

Concrete Handling Standard Operating Procedure		X	High
			Medium
			Low
			NA
Approval Date: September 2025		Original Date: September 2025	

1. OBJECTIVE

Establish mandatory minimum requirements to be met for the safe operation of concrete supply and placement systems.

2. SCOPE

It applies to Contractors at all FCX operations and facilities for concrete supply and placement work using telescopic pumps, stationary pumps, and/or manual methods.

3. LEGAL REFERENCES AND OTHER STANDARDS

- [FCX Health & Safety Policies](#)
- [FCX Contractor Health, Safety, and Environmental Manual](#)

4. DEFINITIONS

- **Placing boom:** Mechanically operated work device composed of one or more extendable, rotating, or foldable elements, used to carry transport pipes.
- **MIXER truck:** Vehicle with a mixing device for transporting.
- **Concrete pump:** Any device intended to pump concrete through pipes or hoses to the application areas.
- **Telescopic concrete pump:** A unit consisting of a transport truck, a concrete pump, and a placing boom.
- **Stationary concrete pumps:** Set consisting of a concrete pump, a placing boom and supporting infrastructure.
- **End hose:** The end hose refers to the hose mounted at the end of the delivery pipe on the placing boom, used to distribute the concrete. It is not allowed to attach couplings, flow nozzles, outlet brakes, or other objects not authorized by the manufacturer to the discharge end of the end hose.
- **End hose danger zone:** The diameter of the danger zone is twice the length of the end hose.
- **Guide or guy rope:** Rope intended to control the swinging movements of the end discharge hose or to guide it to prevent unwanted contact.
- **Machine operator:** A qualified person responsible for the operation of concrete pumps and placing booms.

- **End hose operator:** Personnel trained and accredited in the operation of the end hose. The operators of the end hose shall be able to assess and react appropriately to hazardous situations that can be generated by the hose.
- **Leader/Responsible for placement of materials:** Leads the placement crew.
- **Workstation:** The workstation is the place where personnel perform their work.
- **Machine operator's workstation:** During pumping operations, the machine operator's designated workstation is at the remote-control unit. The workstation shall be selected in such a way that there is visual contact with the placement area and the mixer truck driver, while also allowing control over the working area. Otherwise, the services of an assistant will be required.
- **End hose operator's workstation:** The end hose operator's workstation is located within the hazard zone of the end hose, but not underneath the placing boom. Extreme precautions shall be taken. The end hose operator and the machine operator shall have visual contact.
- **Placement crew's workstation:** The placement crew's workstation is located outside the hazard zone. If it is necessary to enter the hazard zone, authorization shall be obtained from the machine operator or the end hose operator.
- **Material supply and placement supervisor:** Supplies the material and operates the material placement system.
- **Material placement system user:** Requests the presence of the material placement system at the job site and oversees its arrangement.
- **Placement crew:** Personnel responsible for placing and finishing the material supplied by the material placement system.
- **Working area:** Area where machine operations are performed. Some parts may become danger zones depending on the activity and position of the placing boom. It should be clearly marked and secured. The use of PPE is mandatory. The machine operator is responsible for safety in this area.
- **Unauthorized working area:** Area outside the safe operating range of the placing boom. Improper use may cause overloading or damage. Booms shall operate exclusively within the authorized area.
- **Danger zone:** Space around the machine where its movements may pose a risk to personnel. The size varies according to the activity and position of the boom. It must be clearly delimited and supervised at all times by the machine operator or a designated assistant.
- Note: Review Appendix 1 - Workstation, Working Area and Danger Zone.

5. RESPONSIBILITIES

Area Manager

- Provide the necessary resources.
- Ensure compliance with this standard.

FCX Project Manager

- Oversee compliance with this standard and its supplementary annexes.

Company responsible for material supply and placement:

Contract Manager responsible for material supply and placement

- Ensure that the concrete supply and placement equipment is periodically maintained in accordance with the manufacturer's recommendations
- Ensure that all concrete supply and placement equipment is inspected by a competent person according to the manufacturer's recommendations, or at least once a year.
- Ensure that a qualified person is designated as the material supply and placement supervisor
- Provide operating manuals, safety manuals, hazard and risk warnings, and safety instructions.
- Periodically communicate safety instructions in accordance with the manufacturer's manual.
- Provide operating instructions, maintenance information, and install warning signs in locations prescribed by the concrete placement system manufacturer.
- Supply concrete according to the mix design and requirements.
- Ensure that any supply system left in the workplace for continuous use is in a suitable condition for the requirements of the job.

Material Supply and Placement Supervisor

- Comply with the responsibilities assigned.
- Comply with and supervise compliance with this standard and its supplementary annexes.
- Authorize only qualified and accredited workers to use the equipment.
- Responsible for the selection of the supply equipment and necessary components specified by the manufacturer that conform to the configuration and capacity requested by the user.
- Ensure that equipment is used in accordance with the manufacturer's recommendations.
- Responsible for verifying that the ground is suitable for equipment positioning.
- Provide the necessary documentation so that the site for the stationary machines can be prepared.
- Know and be familiar with the specific information of the material supply and placement equipment, which is included in the Written Safe Work Procedures (WSWP) / Standard Operating Procedures (SOP), such as the operation manual, safety manual, hazards and risks, safety instructions.
- Provide service and safety instructions, or, if applicable, the safety manual; ensure they have been read, understood, and are properly applied in the WSWPs/SOPs.
- Ensure that the equipment is capable of maintaining the volume of concrete in the hopper at levels that do not allow air to enter the pumping system; the procedures should include details of how this will be achieved in accordance with the manufacturer's manual (sensors, switches, etc.).

Machine Operator (Pump Operator)

- Comply with this standard and report to their supervisor any damage or anomaly that may affect the operation and safety of the equipment.
- Familiarize themselves with the service instructions and, in particular, with the safety chapter of the operation manual before using the equipment.
- Understand the functions, limitations and operational characteristics of the concrete placement system.
- Ensure that the danger zone of the end hose is clear before starting or resuming pumping, when removing a blockage, during cleaning tasks, or if air has entered the system.
- Immediately stop work and activate the EMERGENCY STOP button if unauthorized people enter the hazard zone.
- Authorize the end hose operator and placement crew when it is safe to re-enter the danger zone.
- Disconnect the remote-control unit every time the machine is left unattended, especially when changing the workplace.

Machine Assistant

- Familiarize themselves with the service and safety instructions of the operation manual to identify and avoid hazards when working with or near the concrete placement system.
- Do not allow the MIXER truck driver to discharge into the pump hopper without authorization from the pump operator.
- Constantly check that the concrete level in the hopper does not drop to prevent air from entering the system.
- Know the correct procedures in case of air or foreign objects entering the hopper.
- Inform the operator if the hopper levels have been below the minimum allowed by the manufacturer's manual.
- Activate the emergency stop if it is not possible to communicate with the operator and air or foreign material has been detected in the hopper.
- Continuously monitor the pressure gauges and alert the operator if the system pressure exceeds the maximum allowed pressure.

Civil Works Company responsible for material reception

Contract Administrator of the Civil Works Company responsible for the material reception

- Ensure that a qualified person is appointed as Civil Works Supervisor responsible for the material reception.
- Ensure access to and knowledge of the specific information for the material supply and placement equipment they interact with (operation manual, safety manual, hazards and risks, safety instructions).
- Order a mix compatible with the material placement system.
- Submit the materials supply request

Civil Works Supervisor responsible for material receipt

- Comply with the responsibilities assigned.
- Comply with and supervise compliance with this standard and its supplementary annexes.
- Include in the WSWPs/SOPs the technical information of the equipment (operation manual, safety manual, hazards and risks, safety instructions).
- Identify fatal risks associated with the activities and implement independent and redundant critical controls in addition to those established by the person responsible for concrete supply and placement.
- Train the placement crew personnel to recognize and avoid hazards when working with or near a concrete placement system.
- Ensure that the concrete volume in the hopper is maintained at levels that prevent air from entering the pumping system, including in the WSWPs/SOPs the controls that will be implemented independently from the concrete supplier
- Ensure that trained personnel is designated as end hose operators and placement crews.
- Verify that the concrete supplied is in accordance with the technical specifications.

End Hose Operator

- Guide the end hose during operation.
- Familiarize themselves with the service and safety instructions of the operation manual to prevent hazards when working with or near the concrete placement system.
- Ensure that the danger zone is clear at each start or pumping resumption, when removing a blockage, during cleaning, or if air has entered the system.
- Maintain visual contact and/or constant communication with the driver.
- Coordinate with the machine operator for the safe entry of the placement crew into the danger zone.

Placement Crew

- Familiarize themselves with the service and safety instructions of the operation manual to identify and avoid hazards when working with or near the concrete placement system.
- Remain outside the reach (danger zone) of the end discharge hose until the operator and the end hose handler indicate that it is safe to enter.
Strictly comply with the tasks assigned by the Civil Works Supervisor responsible for the reception of material.
- Know the risks and be familiar with the controls in place to be able to enter the danger zone.

6. STANDARD SPECIFICATIONS

6.1 General considerations

- The machine shall be used exclusively in accordance with the prescribed use detailed in the manufacturer's manual, which shall be available at the workplace. The equipment installation, operation and maintenance must be carried out in accordance with the manufacturer's technical specifications.
- Each machine shall have an emergency stop system. The actuators of this system should be visible, accessible and easy to operate.
- All protection and safety devices indicated in the manufacturer's manual shall be properly installed and operational.
- The safety recommendations and/or controls indicated in the manual shall be reviewed and implemented within the WSWPs/SOPs.
- To prevent air suction into the system, the mixer hopper should always be kept full of concrete, completely covering the agitator, ensuring that the concrete is above the mixing blades
- The placement of materials shall be carried out in compliance with the pressure values established in the operation manual, and there shall be an alarm system when the pressures exceed the maximum values established in the manual. The WSWPs/SOPs must detail the maximum allowable working pressure, according to the equipment make and model.
- When the alarm system is activated by an increase in pressure, the machine operator (pump operator) must stop pumping and consider the end hose working area as the danger zone. Controls should be implemented to avoid exposure of personnel, the end hose danger zone should be clear. This condition will be maintained until the continuous flow of concrete discharge is re-established within the established pressure parameters.
- When the end hose operator identifies an interruption in the continuous flow of concrete (air escaping through the system), the machine operator (pump operator) should be notified to stop pumping and consider the end hose work area as a danger zone.
- Controls should be implemented to avoid exposure of personnel, the end hose danger zone should be clear. This condition will be maintained until the continuous flow of concrete discharge is re-established within the established pressure parameters.
- All piping components must be properly marked with the maximum allowable pressure.
- It is not permitted to extend the placing boom or end hose beyond the length indicated in the operation manual.
- If clogging occurs in the system during the concrete placement activity, stop the activity, clear the area of influence of the system, and implement the actions indicated in the operation manual
- Only pipes, hoses, couplings and fittings approved by the manufacturer, in optimum technical condition and suitable for pumping and transporting according to the type of concrete specified, should be used.

- Safety loops must be implemented at the connections of pneumatic and/or hydraulic systems according to risk assessment; this includes the end discharge hose.
- The person in charge of supplying and placing the material shall inform about unauthorized areas and danger zones, which shall be detailed in the concrete placement plan.
- Cleaning of the supply and placement system and removal of excess material from the system (pipe and hopper) must be carried out in accordance with the specifications and controls established in the manufacturer's manual.
- When combining two placement systems (stationary and telescopic), a specific risk assessment and WSWPs/SOPs must be conducted, along with a new placement plan considering the provisions of this standard and the manufacturer's recommendations.
- Compliance with Chemical Handling / Material Request Approval Process, including having the Safety Data Sheets (SDSs) for all chemicals, containment trays, and specific Personal Protective Equipment (PPE).
- For work in proximity to energized power lines, compliance with SSOst0048 Estándar de trabajos próximos y traslados por debajo de líneas eléctricas energizadas (Standard for Work in Proximity to and Relocation under Energized Power Lines) is required.
- For night work, adequate lighting should be provided in the working area, especially ensuring that the placement area and the hopper area are illuminated.
- Prior to the supply and/or transport of concrete, an assessment of the access roads must be carried out to guarantee the safe transit of the equipment.
- When positioning the pump by extending the outriggers, and if this only requires manual leveling of the ground and superficial cleaning, it is not necessary to complete the Blue Stake Investigation Form / Blue Stake Permit.

6.1.1 Moving parts / Hot surfaces

- Machines and equipment with exposed moving parts that pose a risk of falling or entrapment of people should have protective guards. These devices must prevent human contact with moving parts such as pulleys, rollers, gears, flywheels, shafts, and others, all of which must be identified, inventoried, and clearly marked.
- All hot surfaces that pose a risk of contact with people must be clearly identified and properly protected.

6.1.2 Inspection and maintenance

- The equipment must be in good operating condition and must be inspected before each use by the operator and/or machine operator (check list)
- If during the inspection (check list) the absence or failure of one of the critical elements is identified, the operation of the equipment must be stopped and the supply and placement supervisor must be informed in order to take the necessary actions to guarantee the safe operation of the equipment.
- There must be a preventive maintenance plan and program for the supply and placement equipment, in accordance with the manufacturer's recommendations. Records should be available at the workplace.

- Maintenance of the equipment must include measuring the wear of the distribution and delivery pipes, in accordance with the manufacturer's recommendations.
- Supply and placement equipment shall be inspected by a competent person in accordance with the manufacturer's recommendations, or at least once a year. An inspection certificate shall be issued. ASME B30.27
- All structural repairs shall be performed according to the manufacturer's specifications.

6.1.3 Telescopic concrete pump

- The end hose shall not interfere with the movements of the placing boom. Before any movement, potential interferences shall be identified and controls must be established to ensure safe operation.
- The risk zone associated with the end hose shall be considered as twice its length, and may be greater as indicated by the manufacturer.
- The operation of the telescopic placing boom shall be carried out under favorable environmental conditions as stated in the operation manual.
- The equipment shall be positioned with all stabilizers fully rotated, extended, and leveled, in accordance with the manufacturer's procedures.
- The use of short stabilizers is only permitted if there are documented procedures from the manufacturer.
- The boom shall be fully extended or configured according to the technical specifications in the operation manual to prevent constrictions that could cause material or air accumulation.

6.1.4 Stationary concrete pumps

- All stationary pumps shall be located in a safe area according to risk assessment.
- To tow, load, or transport the machine, the instructions in the operation manual shall be followed, using only the approved towing devices and adhering to the vehicle manufacturer's guidelines.
- The foundations and structural elements on which the discharge line is mounted shall be designed to withstand the loads and moments transmitted, as specified by the manufacturer.
- All elements and accessories that make up the discharge line shall be approved by the manufacturer.
- The use of makeshift elements and accessories is not permitted.
- The securing systems for the discharge line to fixed structures shall be designed to withstand the transmitted loads and moments.
- Installation and removal of piping shall be carried out when the system is depressurized.
- Working platforms on stationary booms shall only be used for assembly and maintenance tasks. It is forbidden to use them as workstations during operation. It is forbidden to access the machine or climb ladders while it is in operation.

6.1.5 MIXER Truck

- Every mixer truck shall be equipped with emergency stop and/or rotation devices in accordance with the manufacturer's manual.
- The discharge duct or chute shall have a blocking system to prevent uncontrolled movements.
- It is not permitted to manipulate, adjust or deploy the discharge chute or chute while the vehicle is in motion.
- Movement of the mixer truck with the chutes extended is prohibited.

- During the positioning of the mixer truck, there shall be no exposed people in the line of fire between the mixer truck and the pump. Trained personnel should be available to assist in positioning the mixer truck.
- Once the mixer truck is properly positioned, the positioning systems shall be applied according to the operation manual.
- Concrete shall not be discharged into the pump hopper until authorized by the machine operator.
- It is not allowed to wash the mixer truck in the hopper of the pumping system.

6.1.6 Concrete mixer

- This equipment should have physical guards/protections installed around moving parts and potentially hazardous energy sources (hot surfaces).
- For transportation using a towing system, comply with all applicable policies and manufacturer guidelines.
- It should be properly stabilized and placed on leveled, firm surfaces.
- Fueling shall be done when the equipment is turned off.

6.2 Planning

- Before any concrete placement task, Form No. 1 - Concrete Placement Plan shall be completed. All concrete placement work areas shall be marked as temporary restricted zones, following the Restriction / Flagging & Barricading standards, including the danger zones. Access to the restricted area shall be specified in the concrete placement plan.
- The work team shall define the communication method (radio, verbal, hand signals, etc.). If hand signals are used, they shall be aligned according to the manufacturer's manual.
- When massive concrete pours exceed regular work shifts, replacement crews must be assigned to ensure all pouring stages are completed. At their shift beginning, each crew must conduct a risk analysis to verify that all controls are established and/or implemented.

6.2.1 Surroundings Assessment

The supply and placement supervisor shall:

- Verify the bearing capacity of the soil. Ensure that the pressure generated by the stabilizers does not exceed the capacity of the ground.
- Evaluate the slope of the ground to ensure that the equipment is leveled in all directions. The maximum allowable slope shall be 3°, unless otherwise specified by the manufacturer.

6.2.2 Quality Control

A person responsible for concrete quality control shall be designated to ensure compliance with technical specifications.

6.2.3 Placement of materials

- When the MIXER truck is changed, pumping shall be stopped until a continuous flow is ensured to guarantee the concrete levels in the hopper

- Concrete placement shall only be done when the machine assistant is checking the level in the hopper.
- The Civil Works Supervisor responsible for receiving material shall verify that conditions are safe, personnel know and understand the hazards and risks before authorizing entry into the restricted area.
- The end hose operator and the placement crew may only enter when the placement is carried out continuously and under normal conditions.
- The end hose may only be manipulated or guided with the authorization of the driver.
- Guide ropes may be used, provided hands are placed correctly. Wrapping the rope around hands is prohibited.
- Push/pull tools are permitted if they are positioned to prevent injury, ensuring that if they slip, break, or are struck by the hose, they do not present a hazard to personnel.
- It is forbidden to bend the final discharge hose.
- The machine operator shall alert the hose operator to clear the danger zone when a "whiplash" risk condition occurs.
- If any faults or conditions affecting safety are detected during operation, the equipment shall be stopped immediately and reported to the appropriate supervisor.

7. TRAINING

Concrete mixer

Trained to ensure understanding of operating techniques according to the manufacturer's recommendations (manual and/or operating instructions)

End hose operator

Trained to ensure operating techniques understanding according to the manufacturer's recommendations (manual and/or operating instructions)

Stationary Pump, Telescopic Pump and Mixer Truck operators

Adhere to applicable accreditation procedure.

8. EXCEPTIONS

N/A

9. RECORDS, CONTROLS AND DOCUMENTS

Name of the Record	Person in Charge of Control	Minimum Preservation Time

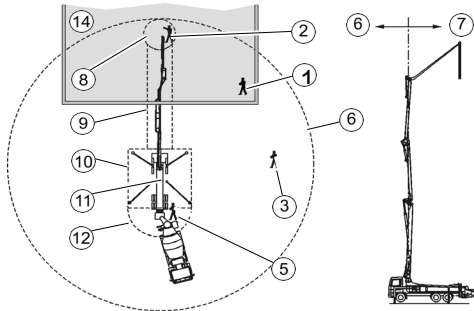
10. ANNEXES AND FORMS

10.1 Annexes

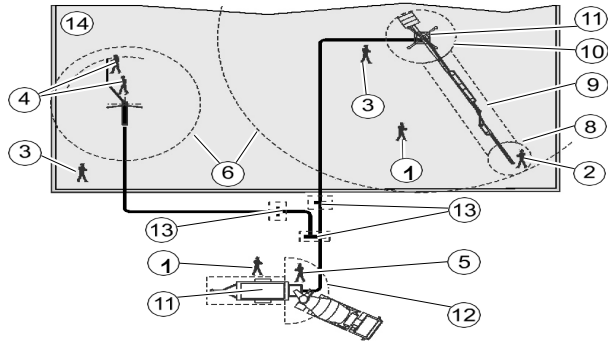
- Annex 1 - Workstation, Working Area and Danger Zone

ANNEX 1 - Workstation, Working Area and Danger Zone

In Telescopic Pumps



In Stationary Pumps



Position	Denomination	Explanation
Workstation During Pumping		
1	Machine Operator	Under normal conditions, in the remote-control unit
2	End Hose Operator	At the end hose in the danger zone
3	Assistant	In the machine operator's field of vision
4	Auxiliary Personnel	As operators of manual distribution systems
5	Mixer truck driver	In the hopper in the danger zone
Working Area		
6	Effective	Area with a radius equal to the longitudinal reach of the placing boom + length of end hose
7	Not authorized	The placing boom must not be tilted in such a way that the end hose extends beyond the vertical line of the boom.
Danger Zone		
8	In the end hose	Danger of injury when starting pumping, during pumping, after removing a plug and during cleaning. The diameter of the danger zone is twice the length of the end hose.
9	Under the placing boom	Danger of injury due to falling material
10	Supporting legs and feet and infrastructure area	Crushing hazard when deploying and retracting the machine
11	On the machine	During pumping, it is forbidden to remain on and under the machine
12	In the hopper	Risk of injury from the mixer truck when cleaning and filling the hopper
13	Area of the transport piping systems	Hazard of pipeline burst, crushing, and cutting, especially with shut-off gates
14	Concrete placement surface	

10.2 Forms and Supplemental Materials

- [FCX Concrete Placement Plan](#)
- [FCX Concrete Pumping Field Guide](#)
- [FCX Do's and Don'ts of Concrete Pumping](#)

11. REVISION (CHANGE CONTROL)

Version	Description of Changes	Date
-	-	-