Woodland Pulp LLC

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Baileyville, Maine

# Mobile Crane Safety Procedure

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## 1. POLICY STATEMENT

It is the goal of Woodland Mill to provide a safe workplace for all employees' contractors and service personnel. This Mobile Crane Safety Procedure ensures the safe operation of the mill's mobile crane and boom trucks. Note: Section 8 is specifically for contractors.

## 2. SCOPE

This procedure applies to all Mobile Cranes and Boom Trucks operated at the Woodland Mill, for all other vehicles please refer to the Mobile Equipment Procedure.

## 3. CRANE OPERATION

Mobile crane equipment can be complex and subject to hazards beyond those experienced with fixed equipment. To avoid hazards associated with material handling by mobile crane, general work practices must be followed by all personnel involved in mobile crane operations.

### 3.1 MANUFACTURER'S INFORMATION

Load Rating Chart

A durable rating chart with legible letters and figures must be provided with crane and securely attached in the cab, easily accessible to the operator while at the controls. The date and information to be provided on these charts must include a full and complete range of manufacturer's crane load ratings at all operating radii, boom angles, work areas, and all state boom lengths and configurations, jib length, and angles or (off set), as well as alternate ratings for use and nonuse of optional equipment on the crane, such as outriggers and extra counterweights, that affect ratings.

Operational Manual

An operating manual supplied by the manufacturer must be readily available to the operator at all times.

### 3.2 LIFT PLAN

At the initial stage of the planning process, the lift must be classified as a non-critical or critical lift. To define the lift as non-critical the operator must complete the pre-work lift checklist. See attachment #2 at the end of this document. This will be included in the binder with all of the crane information.

**Designation of a "critical lift" meets at least one of the following criteria:**

1. When a crane if lifting more than 75% of its rate capacity
2. When a load is lifted near electrical power lines
3. When a load if lifted near the PSM area of the mill
4. When the lift requires two or more pieces of lifting equipment working in unison.
5. Special hoisting/ rigging equipment will be used.
6. There is a potential for release of hazardous materials due to collision or upset of load.
7. The lift poses a high risk of injury or damage to personnel, property, or natural resources due to location and/or space constraints.
8. Damage would result in excessive costs or delay to the schedule
9. When lifting personnel in a man-basket/personnel platform

### 3.3 CRITICAL LIFT PROCEDURE

When the lift is determined to be a “critical lift” additional precautions must be taken. Before a critical lift is made a critical lift plan must be completed. See attachment #4 Critical Lift Plan and attachment #5 Critical lift plan in the PSM area at the end of this document.

### 3.4 CRANE OPERATOR TASKS

Before starting the crane, see that all controls are in the off or neutral position and that all personnel are in the clear. Operators are responsible for those operations under their direct control. The crane operator must perform the following activities:

1. Safely operate equipment.
2. Follow the equipment operating guidelines.
3. Perform the daily inspection.
4. Ensure inspections are current via inspection sticker, other documentation, verbal confirmation.
5. Abide by any restrictions placed on the use of the equipment.
6. Verify that the crane is not at any time going to be closer than 20 ft to any overhead electrical line. If there are any questions on this refer to the electrical line chart in this procedure and see your supervisor
7. Ensure that the load will not exceed the rated capacity of the equipment.
8. The crane must not be loaded beyond its rated capacity of the equipment.
9. Verify the crane is level.
10. Ensure crane pads are in place.
11. Check wind speed before lifting.
12. The load is attached to the hook by means of slings or other approved devices.
13. The load is well secured and properly balanced in the sling or lifting device before it is lifted more than a few inches.
14. The hoist rope is not kinked.
15. Multiple-part lines are not twisted around each other.
16. The hook must be positioned above the center of gravity of the load in such a manner as to minimize swinging when the load is lifted.
17. If there is a slack-rope condition, it should be determined that the rope is properly seated on the drum and in the sheaves.
18. All personnel, including qualified riggers, must be clear of the load.
19. No side loading of the crane
20. Do not engage in any attention-diverting activity while operating the crane.
21. When physically or mentally unfit, do not engage in the operation of equipment.
22. Respond to signals from the appointed signal person.
23. Obey a STOP signal no matter who gives it.
24. Whenever there is any question as to the safety of the activity, an operator has the authority to stop and refuse to handle loads until the matter are been resolved by supervisory personnel.

25. Notify the next operator of any defects in the equipment or operating problems at shift change or on inspection sheet.
26. Secure crane before leaving.
27. Do not hoist two or more separately rigged loads in one lift, even though the combined load is within the crane's rated capacity.
28. Do not lift, lower, or travel the crane while anyone is on the load or hook.
29. Lifts must be halted until weather conditions have changed enough to allow continuation and make this decision.

- **<u>Side Pulls</u>**
- Side loading of booms is prohibited. Cranes must not be used for dragging loads sideways.

- **<u>Drum Brake test</u>**
- The operator must rest the brakes each time a load approaching the rated load is handled. The drum brakes must be tested by raising the load a few inches and applying the brakes.

- **<u>Outriggers</u>**
- When the load at a particular radius exceeds the rated load without outriggers as given by the manufacturer for that crane, outriggers must be used. Where floats are used, they must be securely attached to the outriggers. Wood blocks used to support outriggers must be –
    - Strong enough to prevent crushing.
    - Free from defects
    - Of sufficient width and length to prevent shifting or toppling under load
- Each outrigger must be visible to the operator or to a signaler during extension or setting; pads must be in place as well.

- **<u>Traveling</u>**
- Before a crane travels with a load, a designated person must be responsible for determining and controlling safety. Decisions such as position of load, boom location, ground support, travel route, and speed of movement must be in accordance with his or her determinations.

- **<u>Boom Height Limit</u>**
- A crane with or without a load must not be allowed to travel with the boom so high that it may bounce back over the cab.

### 3.5 ROTATING

Avoid sudden starts and stops when rotating the crane. Rotational speed must be such that the load does not swing out beyond the radius at which it can be

controlled. A tag or restraint line must be used when rotation of the load may cause hazardous conditions.

### 3.6 HOLDING

The operator must not leave his or her position at the controls while the load is suspended. No person is allowed to stand or pass under a load on a hook

### 3.7 WINCH HEAD

Ropes must not be handled on a winch head without the knowledge of the operator. While a winch head is being used, the operator must be within convenient reach of the power unit control lever.

### 3.8 BALLAST OR COUNTERWEIGHT

Operating cranes without the full amount of ballast or counterweight in place as specified by the manufacturer is prohibited. The ballast or counterweight must not exceed the manufacturer's specifications.

### 3.9 CAB HOUSEKEEPING

Necessary clothing and personal belongings must be stored in such a manner as to not interfere with access to the crane or its operation. Tools, oils, cans, waste, extra fuses, and other necessary articles must be stored in the toolbox and must not be permitted to lie loose in or about the cab.

### 3.10 FIRE EXTINGUISHERS

Ensure that a 10BC or larger fire extinguisher is installed in the cab of cab-operated cranes. The extinguisher must be maintained in a serviceable condition.

### 3.11 UNATTENDED CRANE

Before leaving the crane unattended, the operator must perform the following tasks:

1. Land any load, bucket, lifting magnet or other devices.
2. Disengage master clutch.
3. Set travel brakes and other locking devices.
4. Put controls in the of or neutral position.
5. Secure the crane against accidental travel.
6. Stop the engine.

**<u>Exceptions to engine stop for an unattended crane</u>**

An exception to stopping the engine is allowed when the crane operation is frequently interrupted during a shift and the operator must leave the crane. Under the following circumstances, the engine may remain running, including the requirements when leaving a crane unattended:

- The crane is situated where unauthorized entry of the crane can be observed.
- The crane is located within an area protected from unauthorized entry.

If there is a warning sign on the switch or engine starting controls, do not close the switch or start the engine until the warning sign has been removed by the person who placed it or another appointed person.

## 4. HOISTING

When loads that are limited by structural competence rather than by stability are to be handled, the operator must determine the weight of the load within 10-% before hoisting. The weight will be determined accurately enough to determine safety of the pick. The crane and rigging equipment must not be loaded beyond its rated capacity, except for authorized testing.

The use of a crane to hoist employees on a personnel platform is prohibited except when the erection uses and dismantling of conventional means of reaching the worksite, such as a personnel hoist, ladder, stairway, aerial lift, elevating work platform or scaffold would be more hazardous, or is not possible because of structural design or worksite conditions. The definition of hoisting for this section means all crane functions such as lowering, lifting, swinging, booming in and out or up and down or suspending a platform. See Man Basket Section for special requirements.

### 4.1 PRE-LIFT CHECK

Before the lift is performed, the operator must ensure that:

- The hoist rope is wrapped around the load.
- The load is attached to the hook by means of slings or other approved devices.
- The crane is level and where necessary, blocked properly.
- The load is well secured and properly balanced in the sling or lifting device before it is lifted more than a few inches.
- The hoist rope is not kinked.
- Multiple part lines are not twisted around each other.
- The hook is brought over the load in such a manner as to prevent swinging.

### 4.2 PROHIBITIONS ON HOISTING

Crane operators must comply with the following hoist prohibitions:

- The load must not be lowered below the point where less than two full wraps of rope remain in the hoisting drum.
- During hoisting, ensure there is no sudden acceleration or deceleration of the moving load, and the load does not contact any obstructions.
- Do not hoist, lower or travel while anyone is on the load or hook.
- Do not carry loads over people.

### 4.3 MAN BASKET / PERSONNEL PLATFORM

Man-baskets used to hoist personnel have stringent regulations on both design and construction.

- A bridle sling used to suppose the basket must have a master link or shackle to evenly distribute weight.
- The bridle sling and any other rigging attachments used for man-basket hoisting shall not be used for any other purpose.
- Load lines must be capable of supporting without failure at least seven times the maximum intended load.
- A proof test lift at 125% of the basket must be conducted and held suspended for 5 minutes at each new lift site.
- Before personnel use a basket, trial lifts with the anticipated weight must be made to all lift locations. Trial lift shall be performed every time the crane is repositioned.
- The total weight of the loaded platform and related rigging shall not exceed 50% of the rated capacity for the radius and configuration of the crane.
- The number of employees occupying the personnel platform shall not exceed the number required for the work being performed.
- If the hoist is non-rotating wire rope, the safety factor must be 10:1.
- The crane must be equipped with an anti-two block device.
- The crane must have a flip over, positive type hook latch or a construction block with shackled bridle assembly.
- The basket should have a metal nameplate with the basket capacity rating clearly indicated.
- Man basket design must be approved by an engineer.

## 5 ELECTRICAL STORM

In the event of a lightning storm, all personnel on or near a crane, including the crane operator must be evacuated away from it to a safe shelter. Before evacuating the crane and if there is enough time before the electrical storm is imminent, the operator should follow the procedures for an unattended crane.

## 6 POWER FAILURE

If power to the crane fails during a lift operation:

- Set all brakes and locking devices
- Move all clutches or power controls to the neutral position
- If practical, land the suspended load under brake control

# 7 OPERATIONS NEAR OVERHEAD LINES

## 7.1 SAFETY PRACTICES

The following steps must be taken to minimize the hazard of electrocution or serious injury because of contact between the energized power lines and the crane, load line, or load.

- Any overhead wire must be considered to be an energized line.
- Durable signs must be installed at the operator's station and on the outside of the crane, warning that electrocution or serious bodily injury may occur unless a minimum clearance of 10ft is maintained between the crane of the load being handled and the energized power lines.
- Greater clearances are required because of higher voltage as stated below in Table 1 (minimum clearance distances) These signs must be revised, but not removed, when a local jurisdiction requires greater clearance.
- Exercise caution when working near overhead lines with long spans between towers, as they tend to move latterly or vertically due to the wind, which could cause them to breach the safety zone.
- Cranes must not be used to handle materials stored under electric power lines unless any combination of the boom, load, load line, or machine component cannot enter the prohibited zone.
- Crane operators must not rely on the coverings of wires for their protection.

| Table 1<br>Minimum Clearance Distances | |
|---|---|
| Normal Voltage (phase to phase) | Minimum clearance from overhead line |
| 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 1000 | 45 |
| over 1000 | (as established by the power line owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and |

### 7.2 DE-ENERGIZING LINES

De-energized power lines are the preferred condition under which the operation can be performed safely.

**<u>Procedures for De-Energizing Lines</u>**

The following steps must be taken to ensure that de-energization of the power lines has occurred:

- The Power Company or owner of the power lines must de-energize the lines.
- The lines must be visibly grounded to avoid electrical feedback and appropriately marked at the jobsite location.

A designated representative of the owner of the lines or a designated representative of the electrical utility must be on site to verify that the two preceding steps have been completed and that the lines are not energized.

## 8 CONTRACTORS

Contractors must have a documented training and qualification program that includes the following elements:

- Classroom or computer-based training
- Written test with established and documented pass/fail criteria.

- On the job training
- On the job evaluation

# 9 EQUIPMENT TESTS

## 9.1 NEW CRANES

Each production crane must be tested by the manufacturer to the extent necessary to ensure compliance with the operational requirements of ASME B30.5 *Mobile and Locomotive Cranes*. If the complete production crane is not supplied by one manufacturer, such a test must be conducted at final assembly. Certified production-crane tests must be kept on file, written reports must be available showing test procedures and confirming the adequacy of repairs and alterations.

# 10 CRANE INSPECTIONS

Inspections requirements for cranes must follow the procedures provided by the crane manufacturer unless authorized alternative procedures are prescribed in this procedure or attachments.

Any deficiencies discovered during the inspection of a crane conducted according to the procedures outlined in this section that could reduce its load capacity or adversely affect its performance must be corrected before the crane is returned to service.

## 10.1 INITIAL INSPECTION

New, reinstalled, altered, modified, or extensively repaired cranes must be inspected before initial use according to the written procedures outlined in the crane manufacturer's manual and in this procedure. All safety devices, controls, and other operating parts of the equipment must be checked during each inspection and must be in good working order before operating crane.

## 10.2 DAILY INSPECTION

Each crane must be inspected by a qualified crane operator or designated inspector before daily use or before each work shift. The operator must determine whether equipment must be removed from service or if a more detailed inspection is required.

## 10.3 CONTROLS

Test all controls. If any controls do not operate properly, they should be adjusted or repaired before operations begin. Check that motions are smooth and regular,

with no hesitations, vibration, binding, weaving, unusual noise, or other irregularity.

### 10.4 CRANE CABLES

Visually inspect all cables for damage.

### 10.5 FUNCTIONAL OPERATING MECHANISMS

Inspect all functional operating mechanisms for maladjustments that can interfere with the proper operation, including:

### 10.6 DAILY INSPECTION RECORDS

Ensure that inspections of all components, including wire rope, chains, and crane, are current via inspection sticker or other documentation from the designated inspector. The inspection will be documented in the binder for the particular crane being inspected.

### 10.7 QUARTERLY INSPECTION

The maintenance department or other designated inspector must inspect the following items at least once per quarter:

- Engine Oil Level
- Engine Oil Leak
- Water Level
- Battery Cable & Engs
- Fan Belts
- Fuel
- Backup Alarm
- Glass
- Mirrors
- Gauges
- Brake Operation
- Steering Operation
- Transmission Operation
- Throttle and linkage
- Park Brake
- Operators Manual
- Load Chart
- Hand Signal Chart
- Boom Angle indicator
- Winch rotation indicator
- Anti-two block system
- L.M.I. Function
- Controls identified
- Air control leaks
- Swing break operation
- Fire extinguisher
- Level
- Spill kit
- Axle pivot pins
- Axle seals
- Tires
- Lugs and wheels
- Inflation
- Outrigger jack leaks
- Pads, beams and hoses
- Axle oscillation lockout
- General lubrication
- Steps deck
- Sheet metal
- Paint
- Steering cylinder leaks
- Hydraulic valve leak
- Main winch leak
- Main winch wire rope
- Aux winch leak
- Aux winch wire rope
- Boom pivot pin / bottom pivot bushing
- Boom lift cylinder leaks
- Becket wedge and pin
- Cable clamps in place
- Block swivel and latch
  - Block capacity and weight
  - Ball swivel and latch
  - Ball capacity and weight
  - Boom pads and rollers
  - Boom idler sheaves
  - Boom point sheaves
  - Boom ext cylinder and reel
  - Boom condition (hydraulic)
  - Jib, mount, pins, and pendants
  - Swing lock
  - Guards in place
  - Hydraulic Oil Level
  - Windshield Wipers
  - Lights and Signal
  - Horn

## 10.8 ANNUAL INSPECTION

A qualified inspector must examine the following items for deficiencies and determine whether they constitute a hazard:

- Deformed, cracked, or corroded members.
- Loose bolts or rivets
- Cracked or worn sheaves and drums.
- Worn, cracked, or distorted parts, such as pins, bearings, shafts, gears, rollers, locking and clamping devices.
- Load hooks and load blocks
- Excessive wear on brake system parts, linings, pawls, and ratchets.
- Load, wind, and other indicators over their full range, for any significant inaccuracies.
- Gasoline, diesel, electric, or other power plants for improper performance or noncompliance with applicable safety requirements.
- Excessive wear of chain drive sprockets and excessive chain stretch.

A designated inspector must inspect wire ropes at least annually. The inspector must carefully note any deterioration that results in appreciable loss of original strength and determine whether further use of the rope constitutes an acceptable risk. The inspection must include examination of the entire rope length without detaching it from the drum.

### 10.9 OTHER INSPECTION

**Load Hook, Load Block, and Hoist Chains**
Inspection records must be retained on file throughout the service life of the hook or load block and must be readily available for review by designated personnel. A certification record of inspections for the following crane components must be kept on file:

- Hooks with deformities or cracks, with a certification record that includes the date of inspection, the signature of the person who performed the inspection, and the serial number or other identifier of the hook inspected.
- Hoist chains, including end connections, with a certification record that includes the date of inspection, the signature of the person who performed the inspection, and the identifier of the chain inspected.

## 11 MAINTENANCE

### 11.1 CRANE IN REGULAR SERVICE

Maintenance of the crane is the responsibility of the crane operator and must follow the guidelines of the crane manufacturer and this procedure. See the manufacturer's manual for a copy of the crane maintenance and inspection schedule.

A preventive maintenance program must be established based on recommendations of the crane manufacturer. If equipment maintenance procedures deviate from published manufacturer's recommendations, the alternate procedures must be approved in advance by the manufacturer or another designated person and must be kept on file and readily available to designated personnel.

### 11.2 PRE-MAINTENANCE PROCEDURES

Before starting adjustments or repairs on a crane, maintenance personnel must take precautions in the following chronological order:

1. Place the crane where it will cause the least interference with other equipment or operations in the area.
2. Lower the lower load block to the ground or otherwise secure it against dropping.
3. Place all controls in the OFF position and secure all operating features from inadvertent motion by brakes or other means.
4. Lock out the means of starting crane operating equipment.
5. Stop the power source or disconnect it at the power takeoff.
6. “Warning” or “Out-of-Order” signs must be placed on the crane controls and underneath the crane where overhead work may create a hazard. Signs or flags must be removed only by authorized personnel.
7. Guard adjacent runways for the length of the work area to prevent contact with another crane.

## 11.3 ADJUSTMENTS & REPAIRS

Any hazardous conditions disclosed by inspection or during operation must be corrected before operation of the crane is resumed. Adjustments and repairs must be done only by designated personnel.

Adjustments must be maintained to ensure correct functioning of components, which include:

- Functional operating mechanisms
- Safety devices
- Control systems
- Power plants
- Braking systems

Repairs or replacements must be provided promptly as needed for safe operation.

## 11.4 POST-MAINTENANCE PROCEDURES

After adjustments and repairs have been made, the crane must not be operated until:

- All guards have been reinstalled.
- Safety devices have been reactivated.
- Maintenance equipment has been removed.

## 11.5 LOAD ATTACHMENT CHAINS & ROPE SLINGS

Load attachment chains and rope slings showing defects must be repaired or replaced promptly, as must all critical parts that are cracked, broken, bent, or excessively worn.

## 11.6 PENDANT CONTROL

Pendant control stations must be kept clean and function labels kept legible.

## 11.7 WIRE ROPE

Personnel using wire rope must ensure proper care in compliance with the following guidelines. All rope that has been idle for a month or more due to shutdown or storage of a crane must be thoroughly inspected before it is used. This inspection must be for all types of deterioration and performed by a designated inspector whose approval must be required for further use of the rope. Non-rotating rope must be carefully inspected.

## 11.8 STORAGE

Store rope to prevent damage or deterioration, unreel or uncoil rope as recommended by the rope manufacturer and with care to avoid kinking or twisting.

## 11.9 CUTTING

Before cutting a rope, use a method that prevents the unlaying of the strands. Heat-affected zones of flame-cut wire rope must not be allowed to bear a load.

## 11.10 INSTALLATION

During installation, avoid dragging the rope in the dirt or around objects that will scrape, nick, crush, or induce sharp bends in it.

## 11.11 LUBRICATION

Maintain rope in a well-lubricated condition to reduce internal friction and to prevent corrosion. Ensure that lubricant applied as part of a maintenance program is compatible with the original lubricant. Consult the rope manufacturer when in doubt. Lubricant applied must be of the type that does not hinder visual inspection. Those sections of rope that operate over sheaves or that are otherwise hidden during inspection and maintenance procedures require special attention when the rope is lubricated.

## 11.12 WORN ENDS

When an operating rope shows greater wear at its ends than on the remainder, its life can be extended (in cases where a reduced rope length is adequate) by cutting off the worn end, thus shifting the wear to different areas of the rope.

## 11.13 HOOKS

Discard hooks with cracks or those having more than 15 percent in excess of normal throat opening or more than a 10-degree twist from the plane of the unbent hook.

Repairs by welding or reshaping are not generally recommended. If such repairs are attempted, they must be done only under competent supervision, and the hook must be tested to a rated load test before further use.

## 11.14 MAINTENANCE RECORDS

Dated maintenance records must be kept where readily available to appointed personnel. The most recent copy of dated records that document maintenance of critical

items, such as hoisting machinery, sheaves, hooks, chains, ropes, and other lifting devices, must be retained in a maintenance file. Maintenance records must be retained in the crane history file, or an electronic recordkeeping system may be used.

## 12 CRANE BREAKDOWN

In the event a crane breaks down with a suspended load intact and the operator cannot lower the load safely, the operator must:

- Cordon off the area under the load to prevent personnel from entering.
- Contact the supervisor or other designated person immediately and inform him or her of the situation.
- Assist with or take charge of the situation if a supervisor or other designated person is not available and ensure that the area under the suspended load is suitability cordoned off and posted.

## 13 PERSONAL PROTECTIVE EQUIPMENT

### 13.1 SLIPS, TRIPS, FALLS

All workers involved in material handling and lifting with cranes must be provided protection from slips, trips, and falls.

### 13.2 FALL PREVENTION & FALL ARREST

Workers must be provided with suitable fall protection when working on walking and working surfaces near unprotected sides and edges that are 4ft or more above a level. See Fall Protection Procedure for more information.

When an employee is performing maintenance, repair, or inspection of a crane 4 ft or more above the ground or lower level and a standard rail or platform is not provided, the employee must wear an approved safety harness and lanyard or a fall arrest device and fasten the lanyard or device to a secure anchor. See Fall Protection Procedure for more information.

### 13.3 SAFETY SHOES

All personnel participating in lifts involving cranes or hoists must wear approved safety shoes. See PPE Procedure for further information.

### 13.4 HARD HATS

All personnel must wear approved hard hats when such personnel:

- Participate in a lift or are within 15 ft of the vertical plane of the load.

If the top of the load is lifted to a height greater than 5 ft, the load is considered an overhead hazard and head protection must be worn.

### 13.5 GLOVES

Workers who handle wire rope or loads with rough or sharp edges or splinters must wear sturdy work gloves. See PPE Procedure for further information.

## 14 EMERGENCY SITUATIONS - INJURED PERSON

In case of an accident that results in serious injury (i.e., requires medical attention) call 911.

## 15 RESPONSIBILITIES

### 15.1 MAINTENANCE MANAGER

The Maintenance Department Manager is responsible for reviewing this procedure as necessary and has overall responsibility for ensuring that the requirements of this procedure are followed. The Maintenance Department Manager will:

- Ensure that the appropriate insurance and inspection documentation is available with each crane.
- Ensure crane has load rating charts located inside of the crane.
- Ensure inspections are completed as outlined in this procedure.
- Be responsible for the actions of mill employees or subcontractors.
- Stop work if dissatisfied with a operation of the crane.

### 15.2 SAFETY MANAGER

The Safety Manager will conduct periodic hazard assessments and ensure that all appropriate safe work practices prescribed in this procedure for each type of lift operation, crane maintenance activity, and crane inspection are implemented. The Safety Manager has the authority to suspend or stop crane operations if he or she determines that workers are exposed to potential injury or if equipment may be damaged.

### 15.3 SUPERVISORS

The supervisors of lifting and rigging operations must be knowledgeable in the specific types of lifting and rigging operations and the operational hazards under their supervision. The supervisors must be familiar with applicable rules and procedures implemented at the site to ensure that lifting and rigging work under their control is done efficiently and safely, with safety as the top priority. Supervisors will ensure that employees fully understand the importance of safety and that they recognize their own authority and responsibility to stop work when safety is questionable.

## 16 TRAINING

All personnel who operate, rig, inspect, or perform maintenance on cranes and related equipment covered under this procedure must be provided with training, including a means of evaluation, to ensure that they are competent to perform their tasks safely.

This training must also include applicable site-specific lifting and rigging procedures that address abnormal or emergency operations as well as possible equipment failure.

## 16.1 PHYSICAL REQUIREMENTS

The physical examination of crane operators must meet the requirements of the following consensus standards: American Society of Mechanical Engineers (ASME) B30.2, B30.17, and B30.5 The operator must sign off that he or she meets the below listed physical requirements to operate a crane.

A mobile crane operator who successfully passes a commercial motor vehicle (CMV) driver's physical that complies with federal transportation requirements (see 49 CFR 391 Subpart E *Physical Qualification and Examinations*) satisfies the crane operator physical exam requirements.

Operators must meet the following physical requirements to operate a crane:

- Have vision of at least 20/30 Snellen in one eye and 20/50 in the other, with or without corrective lenses
- Distinguish colors regardless of position, if color differentiation is required tor operation.
- Adequate hearing with or without use of a hearing aid.
- Have physical strength, coordination, and sufficient reaction speed to meet the demands of equipment operation.
- Show no evidence of physical defects or of emotional instability that could create a hazard to the operator or others and interfere with safe performance. Such evidence may be sufficient cause for disqualification. Medical examinations may be required to determine these conditions.
- Have normal depth perception, field of vision, manual dexterity, coordination, and no tendencies to dizziness or similar potentially hazardous characteristics.
- Have no detectable or known disease or physical restriction that would render the operator incapable of safely operating equipment. Where any deficiency of arms or legs exists, the acceptability or an operator trainee must be the decision of the supervisor after consulting with the designated physician.

## 16.2 SUBSTANCE ABUSE TESTING

Upon initial assignment and at least every 3 years thereafter, all personnel involved in crane operations must successfully pass a substance abuse test with a negative result. The test must be confirmed by a recognized laboratory service.

## 16.3 PROFICIENCY REQUIREMENTS

Every 3 years mobile crane operators and boom truck operators must complete training.

**Written Exam –** Operators and operator trainees must satisfactorily pass a written examination covering operational characteristics and controls, along with emergency control skills, such as response to fire, power line contact, loss of stability, and control

malfunction. The exam will also include characteristic and performance questions appropriate to the crane type for which qualification is sought.

**Reading Comprehension & Arithmetic Skills Test –** The operator must demonstrate the ability to read, write, comprehend, and exhibit arithmetic skills and properly interpret load capacity charts in the language of the crane manufacturer's operation and maintenance instruction materials.

Load chart usage test. Operators must satisfactorily complete a combination written and verbal test on load chart usage that covers a selection of the configurations the crane may be equipped to handle for the type of crane for which qualification is being sought.

**Operating Skill Evaluation -** The operator must complete a practical operating skill evaluation test (actual or simulated), demonstrating proficiency and basic knowledge in handling the specific type crane for which the operator is being evaluated, that includes:

- Prestart and post-start inspection
- Maneuvering skills
- Shutdown
- Securing the crane

**Limit of Qualification -** Qualification must be limited to the type of equipment for which the operator is being evaluated.

## 16.4 TRAINING METHODS

Trainers must use training methods best suited for the students and the subject material. This may include, but is not limited to:

- Computer-aided training
- Classroom training
- Simulated field training
- On-the-job training
- Training by equipment manufacturer or commercial training companies

Score standards must be set for each examination by the training organization. The minimum passing score will depend on the subject, testing technique, and test difficulty. Management must determine the course of action for persons receiving negative evaluations.

## 16.5 CRANE OPERATORS

Only qualified and authorized operators, or operator trainees under the direct supervision of a qualified operator, are permitted to operate cranes.

Operators must demonstrate knowledge of equipment operating characteristics, capabilities, limitations, effects of variables, safety features, and operating procedures for the cranes they will operate.

The following checklist contains basic factors with which an operator must be familiar. This checklist must be tailored to suit actual conditions.

- Stability
- Load Charts
- Crane Setup
- Refueling
- Assembly and Disassembly
- Outriggers
- Operator Aids
- Operator Characteristics
- Environmental hazards, including weather
- Electrical hazards
- Traveling with load
- Traveling without load
- Lifting personnel
- Equipment inspections and tests
- Load weight estimation
- Emergency procedures
  - Access and exit routes
  - Warning devices
- Rigging
- Lessons learned
- Hand signals
- Load dynamics
- Applicable standards and regulations
- Critical lifts
- Safety features of equipment
- Terminology and definitions
- Ropes and reeving
- Records and documents
- Limit switches
- Warning signals
- Operating practices
- Fire protection
- Crane components

## 16.6 MAINTENANCE WORKERS

### Operational Requirements and Qualifications

Employees who operate cranes to perform crane maintenance must be trained and qualified to operate the cranes on which maintenance is being performed. Crane operation by maintenance personnel must be limited to those crane functions necessary for performing maintenance on the crane or for verifying the performance of the crane after maintenance has been performed.

### Training Topics

Employees who perform maintenance activities on equipment covered by this standard should have an understanding of the following criteria:

- The tools to accomplish their work safely
- Access to operating instructions to perform adjustments
- Parts information furnished by the manufacturer or the responsible maintenance or engineering organization
- Manufacturers' recommendations as to points and frequency of lubrication and levels and types of lubricant to be used
- Maintenance and repair procedures recommended by the manufacturer or responsible maintenance or engineering organization
- Wiring diagrams

- Documentation requirements for maintenance and repair

## Inspectors

Employees who operate cranes to perform crane inspections must be trained and qualified to operate the crane on which the inspection is being performed. Qualified inspectors must have the necessary knowledge and experience to properly inspect hoisting and rigging equipment. Crane operation by crane inspectors must be limited to those crane functions necessary for performing the inspection on the crane.

Inspector training must include basic inspection techniques and acceptance/rejection criteria as specified in this procedure and other applicable sources.

## Instructors

Instructors who develop or deliver lifting and rigging training programs must meet the qualification standards specified by the responsible training organization.

## Qualifications

Instructors must develop technical competence by satisfactorily completing documented training or technical experience in the hoisting and rigging discipline.

## Continuing Education

Instructors should attend recognized training courses, workshops, or seminars in order to remain current on industry practices and changes in applicable codes and standards.

# 17 DEFINITIONS

- **Crane** means a machine for lifting and lowering a load and moving it horizontally, with the hoisting mechanism an integral part of the machine. Whether fixed or mobile, cranes are driven manually or by power.
- **Designated person or personnel** means selected or assigned by the employer or the employer's representative as qualified to perform specific duties. The term designated personnel in reference to recordkeeping refers to company and regulatory officials.
- **Hoist** means a device integral to a crane used for lifting or lowering a load by means of a drum or lift-wheel around which rope or chain wraps. It may be manually, electrically, or pneumatically driven and may use chain, fiber, or wire rope as its lifting medium.
- **Mobile crane** means a crawler crane, locomotive crane, wheel-mounted cranes of both the truck and self-propelled wheel type, and any variation that retains the same fundamental characteristics. It includes only cranes powered by internal combustion engines or electric motors that utilize drums and ropes.

# 18 PROCEDURE REVIEW & UPDATE

This procedure will be reviewed periodically and updated as needed to reflect changes in the work and/or worksite conditions, and when injury or illness incidents warrant a review.

## Attachment 1 – Yearly Sign Off on Physical Abilities to Operate Crane

Operators must meet the following physical requirements to operate a crane:

- Have vision of at least 20/30 Snellen in one eye and 20/50 in the other, with or without corrective lenses
- Distinguish colors regardless of position, if color differentiation is required tor operation.
- Adequate hearing with or without use of a hearing aid.
- Have physical strength, coordination, and sufficient reaction speed to meet the demands of equipment operation.
- Show no evidence of physical defects or of emotional instability that could create a hazard to the operator or others and interfere with safe performance. Such evidence may be sufficient cause for disqualification. Medical examinations may be required to determine these conditions.
- Have normal depth perception, field of vision, manual dexterity, coordination, and no tendencies to dizziness or similar potentially hazardous characteristics.
- Have no detectable or known disease or physical restriction that would render the operator incapable of safely operating equipment. Where any deficiency of arms or legs exists, the acceptability or an operator trainee must be the decision of the supervisor after consulting with the designated physician.

Employee Signature

_____

Employee Name Printed:

_____

Date: _____

# Attachment 2 – Pre-Work Lift Worksheet

***Pre-Work Lift Worksheet***

Before the lift is performed, the operator must complete this Work sheet

| *Date of Pick* | *Weight of Pick in lbs* | *Radius of pick* | *Crane Capacity* | *Is it a Critical Lift?* |
|---|---|---|---|---|
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Reminder:

☐ Ensure all Crane Operator Tasks are completed before operating the crane

**Attachment 3 – Sample of Inspection Log Book**

Woodland Pulp LLC
144 Main Street
Baileyville, Maine 04667

CRANE INSPECTION LOG

| | |
|---|---|
| Year of Inspection | |
| Crane Model | |
| Crane Serial No. | |
| Type of Chassis | |
| Chassis VIN No. | |
| Equipment Number | |

## Introduction

This Woodland Mill Crane Inspection Log is designed as a convenient and precise method of recording maintenance, inspections, tests, and repairs made to the crane. Use this log to keep an accurate machine history and as a way to keep your crane in a safe operating condition. This log should be considered to be a standard part of the crane and should be transferred to any new owner of the crane. The log should also be available to any state, federal, or local inspectors responsible for enforcing compliance codes that are applicable to your equipment.

This log provides charts for daily, and quarterly inspections, charts for lubrication and maintenance performed on a scheduled or unscheduled basis. This log also provides for the recordkeeping of any accidental damage and repairs made due to the damage.

The front cover provides for the recording of the calendar year, crane model, crane serial number, type of chassis and chassis VIN number. Use these areas to record data for the specific crane and chassis applicable and keep this log with the particular unit.

## Instructions for Manual Use

Mark each area with an "S", "I", or "R"

"S" – (Suitable) Area is suitable for operation

"I" – (Inspect) Area is acceptable for operation but some wear is showing should be inspected carefully before next use

"R" – (Repair) Area is in need of repair and unacceptable for operation, remove from service immediately

**WARNING**

Neglecting to follow the checklists, manuals, and performance appraisals that pertain to this crane and supporting equipment may resort to damage to the crane and/or vehicle or DEATH or SERIOUS INJURY to the operator and/or others nearby.

**WARNING**

Welding or modification of this crane is strictly prohibited unless permission is received in writing from the manufacturer. Any welding done on the crane must be performed by a certified welder.

## Quarterly Crane Inspections

| Quarterly | 1st | 2nd | 3rd | 4th |
|---|---|---|---|---|
| Structural damage | | | | |
| Hydraulic pump | | | | |
| Hydraulic motors | | | | |
| Hydraulic hose wear | | | | |
| Rotation backlash | | | | |
| Crane controls | | | | |
| Crane mounting bolts – torque | | | | |
| Rotate mounting bolts | | | | |
| Cylinders oil leaks | | | | |
| Cylinders nicks/dents | | | | |
| Cylinders rod scoring | | | | |
| Cylinders rust on rod | | | | |
| Cylinders pin boss | | | | |
| Winch cracks | | | | |
| Winch worn sheaves | | | | |
| Winch worn drum | | | | |
| Crane hook | | | | |
| Wire rope | | | | |
| Holding valves load test | | | | |
| SIGNATURE | | | | |
| DATE | | | | |

DAILY INSPECTIONS JANUARY

| Date | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CRANE: Structural I | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Loose Parts | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Manual Controls | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Crane Cable | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Crane Remote Control | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Crane Rotate | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Leaks in valve | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hydraulic system leaks | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hydraulic oil level | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hydraulic Oil filter | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Load Handling Equipment | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CHASSIS: Engine Oil | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Radiator | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Battery | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tires/Wheels | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Suspension | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Brakes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Warning Lights | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Safety Equipment | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lights | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Initials | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Note if the inspection indicates any issues, please note it here and let the General Services Supervisor know to allow for timely repair

Maintenance, Lubrication & Repair January

| Date | Signature | Operation Performed | Scheduled (S) Unscheduled (U) | Hours | Total Hours |
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## ACCIDENTAL DAMAGE AND REPAIR LOG

| Date | Signature | Description of Damage | Description of Repair |
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CRANE MODIFICATIONS OR REVISIONS

| Date | Signature | Description of Modification or Revision | Purpose |
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OPERATING PROCEDURES
SAFE WORK PRACTICES/CRITICAL LIFTS OVER COVERED PROCESSES

## Critical Lift Plan
### Mobile Crane

Location:_____ Date of Lift: _____
Load Description: _____
Lift Description: _____
Diagram of Crane Lift and Load Placement Attached: Yes___ No ___
Diagram of Rigging and Load Attached: Yes ___ No ___

**A. Load**
1. Load Condition New __ Used ___
2. Wt. Empty _____ lbs.
3. Wt. of Contents_____ lbs.
4. Wt. of Aux. Block _____ lbs.
5. Wt. of Main Block _____ lbs.
6. Wt. of Lifting Beam _____ lbs.
7. Wt. of Slings/Shackles _____ lbs.
8. Wt. of Jib or Boom extension (erected/stowed) _____ lbs.
9. Wt. of Hoist Rope (extra) _____ lbs.
10. Wt. of Excess Load Material _____ lbs.
11. Other _____lbs.

| TOTAL | lbs. |
|---|---|

Source of Load Wt. Information (Drwgs, Calcs, etc.)
_____
Load Wt. Confirmed by:_____

**B. Crane**
1. Anti-two-block device on crane? Yes__No__
2. Type of Crane _____
3. Maximum Crane Capacity _____
4. Radius @ Pick-up ___ft./Set Down _____ft
5. Crane Capcty at Radius: Over rear_____lbs
   Over side _____ lbs. / Over front _____lbs.
6. Bm angle at Pick-up ___ft./Set-down____ft.
7. **Max Rated Capacity of Crane at this Radius and Boom Angle for this lift is _____ lbs.**
8. **Max Load on Crane is _____ lbs.**
8. Lift is [ ] %of Crane's Rated Capacity

**C. Jib**
1. Erected _____ Stowed _____
2. If Jib is to be used: Length _____ Angle ___
3. Rated capacity of jib from chart _____

**D. Hoist Rope**
1. Rope Diameter _____ No. of Parts _____
2. Lift Capacity based on Parts _____

**E. Rigging**
1. Hitch Type _____
2. No. of Slings ___ Size ___ Type _____
3. Sling Assembly Rated Capacity _____
4. Shackle Size _____ No. of Shackles _____
5. Shackle Rated Capacity _____ lbs.
6. Shackle Secured to Load by: _____
_____

**F. Crane Placement**
1. Any Deviation from Smooth Solid Foundation?
_____
2. High voltage or Electrical Hazards?
_____
3. Obstacles/Obstructions to Lift or Swing?
_____
4. Travel? _____
_____
5. Swing Direction? _____
_____

**G. Considerations**
1. If lift exceeds 75% of crane's capacity, attach additional special instructions, restrictions, diagrams for crane, rigging, lift, etc.
   Yes__ No ____
2. Multiple crane lifts require a separate plan for each crane.
3. Any changes in the crane configuration, placement, rigging, lifting scheme, or calculations require that a new Critical Lift Plan be developed.

**H. Pre-Lift Checklist – Completed Prior to Lift**

| | |
|---|---|
| 1.__Crane inspected | 10.__ Rigger qualificat. |
| 2.__ Rigging inspected | 11.__Signal System |
| 3.__ Crane set –Up | 12.__Tag Lines |
| 4.__ Swing room | 13.__Wind/Temp |
| 5.__ Hoist heights | 14.__ Safety spotter |
| 6.__ Head room | 15.__ Traffic |
| 7.__ Crane Ctrwt. | 16.__ Tailboard |
| 8.__ Load test | 17.__ Site control |
| 9.__ Operator Qualified | 18.__ Signatures |

**I. Notes/Comments**

**J. Authorizations:**
Lift Supervisor Signature (Required) Date
_____
Management Designee (Required) Date
_____
Department Employee/Operator (Required) Date
_____
Crane Operator/Rigger Signature Date
_____
PSM/RMP Coordinator/Safety Date
_____

| PSM | ISSUE: 01 | DATE: 05/01/00 | PAGE 6 OF 6 |
|---|---|---|---|