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# Brunel Energy, Inc.

## Cranes

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## 1. Purpose

- 1.1. Brunel Energy, Inc., hereinafter referred to as, the “Company,” has established a program compliant with to provide for the safe operation of construction cranes. For this program, a crane does not include derricks, side boom, equipment with a maximum manufacturer-rated hoisting/lifting capacity of 2,000 pounds or less.

## 2. Applicability

- 2.1. This policy applies to employees, subcontractors and/or visitor(s) of the Company. For the purposes of this policy, an employee shall be considered on the job whenever he/she is:
  - 2.1.1. On or in, any Company or client property, including parking areas; or
  - 2.1.2. On Company time even if off Company premises (including paid lunch, rest periods and periods of being on call).
- 2.2. As a condition of employment, Company employees are required to abide by additional governmental or customer policies and requirements that may be imposed at a worksite in addition to the requirements of these policies and procedures. Nothing set forth in this policy constitutes, construes, or interprets in any way as a contract of employment.

## 3. Definitions

- 3.1. **Authorized** is one who utilizes cranes or other material handling equipment on a regular basis to complete his or her assigned duties. The authorized person should follow the procedures as laid out in this plan, bring any potential cranes or lifting hazards to the attention of the competent person and properly inspect, use, maintain and store the equipment he or she has been assigned.
- 3.2. **Competent** is one who is capable, by acquired knowledge, demonstrated skills and experience, of identifying existing and predictable hazards in the surroundings, working conditions, or behaviors, which are hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.
- 3.3. **Certified** is to recognize as having met specific qualifications within a field by a third-party company.
- 3.4. **Crane** is a machine used for lifting and lowering a load vertically. It may also move it horizontally. It has a hoisting mechanism as an integral part of it.
- 3.5. **Mobile Crane** is a crane consisting of a rotating or fixed superstructure with power plant, operating machinery, and boom, mounted on a base consisting of an automotive truck equipped with a power plant for travel, or platform equipped with axles and rubber-tired wheels or crawler treads for travel. Mobile cranes include wheel-mounted cranes, truck cranes, crawler cranes, gin trucks, etc.

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- 3.6. **Qualified Person** is one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.

#### 4. Responsibilities

##### 4.1. Manager(s):

- 4.1.1. Prior to any employee being allowed to operate any crane this employer will implement the crane safety program and will ensure that all cranes used are evaluated. Authorized to halt any operation where there is danger of serious personal injury. Serve as crane safety trainers to instruct those employees expected to participate in assignments where cranes are utilized but not expected to operate the crane.

##### 4.2. HSE Supervisor(s):

- 4.2.1. Serve as crane safety trainers to instruct those employees expected to participate in assignments where cranes are utilized but not expected to operate the crane.
- 4.2.2. Sole person authorized to amend these instructions and is authorized to halt any operation where there is danger of serious personal injury.
- 4.2.3. Will certify that employee training has been conducted and is being kept up to date.

##### 4.3. Employee(s):

- 4.3.1. Only properly trained and designated personnel to operate cranes. This standard practice instruction will be provided to and read by all employees receiving training.

##### 4.4. Subcontractor(s):

- 4.4.1. Will provide documentation showing the proper training and credentials of Qualified and Authorized employees.

##### 4.5. Crane Trainers:

- 4.5.1. Professional outside crane safety trainers will be utilized to instruct employees expected to operate cranes. Supervisors will receive training and, as required, serve as crane safety trainers to instruct those employees expected to participate in assignments where cranes are utilized but not expected to operate the crane.

#### 5. Requirements

##### 5.1. Crane Operator(s)

- 5.1.1. Cranes may only be operated by certified/qualified operators. Operators shall be certified by an accredited crane operator testing organization and must be knowledgeable of proper care and operation of the crane.

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5.2. Load Limits

5.2.1. Cranes shall not be loaded beyond their rated load capacity except for test purposes.

5.3. Maintenance

5.3.1. A preventative monthly maintenance program based on the crane manufacturer's recommendations shall be established.

5.4. Signal Person(s)

5.4.1. A signal person shall be provided for the following situations:

5.4.1.1. The point of operation is not in full view of the operator.

5.4.1.2. The view is obstructed when the equipment is traveling.

5.4.1.3. The operator or the person handling the load determines it is necessary due to site specific concerns.

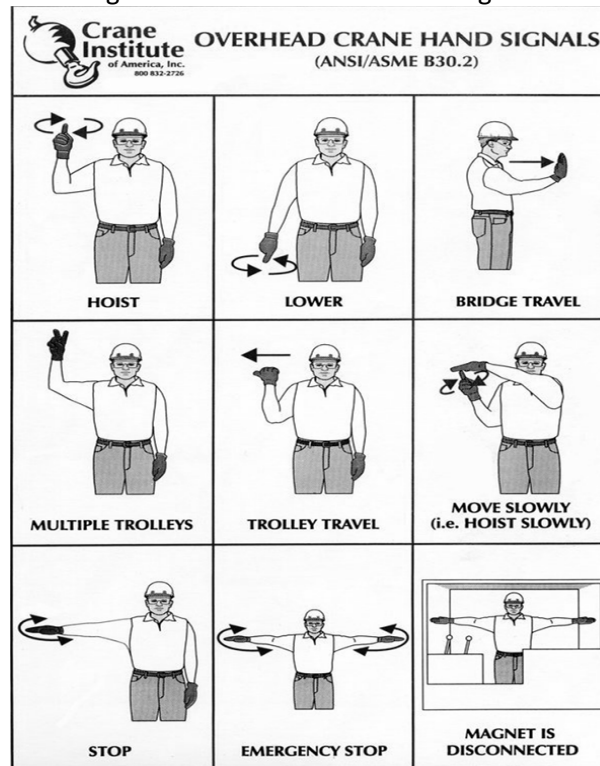
5.4.2. Hand Signals Operators and signal persons shall use the Standard Hand Signals for Controlling Crane Operators as specified in Figure 1 Mobile Crane Hand Signals ANSI/ ASME B30.5 and Figure 2 Overhead Crane Hand Signals.

Figure 1 Mobile Crane Hand Signals ANSI/ ASME B30.5



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Figure 2 Overhead Crane Hand Signals



## 6. Procedure

### 6.1. Rigging up and Down

- 6.1.1. Cranes must be placed on stable ground. Equipment shall not be rigged up or used unless ground conditions are firm, drained, and graded to a sufficient extent so that, in conjunction (if necessary) with the use of supporting materials, the equipment manufacturer's specifications for adequate support and degree of level of the equipment are met.
- 6.1.2. The manufacturer's procedures and prohibitions shall be complied with when rigging up and rigging down equipment and must be followed during assembly and/or disassembly by a competent person.
- 6.1.3. The rigging up and rigging down of equipment shall be directed by a competent and qualified person.

### 6.2. Working Zone Procedure

- 6.2.1. The supervisor shall ensure that the work zone is identified by demarcating boundaries such as flag and range limiting devices or defining the work zone as 360 degrees around the equipment up to the maximum working radius, including the crane's swing radius.

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- 6.2.2. The supervisor shall perform a hazard assessment to identify the work zone and determine if any part of the equipment could get closer than 20 feet to a power line.
- 6.2.3. If it is determined that any part of the equipment load line or load could get closer than 20 feet to a power line, the supervisor shall ensure that at least one of the following measures is taken:
  - 6.2.3.1. The power lines have been deenergized and visibly grounded.
  - 6.2.3.2. No part of the equipment, load line or load gets closer than 20 feet to the power line.
  - 6.2.3.3. Determine the line's voltage and minimum approach distance permitted in the table below:

**Table 3 Minimum Clearance Difference**

<b>Voltage (nominal, kV, alternating current)</b>	<b>Minimum Clearance Distance (feet)</b>
Up to 50	10
Over 20 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.

- 6.2.4. All manufacturer procedures applicable to the operational functions of equipment, including its use with attachments, shall be complied with.
- 6.2.5. The operator shall have access to rated capacities (load charts), recommended operating speeds, special hazard warnings, instructions, and the operator's manual.
- 6.2.6. The crane operation procedures (operator's manual) must always be readily available in the cab.
- 6.2.7. The rated load of the crane shall be marked on each side of the crane, and if the crane has more than one hoisting unit, each hoist shall have its rated load marked on it or its load block and this marking shall be clearly legible from the ground floor.
- 6.2.8. Whenever there is a safety concern, the operator shall have the authority to stop and refuse to handle loads until a qualified person has determined that safety has been assured.
- 6.2.9. The operator shall ensure that safety measures such as marking the boundaries of the crane swing radius with warning lines, railings, or similar barriers are used when the

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equipment has the potential to strike and injure an employee or pinch/crush an employee against any other object.

6.2.10. No sudden acceleration or deceleration of the moving load, the load does not contact any obstructions, cranes shall not be used for side pulls except specifically authorized by a responsible person.

6.2.11. No hoisting/lowering/traveling while an employee is on the load or hook, operator avoids carrying load over people.

6.2.12. The load shall not be lowered where there are less than two full wraps of rope on the hoisting drum, operator does not leave his position at the controls while loading.

### 6.3. Inspections

6.3.1. The operator or competent person shall conduct a visual inspection of the crane prior to each shift and use, all new and altered cranes shall also be tested for compliance. The inspection must consist of:

6.3.1.1. Observation of apparent deficiencies.

6.3.1.2. Control mechanisms

6.3.1.3. Pressurized lines

6.3.1.4. Hooks and latches

6.3.1.5. Wire rope and hoist chains, including end connections.

6.3.1.6. Electrical apparatus

6.3.1.7. Tires (when used)

6.3.1.8. Ground conditions

6.3.2. The crane operator shall not operate the crane unless these safety device items are installed and operating properly:

6.3.2.1. A horn that can be heard above the noise of the running crane engine and background noise.

6.3.2.2. A boom angle indicator.

6.3.2.3. A weight indicator on the main lift line.

6.3.2.4. Load chart

6.3.2.5. An anti-two block device on each lift-line.

6.3.3. A competent and qualified person shall conduct a monthly inspection using the Construction Crane Inspection Form.

6.3.4. Completed Crane Inspection Forms shall be kept for at least three months.

6.3.5. The Crane monthly inspection certificate of record of crane inspection shall include, the date of inspection, the signature of the person who performed the inspection and the serial number, or other identifier, of the inspected.

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6.3.6. The following items shall be inspected for defects at intervals as defined above or as specifically indicated, including observations during operations for any defect which might appear between annual inspections.

6.3.7. All deficiencies such as those listed below shall be carefully examined and corrected:

6.3.7.1. All functional operational mechanisms for maladjustment interfering with proper operation shall be checked daily and corrected immediately.

6.3.7.2. Deterioration or leakage in lines, tanks, valves, drain pumps, and other parts of air or hydraulic systems shall be checked daily and corrected immediately.

6.3.7.3. Hooks shall be visually inspected daily and monthly for any deformation and/or cracks. Hooks with cracks or having more than 15% more than normal throat opening or more than 10% twist from the plane of the unbent hook shall be removed from service and replaced.

6.3.7.4. Wire rope and other rope lifting lines shall be inspected daily and monthly for deterioration, cracks, deformation, broken strands, etc. Any deterioration resulting in appreciable loss of original strength shall be carefully observed and determined if safe or unsafe.

6.3.7.5. Hoist chains, including end connections shall be inspected daily and monthly for excessive wear, twist, distorted links interfering with proper function, or stretch beyond manufacturer's recommendations.

6.3.7.6. Pad-eyes shall be visually inspected (for deterioration, cracks, deformation, etc.) on all loads prior to each lift.

6.3.7.7. Quarterly and annually (no more than twelve calendar months between inspections), a third-party qualified crane inspector shall conduct an operational inspection and load test of each crane in accordance with API RP 2D. The qualified crane inspector shall certify the load capabilities, hoisting machinery, and the operational condition of each crane. Documentation of these certifications, including dates and results shall be maintained in the individual crane maintenance file for five (5) years.

6.3.7.8. Hooks shall be ultrasound or x-ray tested once a year during the manufacturer's representative's inspection.

6.3.7.9. Before any repairs are performed, an "Out of Order" notification must be placed on the crane, or it must be locked out. Also, on the floor beneath the hook where visible from the floor.

#### 6.4. Load Charts

6.4.1. The operator shall know the weight of each load before making a lift. The crane shall not be loaded beyond the specifications of the load-rating chart.



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- 6.4.2. A substantial and durable rating chart with clearly legible letters and figures shall be securely fixed to each crane cab in a location easily visible to the operator while seated at the control station.
- 6.4.3. Written reports of rated load tests shall be available showing test standards and confirming the adequacy of repairs or alterations.
- 6.5. Safety Devices
  - 6.5.1. Safety devices are required to be on all equipment and shall be in proper working order before operations begin. If any of the devices are not in proper working order, the equipment shall be taken out of service and operations shall not resume until the device is working properly again.
  - 6.5.2. An ABC fire extinguisher (5 BC rating or higher) shall be kept in each crane cab or in the vicinity of the cab. All employees shall be trained in the proper use and maintenance of fire extinguishers.
- 6.6. Overhead Electrical Lines
  - 6.6.1. When overhead electrical lines are present in the area where cranes will be operated, all lines shall be de-energized, or grounded or other protective measures shall be provided before work is started.
  - 6.6.2. When it is not feasible to de-energize or ground power lines rated 50 kV or below, the minimum clearance between the lines and any part of the crane or load shall be ten feet.
- 6.7. Internal Combustion Engines
  - 6.7.1. Where internal combustion engine powered equipment exhausts in closed spaces, tests shall be made and recorded to see that employees are not exposed to unsafe concentrations of toxic gases or oxygen deficient atmospheres.
- 6.8. Modifications and Additions
  - 6.8.1. No modifications or additions which affect the capacity or safe operation of the equipment shall be made without the manufacturer's written approval.
  - 6.8.2. If modifications are made, the capacity, operation and maintenance instruction plates, tags or decals shall also be changed accordingly.
  - 6.8.3. A registered professional engineer must be qualified with respect to the equipment involved, must ensure the original safety factor of the equipment is not reduced.
- 6.9. Obstructed Vision
  - 6.9.1. All lifting operations must be illuminated properly during night-time or low visibility conditions.
  - 6.9.2. A signal person must be provided when the point of operation is not in full view of the operator, the view is obstructed when the equipment is traveling, and when the operator or rigger determines it is necessary due to site specific concerns.

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- 6.9.3. The crane operator must have clear visible line-of-sight of the signal person and all other employees involved in the lifting operations.

## 7. Training

- 7.1. Only employees qualified by training or experience shall be allowed to operate cranes. Qualifications are attained through one of the following methods:
  - 7.1.1. Certification by an accredited crane operator testing organization
  - 7.1.2. Qualification by an audited employer program
  - 7.1.3. Qualification by the U.S. military
  - 7.1.4. Licensing by a U.S. government entity

## 8. Recordkeeping

- 8.1. Crane Inspection forms, operator certifications and training records shall be maintained.

## 9. Reference

- 9.1. OSHA. 29 CFR 1926.20, 1402, 1403, 1404, 1408, 1412, 1415, 1417, 1418, 1419, 1424, and 1434.

## 10. Appendix

- 10.1. Crane Inspection Schedule & Maintenance Report

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**APPENDIX 10.1 CRANE INSPECTION SCHEDULE & MAINTENANCE REPORT**

CRANE I.D.		DATE:										Correction - Initial & Date	Comments
INSPECTION TYPE: D / M / A		INSPECTOR:											
COMPONENT	DAILY (D)	MONTHLY (M)	ANNUAL (A)	OK	Adjust	Repair	Replace	Lube	Clean				
Bridge	Motor		X	X									
	Brake & Hydraulics	X	X	X									
	Control Panels		X										
	Control Operation	X	X	X									
	Resistors		X	X									
	Lights	X	X	X									
	Trolley Conductors			X									
	Runway Collectors			X									
	Reducer			X									
	Couplings			X									
	Line Shaft Bearings			X									
	Wheels			X									
	Wheel Gearing			X									
	Wheel Bearings			X									
	Girder Connections			X									
	Align. & Tracking			X									
	Trolley Rails & Stops		X	X									
	Guards & Covers			X									
Bumpers		X	X										
Rail Sweeps			X										
Main Hoist	Motor		X	X									
	Holding Brake	X	X	X									
	Elec. Control Brake	X	X	X									
	Control Panels			X									
	Control Operation	X	X	X									
	Resistors		X	X									
	Upper Limit Switch	X	X	X									
	Mech. Load Brake	X	X	X									
	Reducer		X	X									
	Couplings			X									
	Upper Sheaves		X	X									
	Rope Drum		X	X									
	Wire Rope	X	X	X									
	Bottom Block	X	X	X									
Hook & Latch	X	X	X										

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Auxiliary Hoist	Motor		X	X																
	Holding Brake	X	X	X																
	Elec. Control Brake	X	X	X																
	Control Panels			X																
	Control Operation	X	X	X																
	Resistors		X	X																
	Upper Limit Switch	X	X	X																
	Mech. Load Brake	X	X	X																
	Reducer		X	X																
	Couplings			X																
	Upper Sheaves		X	X																
	Rope Drum		X	X																
	Wire Rope	X	X	X																
	Bottom Block	X	X	X																
Hook & Latch	X	X	X																	
Trolley	Motor		X	X																
	Brake & Hydraulics	X	X	X																
	Control Panels			X																
	Control Operation	X	X	X																
	Resistors		X	X																
	Trolley Collectors			X																
	Reducer		X	X																
	Couplings			X																
	Wheels			X																
	Wheel Bearing			X																
	Wheel Bearings			X																
	Bumpers		X	X																
	Rail Sweeps			X																
Miscellaneous	Gen. Cond. & Housekeeping		X	X																
	Runway Rails-Span		X	X																
	Runway Rails - Joints		X	X																
	Runway Rails - Wear		X	X																
	Main Conductors			X																
	Pushbutton Station	X	X	X																
	Cable Reels		X	X																
	Grabs & Attachments	X	X	X																
	Cap. & Warn. Signs		X	X																
Wind Anchors			X																	