOTICE

THE MANUAL LEVER 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.

## MANUALLY LEVER OPERATED HOIST OPERATION

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Operation of a manually lever operated 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 B30.21. HOIST OPERATORS ARE TO BE FAMILIAR WITH THE HOIST AND HOIST CONTROLS BEFORE BEING AUTHORIZED TO OPERATE THE HOIST.

### **⚠ WARNING**

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

WHEN RIGGING A LEVER HOIST MAKE CERTAIN THAT THE SUSPENSION HOOK AND LOAD HOOK FORM A STRAIGHT LINE WITH THE FRAME AND THAT THE FRAME IS FREE TO SWIVEL AND DOES NOT BEAR AGAINST ANYTHING. ALSO MAKE CERTAIN THAT THE LOAD IS APPLIED TO THE BASE (BOWL) OF THE HOOK AND DOES NOT BEAR AGAINST THE HOOK TIPS OR HOOK LATCHES, IMPROPER RIGGING CAN RESULT IN HOIST FRAME BREAKAGE AND/OR LOAD LOSS. DO NOT SIDE PULL.

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.

## MANUALLY LEVER OPERATED HOIST OPERATION

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### **⚠ WARNING**

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 MOVING OR TENSIONING OF FREE UNGUIDED LOADS; AND ARE NOT INTENDED TO MOVE OR TENSION LOADS THAT ARE NOT FREE OR THAT ARE GUIDED. IF SUCH CONDITIONS EXIST, THE OPERATOR SHOULD CONTACT THE SUPERVISOR FOR INSTRUCTIONS OR THE MANUFACTURER OF THE HOIST.

HOIST OPERATORS MUST OBSERVE THE LOAD RATING OF THE HOIST AND NOT EXCEED IT. SINCE THE LOAD IS NOT ALWAYS KNOWN, OPERATORS MUST REFER TO THE MANUAL FURNISHED WITH THE HOIST TO DETERMINE THE MANUAL LEVER PULL REQUIRED TO APPLY RATED LOAD TO THE HOIST. TYPICAL VALUES ARE IN THE RANGE OF 40 TO 90 LBS. ONLY ONE OPERATOR SHALL OPERATE THE HOIST AT A TIME. DO NOT USE A CHEATER BAR OR HANDLE EXTENDER ON THE LEVER.

DO NOT USE IN A HAZARDOUS LOCATION AS DEFINED IN ANSI/NFPA 70 UNLESS SPECIFICALLY AUTHORIZED BY THE HOIST MANUFACTURER.

IF THE HOIST IS USED NEAR ENERGIZED MACHINERY, DE-ENERGIZE THE MACHINERY, VENT OR DISSIPATE ENERGY, THEN LOCK AND TAG THE MAIN SWITCH IN THE DE-ENERGIZED POSITION PER ANSI Z244.1

DO NOT LIFT PERSONNEL OR LOADS OVER PEOPLE.

## MANUALLY LEVER OPERATED HOIST OPERATION

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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 1 in the HOIST INSPECTIONS section of this Manual, page 15 and 16.
- **SHALL** visually inspect tensioning medium (chain, rope, or web) for obvious damage such as nicks, gouges, and any type of deformation or damage. Check load chain for lubrication.
- **SHALL** visually inspect hooks for nicks, gouges, deformation of the throat opening, wear on the 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 B30.21.
- **SHALL** be familiar with the operations to be performed.

## MANUALLY LEVER OPERATED HOIST OPERATION

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- **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 NOT** operate hoist when the hoist is restricted from forming a straight line with the frame from suspension hook to load hook or the hoist frame is bearing against an object.
  
- **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 capacity of the hoist load hook and the load to be applied.
  
- **SHALL** only apply loads to the hoist load hook that do not exceed the rated load capacity of the hoist (40 to 90 lbs. approximate lever pull typically applies rated load).
  
- **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 and/or suspension hook.
  
- **SHALL** verify that the hook latches operate properly and that the hook latches properly bridge and close the hook throat openings.
  
- **SHALL** verify that the latches of the hoist hooks 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 tips or points of the hooks.
  
- **SHALL** verify that side loads will not be applied to the hoist when the load is lifted.
- **SHALL** verify that hoist lifting medium is not kinked or twisted, and that parts are not twisted about each other.
  
- **SHALL** verify that hoist lifting medium is properly seated in drums and 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 the operating lever 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 moved or tensioned and verify that all personnel are clear of the load.
  
- **SHALL** verify that when the load is moved or tensioned, it will clear all material, machinery, or other obstructions in the area.

## MANUALLY LEVER OPERATED HOIST OPERATION

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### WHILE OPERATING THE HOIST AND APPLYING THE LOAD

It is recommended that

#### **THE OPERATOR:**

- **SHALL NOT** engage in any activity that will divert the attention of the operator.
- **SHALL NOT** apply a load with the hoist until the operator and all other personnel are clear of the load and the path of the load.
- **SHALL** have firm footing and be balanced.
- **SHALL** verify that the load and hoist will clear all obstacles before applying 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** apply the load slowly to minimize impact loading of the hoist.
- **SHALL** keep a firm grip on the lever until the operating stroke is complete and the lever at rest to avoid lever fly back.
- **SHALL** only apply a light load to verify that the load is properly attached and balanced before continuing.
- **SHALL** verify that the hoist braking system is functioning properly by tensioning the load at first before continuing.
- **SHALL** avoid swinging of the load or hoist load hook.
- **SHALL** avoid sharp contact between the hoist and other objects to avoid damage.
- **SHALL NOT** use the hoist load limiting device or load warning device (if provided) to measure the load to be applied.
- **SHALL NOT** permit more than one operator to pull on a single lever at the same.
- **SHALL NOT** use means other than manual power to operate hoist.

## MANUALLY LEVER OPERATED HOIST OPERATION

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### PARKING THE LOAD

It is recommended that

#### THE OPERATOR:

- **SHALL NOT** release 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 moving the load.
- **SHALL** block loads before landing if slings or other 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 tensioned load unattended unless specific precautions to prevent the load from inadvertently releasing have been instituted and are in place.
- **SHALL** if suspended overhead, position the hoist 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 (refer to B30.16) 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.



## MANUALLY LEVER OPERATED HOIST OPERATION

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### RECOMMENDED GENERAL DO NOTS:

- **DO NOT** operate a hoist that is damaged or has any actual or suspected mechanical malfunction.
- **DO NOT** attempt to lengthen tensioning medium (chain, rope, or web) or repair damaged tensioning medium.
- **DO NOT** use load chain or wire rope, 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 load chain or wire rope, suspension hook, 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 in the path of a tensioned load or allow other personnel to walk under a suspended load or in the path of a tensioned load.
- **DO NOT** perform or allow any other person to perform ANY work on a suspended or tensioned load that requires a worker to be positioned under the suspended load or in the path of a tensioned load.

### **⚠ WARNING**

DO NOT WALK UNDER A SUSPENDED LOAD OR IN THE PATH OF A TENSIONED LOAD.

DO NOT PERFORM ANY WORK ON A SUSPENDED LOAD OR TENSIONED LOAD THAT REQUIRES A WORKER TO BE POSITIONED UNDER THE SUSPENDED LOAD OR IN THE PATH OF THE TENSIONED LOAD.

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

## **MANUALLY LEVER OPERATED HOIST OPERATION**

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Refer to Appendix C for a copy, in English, of the HMI Recommended Practices – Manually Lever Operated 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 28216

## **MANUALLY LEVER OPERATED HOIST INSPECTION, MAINTENANCE, AND REPAIR**

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Manually lever operated 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 their 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 SHALL 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**

Manually lever operated 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 B30.21.

Before maintenance or inspections are performed on a hoist, 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 subject hoist, if on a trolley, shall be moved to a location where it will cause the least interference with other 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.

## MAINTENANCE AND INSPECTION PROCEDURES

2. If a load is attached to the hoist, it shall be removed.
3. Warning signs and barriers shall be utilized on the floor beneath the hoist where overhead maintenance, repair, or inspection work creates a hazardous area on the floor beneath the hoist.
4. 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.
5. After maintenance, repair, or inspection work is completed, and before the hoist is returned to normal operation:
  - Any guards or covers on the hoist that were removed to perform maintenance, repair or inspection work shall be reinstalled.
  - Any safety devices on the hoist 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.
6. Warning signs, barriers, and guards shall be removed only by authorized personnel.
7. If the extent of the maintenance or repair work requires any testing as outlined in ASME B30.21 or any other applicable ASME B30 volume, such tests shall be conducted before the hoist is returned to normal operation.

**NOTE:** Strict execution and observation of ALL procedures in this Manual should 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.

## APPENDIX A

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### DEFINITIONS

*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.

*appointed:* assigned specific responsibilities by the employer or the employer's representative.

*block, load:* the assembly of hook or shackle, swivel, bearings, sheaves, sprockets, pins, and frame suspended by the load chain, wire rope, or web strap. This shall include any appurtenances reeved in the load chain, wire rope, or web strap.

*brake:* a device for retarding and stopping motion of the load (see load controlling mechanism).

*chain, load:* the load-bearing chain in a hoist.

*chain, roller:* a series or 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.

*drum:* the cylindrical member around which the wire rope or web strap is wound for lifting and lowering the load.

*guide, chain:* a means to guide the load chain at the load sprocket.

*guide, web strap:* a means to guide the web strap at the load sprocket (drum).

*guide, wire rope:* a means to guide the wire rope at the load sprocket (drum).

*hoist, lever operated:* a lever operated manual device used to lift, lower, or pull a load and to apply or release tension.

## APPENDIX A

---

### DEFINITIONS

*hook latch:* a mechanical device to bridge the throat opening of a hook, but not to support the load.

*lift:* the maximum distance through which the load hook can travel.

*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.

*load controlling mechanism:* a mechanism that functions automatically to hold and control the load. In each of the following general types, a reciprocating force must be applied to the hoist lever to lower the load.

*friction brake type:* an automatic type of brake used for holding and controlling loads. This unidirectional device requires a force applied to the operating lever to lower the load, but does not impose additional lever pull when lifting the load.

*ratchet and pawl type:* a load controlling mechanism consisting of interlocking pawl(s) and ratchet that act to hold the load by mechanical engagement.

*load hook:* the hook used to connect the load to the hoist.

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

*operating lever:* the lever or handle provided to operate the hoist.

*overload:* any load greater than the rated load.

*overtravel restraint:* a device used to prevent the slack load chain from inadvertently being lowered past the load sprocket.

*parts (lines):* number of lines of chain, wire rope, or web strap supporting the load block or hook.

*pawl:* a device for holding the machinery against undesired rotation by engaging a ratchet.

## APPENDIX A

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### DEFINITIONS

*qualified person:* a person who, by possession of a recognized degree in an applicable field, or 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.

*ratchet:* a toothed member for engagement with the pawl.

*reeving:* a system in which the chain, wire rope, or web strap travels around sprockets (drums) and sheaves.

*rope:* refers to wire rope unless otherwise specified.

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

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

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

*side pull:* any force or operating condition that restricts the load block, chain, wire rope, or web strap, and hoist body from forming a straight line with the direction of loading.

*sprocket, idler:* a freely rotating device that changes the direction of the load chain, wire rope, or web strap.

*sprocket, load:* a hoist component that transmits motion to the load chain, wire rope, or web strap. This component is sometimes called the load wheel, load sheave, pocket wheel, chain wheel, or drum.

*strap, web:* a fabric woven of high tenacity synthetic yarns.

*tensioning medium:* the chain, wire rope, or web strap used to apply tension to the load.

## APPENDIX A

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### DEFINITIONS

*unattended:* a condition in which the operator of a hoist is not at the operating lever. If the hoist is within an unobstructed distance of 26 ft. (8.0 m) and within sight of the operator, the hoist should be considered attended.



## 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 – Manually Lever Operated Hoists

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

ASME HST-3-1999 Performance Standard for Manually Lever Operated Chain 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 B20.10-1999 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)

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

ASME B30.21-1999 Safety Standard, Manually Lever Operated Hoists

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

## APPENDIX B

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### HOIST REFERENCE DOCUMENTS AND STANDARDS

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

## APPENDIX B

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### HOIST REFERENCE DOCUMENTS AND STANDARDS

NFPA 70-1999 National Electrical Code

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

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 MANUALLY LEVER OPERATED 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 tensioning medium.
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**

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