

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
			Page:	Page 1 of 50
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety		

Purpose

To provide guidelines ensuring the safety of all employees that may be exposed to the hazards associated with crane and derrick erection, operation and dismantling

Scope

This procedure applies to all divisions, on-site construction and maintenance projects, including contractors under contract with Midland Engineering Co., Inc..

References

29 CFR 1926.1400-1442
ASME B30.5-2007

Definitions

A/D director (Assembly/Disassembly director) means an individual who meets the requirements for an A/D director, irrespective of the person's formal job title or whether the person is non-management or management personnel.

Articulating crane means a crane whose boom consists of a series of folding, pin connected structural members, typically manipulated to extend or retract by power from hydraulic cylinders.

Assembly/Disassembly means the assembly and or disassembly of equipment covered under this standard. With regard to tower cranes, "erecting and climbing" replaces the term "assembly," and "dismantling" replaces the term "disassembly." Regardless of whether the crane is initially erected to its full height or is climbed in stages, the process of increasing the height of the crane is an erection process.

Assist crane means a crane used to assist in assembling or disassembling a crane.

Attachments means any device that expands the range of tasks that can be done by the equipment. Examples include, but are not limited to: An auger, drill, magnet, pile-driver, and boom-attached personnel platform.

Blocking (also referred to as "cribbing") is wood or other material used to support equipment or a component and distribute loads to the ground. It is typically used to support lattice boom sections during assembly/disassembly and under outrigger and stabilizer floats.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 2 of 50

Boom (equipment other than tower crane) means an inclined spar, strut, or other long structural member which supports the upper hoisting tackle on a crane or derrick. Typically, the length and vertical angle of the boom can be varied to achieve increased height or height and reach when lifting loads. Booms can usually be grouped into general categories of hydraulically extendible, cantilevered type, latticed section, cable supported type or articulating type.

Boom (tower cranes): On tower cranes, if the “boom” (i.e., principal horizontal structure) is fixed, it is referred to as a jib; if it is moveable up and down it is referred to as a boom.

Boom angle indicator means a device which measures the angle of the boom relative to horizontal.

Boom hoist limiting device includes boom hoist disengaging device, boom hoist shut-off, boom hoist disconnect, boom hoist hydraulic relief, boom hoist kick-outs, automatic boom stop device, or derricking limiter. This type of device disengages boom hoist power when the boom reaches a predetermined operating angle. It also sets brakes or closes valves to prevent the boom from lowering after power is disengaged.

Boom length indicator indicates the length of the permanent part of the boom (such as ruled markings on the boom) or, as in some computerized systems, the length of the boom with extensions/attachments.

Boom stop includes boom stops, (belly straps with struts/standoff), telescoping boom stops, attachment boom stops, and backstops. These devices restrict the boom from moving above a certain maximum angle and toppling over backward.

Boom suspension system means a system of pendants, running ropes, sheaves, and other hardware which supports the boom tip and controls the boom angle.

Come-a-long means a mechanical device typically consisting of a chain or cable attached at each end that is used to facilitate movement of materials through leverage.

Competent person means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
			Page:	Page 3 of 50
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety		

Controlled load lowering means lowering a load by means of a mechanical hoist drum device that allows a hoisted load to be lowered with maximum control using the gear train or hydraulic components of the hoist mechanism. Controlled load lowering requires the use of the hoist drive motor, rather than the load hoist brake, to lower the load.

Controlling entity means an Midland Engineering Co., Inc. that is a prime contractor, general contractor, construction manager or any other legal entity which has the overall responsibility for the construction of the project—its planning, quality and completion.

Counterweight means a weight used to supplement the weight of equipment in providing stability for lifting loads by counterbalancing those loads.

Crawler crane means equipment that has type of base mounting which incorporates a continuous belt of sprocket driven track.

Crossover points means locations on a wire rope which is spooled on a drum where one layer of rope climbs up on and crosses over the previous layer. This takes place at each flange of the drum as the rope is spooled onto the drum, reaches the flange, and begins to wrap back in the opposite direction.

Dedicated spotter (power lines): To be considered a dedicated spotter, the requirements of 1926.1428 (Signal person qualifications) will be met and his/her responsibility is to watch the separation between the power line and the equipment, load line and load (including rigging and lifting accessories), and ensure through communication with the operator that the applicable minimum approach distance is not breached.

Dismantling includes partial dismantling (such as dismantling to shorten a boom or substitute a different component).

Electrical contact occurs when a person, object, or equipment makes contact or comes in close proximity with an energized conductor or equipment that allows the passage of current.

Encroachment is where any part of the crane, load line or load (including rigging and lifting accessories) breaches a minimum clearance distance that this subpart requires to be maintained from a power line.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
			Page:	Page 4 of 50
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety		

Fall zone means the area (including but not limited to the area directly beneath the load) in which it is reasonably foreseeable that partially or completely suspended materials could fall in the event of an accident.

Free fall (of the load line) means that only the brake is used to regulate the decent of the load line (the drive mechanism is not used to drive the load down faster or retard its lowering).

Hoist means a mechanical device for lifting and lowering loads by winding a line onto or off a drum.

Insulating link/device means an insulating device listed, labeled, or accepted by a Nationally Recognized Testing Laboratory in accordance with 29 CFR 1910.7.

Jib stop (also referred to as a jib backstop), is the same type of device as a boom stop by is for a fixed or luffing jib.

Load refers to the object(s) being hoisted and/or the weight of the object(s); both uses refer to the object(s) and the load-attaching equipment, such as, the load block, ropes, slings, shackles, and any other ancillary attachment.

Load moment (or rated capacity) indicator means a system which aids the equipment operator by sensing (directly or indirectly) the overturning moment on the equipment, i.e., load multiplied by radius. It compares this lifting condition to the equipment's rated capacity, and indicates to the operator the percentage of capacity at which the equipment is working. Lights, bells, or buzzers may be incorporated as a warning of an approaching overload condition.

Load moment (or rated capacity) limiter means a system which aids the equipment operator by sensing (directly or indirectly) the overturning moment on the equipment, i.e., load multiplied by radius. It compares this lifting condition to the equipments rated capacity, and when the rated capacity is reached, it shuts off power to those equipment functions which can increase the severity of loading on the equipment, e.g., hoisting, telescoping out, or luffing out. Typically, those functions which decrease the severity of loading on the equipment remain operational, e.g., lowering, telescoping in, or luffing in.

Luffing jib limiting device is similar to a boom hoist limiting device, except that it limits the movement of the luffing jib.

Mobile crane means a lifting device incorporating a cable suspended latticed boom or hydraulic telescopic boom designed to be moved between operating locations by transport over the road.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
			Page:	Page 5 of 50
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety		

Multi-purpose machine means a machine that is designed to be configured in various ways, at least one of which allows it to hoist (by means of a winch or hook) and horizontally move a suspended load. For example, a machine that can rotate and can be configured with removable forks/tongs (for use as a forklift) or with a winch pack, jib (with a hook at the end) or jib used in conjunction with a winch. When configured with the forks/tongs, it is not covered by this subpart. When configured with a winch pack, jib (with a hook at the end) or jib used in conjunction with a winch, it is covered by this subpart.

Nationally recognized accrediting agency is an organization that, due to its independence and expertise, is widely recognized as competent to accredit testing organizations. Examples of such accrediting agencies include, but are not limited to, the National Commission for Certifying Agencies and the American National Standards Institute.

Nonconductive means that, because of nature and condition of the materials used, and the conditions of use (including environmental conditions and condition of the material), the object in question has the property of not becoming energized (that is, it has high dielectric properties offering a high resistance to the passage of current under the conditions of use).

Operational aids are devices that assist the operator in the safe operation of the crane by providing information or automatically taking control of a crane function. These include, but are not limited to, the devices listed in 1926.1416 ("listed operational aids").

Operational controls means levers, switches, pedals and other devices for controlling equipment operation.

Pendants includes both wire and bar types. Wire type: A fixed length of wire rope with mechanical fittings at both ends for pinning segments of wire rope together. Bar type: Instead of wire rope, a bar is used. Pendants are typically used in a latticed boom crane system to easily change the length of the boom suspension system without completely changing the rope on the drum when the boom length is increased or decreased.

Power lines means electric transmission and distribution lines.

Proximity alarm is a device that provides a warning of proximity to a power line and that has been listed, labeled, or accepted by a Nationally Recognized Testing Laboratory in accordance with 29 CFR 1910.7.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
			Page:	Page 6 of 50
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety		

Qualified evaluator (not a third party) means a person employed by the signal person's Midland Engineering Co., Inc. who has demonstrated that he/she is competent in accurately assessing whether individuals meet the Qualification Requirements in the subpart for a signal person.

Qualified evaluator (third party) means an entity that, due to its independence and expertise, has demonstrated that it is competent in accurately assessing whether individuals meet the Qualification Requirements in the subpart for a signal person.

Qualified person means a person who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training or experience, successfully demonstrated the ability to solve/resolve problems relating to the subject matter, the work, or the project.

Qualified rigger is a rigger who meets the criteria for a qualified person.

Range control limit device is a device that can be set by an equipment operator to limit movement of the boom or jib tip to a plane or multiple planes.

Range control warning device is a device that can be set by an equipment operator to warn that the boom or jib tip is at a plane or multiple planes.

Rated capacity means the maximum working load permitted by the manufacturer under specific working conditions. Such working conditions typically include a specific combination of factors such as equipment configuration, radii, boom length, and other parameters of use.

Repetitive pickup points refer to when operating on a short cycle operation, the rope being used on a single layer and being spooled repetitively over a short portion of the drum.

Running wire rope means a wire rope that moves over sheaves or drums.

Runway means a firm, level surface designed, prepared and designated as a path of travel for the weight and configuration of the crane being used to lift and travel with the crane suspended platform. An existing surface may be used as long as it meets these criteria.

Sideboom crane means a track-type or wheel-type tractor having a boom mounted on the side of the tractor, used for lifting, lowering or transporting a load suspended on the load hook. The boom or hook can be lifted or lowered in a vertical direction only.

Special hazard warnings means warnings of site-specific hazards (for example, proximity or power lines).

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 7 of 50

Tagline means a rope (usually fiber) attached to a lifted load for purposes of controlling load spinning and pendular motions or used to stabilize a bucket or magnet during material handling operations.

Tender means an individual responsible for monitoring and communicating with a diver.

Tilt up or tilt down operation means raising/lowering a load from the horizontal to vertical or vertical to horizontal.

Two blocking means a condition in which a component that is uppermost on the hoist line such as the load block, hook block, overhaul ball, or similar component, comes in contact with the boom tip, fixed upper block or similar component. This binds the system and continued application of power can cause failure of the hoist rope or other component.

Upperworks means the revolving frame of equipment on which the operating machinery (and many cases the engine) are mounted along with the operator's cab. The counterweight is typically supported on the rear of the upperstructure and the boom or other front end attachment is mounted on the front.

Wire rope means a flexible rope constructed by laying steel wires into various patterns of multi-wired strands around a core system to produce a helically wound rope.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
			Page:	Page 8 of 50
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety		

Ground Conditions

It is the responsibility of the controlling entity to ensure that stable ground conditions exist in the area where the crane is to be set. The area will be graded properly, firm, drained and level and all information of underground utilities will be known and shared with the crane operator.

- If no controlling entity is present, whoever has authority is responsible for the requirements.
- If A/D director feels that conditions are not acceptable, it will be brought to the attention of the controlling entity.

Assembly/Disassembly

Each crane Midland Engineering Co., Inc. operates will have a specific manufacturer's procedures used for assembly and disassembly. Procedures include instructions and prohibitions. When manufacturer's procedures are not available, Midland Engineering Co., Inc. may establish their own designed procedures which meet the requirements of 1926.1406.

For the assembly and disassembly of equipment covered by this section, Midland Engineering Co., Inc. will designate an Assembly/Disassembly Director. The A/D director will be a competent and qualified person in the procedure for that specific piece of equipment. All work will be supervised by the A/D director. In most cases, the A/D director will be the individual crane operator, unless Midland Engineering Co., Inc. designates another individual.

- Must have knowledge of the procedures or has procedures available for review prior to and during A/D.
- Crew members will understand their tasks, hazards associated with A/D, and hazardous positions they need to avoid.
- Before crew member goes out of operator site, they will inform the operator.
- Operator cannot move any part of the crane until crew member is in a safe position.
- When removing pins, employees will not be in a position under the boom, jib, or other components. Exception: when A/D director has taken appropriate steps to minimize the risks of unintended movement.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
			Page:	Page 9 of 50
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety		

- Rated equipment load capacities will not be exceeded.
- Addressing specific hazards: Site and ground bearing, blocking material, placement of blocking material (protect equipment and prevent movement), verify assist crane loading, boom and jib pick points, center of gravity, stability when removing pins, snagging, struck by counterweights, boom hoist brake failure, loss of backwards stability, wind speed and weather.
- Cantilevered boom segments will not exceed manufacturer's limitations.
- Weight of all components will be readily available.
- Components and configuration will be within manufacturer's specifications or RPE will approve in writing; or modified under requirements of 1434.
- Post-assembly inspection will be completed to ensure proper configuration.
- Shipping pins, straps, links, etc... will be stored to prevent falling object hazards.
- No jibs are permitted to be attached during pile driving operations.
- Outriggers and stabilizers will be: fully extended or follow manufacturer's limits for extension, set to remove equipment weight from the wheels (outriggers only), have floats attached.
- Blocking will be: placed under floats/pads.
- Rigging of the crane will be performed by a qualified rigger.
- Synthetic slings will be protected from damage that may reduce capacity.

Disassembly – additional requirements for booms and jibs

Pins in the pendants or boom sections will not be removed (partly or completely) when the pendants are in tension.

Pins on boom sections located between the uppermost boom section and the crane/derrick body will not be removed (partly or completely) when the boom is being supported by the uppermost boom section resting on the ground (or other support).

Top pins on boom sections located on the cantilevered portion of the boom being removed will not be removed (partly or completely) until the cantilevered section to be removed is fully supported

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 10 of 50

Power line safety – assembly and disassembly up to 350kV

For any assembly/disassembly work involving mobile cranes and proximity to powerlines, the following section will be followed. If at any point the working radius of the crane is within 20 feet of power lines, one of the following options will be used.

- Option 1 – Deenergize and ground
- Option 2 – 20 foot clearance
- Option 3 – follow table A clearances
 - Determine line's voltage and distance under table A
 - Ensure no part of the equipment, line, or load comes within table A clearance.

To prevent encroachment under options 2 or 3, a planning meeting will be held to go over steps to prevent encroachment. Use only non-conductive tag lines. Use at least one of the following additional measures.

- Use a dedicated spotter equipped with a visual aid, positioned to effectively judge clearance, be in constant communication with operator, give timely information to the operator.
- A proximity alarm
- A device that warns operator when to stop movement prior to encroachment such as a range control warning device
- A device used to automatically limit movement.
- An elevated warning line, barricade, or line of signs in view of the operator. will have flags or other high visibility markers.
- No part of the crane may be below the power line unless the power line has been deenergized and visibly grounded.
- No part of the crane may be within the table A clearance of the power line unless it has been deenergized and visibly grounded.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 11 of 50

- Power utility owners/operators will provide voltage information within two days of request. If no response is received, the project manager will follow up with the job authority to relay information regarding the delay.
- At least one electrocution warning sign in the crane cab, and two on the exterior of the equipment.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 12 of 50

Power line safety – equipment operations up to 350kv

Before beginning operation Midland Engineering Co., Inc. will perform a hazard assessment of the work area to determine proximity to any power lines. One of the following options may be used when working in an area near power lines:

- Identify the work zone by demarcating boundaries or defining the work zone as a 360 degree radius of the maximum working radius, or
- Determine if any part of the equipment, line or load will come within 20 feet of lines. If so, one of the following options may be used.
 - Option 1 – Deenergize and ground
 - Option 2 – 20 foot clearance
 - Option 3 – follow table A clearances
 - Determine line’s voltage and distance under table A
 - Ensure no part of the equipment, line, or load comes within table A clearance.

Work below a power line is prohibited unless:

- It falls under 1926 subpart V for power distribution.
- Equipment with boom fully extended, does not come closer than table A clearances or 20 feet from the plane of the lines, in true vertical position.
- Midland Engineering Co., Inc. demonstrates infeasibility with this section and meets requirements of 1926.1410.
- All power lines will be presumed energized unless confirmed by owner/operator and the lines are visibly grounded.
- If working near transmitters or communication towers, crane cannot come close enough to induce an electrical charge. Transmitter will be deenergized or grounded and have a non-conductive tag line.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 13 of 50

Employees will be trained in the following areas:

- Procedures if contact with a power line is made, including:
 - Information regarding the danger of electrocution and touching equipment and ground.
 - Importance of staying in the cab unless more imminent danger exists
 - Safest means of evacuating energized equipment.
 - Danger of the potentially energized zone around the equipment.
 - Necessity for the crew to stay away from energized equipment.
 - Safe clearances from power lines
- Necessity for owner/operator to deenergize and visibly ground power lines
- Presumed uninsulated power lines unless owner/operator confirms it is insulated.
- Limitations of an insulating link/device, proximity alarm, and range control devices if used.
- Procedures for properly grounding equipment and limitations of grounding.
- Dedicated spotter training.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
			Page:	Page 14 of 50
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety		

TABLE A—MINIMUM CLEARANCE DISTANCES

Voltage (nominal, kV, alternating current)	Minimum clearance distance (feet)
up to 50	10
over 50 to 200	15
over 200 to 350	20
over 350 to 500	25
over 500 to 750	35
over 750 to 1,000	45
over 1,000	(as established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution).

Note: The value that follows "to" is up to and includes that value. For example, over 50 to 200 means up to and including 200kV.

Power line safety – over 350kv

- Power lines operated between 350kv and 1000kv, the 20 foot encroachment distance will be changed to 50 feet.
- For power lines rated over 1000kv, the utility owner will be contacted to establish clearance distances.

Power line safety (all voltages) – operations closer than table A

For any operations where work will be performed closer than the Table A Clearances, all of the following will be met.

- Midland Engineering Co., Inc. will demonstrate that work outside range of table A is infeasible.
- After consulting with the owner/operator of the lines, that relocation or de-energization is infeasible

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 15 of 50

- Power line owner/operator or RPE will establish minimum clearance distance to prevent contact with site specific conditions in mind. (atmospheric conductivity; time necessary to bring equipment, load line, load, rigging equipment to a complete stop; wind conditions; degree of power line sway; lighting conditions; other conditions to prevent contact) – this does not apply to work covered under 1926 subpart V
- A planning meeting will be held with power line owner/operator or RPE to determine the procedures to prevent contact. This will include the following:
 - If power line is equipped with a device to automatically reenergize the line in the event of contact will be made inoperable.
 - Dedicated spotter in continuous contact with the operator (see dedicated spotter requirements)
 - Elevated warning line or other high visibility markers.
- Insulating link/device (until November 2011, all non-operators who may contact load, line, or equipment will be properly insulated – rated gloves acceptable.)
- Non conductive rigging.
- If a range limiting device is available, it will be used.
- Tag lines will be non-conductive
- Barricading the perimeter of the crane at least 10 feet to prevent unauthorized contact.
- Workers other than the operator will be prohibited from touching the load line above the insulating link. Operators with remote operation will use wireless controls or use an insulating mat to stand on.
- Only essential personnel are permitted to be in the area of the crane and load.
- Crane will be properly grounded.
- Insulating line hose or cover-up will be installed by the utility owner/operator, unless such devices are unavailable for the lines involved.
- Procedures developed for this plan will be onsite and immediately available.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
			Page:	Page 16 of 50
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety		

Inspections

All mobile cranes will undergo inspections at the required intervals. Inspections will be performed by qualified persons and will be documented. Records will be kept in Midland Engineering Co., Inc.'s home office and on the crane as required. Inspections will follow the manufacturer's guidelines and will include all areas of the crane covered by B30.5-2007 and 1926.1400.

Modified equipment.

Equipment that has had modifications or additions which affect the safe operation of the equipment or capacity will be inspected by a qualified person after such modifications/additions have been completed, prior to initial use.

Post Assembly

Upon completion of assembly, the equipment will be inspected by a qualified person to assure that it is configured in accordance with manufacturer equipment criteria. All manufacturer procedures applicable to the operational functions of equipment, including its use with attachments, must be complied with.

Each Shift

A competent person will begin a visual inspection prior to each shift the equipment will be used, which will be completed before or during that shift. The inspection will consist of observation for apparent deficiencies. Taking apart equipment components and booming down is not required as part of this inspection unless the results of the visual inspection or trial operation indicate that further investigation necessitating taking apart equipment components or booming down is needed.

Determinations made in conducting the inspection will be reassessed in light of observations made during operation.

Monthly Inspection

Each crane will be inspected monthly by a competent person. Documentation of this inspection will be kept on file.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
			Page:	Page 17 of 50
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety		

Documentation

The following information will be documented and maintained by Midland Engineering Co., Inc. that conducts the inspection:

- The items checked and the results of the inspection.
- The name and signature of the person who conducted the inspection and the date.
- This document will be retained for a minimum of three months.

Annual/Comprehensive

- All cranes will be inspected at least every 12 months. Disassembly is required, as necessary, to complete the inspection.
- This inspection will include functional testing to determine that the equipment as configured in the inspection is functioning properly.
- If any deficiency is identified, an immediate determination will be made by the qualified person as to whether the deficiency constitutes a safety hazard or, though not yet a safety hazard, needs to be monitored in the monthly inspections.
- If the qualified person determines that a deficiency is a safety hazard, the equipment will be taken out of service until it has been corrected.

Documentation of annual/comprehensive inspection.

- The following information will be documented, maintained, and retained for a minimum of 12 months, by Midland Engineering Co., Inc. that conducts the inspection:
- The items checked and the results of the inspection.
- The name and signature of the person who conducted the inspection and the date.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
			Page:	Page 18 of 50
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety		

Severe Service

Where the severity of use/conditions has caused reasonable probability of damage or excessive wear (such as loading that may have exceeded rated capacity, shock loading that may have exceeded rated capacity, prolonged exposure to a corrosive atmosphere), Midland Engineering Co., Inc. will stop using the equipment have a qualified person inspect the equipment.

Equipment not in regular use

Equipment that has been idle for 3 months or more will be inspected by a qualified person.

Manufacturer's requirements will be followed.

Wire Rope Inspection

Shift inspection

A competent person will begin a visual inspection prior to each shift the equipment is used, which will be completed before or during that shift. The inspection will consist of observation of wire ropes (running and standing) that are likely to be in use during the shift for apparent deficiencies. Untwisting (opening) of wire rope or booming down is not required as part of this inspection.

Apparent deficiencies

Category I. Apparent deficiencies in this category include the following:

- Significant distortion of the wire rope structure such as kinking, crushing, unstranding, birdcaging, signs of core failure or steel core protrusion between the outer strands.
- Significant corrosion.
- Electric arc damage (from a source other than power lines) or heat damage.
- Improperly applied end connections.
- Significantly corroded, cracked, bent, or worn end connections (such as from severe service).

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 19 of 50

Remove from services

- If a deficiency in Category I is identified, an immediate determination will be made by the competent person as to whether the deficiency constitutes a safety hazard. If the deficiency is determined to constitute a safety hazard, operations involving use of the wire rope in question will be prohibited until:
 - The wire rope is replaced , or
 - If the deficiency is localized, the problem is corrected by severing the wire rope in two; the undamaged portion may continue to be used. Joining lengths of wire rope by splicing is prohibited. If a rope is shortened then Midland Engineering Co., Inc. will ensure that the drum will still have two wraps of wire when the load and/or boom is in its lowest position.

Category II. Apparent deficiencies in this category are:

Visible broken wires, as follows:

- In running wire ropes: six randomly distributed broken wires in one rope lay or three broken wires in one strand in one rope lay, where a rope lay is the length along the rope in which one strand makes a complete revolution around the rope.
- In rotation resistant ropes: two randomly distributed broken wires in six rope diameters or four randomly distributed broken wires in 30 rope diameters.
- In pendants or standing wire ropes: more than two broken wires in one rope lay located in rope beyond end connections and/or more than one broken wire in a rope lay located at an end connection.
- A diameter reduction of more than 5% from nominal diameter.

Remove from services

- If a deficiency in Category II is identified, operations involving use of the wire rope in question will be prohibited until:
 - Midland Engineering Co., Inc. complies with the wire rope manufacturer's established criterion for removal from service or a different criterion that

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 20 of 50

the wire rope manufacturer has approved in writing for that specific wire rope,

- The wire rope is replaced (see § 1926.1417), or
- If the deficiency is localized, the problem is corrected by severing the wire rope in two; the undamaged portion may continue to be used. Joining lengths of wire rope by splicing is prohibited. If a rope is shortened under this paragraph, the Midland Engineering Co., Inc. will ensure that the drum will still have two wraps of wire when the load and/or boom is in its lowest position.

Category III. Apparent deficiencies in this category include the following:

- In rotation resistant wire rope, core protrusion or other distortion indicating core failure.
- Prior electrical contact with a power line.
- A broken strand.

Remove from services

- If a deficiency in Category III is identified, operations involving use of the wire rope in question will be prohibited until:
 - The wire rope is replaced , or
 - If the deficiency (other than power line contact) is localized, the problem is corrected by severing the wire rope in two; the undamaged portion may continue to be used. Joining lengths of wire rope by splicing is prohibited. Repair of wire rope that contacted an energized power line is also prohibited. If a rope is shortened under this paragraph, Midland Engineering Co., Inc. will ensure that the drum will still have two wraps of wire when the load and/or boom is in its lowest position.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
			Page:	Page 21 of 50
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety		

Critical review items

The competent person will give particular attention to all of the following:

- Rotation resistant wire rope in use.
- Wire rope being used for boom hoists and luffing hoists, particularly at reverse bends.
- Wire rope at flange points, crossover points and repetitive pickup points on drums.
- Wire rope at or near terminal ends.
- Wire rope in contact with saddles, equalizer sheaves or other sheaves where rope travel is limited.

Where a wire rope is required to be removed from service under this section, either the equipment (as a whole) or the hoist with that wire rope will be tagged-out until the wire rope is repaired or replaced.

Inspection Frequency of Wire Rope

Crane's wire rope, running and standing, will be inspected at the following frequencies:

- Each shift.
- Each month
- During the Annual Inspection

Safety Devices

The following safety devices will be working properly for the crane to be operational:

- Crane level indicator
- Boom stops, except for derricks and hydraulic booms
- Jib stops (if a jib is attached), except for derricks
- Equipment with foot pedal brakes will have locks.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 22 of 50

- Hydraulic outrigger jacks and hydraulic stabilizer jacks will have an integral holding device/check valve.
- Equipment on rails will have rail clamps and rail stops, except for portal cranes.
- Horn – The equipment will have a horn that is either built into the equipment or is immediately available to the operator. If the horn(s) are not working properly, the equipment will be tagged out or removed.

If any of the devices listed in this section are not in proper working order, the equipment will be taken out of service and operations will not resume until the device is again working properly. Alternative measures are not permitted to be used.

Operational Aids

Operations will not begin unless the listed operational aids are in proper working order, except where an operational aid is being repaired Midland Engineering Co., Inc. uses the specified temporary alternative measures. More protective alternative measures specified by the crane/derrick manufacturer, if any, will be followed.

If a listed operational aid stops working properly during operations, the operator will safely stop operations until the temporary alternative measures are implemented or the device is again working properly.

Category I operational aids will be repaired within 7 calendar days of the occurrence of deficiency

Boom hoist limiting device

Temporary alternative measures (use at least one).

- Use a boom angle indicator.
- Clearly mark the boom hoist cable (so that it can easily be seen by the operator) at a point that will give the operator sufficient time to stop the hoist to keep the boom within the minimum allowable radius. In addition, install mirrors or remote video cameras and displays if necessary for the operator to see the mark.
- Clearly mark the boom hoist cable (so that it can easily be seen by a spotter) at a point that will give the spotter sufficient time to signal the operator and have the operator stop the hoist to keep the boom within the minimum allowable radius.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 23 of 50

Luffing jib limiting device

- Equipment with a luffing jib will have a luffing jib limiting device.

Temporary alternative measures are the same as with boom hoist limiting device, except to limit the movement of the luffing jib rather than the boom hoist.

Anti two-blocking device

Telescopic boom cranes manufactured after February 28, 1992

Temporary alternative measures

- Clearly mark the cable (so that it can be seen by the operator) at a point that will give the operator sufficient time to stop the hoist to prevent two-blocking, and use a spotter when extending the boom.

Lattice boom cranes

Temporary alternative measures

- Clearly mark the cable (so that it can easily be seen by the operator) at a point that will give the operator sufficient time to stop the hoist to prevent two-blocking, or use a spotter.

Articulating cranes

Temporary alternative measures

- When two-blocking could only occur with movement of the load hoist, clearly mark the cable (so that it can easily be seen by the operator) at a point that will give the operator sufficient time to stop the hoist to prevent two-blocking, or use a spotter.

Category II operational aids and alternative measures.

Operational aids listed in this paragraph that are not working properly will be repaired no later than 30 calendar days after the deficiency occurs.

Boom angle or radius indicator

The equipment will have a boom angle or radius indicator readable from the operator's station.

Temporary alternative measures

- Radii or boom angle will be determined by measuring the radii or boom angle with a measuring device.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 24 of 50

Jib angle indicator if the equipment has a luffing jib

Temporary alternative measures

- Radii or jib angle will be determined by ascertaining the main boom angle and then measuring the radii or jib angle with a measuring device.

Boom length indicator if the equipment has a telescopic boom, except where the rated capacity is independent of the boom length.

Temporary alternative measures. One or more of the following methods will be used

- Mark the boom with measured marks to calculate boom length,
- Calculate boom length from boom angle and radius measurements,
- Measure the boom with a measuring device.

Load weighing and similar devices.

Equipment (other than derricks and articulating cranes) manufactured after March 29, 2003 with a rated capacity over 6,000 pounds will have at least one of the following: load weighing device, load moment (or rated capacity) indicator, or load moment (or rated capacity) limiter.

Temporary alternative measures

- The weight of the load will be determined from a source recognized by the industry (such as the load's manufacturer) or by a calculation method recognized by the industry (such as calculating a steel beam from measured dimensions and a known per foot weight). This information will be provided to the operator prior to the lift.

Articulating cranes manufactured after November 8, 2011 will have at least one of the following: automatic overload prevention device, load weighing device, load moment (or rated capacity) indicator, or load moment (rated capacity) limiter.

Temporary alternative measures

- The weight of the load will be determined from a source recognized by the industry (such as the load's manufacturer) or by a calculation method recognized by the industry (such as calculating a steel beam from measured dimensions and a known per foot weight). This information will be provided to the operator prior to the lift.

The following devices are required on equipment manufactured after November 8, 2011:

Outrigger/stabilizer position (horizontal beam extension) sensor/monitor if the equipment has outriggers or stabilizers.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 25 of 50

Temporary alternative measures

- The operator will verify that the position of the outriggers or stabilizers is correct (in accordance with manufacturer procedures) before beginning operations requiring outrigger or stabilizer deployment.

Hoist drum rotation indicator if the equipment has a hoist drum not visible from the operator's station.

Temporary alternative measures

- Mark the drum to indicate the rotation of the drum. In addition, install mirrors or remote video cameras and displays if necessary for the operator to see the mark.

Operation

Midland Engineering Co., Inc. will comply with all manufacturers' operational procedures for the equipment being used. If procedures are not available, a procedure will be developed by a qualified person. If procedures are related to the crane capacity, they will be developed and approved by a registered professional engineer.

All procedures related to the safe operation of the equipment will be available to the operator in the cab of the crane during use.

Load charts will be available to the operator in the cab of the crane. If electronic equipment (used in lieu of physical load charts) fail during the course of operation, the operator will cease all operations and will not resume until the proper resources are available.

The operator will not engage in any activity that may divert their attention while engaged in operation of the equipment. This includes but is not limited to cell phones, computers, or other electronic devices, even if used in hands free mode, unless the equipment is used for signal communications.

The operator will stay at the controls of the equipment while a load is suspended, except when the following criteria are met:

- Operator remains adjacent to the equipment and not engaged in any other duties
- The load is to be held suspended for a period exceeding normal lifting operations

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 26 of 50

- The competent person determines that it is safe to leave the load suspended and ensures measures are taken to restrain the boom hoist, telescoping, load, swing, and outrigger functions
- Barricades or caution lines are established to prevent entry into the fall zone, regardless of their function.

When equipment is removed from service, it will be tagged out to prevent use. When a particular function has been removed from service, the tag will be placed in a conspicuous location stating that function is not to be used. The tag may only be removed by a person authorized to remove it.

The operator will verify that all controls are in the proper starting position and all personnel are clear before starting the equipment.

The competent person will determine if it is necessary to implement procedures for securing equipment when adverse weather or a storm warning has been issued. Effects of wind, ice, and snow will be made by the competent person to determine if capacity will be reduced.

Equipment adjustments will be communicated to all affected employees at the beginning of each shift.

Safety devices and operational aids are not to be used as a substitute for the exercise of professional judgment by the operator.

Equipment will be operated within the rated capacity.

The operator will verify that the load is within the rated capacity of the equipment by at least one of the following methods:

- The weight of the load will be determined from a source recognized by the industry, or by a calculation method recognized by the industry, or by other equally reliable means. This information will be provided to the operator prior to the lift; or
- The operator will begin hoisting the load to determine, using a load weighing device, load moment indicator, rated capacity indicator, or rated capacity limiter, if it exceeds 75 percent of the maximum rated capacity at the longest radius that will be used during the lift operation. If it does, the operator will not proceed with the lift until he/she verifies the weight of the load.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 27 of 50

The boom or other parts of the equipment will not contact any obstruction.

The equipment will not be used to drag or pull loads sideways.

On wheel-mounted equipment, no loads will be lifted over the front area, except as permitted by the manufacturer.

The operator will test the brakes each time a load that is 90% or more of the maximum line pull is handled by lifting the load a few inches and applying the brakes. In duty cycle and repetitive lifts where each lift is 90% or more of the maximum line pull, this requirement applies to the first lift but not to successive lifts.

Neither the load nor the boom will be lowered below the point where less than two full wraps of rope remain on their respective drums.

Traveling with a load

Traveling with a load is prohibited if the practice is prohibited by the manufacturer.

Where traveling with a load, Midland Engineering Co., Inc. will ensure that:

- A competent person supervises the operation, determines if it is necessary to reduce rated capacity, and makes determinations regarding load position, boom location, ground support, travel route, overhead obstructions, and speed of movement necessary to ensure safety.
- For equipment with tires, tire pressure specified by the manufacturer is maintained.
- Rotational speed of the equipment will be such that the load does not swing out beyond the radius at which it can be controlled.
- A tag or restraint line will be used if necessary to prevent rotation of the load that would be hazardous.
- The brakes will be adjusted in accordance with manufacturer procedures to prevent unintended movement.
- The operator will obey a stop (or emergency stop) signal, irrespective of who gives it.
- Equipment will not be operated without the counterweight or ballast in place as specified by the manufacturer.
- The maximum counterweight or ballast specified by the manufacturer for the equipment will not be exceeded.

Authority to stop

Whenever there is a concern as to safety, the operator will have the authority to stop and refuse to handle loads until a qualified person has determined that safety has been assured.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 28 of 50

Signals

Signaling for crane operation may only be performed by a qualified signal person. Midland Engineering Co., Inc. will establish the individual responsible for signaling prior to the start of the lift.

Hand signal charts will be either posted on the equipment or conspicuously posted in the vicinity of the hoisting operations.

A signal person will be provided in each of the following situations:

- The point of operation, meaning the load travel or the area near or at load placement, is not in full view of the operator.
- When the equipment is traveling, the view in the direction of travel is obstructed.
- Due to site specific safety concerns, either the operator or the person handling the load determines that it is necessary.

Radio, telephone, or other electronic transmission of signals

- The device(s) used to transmit signals will be tested on site before beginning operations to ensure that the signal transmission is effective, clear, and reliable.

Signal transmission will be through a dedicated channel, except:

- Multiple cranes/derricks and one or more signal persons may share a dedicated channel for the purpose of coordinating operations.
- Where a crane is being operated on or adjacent to railroad tracks, and the actions of the crane operator need to be coordinated with the movement of other equipment or trains on the same or adjacent tracks.
- The operator's reception of signals will be by a hands-free system.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 29 of 50

Voice Signals

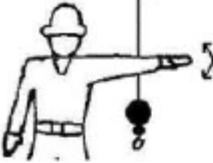
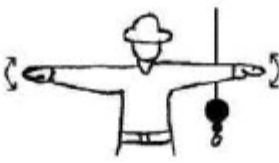



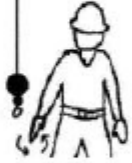


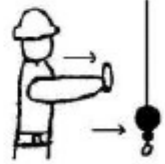
Prior to beginning operations, the operator and signal person will contact each other and agree on the voice signals that will be used.

Each voice signal will contain the following three elements, given in the following order:

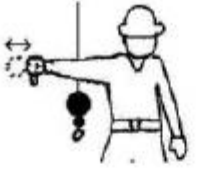





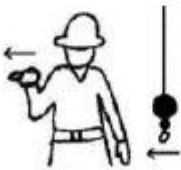
- Function (such as hoist, boom, etc.)
- Direction (distance and/or speed)
- Function (stop command)

The operator and signal person will be able to effectively communicate in the language used.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 30 of 50

 <p>STOP – With arm extended horizontally to the side, palm down, arm is swung back and forth.</p>	 <p>EMERGENCY STOP – With both arms extended horizontally to the side, palms down, arms are swung back and forth.</p>	 <p>HOIST – With upper arm extended to the side, forearm and index finger pointing straight up, hand and finger make small circles.</p>
 <p>RAISE BOOM – With arm extended horizontally to the side, thumb points up with other fingers closed.</p>	 <p>SWING – With arm extended horizontally, index finger points in direction that boom is to swing.</p>	 <p>RETRACT TELESCOPING BOOM – With hands to the front at waist level, thumbs point at each other with other fingers closed.</p>
 <p>RAISE THE BOOM AND LOWER THE LOAD – With arm extended horizontally to the side and thumb pointing up, fingers open and close while load movement is desired.</p>	 <p>DOG EVERYTHING – Hands held together at waist level.</p>	 <p>LOWER – With arm and index finger pointing down, hand and finger make small circles.</p>
 <p>LOWER BOOM – With arm extended horizontally to the side, thumb points down with other fingers closed.</p>	 <p>EXTEND TELESCOPING BOOM – With hands to the front at waist level, thumbs point outward with other fingers closed.</p>	 <p>TRAVEL/TOWER TRAVEL – With all fingers pointing up, arm is extended horizontally out and back to make a pushing motion in the direction of travel.</p>

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 31 of 50

 <p>LOWER THE BOOM AND RAISE THE LOAD – With arm extended horizontally to the side and thumb pointing down, fingers open and close while load movement is desired.</p>	 <p>MOVE SLOWLY – A hand is placed in front of the hand that is giving the action signal.</p>	 <p>USE AUXILIARY HOIST (whipline) – With arm bent at elbow and forearm vertical, elbow is tapped with other hand. Then regular signal is used to indicate desired action.</p>
 <p>CRAWLER CRANE TRAVEL, BOTH TRACKS – Rotate fists around each other in front of body; direction of rotation away from body indicates travel forward; rotation towards body indicates travel backward.</p>	 <p>USE MAIN HOIST – A hand taps on top of the head. Then regular signal is given to indicate desired action.</p>	 <p>CRAWLER CRANE TRAVEL, ONE TRACK – Indicate track to be locked by raising fist on that side. Rotate other fist in front of body in direction that other track is to travel.</p>
 <p>TROLLEY TRAVEL – With palm up, fingers closed and thumb pointing in direction of motion, hand is jerked horizontally in direction trolley is to travel.</p>		

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
			Page:	Page 32 of 50
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety		

Fall Protection

Boom walkway criteria

The walkways will be at least 12 inches wide.

Guardrails, railings and other permanent fall protection attachments along walkways are:

- Not required
- Prohibited on booms supported by pendant ropes or bars if the guardrails/railings/attachments could be snagged by the ropes or bars.
- Prohibited if of the removable type (designed to be installed and removed each time the boom is assembled/disassembled).
- Where not prohibited, guardrails or railings may be of any height up to, but not more than, 45 inches.

Steps, handholds, ladders, grabrails, guardrails and railings

Midland Engineering Co., Inc. will maintain in good condition originally-equipped steps, handholds, ladders and guardrails/railings/grabrails.

Personal fall arrest and fall restraint systems

Personal fall arrest system components will be used in personal fall arrest and fall restraint systems and will conform to the criteria in the Fall Protection section.

Either body belts or body harnesses will be used in personal fall arrest and fall restraint systems.

For non-assembly/disassembly work, Midland Engineering Co., Inc. will provide and ensure the use of fall protection equipment for employees who are on a walking/working surface with an unprotected side or edge more than 6 feet above a lower level as follows:

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
			Page:	Page 33 of 50
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety		

- When moving point-to-point:
 - On non-lattice booms (whether horizontal or not horizontal).
 - On lattice booms that are not horizontal.
 - On horizontal lattice booms where the fall distance is 15 feet or more.
 - While at a work station on any part of the equipment (including the boom, of any type), except when the employee is at or near draw-works (when the equipment is running), in the cab, or on the deck.

For assembly/disassembly work, Midland Engineering Co., Inc. will provide and ensure the use of fall protection equipment for employees who are on a walking/working surface with an unprotected side or edge more than 15 feet above a lower level, except when the employee is at or near draw-works (when the equipment is running), in the cab, or on the deck.

Anchorage criteria

- *Anchorage for personal fall arrest and positioning device systems.*
 - Personal fall arrest systems will be anchored to any apparently substantial part of the equipment unless competent person from visual inspection says it will not hold.
 - Positioning device systems will be anchored to any apparently substantial part of the equipment unless a competent person from visual inspection says it will not hold.
 - Attachable anchor devices (portable anchor devices that are attached to the equipment) will meet the anchorage
- *Anchorage for fall restraint systems.*
 - Fall restraint systems will be anchored to any part of the equipment that is capable of withstanding twice the maximum load that an employee may impose on it during reasonably anticipated conditions of use.
- *Anchoring to the load line.*

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 34 of 50

A personal fall arrest system is permitted to be anchored to the crane/derrick's hook (or other part of the load line) where all of the following requirements are met:

- A qualified person has determined that the set-up and rated capacity of the crane/derrick (including the hook, load line and rigging) meets or exceeds the requirements the fall protection section.
- The equipment operator will be at the work site and informed that the equipment is being used for this purpose.
- No load is suspended from the load line when the personal fall arrest system is anchored to the crane/derrick's hook (or other part of the load line).

Training

Midland Engineering Co., Inc. will train each employee who may be exposed to fall hazards while on, or hoisted by, equipment covered by this subpart on all of the following:

- The requirements in this chapter that address fall protection.

Work area control

Swing radius hazards.

When the equipments rotating superstructure poses a reasonably foreseeable risk of striking and injuring and employee, or

Pinching/crushing an employee against another part of the equipment or another object.

To prevent employees from entering these hazard areas, Midland Engineering Co., Inc. must:

Train each employee assigned to work on or near the equipment in how to recognize struck-by and pinch/crush hazard areas posed by the rotating superstructure.

Erect and maintain control lines, warning lines, railings or similar barriers to mark the boundaries of the hazard areas.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 35 of 50

Keeping clear of the load

Where available, hoisting routes that minimize the exposure of employees to hoisted loads will be used, to the extent consistent with public safety. The building owner or controlling contractor will be consulted to determine safety of lifting materials over an occupied building.

While the operator is not moving a suspended load, no employee will be within the fall zone, except for employees:

- Engaged in hooking, unhooking or guiding a load;
- Engaged in the initial attachment of the load to a component or structure; or
- Operating a concrete hopper or concrete bucket.

When employees are engaged in hooking, unhooking, or guiding the load, or in the initial connection of load to a component or structure and are within the fall zone, all of the following criteria will be met:

- The materials being hoisted will be rigged to prevent unintentional displacement.
- Hooks with self-closing latches or their equivalent will be used.
- The materials will be rigged by a qualified rigger.

Receiving a load

Only employees needed to receive a load are permitted to be within the fall zone when a load is being landed.

During a tilt-up or tilt-down operation:

- No employee will be directly under the load.
- Only employees essential to the operation are permitted in the fall zone (but not directly under the load).

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 36 of 50

- An employee is essential to the operation if the employee is conducting one of the following operations and Midland Engineering Co., Inc. can demonstrate it is infeasible for the employee to perform that operation from outside the fall zone:
 - physically guide the load;
 - Closely monitor and give instructions regarding the load's movement; or
 - Either detach it from or initially attach it to another component or structure (such as, but not limited to, making an initial connection or installing bracing).

Free Fall and Controlled Load Lowering

The use of equipment in which the boom is designed to free fall (live boom) is prohibited in each of the following circumstances:

- An employee is in the fall zone of the boom or load
- An employee is being hoisted
- The load or boom is directly over a power line, or over any part of the area extending the Table A of the power line section ; or any part of the area extending the Table A clearance distance to each side of the power line is within the radius of vertical travel of the boom or the load.
- The load is over a shaft, except where there are no employees in the shaft.
- The load is over a cofferdam, except where there are no employees in the fall zone of the boom or the load.
- Lifting operations are taking place in a refinery or tank farm and controlled load lowering

Where the use of equipment with a boom that is designed to free fall (live boom) is prohibited, the boom hoist will have a secondary mechanism or device designed to prevent the boom from falling in the event the primary system used to hold or regulate the boom hoist fails, as follows:

Friction drums will have:

- A friction clutch and, in addition, a braking device, to allow for controlled boom lowering.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 37 of 50

- A secondary braking or locking device, which is manually or automatically engaged, to back-up the primary brake while the boom is held (such as a secondary friction brake or a ratchet and pawl device)
- Hydraulic drums will have an integrally mounted holding device or internal static brake to prevent boom hoist movement in the event of hydraulic failure.
- Neither clutches nor hydraulic motors will be considered brake or locking devices for purposes of this subpart.
- Hydraulic boom cylinders will have an integrally mounted holding device.
- Hydraulic telescoping booms will have an integrally mounted holding device to prevent the boom from retracting in the event of hydraulic failure.

In each of the following circumstances, controlled load lowering is required and free fall of the load line hoist is prohibited:

- An employee is directly under the load
- An employee is being hoisted
- The load is directly over a power line; or
- The load is over a shaft
- The load is over a cofferdam, except where there are no employees in the fall zone of the load

Operator qualification and certification

Only qualified employees shall operate cranes. Operators will be trained and certified by an accredited crane operator testing organization or employee will have current operator qualification issued by the U.S. military for operation of the equipment. Within 4 years of November 8th 2010, employers must ensure operators be qualified/certified by one of the following methods:

1. Certification by an accredited crane operator testing organization
2. Qualification by an audited employer program

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 38 of 50

3. Qualification by the U.S. military

4. Licensing by a government entity

The trainer will be a current employee, and hold current certified operators card and will stay in direct line of sight of trainee at all times. While monitoring the operator-in-training, the operator's trainer performs no tasks that detract from the trainer's ability to monitor the operator-in-training.

Signal person qualification

Midland Engineering Co., Inc. of the signal person will ensure that each signal person meets the Qualification Requirements:

- The signal person has documentation from a third party qualified evaluator showing that the signal person meets the Qualification Requirements, or
- Midland Engineering Co., Inc.'s qualified evaluator assesses the individual and determines that the individual meets the qualification and provides documentation of that determination.
 - This type of qualification is not portable.

Qualification of maintenance and repair employees

Maintenance, inspection and repair personnel are permitted to operate the equipment only when under the direct supervision of a qualified/certified Operator. Employee will also be familiar with the operation, limitations, characteristics and hazards associated with the type of equipment.

Training

Midland Engineering Co., Inc. will provide training as follows:

- Midland Engineering Co., Inc. will train each employee that will be engaged with crane operations and the dedicated spotter on the overhead power line section of this manual.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 39 of 50

- Midland Engineering Co., Inc. will train each employee who will be assigned to work as a signal persons.

Operators

Midland Engineering Co., Inc. will train each operator-in-training. Midland Engineering Co., Inc. will provide re-training if the operator-in-training does not pass a qualification or certification test.

During the four-year phase-in period for operator certification or qualification Midland Engineering Co., Inc. will train each operator who has not yet been certified or qualified in the areas addressed in the certification section of this manual. Midland Engineering Co., Inc. will train each operator from the requirements on the safe operation of the equipment the operator will be using.

Midland Engineering Co., Inc. will train each operator of the equipment covered in this chapter in the following practices:

- On friction equipment, whenever moving a boom off a support, first raise the boom a short distance (sufficient to take the load of the boom) to determine if the boom hoist brake needs to be adjusted. On other types of equipment with a boom, the same practice is applicable, except that typically there is no means of adjusting the brake; if the brake does not hold, a repair is necessary.
- Where available, the manufacturer's emergency procedures for halting unintended equipment movement.

Midland Engineering Co., Inc. will train each competent person and each qualified person regarding the requirements of this subpart applicable to their respective roles. Midland Engineering Co., Inc. will train each employee who works with the equipment to keep clear of holes, and crush/pinch points and the hazards addressed in Work area control. Midland Engineering Co., Inc. will train each operator and each additional employee authorized to start/energize equipment or operate equipment controls (such as maintenance and repair employees).

Training administration

Midland Engineering Co., Inc. will evaluate each employee required to be trained to confirm that the employee understands the information provided in the training. Midland Engineering Co., Inc. will provide refresher training in relevant topics for each employee when, based on the conduct of the employee or an evaluation of the employee's knowledge, there is an indication that retraining is necessary.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 40 of 50

Hoisting personnel

The use of equipment to hoist employees is prohibited except where Midland Engineering Co., Inc. demonstrates that the erection, use, and dismantling of conventional means of reaching the work area, such as a personnel hoist, ladder, stairway, aerial lift, elevating work platform, or scaffold, would be more hazardous, or is not possible because of the project's structural design or worksite conditions.

Use of personnel platform

When using equipment to hoist employees, the employees will be in a personnel platform that meets the requirements of the personal platform section of this chapter.

Equipment set-up

The equipment will be uniformly level, within one percent of level grade, and located on footing that a qualified person has determined to be sufficiently firm and stable. Equipment with outriggers or stabilizers will have them all extended and locked. The amount of extension will be the same for all outriggers and stabilizers and in accordance with manufacturer procedures and load charts.

Equipment criteria

Capacity: use of suspended personnel platforms. The total load (with the platform loaded, including the hook, load line and rigging) will not exceed 50 percent of the rated capacity for the radius and configuration of the equipment, except during proof testing.

Capacity: use of boom-attached personnel platforms. The total weight of the loaded personnel platform will not exceed 50 percent of the rated capacity for the radius and configuration of the equipment (except during proof testing).

Capacity: hoisting personnel without a personnel platform. When hoisting personnel without a personnel platform the total load (including the hook, load line, rigging and any other equipment that imposes a load) will not exceed 50 percent of the rated capacity for the radius and configuration of the equipment, except during proof testing. When the occupied personnel platform is in a stationary working position, the load and boom hoist brakes, swing brakes, and operator actuated secondary braking and locking features (such as pawls or dogs) or automatic secondary brakes will be engaged.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
			Page:	Page 41 of 50
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety		

Devices

Specific safety devices are required to be in place for a crane involved with hoisting personnel.

Equipment (except for derricks and articulating cranes) with a variable angle boom will be equipped with all of the following:

- A boom angle indicator, readily visible to the operator, and
- A boom hoist limiting device.

Articulating cranes will be equipped with a properly functioning automatic overload protection device.

Equipment with a luffing jib will be equipped with:

- A jib angle indicator, readily visible to the operator, and.
- A jib hoist limiting device.

Equipment with telescoping booms will be equipped with a device to indicate the boom's extended length clearly to the operator, or will have measuring marks on the boom.

Anti two-block. A device which automatically prevents damage and load failure from contact between the load block, overhaul ball, or similar component, and the boom tip (or fixed upper block or similar component) will be used. The device(s) will prevent such damage/failure at all points where two-blocking could occur.

Controlled load lowering. The load line hoist drum will have a system, other than the load line hoist brake, which regulates the lowering rate of speed of the hoist mechanism. This system or device will be used when hoisting personnel

Proper operation required. Personnel hoisting operations will not begin unless the devices listed in this section are in proper working order. If a device stops working properly during such operations, the operator will safely stop operations. Personnel hoisting operations will not resume until the device is again working properly.

Direct attachment of a personnel platform to a luffing jib is prohibited.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 42 of 50

Personnel platform criteria.

A qualified person familiar with structural design will design the personnel platform and attachment/suspension system used for hoisting personnel. The system used to connect the personnel platform to the equipment will allow the platform to remain within 10 degrees of level, regardless of boom angle. The suspension system will be designed to minimize tipping of the platform due to movement of employees occupying the platform. The personnel platform itself (excluding the guardrail system and personal fall arrest system anchorages), will be capable of supporting, without failure, its own weight and at least five times the maximum intended load. All welding of the personnel platform and its components will be performed by a certified welder familiar with the weld grades, types and material specified in the platform design.

The personnel platform will be equipped with a guardrail system which meets the requirements of subpart M of this part, and will be enclosed at least from the toeboard to mid-rail with either solid construction material or expanded metal having openings no greater than ½ inch (1.27cm). Points to which personal fall arrest systems are attached will meet the anchorage requirements in the fall protection section of this manual. A grab rail will be installed inside the entire perimeter of the personnel platform except for access gates/doors

Access gates/doors

If installed, access gates/doors of all types (including swinging, sliding, folding, or other types) must:

- Not swing outward
 - If due to the size of the personnel platform, such as a 1-person platform, it is infeasible for the door to swing inward and allow safe entry for the platform occupant, then the access gate/door may swing outward
- Be equipped with a device that prevents accidental opening
- Headroom will be sufficient to allow employees to stand upright in the platform
- In addition to the use of hard hats, employees will be protected by overhead protection on the personnel platform when employees are exposed to falling objects. The platform overhead protection will not obscure the view of the operator or platform occupants (such as wire mesh that has up to ½ inch openings), unless full protection is necessary.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 43 of 50

- All edges exposed to employee contact will be smooth enough to prevent injury. The weight of the platform and its rated capacity will be conspicuously posted on the platform with a plate or other permanent marking.

Personnel platform loading

The personnel platform will not be loaded in excess of its rated capacity.

Use

Personnel platforms will be used only for employees, their tools, and the materials necessary to do their work. Platforms will not be used to hoist materials or tools when not hoisting personnel.

Materials and tools will be:

- Secured to prevent displacement
- Evenly distributed within the confines of the platform while it is suspended
- The number of employees occupying the personnel platform will not exceed the maximum number the platform was designed to hold or the number required to perform the work, whichever is less.

Attachment and rigging

Hooks and other detachable devices

Hooks used in the connection between the hoist line and the personnel platform (including hooks on overhaul ball assemblies, lower load blocks, bridle legs, or other attachment assemblies or components) will be:

- Of a type that can be closed and locked, eliminating the throat opening
- Closed and locked when attached
- Shackles used in place of hooks will be of the alloy anchor type, with either:
 - A bolt, nut and retaining pin, in place; or
 - Of the screw type, with the screw pin secured from accidental removal

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 44 of 50

- Where other detachable devices are used, they will be of the type that can be closed and locked.

Rope bridle

When a rope bridle is used to suspend the personnel platform, each bridle leg will be connected to a master link or shackle in a manner that ensures that the load is evenly divided among the bridle legs.

Rigging hardware

(Including wire rope, shackles, rings, master links, and other rigging hardware) and hooks will be capable of supporting, without failure, at least five times the maximum intended load applied or transmitted to that component. Where rotation resistant rope is used, the slings will be capable of supporting without failure at least ten times the maximum intended load.

Eyes in wire rope slings will be fabricated with thimbles. Bridles and associated rigging for suspending the personnel platform will be used only for the platform and the necessary employees, their tools and materials necessary to do their work. The bridles and associated rigging will not have been used for any purpose other than hoisting personnel.

Trial lift and inspection

A trial lift with the unoccupied personnel platform loaded at least to the anticipated liftweight will be made from ground level, or any other location where employees will enter the platform, to each location at which the platform is to be hoisted and positioned. Where there is more than one location to be reached from a single set-up position, either individual trial lifts for each location, or a single trial lift, in which the platform is moved sequentially to each location, will be performed; the method selected will be the same as the method that will be used to hoist the personnel.

The trial lift will be performed immediately prior to each shift in which personnel will be hoisted. In addition, the trial lift will be repeated prior to hoisting employees in each of the following circumstances:

- The equipment is moved and set up in a new location or returned to a previously used location
- The lift route is changed, unless the competent person determines that the new route presents no new factors affecting safety.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 45 of 50

The competent person will determine that:

- Safety devices and operational aids required by this section are activated and functioning properly.
- Nothing interferes with the equipment or the personnel platform in the course of the trial lift.
- The lift will not exceed 50 percent of the equipment's rated capacity at any time during the lift.
- The load radius to be used during the lift has been accurately determined.

Immediately after the trial lift, the competent person must:

- Conduct a visual inspection of the equipment, base support or ground, and personnel platform, to determine whether the trial lift has exposed any defect or problem or produced any adverse effect.
- Confirm that, upon the completion of the trial lift process, the test weight has been removed.

Immediately prior to each lift:

- The platform will be hoisted a few inches with the personnel and materials/tools on board and inspected by a competent person to ensure that it is secure and properly balanced.

The following conditions will be determined by a competent person to exist before the lift of personnel proceeds:

- Hoist ropes will be free of deficiencies
- Multiple part lines will not be twisted around each other
- The primary attachment will be centered over the platform
- If the load rope is slack, the hoisting system will be inspected to ensure that all ropes are properly seated on drums and in sheaves.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 46 of 50

Proof testing

At each jobsite, prior to hoisting employees on the personnel platform, and after any repair or modification, the platform and rigging will be proof tested to 125 percent of the platform's rated capacity. The proof test may be done concurrently with the trial lift. The platform will be lowered by controlled load lowering, braked, and held in a suspended position for a minimum of five minutes with the test load evenly distributed on the platform.

After proof testing, a competent person will inspect the platform and rigging to determine if the test has been passed. If any deficiencies are found that pose a safety hazard, the platform and rigging will not be used to hoist personnel unless the deficiencies are corrected, the test is repeated, and a competent person determines that the test has been passed.

Personnel hoisting will not be conducted until the competent person determines that the platform and rigging have successfully passed the proof test.

Work practices

Hoisting of the personnel platform will be performed in a slow, controlled, cautious manner, with no sudden movements of the equipment or the platform.

Platform occupants must:

- Keep all parts of the body inside the platform during raising, lowering, and horizontal movement.
 - This provision does not apply to an occupant of the platform when necessary to position the platform or while performing the duties of a signal person.
- Not stand, sit on, or work from the top or intermediate rail or toeboard, or use any other means/device to raise their working height.
- Not pull the platform out of plumb in relation to the hoisting equipment

Before employees exit or enter a hoisted personnel platform that is not landed, the platform will be secured to the structure where the work is to be performed, unless Midland Engineering Co., Inc. can demonstrate that securing to the structure would create a greater hazard.

If the platform is tied to the structure, the operator will not move the platform until the operator receives confirmation that it is freely suspended.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 47 of 50

Tag lines will be used when necessary to control the platform.

Platforms without controls. Where the platform is not equipped with controls, the equipment operator will remain at the equipment controls, on site, and in view of the equipment, at all times while the platform is occupied.

Platforms with controls. Where the platform is equipped with controls, all of the following will be met at all times while the platform is occupied:

- The occupant using the controls in the platform will be a qualified person with respect to their use, including the safe limitations of the equipment and hazards associated with its operation.
- The equipment operator will be at a set of equipment controls that include boom and swing functions of the equipment, and will be on site and in view of the equipment.
- The platform operating manual will be in the platform or on the equipment.

Environmental conditions

Wind

When wind speed (sustained or gusts) exceeds 20 mph at the personnel platform, a qualified person will determine if, in light of the wind conditions, it is not safe to lift personnel. If it is not, the lifting operation will not begin (or, if already in progress, will be terminated).

Other weather and environmental conditions

A qualified person will determine if, in light of indications of dangerous weather conditions, or other impending or existing danger, it is not safe to lift personnel. If it is not, the lifting operation will not begin (or, if already in progress, will be terminated). Employees being hoisted will remain in direct communication with the signal person (where used), or the operator.

Fall Protection

Except over water, employees occupying the personnel platform will be provided and use a personal fall arrest system. The system will be attached to a structural member within the personnel platform.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 48 of 50

Other load lines

No lifts will be made on any other of the equipment's load lines while personnel are being hoisted, except in pile driving operations.

Factory-produced boom-mounted personnel platforms that incorporate a winch as original equipment.

Loads are permitted to be hoisted by such a winch while employees occupy the personnel platform only where the load on the winch line does not exceed 500 pounds and does not exceed the rated capacity of the winch and platform.

Pre-lift meeting

A pre-lift meeting will be:

- Held to review the applicable requirements of this section and the procedures that will be followed
- Attended by the equipment operator, signal person (if used for the lift), employees to be hoisted, and the person responsible for the task to be performed
- Held prior to the trial lift at each new work location, and will be repeated for any employees newly assigned to the operation

Hoisting personnel near power lines

Hoisting personnel within 20 feet of a power line that is up to 350 kV, and hoisting personnel within 50 feet of a power line that is over 350 kV, is prohibited.

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 49 of 50

Multiple-crane/derrick lifts

Before beginning a crane/derrick operation in which more than one crane/derrick will be supporting the load, the operation will be planned.

The plan must:

- Be developed by a qualified person to ensure that the requirements of this section are met.
- Ensure that Midland Engineering Co., Inc. provides engineering expertise where a qualified person determines that it is needed for the planning.

Plan Implementation

The multiple-crane/derrick lift will be directed by a person who meets the criteria for both a competent and qualified person, or as a competent person who is assisted by one or more qualified persons.

Equipment modifications

Modifications or additions which affect the capacity or safe operation of the equipment are prohibited except where:

Manufacturer review and approval

- The manufacturer approves the modifications/additions in writing
- The load charts, procedures, instruction manuals and instruction plates/tags/decals are modified as necessary to accord with the modification/addition
- The original safety factor of the equipment is not reduced

Manufacturer refusal to review request

The manufacturer is provided a detailed description of the proposed modification/addition, is asked to approve the modification/ addition, but it declines to review the technical merits of the proposal or fails, within 30 days, to acknowledge the request or initiate the review, and all of the following are met:

Midland Engineering Co., Inc. Safety Management System			Doc No:	CRANE
			Initial Issue Date	12/14/15
Chapter 09-Crane			Revision Date:	Initial Version
			Revision No.	0
			Next Review Date:	
Preparation: Safety Mgr	Authority: President	Issuing Dept: Safety	Page:	Page 50 of 50

A registered professional engineer who is a qualified person with respect to the equipment involved:

- Approves the modification/addition and specifies the equipment configurations to which that approval applies, and
- Modifies load charts, procedures, instruction manuals and instruction plates/tags/decals as necessary to accord with the modification/addition.
- The original safety factor of the equipment is not reduced.

Unavailable manufacturer

The manufacturer is unavailable and the professional engineer and the original safety factor of the equipment is not reduced and the following requirements are met:

Manufacturer does not complete the review within 120 days of the request. The manufacturer is provided a detailed description of the proposed modification/addition, is asked to approve the modification/ addition, agrees to review the technical merits of the proposal, but fails to complete the review of the proposal within 120 days of the date it was provided the detailed description of the proposed modification/addition and the requirements under the first three paragraphs of this section are met.

Modifications or additions which affect the capacity or safe operation of the equipment are prohibited where the manufacturer, after a review of the technical safety merits of the proposed modification/addition, rejects the proposal and explains the reasons for the rejection in a written response. If the manufacturer rejects the proposal but does not explain the reasons for the rejection in writing, Midland Engineering Co., Inc. may treat this as a manufacturer refusal.

Equipment with rated capacity of 2,000 lbs or less

Equipment that is rated 2,000 lbs or less will comply with the standard including:

- Knowing Ground conditions
- Following the correct procedure (manufactures procedures or Midland Engineering Co., Inc.'s procedures) for Assembly or Disassembly
- Power line safety