



CONCRETE PUMPING

Potential Hazards

1. noise (hearing loss)
2. flying objects/eye injury
3. chemical burn/exposure
4. repetitive strain injuries
5. equipment failure
6. form collapse

Personal Protective Equipment Required

- | | | |
|-----------------|--------------------|-----------------|
| Hard hat | CSA Boots | Eye protection |
| Hand protection | Hearing protection | Skin protection |
| Face protection | | (clothing) |

PRELIMINARY ACTIVITIES

Where multiple trade activity is scheduled, the general contractor is to review in advance the priority of work and schedule the appropriate time frame to allow each trade to complete their scope of work. Prior to any work commencing supervisors must conduct a hazard assessment of all applicable work areas. Any hazards that are found during the hazard assessment must be addressed prior to any work commencing.

DO'S:

1. Isolate the concrete truck and pump zone with fencing or other barriers.
2. If working in the street, comply with local by-laws.
3. Check all individual components for wear and possible damage.
4. Check each vertical bend is fixed to stop movement of the bend.
5. Pumping equipment must be in a mechanically sound condition.
6. People not involved in concrete pumping are excluded from the working zone. Temporary barriers and/or signage may be required.
7. The spotter must stay in view of the concrete truck driver while the truck is moving.
8. When the spotter is out of view the truck driver must stop the vehicle.
9. People in the concrete delivery area must always wear high visibility vests.
10. All trucks must have audible reversing alarms and flashing amber lights.
11. Unless working on the ground, pouring and pumping of concrete into wall forms must be done from platforms that are a minimum of 510 mm (20 in.) wide.
12. All workers are required to wear hard hats when a pumper or crane is operating on site.

DON'Ts:

1. Do not walk in the path of a moving truck.
2. Do not move the concrete delivery chute on a reversing truck
3. Do not position yourself between the concrete hopper and a reversing concrete truck.
4. Do not run within the concrete delivery area.
5. Workers must not walk on top of the formwork.

SAFE WORK PROCEDURE

1. A concrete pump, placing boom and mast must bear a legible identification plate specifying the:
 - Manufacturer's name,
 - Year of manufacture,
 - Model and serial number, and
 - Maximum pressure the concrete pump can generate.
2. A concrete placing boom or mast not affixed to a concrete pump must bear an identification plate specifying the:
 - Manufacturer's name,
 - Model and serial number,
 - Maximum allowable concrete pressure in the delivery pipe, and
 - Maximum allowable pipe diameter and permitted wall thickness.
3. The manufacturer's operation and maintenance manual for a concrete pump, placing boom and mast must be readily accessible to the operator and to maintenance personnel.



4. Records of inspection and maintenance must be made by the equipment operator and other persons inspecting and maintaining a concrete placing boom or mast.
5. Pre-use inspection
 - The operator must inspect a concrete placing boom or mast and test its safety and control devices before use on each shift and record the results of the inspection and tests in accordance with section 20.29.
 - Any defects found in the concrete placing boom or mast must be recorded and reported immediately to the supervisor, who must determine the course of action.
 - If a defect may affect the safe operation of the concrete placing boom or mast, the equipment must not be used until the defect has been remedied.
6. Controls for a concrete placing boom or mast must have their function clearly identified.
7. Hydraulic cylinders on a concrete pump, placing boom and mast must have pressure relief valves to prevent cylinder and boom damage due to excess pressure.
8. Hydraulic holding valves must be used on a placing boom or mast if hydraulic hose or coupling failure could result in uncontrolled movement of mechanisms.
9. A trailer or skid mounted concrete pump must have a permanent, legible notice stating the total weight of the unit.
10. A concrete pump may only be lifted using the lift points specified by the manufacturer or a professional engineer.
11. The trailer or skid on which a concrete pump is mounted must be secured to prevent movement during pumping.
12. A concrete pump must have a clearly labeled emergency stop switch near the hopper, which if activated will stop the pumping action.
13. Agitator guarding
 - Concrete pump agitator guarding must be maintained to the pump manufacturer's specifications, with reasonable allowance for wear.
 - Bent bars in a concrete pump agitator grill guard must be repaired.
 - Concrete pump grill bar spacing may be increased to a maximum bar spacing of 3 ¼ inches (8 cm) when pumping concrete mixes with a slump of 2 inches (5 cm) or less and provided specific instructions are given to the crew regarding the hazard present due to the larger openings in the grill guard.
 - The distance from the grill bars to the concrete pump's agitator must be at least 3 inches (7.5 cm).
 - A concrete pump agitator grill guard must be hinged or bolted in place.
 - A person must not stand on the grill when the concrete pump or agitator is running.
14. A concrete pump's engine exhaust system must be arranged to prevent exhaust exposure to the operator and hopper area.
15. The deck area of a concrete pump must be kept clean and free of unnecessary objects.
16. Outriggers
 - Outriggers must be used in accordance with the concrete placing boom or mast manufacturer's specifications.
 - Outriggers must be used Extendible outriggers for a concrete placing boom or mast must be marked to indicate maximum extension.
 - A concrete placing boom or mast manufactured after January 1, 1999 must have its outriggers or jacks permanently marked to indicate the maximum load they will transmit to the ground.
17. Load on a placing boom
 - The load on a concrete placing boom or mast must not exceed the specification of the manufacturer or a professional engineer.
 - The length and diameter of hose suspended from a concrete placing boom or mast must not exceed the specification of the manufacturer or a professional engineer.
 - A concrete placing boom or mast must not be used to drag hoses or other loads.
18. Pipe diameter and thickness
 - The diameter and weight of pipe mounted on a concrete placing boom or mast must not exceed the boom manufacturer's specification or the specifications of a professional engineer.



- The pipe wall thickness must be sufficient to withstand a pressure greater than the maximum pressure that the concrete pump can produce in the concrete being pumped.
 - The method used to measure pipe wall thickness on a concrete pump, placing boom or mast must be in accordance with the manufacturer's instructions, and pipe sections must be replaced when thickness measurements indicate that wall thickness has been reduced to the limits specified by the manufacturer.
19. Pipe clamps
- Concrete must not be pumped through pipe with grooved ends, such as those for Victaulic-type couplers.
 - Pipe clamps used with pipe carrying concrete must have a pressure rating at least equal to the pipe pressure rating.
 - To ensure proper connection of concrete delivery pipes, pipe and pipe clamp contact surfaces must be free of concrete and other foreign matter when a connection is being made.
 - Quick connect clamps used on a concrete delivery pipe must be pinned or secured after installation to keep them from inadvertently opening.
20. Delivery pipe between the concrete pump and the placing system must be supported and anchored to prevent movement and excessive loading on pipe clamps.
21. Restraining devices providing a safety factor of at least 5 must be used on attachments suspended from the placing boom or mast tip.
22. Concrete pump lines
- Concrete pump discharge line couplings, if located where inadvertent disconnection could cause injury to workers, must be guarded.
 - The guards on a discharge line coupling must be positioned to effectively deflect in a safe direction any jet of concrete, which might result from disconnection of the coupling.
23. A concrete placing boom and mast must be inspected in accordance with good engineering practice at intervals not exceeding 12 months, repaired as necessary, and certified safe for use by a professional engineer, the manufacturer or the manufacturer's authorized agent.
24. Replacement parts used for repair of a concrete placing boom or mast must meet or exceed the original manufacturer's specifications or be certified by a professional engineer.
25. The weight of each removable section of a concrete placing boom or mast must be permanently and legibly marked on the section.
26. A concrete placing boom or mast must not be used to hoist loads.
27. Compressed air cleaning
- A concrete delivery pipe system other than an individual section of pipe may be cleaned out using compressed air, but the system must be securely anchored before such cleaning is done.
 - Any flexible discharge hose must be removed before cleaning out concrete delivery pipes using compressed air.
 - Only workers essential to the clean out process may be in the vicinity of concrete delivery pipes when they are pressurized with air.
 - An air system being used to clean out concrete delivery pipes must have a shutoff valve.
 - A trap basket must be attached to the discharge end of the concrete delivery pipe to receive the clean out ball or go-devil.
 - A blowout cap must have a bleed valve to relieve air pressure in a delivery pipe being cleaned using compressed air.
 - Delivery pipes must be depressurized before clamps and fittings are released.
28. The operator of a concrete placing boom or mast must have full control of the pump and placing equipment controls whenever the equipment is operating and engage in no other duties while operating the concrete pump and placing boom or mast. Furthermore the operator must ensure the following occurs:
- The concrete pump operator must ensure that all WorkSafeBC requirements are being met.
 - The crane operator has been notified prior to raising the concrete truck boom.
 - Proper personal protective equipment must be worn at all times.



29. A concrete placing boom or mast must not come within the minimum distances specified in Part 19 (Electrical Safety) to energized high voltage conductors or exposed energized electrical equipment except as provided for, in that Part.
30. If a concrete placing boom operator cannot see and monitor the hopper on the concrete pump from every location the operator must be at during the pumping activity, there must be a device at the hopper for the concrete delivery truck driver and other workers to signal the pump operator if there is a problem at the pump or hopper.