
YARBROUGH CABLE SERVICE
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Glossary

Wire Rope Classifications

Wire ropes are classified by the number of strands as well as by the number of wires in each strand. For example: 6x7, 6x19, 6x36, etc., where the first number indicates the number of strands in the rope, and the second number indicates the number of wires in each strand. Note however, that these are nominal classifications and may or may not reflect the actual construction of a given rope.

The 6x19 classification includes six strands with each strand consisting of 15 to 26 individual wires. The six strands of a 6x36 class wire rope are constructed of 27 to 49 individual wires. Other popular classifications include 19x7, 7x19, and 8x19.

Every wire rope has three basic components: the wires, the strands, and the core. The core may be either Fiber Core (FC), such as sisal, manila or jute, or an Independent Wire Rope Core (IWRC), which is actually a smaller wire rope within the strands of the outer wire rope.

The wires themselves are predominantly high-carbon steel, but may also be various other alloys or metals such as iron, stainless steel, monel or bronze. Carbon steel wire rope is manufactured in various grades, including Improved Plow Steel (IPS), Extra Improved Plow Steel (EIPS), and Extra Extra Improved Plow Steel (EEIPS), which designate the nominal strength of the wire rope. EIPS is the most commonly used and manufactured grade today. The corresponding metric grades are: 1170 MPa (IPS), 1960 MPa (EIPS), and 2160 MPa (EEIPS).

While 6x19 ropes give primary emphasis to abrasion resistance in varying degrees, 6x36 ropes are important for their fatigue resistance. This fatigue resistance is made possible by the greater number of small wires per strand.

Rotation Resistant Wire Ropes

In an application where rotation-resistant properties are essential for rope performance, the 19x7 construction can be used. The rotation-resistant characteristic of this construction is achieved by laying six strands around a core strand in one direction, then laying 12 strands around the first operation in the opposite direction. Thus, when the rope is in tension, opposing rotational forces are created between the inner and outer layers.

Aircraft Cable

Aircraft cable is a common industry term for small diameter wire rope originally designed for aeronautical applications. It is a flexible and inexpensive cable used on winches, guy lines, and numerous other commercial, industrial, and marine applications. For corrosion resistance, aircraft cable is available with a zinc coating (galvanized) or in various stainless steel alloys. Galvanized aircraft cable is also available with a flexible, PVC cover to extend the cable's life by protecting wires from abrasion, dirt, grit, and moisture, sealing in lubrication, and reducing wear on sheaves and pulleys. The PVC cover also protects hands, clothes, and other materials with which the cable is in contact.

Glossary of Rigging, Lifting, and Wire Rope Terms

AC – Alternating current.

Acceleration stress – Additional stress imposed by an increase in the load velocity.

ACI – American Concrete Institute.

Aggregate strength – The wire rope strength derived by totaling the individual breaking strengths of the elements of the strand or rope. This strength does not recognize the reduction in strength resulting from the angularity of the elements in the rope or from other factors that may affect efficiency.

AGMA – American Gear Manufacturers Association.

AISC – American Institute of Steel Construction.

AISE – Association of Iron and Steel Engineers.

AISI – American Iron and Steel Institute.

Albert lay – See *lang lay*.

Alternate lay – Lay of wire rope in which the strands are alternately regular lay and lang lay.

Angle of loading – The inclination of a leg or branch of a sling measured from the horizontal or vertical plane. Note that an angle of loading of five degrees or less from the vertical plane may be considered a vertical angle of loading.

ANS – American Nuclear Society.

ANSI – American National Standards Institute.

API – American Petroleum Institute.

ASLE – American Society of Lubrication Engineers.

ASM – American Society of Materials.

ASME – American Society of Mechanical Engineers.

ASNT – American Society for Nondestructive Testing.

ASTM – American Society for Testing Materials.

AWRF – Associated Wire Rope Fabricators.

AWG – American Wire Gage.

AWS – American Welding Society.

Bail – (a) The U-shaped member of a bucket or load usually used as a lifting point; or (b) a U-shaped portion of a socket or other fitting used on wire rope.

Barrel – The lagging or body part of a rope drum in a drum hoist.

Base – The mounting flanges or feet used to attach a hoist to its supporting structure or foundation.

Basket hitch – A sling configuration whereby the sling is passed under the load while both ends, end attachments, eyes, or handles remain on the hook or a single master link.

Basket of socket – The conical portion of a socket into which a splayed rope end is inserted and secured with zinc.

Bearing life (rated life) – The number of revolutions or the number of hours at a constant speed that 90% of an apparently identical group of bearings will complete or exceed before the first evidence of fatigue develops; i.e., 10 out of 100 bearings will fail before rated life. Minimum life and L10 life are also used to mean rated life.

Becket line – That part of the rope in a multi-ply reeving system that is dead-ended on one of the blocks.

Becket loop – A loop of small rope or strand fastened to the end of a large wire rope used to facilitate installation of the large rope.

Bird cage – A colloquial term describing the appearance of wire rope forced into compression. The outer strands form a "cage" and, at times, displace the core.

Bleeding line – A condition caused when wire rope is overloaded, forcing the lubricant in the cable to be squeezed out and run excessively.

Block – A term applied to a wire rope sheave (pulley) enclosed inside plates and fitted with some attachment such as a hook or shackle.

Braided wire rope – A wire rope formed by plaiting component wire ropes.

Brake – A device used for retarding or stopping motion by friction or power means.

Brake, eddy current – A device used for controlling load speed in the hoisting or lowering direction by placing a supplementary load on the motor. This loading results from the interaction of magnetic fields produced by an adjustable or variable direct current in the stator coils and induced currents in the rotor.

Brake, holding or parking – A brake that automatically sets and prevents motion when power is off.

Brake, mechanical load – A friction device, usually using multiple discs or shoes, for controlling load speed in the lowering direction only. The brake prevents the load from overhauling the motor.

Breaking strength (also: minimum breaking strength or force) – The measured tensile load required to cause failure of cable, chain, wire rope, or any other load-bearing element.

The average force at which a product—in its original factory condition—has been found by representative testing to break, when a constantly increasing force is applied in direct line to the product at a uniform rate of speed on a standard pull testing machine.

***Remember:* Breaking strengths, when published, were obtained under controlled laboratory conditions. Listing of the breaking strength does not mean the working load limit should ever be exceeded.**

⚠ *Do not use breaking strength as a criterion for service or design purposes. Refer to the working load limit instead.*

Bridge crane – See *crane, bridge*.

Bridge travel – Horizontal travel of the crane parallel with bridge runway rails.

Bridge trucks – An assembly consisting of wheels, bearings, axles, and structural framework that supports the end reactions of the bridge girders.

Bridle sling – Sling composed of multiple wire rope legs with a fitting that attaches to the lifting hook.

Bright rope – Wire rope made of wires that are not coated with zinc or tin.

Brooming – Unlaying and straightening of strands and wires in the end of wire ropes during the process of installing a wire rope socket.

Bull ring – The main, large ring of a sling to which sling legs are attached; also called a master link.

Bumper (buffer) – An energy-absorbing device that reduces impact when two moving cranes or trolleys come into contact or when a moving crane or trolley reaches the end of its permitted travel.

Cab – Operator's compartment on a crane.

Cable – A term loosely applied to wire rope, wire strand, and electrical conductors. Wire rope is the preferred term for hoisting and rigging applications.

Cable crowd rope – Wire rope used to force the bucket of a power shovel into the material being handled.

Cable laid wire rope – A wire rope consisting of several independent wire ropes wrapped around a fiber or wire rope core.

Cable laid endless sling, mechanical joint – A wire rope sling made endless by joining the ends of a single length of cable laid rope with one or more metallic fittings.

Cable laid grommet, hand tucked – An endless wire rope sling made from one length of rope wrapped six times around a core formed by hand tucking the ends of the rope inside the six wraps.

Cable laid rope – A wire rope composed of six wire ropes wrapped around a fiber or wire rope core.

Cable laid rope sling – A cable laid rope with eyes formed at each end by any one of several methods.

Cableway, aerial – Conveying system for transporting single loads along a suspended track cable.

Camber – The slight curvature given to beams and girders to compensate for deflections caused by loading.

Cheek plate(s) – The stationary plate(s) that support(s) the pin (axle) of a sheave or load.

Cheek weights – Overhauling weights attached to the side plates of a lower load block.

Choker sling – Wire rope with eyes spliced on each end, which is used to lift a load.

Choker hitch – A sling configuration with one end of the sling passing under the load and through an end attachment, handle, or eye on the other end of the sling.

Clearance – The horizontal or vertical distance from any part of the crane to a point of the nearest obstruction.

Clevis – A U-shaped fitting with holes in each end through which a pin or bolt is run.

Clip – Fitting for clamping two parts of wire rope.

Closed socket – Wire rope end fitting consisting of integral basket and bail.

Closing line – Wire rope that closes a clamshell or orange-peel bucket, and then operates as a hoisting rope.

CMAA – Crane Manufacturers Association of America.

CMV – Commercial Motor Vehicle.

Coil – Circular bundle of wire or fiber rope not packed on a reel.

Collector – Contacting device mounted on a bridge or trolley for collecting current from a conductor system.

Come-along – Lever-operated chain or wire rope devices designed for pulling, not lifting; also called pullers. Unlike hoists, the tension is held by a releasable ratchet. Much smaller and lighter than hoists of equal capacity, they are not intended or allowed for lifting, but are suited for activities such as skidding machinery.

Conductors, bridge or runway – Electrical conductors located along the bridge girder(s) or runway to provide power and/or control circuits to the crane and trolley.

Conical drum – Grooved hoisting drum of tapering diameter.

Continuous bend – Reeving of wire rope over sheaves and drums so that it bends in one direction, as opposed to reverse bend.

Control braking – A method of controlling hoisting or lowering speed of the load by removing energy from the moving load or by imparting energy in the opposite direction.

Controller – A device or group of devices that serve to govern, in some predetermined manner, the power delivered to the motor to which it is connected.

Controller, spring return – A controller which, when released, will return automatically to a neutral position.

Control panel – An assembly of magnetic or static electrical components that govern the flow of power to or from a motor in response to signals from a master switch, pushbutton station, or remote control.

Core – Member of wire rope about which the strands are laid. It may be fiber, a wire strand, or an independent wire rope.

Corrosion – Chemical decomposition by exposure to moisture, acids, alkalis, or other destructive agents.

Corrugated – A term used to describe the grooves of a sheave or drum when worn so as to show the impression of a wire rope.

Cover plate – The top or bottom plate of a box girder or junction box.

Crane – A machine for lifting and lowering a load vertically and moving it horizontally with the hoisting mechanism as an integral part of the machine. The term is applicable to fixed and mobile machines and to powered or manually driven machines.

Crane classification – The CMAA has established six service classes to enable the purchaser to specify the most economical class of crane for a particular installation. It is not economical either to under specify or to over specify when choosing a service class. Specifying a crane with too light a service class will reduce the initial cost but may result in excessive maintenance. A crane with too high a service class may decrease maintenance costs but at an excessive initial investment. The six crane service classifications are:

Class A1 (Standby Service) – This service class covers cranes used in installations such as power houses, public utilities, turbine rooms, nuclear reactor buildings, motor rooms, and nuclear fuel handling and transfer stations, where precise handling of valuable machinery at slow speeds with long idle periods between lifts is required.

Class A2 (Infrequent Service) – This service class covers cranes used in installations such as small maintenance shops, pump rooms, testing laboratories, and similar operations, where the loads are relatively light, speeds are slow, and a low degree of control accuracy is required. The

loads may vary anywhere from no load to full-rated load with a frequency of a few lifts per day or month.

Class B (Light Service) – This service class covers cranes that may be used in repair shops, light assembly operations, service buildings, or light warehousing, where service requirements are light, and the speed is slow. Loads may vary from no load to occasional full-rated loads with two to five lifts per hour, averaging 3 meters (10 feet) per lift.

Class C (Moderate Service) – This service class covers cranes that may be used in machine shops or paper-mill machine rooms, where service requirements are moderate. In this type of service, the crane will handle loads that average 50% of the rated capacity with 5 to 10 lifts per hour, averaging 4.6 meters (15 feet), not over 50% of the lifts at rated capacity.

Class D (Heavy Service) – This service class covers cranes that may be used in heavy machine shops, foundries, fabricating plants, steel warehouses, container yards, lumber mills, or standard-duty bucket and magnet operations, where heavy-duty production is required. In this type of service, loads approaching 50% of the rated capacity will be handled constantly during the working period. High speeds are desirable for this type of service with 10 to 20 lifts per hour averaging 4.6 meters (15 feet), not over 65% of the lifts at rated capacity.

Class E (Severe Service) – This service class covers cranes capable of handling loads approaching rated capacity throughout the crane's service life. Applications may include magnet, bucket, magnet/bucket combination cranes for scrap yards, cement mills, lumber mills, fertilizer plants, or container handling, with 20 or more lifts per hour at or near the crane's rated capacity.

Class F (Continuous Severe Service) – This service class covers cranes capable of handling loads approaching rated capacity continuously under severe service conditions throughout the crane's service life. Applications may include custom-design specialty cranes essential to performing critical work tasks affecting the total production of a facility. These cranes must provide the highest reliability with special attention to ease of maintenance features.

Crane, automatic – A crane that, when activated, operates through a preset cycle or cycles.

Crane, bridge – A crane with a single- or multiple-girder movable bridge, carrying a movable trolley or fixed hoisting mechanism, and traveling on an overhead fixed runway structure.

Crane, crawler – A crane consisting of a rotating superstructure with power plant, operating machinery, and boom, mounted on a base, equipped with crawler treads for travel. Its function is to hoist, lower, and swing loads at various radii.

Crane, double-girder – A crane having two bridge girders mounted between, and supported from, the end trucks.

Crane, floor-operated – A power-operated crane that is controlled by an operator from the floor or an independent platform or walkway located in the craneway, using power control switches or pushbuttons on a pendant.

Crane, gantry – A crane similar to an overhead bridge crane, except that the bridge for carrying the trolley or trolleys is rigidly supported on two or more legs running on fixed rails or other runway, usually 3 meters (10 feet) or more below the bottom of the bridge.

Crane, jib – A fixed crane with a vertical rotating member supported at the bottom (also at the top in some types), from which an arm extends to carry the hoist trolley. Jib cranes are most commonly mounted on a vertical column, supplied as part of the jib crane or mounted on existing structural members (e.g., a wall-mounted jib crane).

Crane, manually operated – A crane whose hoist mechanism is driven by pulling an endless chain, or whose travel mechanism is driven in the same manner or by manually moving the load.

Cane, monorail – A crane or hoist attached to a trolley that runs on the flanges of a structural beam.

Crane, overhead – A crane with a single or multiple girder movable bridge, carrying a movable trolley or fixed hoisting mechanism, and traveling on an overhead fixed runway structure.

Crane, power-operated – A crane whose mechanism is driven by electricity, air, hydraulics, or an internal combustion engine, as opposed to hand-operated movements.

Crane, remotely operated – A crane controlled by any method other than with a pendant, rope, or attached cab.

Crane, semi-gantry – A gantry crane with one end of the bridge rigidly supported by leg(s) that run on a fixed rail or runway and the other end supported by end trucks that run on an elevated rail or runway.

Crane, single-girder – A crane having one bridge girder mounted between, and supported from the end trucks.

Crane, wall-mounted jib – See *crane, jib.*

Crane, wall – A crane having a jib, with or without a trolley, supported from a side wall or line of columns of a building. It is a traveling-type crane and operates on a runway attached to the side wall or line of columns.

Craneway – The area in length and width served by a crane.

Creep speed – A very slow, continuous, fixed rate of motion of the hoist, trolley, or bridge, usually established at 1% to 10% of the normal full-load speed.

Critical diameter – Diameter of the smallest bend for a given wire rope that permits the wires and strands to adjust themselves by relative movement while remaining in normal position.

Critical load – In accordance with ANSI N14.6: Any lifted load whose uncontrolled movement or release could adversely affect any safety-related system when such system is required for unit safety or could result in potential offsite exposures comparable to the guideline exposures outlined in *Code of Federal Regulations, Title 10, Part 100*.

Critical service – The use of equipment or tackle for hoisting, rigging, or handling of critical items, or other items in, around, or above spaces containing critical items.

Crossover points – In multiple-layer spooling of rope on a drum, those points of rope contact where the rope crosses the preceding rope layer.

Cross rod – A wire used to join spirals of metal mesh to form a complete fabric.

Cylindrical drum – Hoisting drum of uniform diameter.

DC – Direct current.

D/d ratio – A term regarding wire rope. D = Diameter of curvature around which the rope is bent. d = diameter of rope. Example: With a 0.5-inch-diameter rope passing over a 20-inch-diameter sheave, the D/d ratio is 40. The D/d ratio is a key factor in load-carrying ability and life span of a wire rope.

Dead end – The point of fastening of one rope end in a running rope system, the other end being fastened at the rope drum.

Deadman – An object or structure, either existing or built for the purpose, used as anchorage for a guy rope.

Deceleration stress – Additional stress imposed on rigging resulting from a decrease in load velocity.

Deflection – (a) The sag across a span of a load member caused by the imposed live and/or dead loads, which is usually measured at mid-span as the distance along a straight horizontal line drawn between the supports; (b) any deviation from a straight horizontal line.

Derrick – An apparatus for lifting or lowering loads, consisting of a mast or equivalent member held at the head by guys or braces, with or without a boom, for use with hoists and ropes.

Design factor – The conservatism used in design calculations. As a function of design, this factor can be based on the point of equipment failure, such as crane tipping and brake stopping capacity, or based on strength of materials, ultimate, nominal, or yield. Consensus standards and this catalog express design factors as a ratio (for example: 5:1, 3:1, 3.5:1) or as a single number (e.g., 5, 3, or 3.5, understood to mean the "X" to 1). Although "design factor" is sometimes referred to as a "safety factor," "design factor" is the preferred term. An inexperienced person may incorrectly assume this factor of design conservatism will make up for such conditions as shock loading, poor rigging, improper equipment selection, and overload conditions.

Diameter, wire rope – The diameter of wire rope is the diameter of the circle that will contain the rope.

Direct geared – A hoist with drum(s) geared directly to its power source.

Dog leg – Permanent short bend or kink in wire rope caused by improper use.

DOL, U.S. – United States Department of Labor.

DOT, U.S. – United States Department of Transportation.

Dragline – Wire rope used to pull an excavating or drag bucket. Also used as an expression of a particular type of mobile crane using a drag bucket during excavation.

Drifting – Pulling a suspended load laterally to change its horizontal position.

Drift point – A point on a travel motion controller that releases the brake while the motor is not energized. This allows for coasting before the brake is set.

Drive – An assembly consisting of motors, couplings, gears, and gear case(s) that is used to propel a bridge, trolley, or hoist.

Drive girder – Girder on which the bridge drive, cross shaft, walk, railing, and operator's cab are mounted.

Drum – (a) A cylindrical-flanged barrel of uniform (cylindrical drum) or tapering (conical drum) diameter—which may be smooth or grooved—on which cable is wound for operation or storage; (b) the cylindrical member around which rope is wound for lifting or lowering the load or boom, or swinging the boom supporting structure.

Drum capacity, rope – The length of a specific diameter of rope that can be wound on a drum.

Drum hoist – A hoisting mechanism incorporating one or more rope drums; also called hoist, winch, or hoisting engine.

Dynamic loading – Loads introduced into the machine or its components by forces in motion.

Efficiency, wire rope – Ratio of a wire rope's measured breaking strength and the aggregate strength of all individual wires tested separately, which is usually expressed as a percentage. The breaking strength of wire ropes seldom exceeds 90% of the aggregate strength of all the wires, the average being about 82.5%.

Elastic limit – Limit of stress above which a permanent deformation takes place within the material. This limit is approximately 55% to 65% of the breaking strength of steel wire ropes.

End control – An operator-control position that is located at the end opposite the load end of the truck.

End penetration – The treatment of the end of a length of wire rope designed primarily as an aid for pulling the rope through a reeving system or tight drum opening. These are not designed for use as a method for making a permanent connection.

End termination – The treatment at the end or ends of a length of wire rope, which is usually made by forming an eye or attaching a fitting, designed to be the permanent end termination on the wire rope that connects it to the load.

End tie – A structural member, other than the end truck, that connects the ends of the girders to maintain the squareness of the bridge.

End truck – An assembly consisting of structural members such as wheels, bearings, and axles, that supports the bridge girder(s) or the trolley cross member(s).

Endless rope – Rope whose two ends are spliced together.

Equalizer – Device used to compensate for unequal length or stretch of a hoist rope that connects two or more systems to a single running block.

Equalizing thimble – Special type of fitting used as a component part of some wire rope slings.

Equalizing sheave – The sheave at the center of a rope system over which no rope movement occurs other than equalizing movement. It is frequently overlooked during crane inspections, with disastrous consequences. It can be a source of severe degradation.

Extender – A device that increases a jack's closed length.

Extra-flexible wire rope – See *extra-pliable wire rope*.

Extra-improved plow steel rope – See *grades, rope*.

Extra-pliable wire rope – Wire rope made with either 8 strands of 19 wires each, or (also called extra-flexible) 6 strands of 37 wires each, with a fiber core. The wires in this rope are smaller than those used in standard rope and consequently are not as suitable to withstand abrasion.

Eye or eye splice – A loop with or without a thimble formed in the end of a wire rope.

Fabric, metal mesh – The flexible portion of a metal mesh sling consisting of a series of transverse coils and cross rods.

Factor of safety – See *design factor.*

Fail-safe – A provision designed to automatically stop or safely control any motion in which a malfunction occurs.

Falls – See *parts of line.*

Fatigue – The phenomenon leading to fracture under repeated or fluctuating stresses having a maximum value less than the tensile strength of the material.

Female handle, choker – A handle with a handle eye and a slot of such dimension as to permit passage of a male handle, thereby allowing the use of a metal mesh sling in a choker hitch.

Fiber cores – Cords or rope made of vegetable or synthetic fiber that is used in the core of a wire rope.

Filler wire – Small auxiliary wires in a strand used for spacing and positioning other wires.

Fitting – Any accessory used as an attachment for wire rope.

Flange point – A point of contact between rope and drum flange where the rope changes layers.

Flat rope – Wire rope made of parallel alternating right-lay and left-lay ropes sewn together by relatively soft wire.

Fleet angle – The maximum angle between a rope and the line perpendicular to the drum on which it winds.

Fleeting sheave – Sheave mounted on a shaft parallel to the rope-drum shaft and arranged so that it can slide laterally as the rope spools, permitting close sheave placement without excessive fleet angle.

Flemish eye – A type or method of making a wire rope eye splice. Same as a *Molly Hogan*.

Floor-operated crane – See *crane, floor-operated.*

Footblock – A steel weldment or assembly serving as the base mounting for a guy derrick, gin pole, or boom derrick.

Foot-walk – A walkway with handrails and toeboards, attached to the bridge or trolley for access purposes.

Forklift truck – A high-lift, self-loading truck, equipped with load carriage and forks for transporting and tiering loads.

Gage points – Permanent marks on a hook that are used to determine any change in the throat-opening dimension.

Galvanized rope – Wire rope made of galvanized wire.

Galvanized strand – Strand made of galvanized wire.

Gantry crane – See *crane, gantry.*

Girder, bridge – The principal horizontal beam(s) of the crane, which supports the trolley, is supported by the end trucks, and is perpendicular to the runway.

Girder, drive – (Girder A) The bridge girder to which the bridge motor and gear-case(s) are attached. For cranes having a drive on each girder, it is the girder to which the control panels and/or the cab are attached.

Girder, idler – (Girder B) The bridge that does not have the bridge drive attached, but usually carries the bridge conductors.

Girder, runway – A horizontal beam attached to the building columns or wall and a supporting runway rail on which the crane travels.

Girder, auxiliary – (Outrigger) An additional girder, either solid or latticed, arranged parallel to the bridge girder(s) for supporting the footwalk, control panels, or operator's cab to reduce the torsional forces such loads might otherwise impose.

Grades, rope – Classification of wire rope by its breaking strength. Listed in order of increasing breaking strengths: iron, traction, mild plow steel, plow steel, improved plow steel, extra-improved plow steel, extra-extra-improved plow steel.

Grooved drum – Drum with a grooved surface that accommodates and guides the rope.

Grooves – Depressions in the periphery of a sheave or drum used for positioning and supporting a rope.

Handle – A terminal fitting to which metal mesh fabric is attached.

Handle eye – An opening in a handle of a metal mesh sling shaped to accept a hook, shackle, or other lifting device.

Handling fixture – A cradle, handling structure, shipping fixture, or container designed specifically to support or facilitate component lifting or handling during fabrication, loading, shipping, storage, installation, or use.

Hazardous locations – (Classified) Locations where fire or explosion hazards may exist. Locations are classified depending on the properties of the flammable vapors, liquids, or gases, or combustible dusts or fibers which may be present, and the likelihood that a flammable or combustible concentration or quantity is present.

> **Class I** – Locations in which flammable gases or vapors are—or may be—present in the air in quantities sufficient to produce explosive or ignitable mixtures.
>
> **Class II** – Locations that are hazardous because of the presence of combustible dust.
>
> **Class III** – Locations where easily ignitable fibers or flyings are present but not likely to be suspended in quantities sufficient to produce ignitable mixtures.

Hitch – A sling configuration whereby the sling is fastened to an object or load, either directly to it or around it.

HMI – Hoist Manufacturers Institute.

Hoist – Noun: (a) A lifting device for raising or lowering loads. Its service area is vertical over its mounting. Hoists may be attached to fixed or moveable structures by an upper hook or bracket and can be either power or manually operated; (b) a power-operated component of a crane or monorail system that provides torque to raise a load or lower it at a controlled speed and hold a load stationary; (c) a power-driven drum or drums capable of lifting and lowering loads. Verb: The action of raising a load.

Hoist, direct geared – A hoist with a drum(s) geared directly to its power source.

Hoist, drum – A hoist with hoisting drum(s), with or without a swinger.

Hoist, lever-operated – A lever-operated, manual device used to lift, lower, or pull a load and to apply or release tension. See *come-along*.

Hook, rigging – A hook used as part of tackle. Any hook used in hoisting and rigging that is not the "primary hook" or main "load hook."

Hook, latch – A mechanical device used to bridge the throat opening of a hook.

Idler – Sheave or roller used to guide or support a rope. It is also used as a slang expression for an equaling sheave.

Improved plow steel rope – See *grades, rope*.

Inching – See *jog*.

Inching drive (micro drive) – A mode of crane operation (usually limited to hoists) that disengages the main drive motor by means of a clutch mechanism and engages a single, nonvariable motor drive at a very low or creep speed.

Independent wire rope core (IWRC) – Wire rope used as the core of a larger rope.

Internally lubricated – Wire rope or strand in which all wires are coated with lubricant.

Iron rope – See *grades, rope*.

ISO – International Standards Organization.

Jack, double-acting hydraulic – A jack that is extended and retracted under hydraulic pressure.

Jack, mechanical – A jack using any means other than fluid to move the load.

Jib – An extension attached to the boom point to provide added boom length for lifting specified loads. The jib may be in line with the boom or offset to various angles in the vertical plane of the boom.

Jib crane – See *crane, jib*.

Jog (inch) – To move the hook, trolley, or bridge in a series of short, discontinuous increments by momentary operation of a controller.

Kink – Permanent distortion of wires and strands resulting from sharp bends.

Laced blocks – Passing wire rope through a set of blocks by starting from an outside sheave

and following in rotation. Will usually tilt travel block when running empty.

Lagging – External wood covering on a reel to protect the wire rope, strand, or grooved drum.

Lang lay – Wire rope in which the wires in the strands and the strands in the rope are laid in same direction. Synonymous with Albert lay.

Latch, hook – A device used to bridge the throat opening of a hook.

Lay, wire rope – (a) The manner in which the wires in a strand or the strands in a rope are helically laid, or (b) the distance measured parallel to the axis of the rope (or strand) in which a strand (or wire) makes one complete helical convolution about the core (or center). In this connection, lay is also referred to as "lay length" or "pitch."

Lead line – That part of a rope tackle leading from the first or fast sheave to the drum.

Left hand end – A reference to parts or dimensions on the viewer's left of the centerline of span, established when facing the drive girder side of the crane.

Left lay – (a) strand—strand in which cover wires are laid in a helical pitch, similar to left-hand screw; (b) rope—rope in which strands are laid in a helix having a left-hand pitch, similar to left-hand screw.

Lift – (a) Any sequence of operations in which a hoisting device raises an object above the ground, floor, or support, and then places it on the ground, floor, or support; (b) maximum safe vertical distance through which the hook can travel; (c) the hoisting of a load.

Lift beam – See *spreader beam*.

Lifting devices – Devices that are not reeved onto the hoist ropes, such as hook-on buckets, magnets, grabs, load-spreader bars, and other supplemental units used for ease of handling certain types of loads. The weight of these devices is to be considered part of the working load.

Lifting eye – A point of attachment on the item to be lifted, having a looped head designed to accommodate a hook or shackle. Also called a slinging eye.

Limiting devices – A device that is operated by some part of a power-driven machine or equipment to control motions of the machine or equipment.

Limit switch – An electrical device that is operated by the bridge, trolley, or hoist motion to disconnect the circuit, to establish a new circuit, or to provide a warning.

Line – Rope used for supporting and controlling a suspended load.

Line pull – The pulling force attainable in a rope leading off a rope drum or lagging at a particular pitch diameter (number of layers).

Line speed – The speed attainable in a rope leading off a rope drum or lagging at a particular pitch diameter (number of layers).

Link – A single ring of a chain.

Load – The total superimposed weight or force to be overcome by the hoisting and rigging equipment.

Load-bearing parts – Any part of a material-handling device in which the induced stress is influenced by the hook load. A primary load-bearing part is one whose failure could result in dropping, upset, or uncontrolled motion of the load. Load-bearing parts that fail but result in no more than stoppage of the equipment without causing dropping, upset, or loss of control of the load, are not considered to be primary load-bearing parts.

Load block, lower – The assembly of hook or shackle, swivel, sheaves, pins, and frame suspended by hoisting ropes.

Load block, upper – The assembly of sheaves, pins, and frame suspended from the hoisting platform or from the boom in mobile cranes.

Load center, forklifts – The horizontal longitudinal distance from the intersection of the horizontal load-carrying surfaces and vertical load engaging faces of the forks (or equivalent load positioning structure) to the center of gravity of the load.

Load, critical – See *critical load*.

Load, dead – The load(s) on a portion of the crane, which remain(s) in a fixed position relative to the member being considered.

Load, float – A control system that enables stepless operation of a hoist in either the lifting or lowering direction for a range of about 0% to 5% of full-rated speed, as well as permitting the load to be suspended stationary for a very short time with the holding brake(s) released.

Load, live – A load that moves or varies relative to the member being considered. For the trolley, the live load consists of the rated load plus the weight of the block. For the bridge, the live load consists of the rated load plus the weight of the trolley.

Load point – The point of load application.

Load point, auxiliary – Any point of load application other than the load point.

Load, rated – The maximum static vertical load for which a crane or an individual hoist is designed. See *rated load, capacity*.

Load rating – Rating in pounds established by the manufacturer.

Load, working – The external load, in pounds applied to the crane. For mobile cranes and derricks, the weight of load-attaching equipment is included as part of the working load (e.g., load blocks, hooks, shackles, and slings). In permanently installed cranes such as overhead, gantry, and monorail cranes and hoists, the weight of the load block and hook is not part of the working load.

Locked coil strand – Smooth-surfaced strand composed of shaped wires laid in concentric layers around a center of round wires.

Lowest service temperature (LST) – A predetermined temperature below which all lifting equipment, assemblies, or fixtures should not be used.

LP gas – Liquefied petroleum gas (propane).

Magnet – An electromagnetic device carried on a crane hook that picks up loads magnetically.

Magnetic controls – Controls in which acceleration and deceleration are controlled as a master switch or pushbutton is moved from neutral to the forward or reverse position. A combination of electromagnetically operated contactors and relays that actuate sequentially to vary the motor torque by changing the resistance.

Magnetic particle examination – A nondestructive test that reveals defects in ferromagnetic materials via detection of leakage fields at discontinuities in magnetic flow paths.

Marlin spike – Tapered steel pin used in splicing wire rope.

Master link – Forged or welded steel link used to support all members (legs) of an alloy-steel chain or wire rope sling (includes pear link, oblong link, and weldless sling link). Also called a bull ring.

Master coupling link – An alloy steel welded coupling link used as an intermediate link to join alloy steel chain to master links.

Master link or gathering ring – A forged or welded steel link used to support all members (legs) of an alloy steel chain sling or wire rope sling.

Master switch – A manual or automatic device that governs the operation of contractors and/or auxiliary devices of an electric control and provides for shutdown of all electric power to a crane or hoist.

Mechanical coupling link – A nonwelded, mechanically closed steel link used to attach master links, hooks, etc., to alloy steel chain.

MHI – Material Handling Institute.

Micro drive – See *inching drive*.

Mild plow – See *grades, rope*.

Milking – The progressive movement of strands along the axis of the rope, resulting from the rope's movement through a restricted passage such as a tight sheave.

Minimum life – See *bearing life*.

Molly Hagan – A type or method of making a wire rope eye splice. Same as a *Flemish eye*.

Monorail – Usually a series of continuous beams with curves, switches, and stops that carry loads over a predetermined route or routes.

Mousing – A method of bridging the throat opening of a hook to prevent the release of load lines and slings, under service or slack conditions, by wrapping with soft wire, rope, heavy tape, or similar materials.

Narrow-aisle truck – A self-loading truck primarily intended for right-angle stacking in aisles narrower than those normally required by counterbalance trucks of the same capacity.

NCR – Nonconformance Report.

NDA – Nondestructive Assessment.

NDT – Nondestructive Test.

NEMA – National Electrical Manufacturers Association.

NFPA – National Fire Protection Association.

Nil-ductility transition temperature – The maximum temperature at which a standard drop-weight specimen breaks when tested in accordance with ASTM E-208.

NLGI – National Lubricating Grease Institute.

NLGI Grade number – A grade number defining the consistency of grease in accordance with methods prescribed by the National Lubricating Grease Institute.

Nominal strength, wire rope – Nominal wire rope strengths as calculated by a standardized industry-accepted procedure. Minimum acceptance strength is 22% lower than nominal strength. (Re: Wire Rope Users Manual.)

Nondestructive examination (NDE) – A name applied to a variety of tests which make use of indirect means to locate material discontinuities (e.g., radiography, dye penetrant, magnetic particle, ultrasonic).

Nonrotating wire rope – See *rotation-resistant rope*.

Nonspinning wire rope – See *rotation-resistant rope*.

Normal operating conditions – Those conditions during which a crane or carrier is being operated and is performing functions within the scope of the original design. For a cab-operated crane, the operator is at the operating control devices in the cab and no other person is on the crane. For a floor-operated crane or carrier, the operator is at the operating control devices, which are suspended from the crane but operated with the operator off the crane, and no person is on the crane. For a remote-operated crane or carrier, the operator is at the operator control devices, which are not attached to any part of the crane, and no person is on the crane.

NRC – Nuclear Regulatory Commission.

Open socket – Wire rope fitting consisting of a basket and two ears with a pin.

Overhead guard – A framework fitted to a truck over the head of a riding operator.

Overload – Any load in excess of the working load limit or rated capacity of the equipment or tackle.

Overtravel – Movement beyond maximum travel for which the jack was designed.

Parts of line – A number of running ropes supporting a load or force, also called parts or falls.

Paying out – Adding slack to a line or relieving load on a line by letting (spooling) out rope.

Pendant control station – Controls suspended from an overhead crane, gantry crane, or overhead hoist for operating the unit. (Commonly called the pendant.)

Peening – Permanent distortion of outside wire in a rope caused by pounding.

Pitch diameter – The distance, measured through the center of a drum or sheave, from center-to-center of a rope passed about the periphery of the drum or sheave.

Plug – To operate a controller in such a manner that the motor line voltage polarity or phase sequence is reversed before the motor rotation has stopped, thereby developing a counter torque that acts as a retarding force.

Plugging – Stopping the forward motion of the bridge or trolley travel by reversing the controller to the opposite direction.

Plugging relay – A current relay that senses current in the secondary circuit of an alternating current motor and limits reverse torque of the motor until the motor rotation has stopped. In a direct current control panel, the relay performs the same function by establishing a sensing circuit at the motor armature (also known as the antiplugging relay).

Power-controlled lowering – A system or device in the power train, other than the load holding brake, which can control the lowering speed of the load hoist mechanism.

Powered industrial truck – A mobile, power-driven vehicle used to carry, push, pull, lift, stack, or tier material.

Power-operated crane – See *crane, power-operated*.

Pre-engineered lift – A lift for which a qualified individual or engineer independently pre-identifies load weight, load center of gravity, lift attachment points, and minimum lifting hardware (slings, below-the-hook lifting devices, shackles, etc.) capacities that will be used for the lift or series of lifts.

Preece test – A recognized standard of testing the galvanized coating on wire.

Preformed strand – Strand in which the wires are permanently shaped—before they are fabricated into strands—to the helical form they assume in the strand.

Preformed wire rope – Wire rope in which the strands are permanently shaped—before they are fabricated into rope—to the helical form they assume in the wire rope.

Pressure gripping lifters, friction type – Lifters that grip the load without significant or harmful permanent deformation of the load surfaces.

Pressure gripping lifters, indentation type – Lifters that carry the load by applying sufficient force to permanently indent the sides of the load.

Prestressing – Stressing a wire rope or strand before use under such a tension and for such a time that the construction stretch is largely removed.

Pullers – See *come-along*.

Rail, bridge – The track supported by the bridge girder(s) on which the trolley travels.

Rail, runway – The track supported by the runway beams on which the crane travels.

Rail, sweep – A mechanical device attached to the end truck of a bridge or trolley, located in front of the leading wheels, to remove foreign objects from the rail.

Ratchet – A toothed member, attached to the drum or a part of the drum, for engagement with the pawl.

Rated life – See *bearing life*.

Rated load, capacity – (a) The maximum load designated by the manufacturer for which a crane, hoist, rigging, or other lifting device is designed and built; (b) the weight established by the manufacturer or a registered professional engineer at a required load center that a given truck equipped with load carriage and forks or attachments can transport and stack to an established height.

Rated rope (line) pull – The manufacturer's recommended load in pounds (kilograms) applied to the rope attached to the hoist drum.

Reach – The effective length of an alloy steel chain sling measured from the top bearing surface of the upper terminal component to the bottom bearing surface of the lower terminal component.

Reel – The flanged spool on which wire rope or strand is wound for storage or shipment.

Reeve – The pattern that a rope forms between sheaves in a hoisting system.

Reeved blocks – Passing rope through a set of blocks, as opposed to laced blocks, in such a manner that there are no lines crossed or rubbing each other.

Reeving – A rope system in which the rope travels around drums and sheaves in a prescribed manner.

Reeving diagram – A diagram showing the path of the rope through a system of sheaves (blocks).

Regenerative – A method of control in which the electrical energy generated by the motor is fed back into the power system.

Regular-lay rope – Wire rope in which the wires in the strands and the strands in the rope are laid in opposite directions.

Remote-operated crane – See *crane, remotely operated*.

Repetitive pickup point – When operating on a short cycle operation, the rope being used on single layer and being spooled repetitively over a short portion of the drum.

Rerate – To change the rated load (capacity). The rated capacity may be increased or decreased.

Reverse bend – Reeving of a wire rope over sheaves and drums so that it bends in opposite directions.

Reverse lay – See *alternate lay*.

Right-hand end – A reference to parts or dimensions on the viewer's right of the centerline of span, established when facing the drive-girder side of the crane.

Right-lay – (a) Strand in which the cover wires are laid in a helix having a right-hand pitch, similar to a right-hand screw; (b) rope in which the strands are laid in a helix having a right-hand pitch, similar to a right-hand screw.

Rigging – The act of attaching hoisting equipment to the load.

Rigging hook – See *hook, rigging*.

Rocker beam – Beam used for hoisting flimsy trusses or long flimsy loads. Also used to equalize the weight and to keep a load from buckling.

Rollers – Relatively small-diameter cylinders or wide-faced sheaves used for supporting or guiding ropes.

Rope drum – That part of a drum hoist that consists of a rotating cylinder with side flanges on which hoisting rope is spooled in or out (wrapped).

Rotation-resistant rope – A wire rope consisting of an inner layer of strands laid in one direction, covered by a layer of strands laid in the opposite direction. This has the effect of counteracting torque by reducing the tendency of the finished rope to rotate.

Running line – A rope that moves over sheaves or drums.

Running sheave – A pulley-type device that changes location in relation to the hoisting device.

Runway – An assembly of rails, girders, and brackets that form a structural support on which a crane operates.

Safety factor – See *design factor*.

Sag – See *deflection*.

Seale – A wire rope strand construction that has two adjacent layers laid in one operation with any number of uniform sized wires in the outer layer, and with the same number of uniform but smaller sized wires in the inner layer.

Seize – To bind securely the end of a wire rope or strand with seizing wire or strand.

Seizing strand – Small strand, usually of seven wires, made of soft annealed iron wire.

Seizing wire – A soft annealed iron wire.

Selvage edge – The finished edge of synthetic webbing designed to prevent unraveling.

Serve – To cover the surface of a wire rope or strand with a wrapping of wire.

Service, normal – That service which involves operation with randomly distributed loads within the rated load limit, or uniform loads of less than 65% of the rated load for not more than 15% of the time for manually operated hoists and 25% of the time for electric- or air-powered hoists, of a single work shift.

Service, heavy – That service which involves operation within the rated load limit which exceeds normal service.

Service, severe – That service which involves normal or heavy service with abnormal operating conditions.

Shackle – A type of clevis normally used for lifting.

Shaft, cross (squaring shaft) – The shaft(s) extending the length of the bridge, used to transmit (drive shaft) torque from the motor to one or more wheels at each end of the bridge.

Sheave – A wheel or pulley with a circumferential groove designed for a particular size of wire rope; used to change direction of a running rope.

Shock load – A load resulting from a rapid change of movement, such as impacting, jerking, or swinging a static load. Sudden release of tension is a type of shock load. Shock loads are generally significantly greater than static loads. Shock loads must be considered when selecting the item for use in a system. Avoid shock loads as they may exceed the working load limit.

Shock loading – Term used to call attention to the application of any sudden, unplanned loading of equipment that would jeopardize the safety of the lift. Typical examples that could result in shock loading are: (a) rapid travel of the burden block without alteration of speed before all slack is removed from the sling(s), (b) unplanned shifting of the load while suspended, (c) fracture of a lifting system component resulting in the application of unknown loading on remaining components.

Side pull – That portion of the hoist pull acting horizontally when the hoist lines are not operated vertically.

Side loading – A loading applied at any angle to the vertical plane of the boom.

Siemens-martin strand – A grade of galvanized strand.

Slewing – A crane or derrick function wherein the boom or load-supporting member rotates about a vertical axis (axis of rotation); also called swing.

Slinging eye – See *lifting eye*.

Slings – Wire ropes, chains, or synthetic fabric made into forms, with or without fittings, for handling loads.

Sling, braided – A very flexible sling composed of several individual wire ropes braided into a single sling.

Sling, endless / grommet wire rope – A wire rope made endless from one continuous length of cable-laid rope with the ends joined by one or more metallic fittings.

Sling, four-leg bridle – Sling made with four single-rope legs, secured to a single lifting ring.

Sling, three-leg bridle – Sling made with three single-rope legs, secured to a single lifting ring.

Sling, two-leg bridle – Sling with two single-rope legs, equalizing double-rope legs, or multiple-part rope legs.

Slip, motor – The difference between theoretical (synchronous) speed and actual speed in an induction motor. Under standard conditions, an induction motor never reaches synchronous speed, at which zero torque is developed.

Smooth coil strand – Strand composed entirely of round wires.

Snatch block – A single- or double-sheave block arranged so one or both cheek plates can be opened, permitting the block to be reeved without having to use a free rope end; also called gate block. (The brand name Skookum® may be used generically as a term for a snatch block. Thus, a snatch block may be called a skookum block.)

Socket – Type of wire rope fitting. See *closed socket*, *open socket*, and *wedge socket*.

Softeners – Anything used to protect the load or the rigging from damage while making a lift. Also, prevents load from slipping.

Span – The horizontal distance center-to-center of runway rails.

Spiral – A single transverse coil that is the basic element from which metal mesh is fabricated.

Splicing – Interweaving of two ends of ropes to make a continuous or endless length without appreciably increasing the diameter. Also, making a loop or eye in the end of a rope by tucking the ends of the strands.

Spooling, rope – Winding of rope on a cylindrical drum in evenly spaced, uniform layers.

Spreader bar – A frame, forming part of the boom suspension, supporting sheaves for the live suspension ropes and attached to the fixed suspension ropes (pendants); also called bridle, spreader, or live spreader.

Spreader beam – A fixture made of rigid parts, such as pipe, wide-flange, I-beam, channel, plate, etc., to assist in rigging a load; also called lifting beam.

Stainless steel rope – Wire rope made of low-carbon corrosion-resistant steel.

Standby – A crane or derrick that is not in regular service, but one that is used occasionally or intermittently as required.

Standing line – A fixed-length line that supports loads without being spooled on or off a drum; a line of which both ends are dead; also called stay rope or pendant.

Standing rope (pendant) – A supporting rope that maintains a constant distance between the points of attachment to the two components connected by the rope.

Static controls – Controls that provide a function similar to that of magnetic controls. The accelerating resistors and contactors are replaced with thyristors, silicon-controlled rectifiers (SCRs), and similar static electronic devices. Operating characteristics are similar to those that might be obtained from magnetic control having an infinite number of accelerating contacts between the first and final control points.

Stirrup – The U-bolt or eyebolt attachment on a bridge socket.

Stop – A member to physically limit the travel of a trolley or bridge. This member is rigidly attached to a fixed structure and normally does not have energy-absorbing ability.

Strand, wire rope – A plurality of round or shaped wires helically laid about an axis.

Strand laid endless sling, mechanical joint – A wire rope sling made endless from one length of rope with the ends joined by one or more metallic fittings.

Strand laid grommet, hand tucked – An endless wire rope sling made from one length of strand wrapped six times around a core formed by hand tucking the ends of the strand inside the six wraps.

Strand laid rope – A wire rope made with strands (usually six or eight) wrapped around a fiber core, wire strand core, or independent wire rope core (IWRC).

Strength margin – The ratio of structural failure load (or stress) to actual or permitted load (or stress).

Structural competence – The ability of the equipment and its components to support the stresses imposed by operating loads without the stresses exceeding specified limits.

SUS – Saybolt Universal Seconds.

Swaged fittings – Fittings in which wire rope is inserted and attached by a cold forming method.

Switch, limit– A switch that is operated by some part or motion of a power-driven machine or equipment to open or close the electrical circuit associated with the machine or equipment.

Synchronous speed – The synchronous speed of an alternating current (AC) motor is directly proportional to the supply frequency and inversely proportional to the number of poles; e.g., the synchronous speed of a four pole motor operating at 60 Hz is determined by the following equation: Synchronous Speed = 120 X Frequency/# of Poles therefore: 120 x 60/4 = 1800 r/min.

Tackle – Those pieces of rigging such as slings, spreader bars, chokers, shackles, thimbles, eyebolts, rings, or other handling fixtures used for attachment of the load to the crane or hoist.

Tag line – A length of rope used to guide a load that is being lifted into a desired position.

Taking up – The process of removing slack from a line or drawing (spooling) in on a line; loading a line by drawing in on it.

Test load – The term *test load* designates the force (load) applied to a product for the purpose of detecting defects in material or manufacture. The test load is the load which the product withstood without deformation when new and under laboratory test conditions. A constantly increasing force is applied in direct line to the product at a uniform rate of speed in a standard pull testing machine.

> ⚠ Typically—though not always—the test load force is twice the Working Load Limit (WLL). **Regardless of the test load force applied, the Working Load Limit should never be exceeded.**

Thimble – Grooved-metal fitting designed to prevent crushing or overstressing wire rope at the terminal end; used to protect the eye of a wire rope or sling.

Tiller rope – A very flexible operating rope, commonly made by cable-laying six 6x7 ropes around a fiber core.

Tinned wire – Wire coated with tin.

Torque, locked-rotor – The minimum torque which an induction motor will develop at rest, for all angular positions of the rotor, with rated voltage applied at rated frequency. Not applicable to wound-rotor (slipping motors).

Torque, motor breakdown – The maximum torque that an induction motor will develop with rated voltage applied at rated frequency without an abrupt drop in speed.

Torque, motor full-load – The torque developed by an electric motor (AC or DC) to produce its rated horsepower at rated full-load speed.

Torque, motor pull-up – The minimum torque developed by an induction motor during the period of acceleration from rest to the speed at which breakdown torque occurs. For induction motors with 8% or greater slip, the pull-up torque, the breakdown torque, and the starting torque are all equal and occur at zero speed.

Traction steel – A grade of wire rope used in elevator service. See *grades, rope*.

Tram – The practice of placing punch marks on a hook for gauging use.

Travel – (a) Movement of a mobile or wheel-mounted crane about a job site under its own power; (b) linear extending or retracting movement of a jack.

Travel base – The base mounting for a wheel-mounted (traveling) tower crane.

Tread diameter – The diameter of a sheave or grooved rope drum measured at the base of the groove. The diameter of a smooth barrel on a rope drum.

Trolley – A unit that travels on the bridge rails consisting of a frame, end trucks, a drive

supporting the hoisting mechanism, rope, and a load block that supports the load, or a unit that travels on the lower flange of a beam or monorail system supporting a hoist.

Trolley girts – Structural members that are supported on the trolley trucks and contain the upper sheave assemblies.

Trolley travel – The trolley movement.

Trolley truck – An assembly consisting of wheels, bearings, axles, and structural framework that supports the hoist mechanism.

Turnbuckle – Device attached to wire rope, chain, or rods for making limited adjustments in length, which consists of a barrel and right-hand and left-hand threaded bolts.

UBC – Uniform Building Code.

UL – Underwriters Laboratory.

Ultimate strength – The maximum conventional stress, tensile, compressive, or shear that a material can stand without failure.

Vertical hitch – A method of supporting a load by a single, vertical part or leg of the sling.

Wall crane – See *crane, jib*.

Warrington – A wire rope strand construction in which one layer of wires, usually the outer, is composed of alternating large and small wires.

Web plate – The vertical plate(s) connecting the upper and lower flanges or cover plates of a girder.

Wedge socket – Wire rope fitting in which the rope end is secured by a wedge.

Wheel load – Load placed on a bridge or trolley wheel.

Wheel load, bridge – The vertical force (without impact) produced on any bridge wheel by the sum of the rated load, trolley weight, and bridge weight, with the trolley so positioned on the bridge as to give maximum loading.

Wheel load, trolley – The vertical force (without impact) produced on any trolley wheel by the sum of the rated load and the trolley weight.

Wheelbase – The distance from center-to-center of the outermost wheels of the bridge or trolley, measured parallel to the rail.

Winch head (gypsy head) – A rotatable cylindrical drum with curved end flanges, used for load handling by means of fiber rope coiled about its barrel with hand tension applied to the nonload end. Also called a capstan.

Wire rope – A plurality of strands of wire laid helically around an axis or a core.

Wire, round – A single, continuous length of metal, cold drawn from a rod.

Wire, shaped – A single, continuous length of metal either cold drawn or cold rolled from a rod.

WISHA – Washington Industrial Safety and Health Act.

Wrap – One circumferential turn of wire rope around a rope drum barrel.

Working Load Limit (WLL) – The maximum load a piece of equipment (or tackle) can handle without exceeding the rated capacity (the rated capacity of the lowest capacity item used in the lift). See *load, rated*.

WSMA – Web Sling Manufacturers Association.

Yarbrough

PRIDE INTEGRITY QUALITY

Decimal and Metric Conversions

Imperial Fractions (in.)	Decimal Equivalent (in.)	Metric Equivalent (mm)	Imperial Fractions (in.)	Decimal Equivalent (in.)	Metric Equivalent (mm)
1/64	0.016	0.397	33/64	0.516	13.097
1/32	0.031	0.794	17/32	0.531	13.494
3/64	0.047	1.191	35/64	0.547	13.891
1/16	0.063	1.588	9/16	0.563	14.288
5/64	0.078	1.984	37/64	0.578	14.684
3/32	0.094	2.381	19/32	0.594	15.081
7/64	0.109	2.778	39/64	0.609	15.478
1/8	0.125	3.175	5/8	0.625	15.875
9/64	0.141	3.572	41/64	0.641	16.272
5/32	0.156	3.969	21/32	0.656	16.669
11/64	0.172	4.366	43/64	0.672	17.066
3/16	0.188	4.763	11/16	0.688	17.463
13/64	0.203	5.159	45/64	0.703	17.859
7/32	0.219	5.556	23/32	0.719	18.256
15/64	0.234	5.953	47/64	0.734	18.653
1/4	0.250	6.350	3/4	0.750	19.050
17/64	0.266	6.747	49/64	0.766	19.447
9/32	0.281	7.144	25/32	0.781	19.844
19/64	0.297	7.541	51/64	0.797	20.241
5/16	0.313	7.938	13/16	0.813	20.638
21/64	0.328	8.334	53/64	0.828	21.034
11/32	0.344	8.731	27/32	0.844	21.431
23/64	0.359	9.128	55/64	0.859	21.828
3/8	0.375	9.525	7/8	0.875	22.225
25/64	0.391	9.922	57/64	0.891	22.622
13/32	0.406	10.319	29/32	0.906	23.019
27/64	0.422	10.716	59/64	0.922	23.416
7/16	0.438	11.113	15/16	0.938	23.813
29/64	0.453	11.509	61/64	0.953	24.209
15/32	0.469	11.906	31/32	0.969	24.606
31/64	0.484	12.303	63/64	0.984	25.003
1/2	0.500	12.700	1	1.000	25.400

Equivalents

1 meter = 1000 millimeters = 39.37 inches
1 inch = 25.4 millimeters
1 foot = 304.8 millimeters
1 pound = 0.45359 kilograms
1 kilogram = 2.2046 pounds
1 metric ton = 1000 kilograms = 2204.6 pounds
1 U.S. ton = 2000 lbs. = 0.90718 metric tons

Imperial to Metric Conversion Formulas

To convert inches to millimeters, multiply inches x 25.4 To convert millimeters to inches, multiply mm x .03937
To convert feet to millimeters, multiply feet x 304.8 To convert millimeters to feet, multiply mm x 0.0032808
To convert feet to meters, multiply feet x 0.3048 To convert meters to feet, multiply meters x 3.2808
To convert inches to meters, multiply inches x 0.0254 To convert meters to inches, multiply meters x 39.37
To convert pounds to kilograms, multiply pounds x 0.453592 To convert kilograms to pounds, multiply kg x 2.20462
To convert pounds to metric tons, multiply pounds x 0.00045359 To convert metric tons to pounds, multiply metric tons x 2204.6
To convert U.S. tons to metric tons, multiply U.S. tons x 0.90718 To convert metric tons to U.S. tons, multiply metric tons x 1.10231

Converting Decimal Feet to Feet and Inches

Sometimes you will have a length that is given in decimal feet (for example: 14.4689 ft.) and you need to convert this length to numbers you can read on a tape measure; that is, feet and inches.

Here is how to make the conversion from decimal feet to feet and inches:

1. You are given a length of 14.4689 feet.
2. Take just the decimal portion of this length (.4689) and multiply this number by 12.
3. This result gives you inches and fractions of inches.
4. Example: .4689 x 12 = 5.626 or 5-5/8 inches.
5. Put this result together with the whole number of feet from the original number, and you have a length you can find on a tape measure.
6. Example: 14 feet (whole feet from original number) 5-5/8 inches.; 14 ft. 5-5/8 in.

Yarbrough

PRIDE INTEGRITY QUALITY

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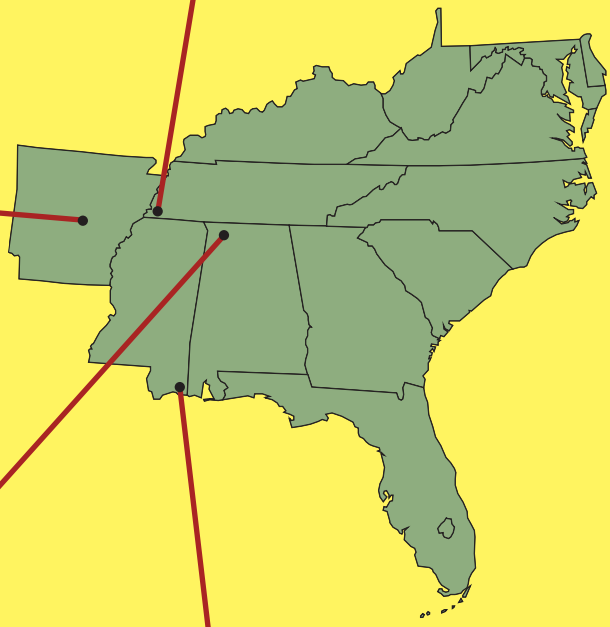

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