RISK ASSESSMENT

Concrete Pouring and Formwork

Scope: Concrete Pump Truck Operations and Formwork Striking

Document Reference: HSE-RA-XXX-001
Revision: Rev. 01
Date: 03 July 2026
Target Jurisdiction: Armenia / United States
Classification: CONTROLLED DOCUMENT — HSE / Quality Department

International Edition

1. Document Information

Field	Detail
Document Title	Risk Assessment — Concrete Pouring and Formwork
Document Reference	HSE-RA-XXX-001
Revision	Rev. 01
Date of Issue	03 July 2026
Scope	Concrete pump truck operations (mobilisation, boom/line pumping, hose and pipeline handling) and formwork erection/striking operations
Applicable Standards	ISO 45001:2018, ISO 31000:2018, plus jurisdiction-specific OSH regulations
Target Country / Region	Republic of Armenia; United States of America
Classification	CONTROLLED DOCUMENT — HSE / Quality Department
Prepared By	HSE Department
Review Cycle	Annually, or upon change of scope, method statement, plant, or regulatory requirement
Next Review Date	03 July 2027

2. Applicable Standards

Standard	Scope & Application
ISO 45001:2018 — Occupational Health and Safety Management Systems	Provides the framework for hazard identification, risk assessment, and determination of controls applied throughout this document (Clause 6.1.2 and Clause 8.1).
ISO 31000:2018 — Risk Management Guidelines	Provides the risk assessment methodology (identification, analysis, evaluation, and treatment) underpinning the 5×5 Likelihood × Severity matrix used in the Risk Register.
OSHA 29 CFR 1926 — Safety and Health Regulations for Construction (USA)	Federal construction safety standard applicable to all US-based project sites; Subparts C, K, L, M, Q, and CC are directly relevant to concrete pumping, formwork, fall protection, and electrical hazards.
Republic of Armenia Labor Code (as amended) — Occupational Safety and Health Provisions	Establishes employer obligations for hazard prevention, risk assessment, provision of PPE, and accident reporting to the Health and Labor Inspection Body (HLIB) for Armenia-based operations.
ACI 304.2R — Placing Concrete by Pumping Methods	Industry guidance for the safe operation, setup, and maintenance of concrete pumping equipment, referenced for pump-specific control measures.
ANSI/ASME B30.5 — Mobile and Locomotive Cranes	Referenced by analogy for boom-pump structural inspection, load-chart compliance, and annual certification requirements.
ACI 347 / ACI 318 — Guide to Formwork for Concrete / Building Code Requirements for Structural Concrete	Governs formwork design loads, bracing requirements, and minimum concrete strength for safe striking (stripping) of formwork.

3. Risk Rating Matrix (5×5 Likelihood × Severity, per ISO 31000:2018)

Score	Risk Level	Colour	Required Action	Approval Authority
1 – 4	**LOW**		Acceptable with existing controls. Maintain routine monitoring and supervision.	Site Supervisor
5 – 9	**MEDIUM**		Tolerable; implement additional controls where reasonably practicable within a defined timeframe.	Site Engineer / HSE Officer
10 – 16	**HIGH**		Activity must not proceed until additional controls are implemented and verified. Close supervision required.	Project HSE Manager
17 – 25	**CRITICAL**		Activity must stop immediately. Work is prohibited until the risk is reduced through elimination, substitution, or engineering controls, with senior management authorisation.	Project Director / HSE Manager

Risk Rating (R) = Likelihood (L) × Severity (S), each rated 1–5. LOW = 1–4, MEDIUM = 5–9, HIGH = 10–16, CRITICAL = 17–25.

4. Authorisation

This Risk Assessment has been reviewed and authorised for implementation by the signatories below prior to commencement of concrete pouring and formwork activities.

Role	Name	Signature	Date
Prepared By (HSE Officer)			
Reviewed By (Site Engineer)			
Reviewed By (Project HSE Manager)			
Approved By (Project Director)			

5. Risk Register — Concrete Pouring and Formwork (Pump Truck Operations & Formwork Striking)

No.	Work Area	Activity / Task	Hazard Description	Persons at Risk	Hazard Type	L / S / R (Initial)	Risk Level	Control Measures (Hierarchy of Controls)	L / S / R (Residual)	Risk Level	Monitoring / Frequency
1. Pump Truck Mobilisation, Positioning & Outrigger Setup											
1	Pump Truck Mobilisation, Positioning & Outrigger Setup	Positioning concrete pump truck and extending outrigger legs on site	Ground collapse or truck overturn caused by unstable, uncompacted ground or unmarked underground voids beneath outrigger pads, resulting in vehicle rollover and crush injuries to nearby personnel	Pump Operator, Banksman, Site Labourers	Mechanical / Structural	L4 × S5 = 20	**20** CRITICAL	1) Eliminate: conduct ground-bearing capacity survey and underground utility scan before any outrigger deployment. 2) Engineering: use manufacturer-rated outrigger mats/pads sized for maximum ground-bearing pressure per ACI 304.2R. 3) Administrative: implement permit-to-work with ground assessment sign-off and establish a barricaded exclusion zone of minimum 3 m radius around each outrigger. 4) PPE: hi-visibility clothing (EN ISO 20471 Class 2) for all personnel in the setup zone.	L1 × S4 = 4	**4** LOW	Daily pre-setup ground condition inspection and permit review
2	Pump Truck Mobilisation, Positioning & Outrigger Setup	Extending and retracting hydraulic outrigger legs during setup and pack-down	Crush or amputation injury to hands and feet at pinch points on the outrigger extension mechanism during deployment or retraction	Pump Operator, Ground Crew	Mechanical	L3 × S3 = 9	**9** MEDIUM	1) Engineering: retain factory pinch-point guarding on all outrigger mechanisms; do not defeat interlocks. 2) Administrative: mark a hands/feet clearance zone and restrict access to the trained pump operator only during extension/retraction. 3) PPE: cut-resistant gloves (EN388 level 3) and safety boots with toe protection (EN ISO 20345).	L1 × S3 = 3	**3** LOW	Pre-shift equipmer inspection and function test of outrigger controls
3	Pump Truck Mobilisation, Positioning & Outrigger Setup	Manoeuvring and extending pump boom near overhead power lines during positioning	Electrocution of personnel from the boom, hopper, or delivery hose contacting or arcing to live overhead power lines	Pump Operator, Banksman, Site Labourers	Electrical	L3 × S5 = 15	**15** HIGH	1) Eliminate/Substitute: complete a site electrical hazard survey to map overhead line routes before mobilisation; reroute pump position where possible. 2) Engineering: maintain minimum approach distance of 20 ft (6 m) for lines up to 350 kV per regulatory requirement, or arrange line de-energisation/insulated barriers. 3) Administrative: dedicated spotter/banksman with radio contact and signed electrical permit-to-work for any placement within proximity zones. 4) PPE: non-conductive footwear as secondary control.	L1 × S5 = 5	**5** MEDIUM	Pre-task electrical hazard survey and spotter briefing
2. Concrete Line / Boom Pumping Operations											
4	Concrete Line / Boom Pumping Operations	Operating the placing boom to direct concrete discharge into formwork	Boom collapse or uncontrolled whip caused by hydraulic system failure or operation beyond the manufacturer's rated reach/load chart, striking workers below	Pump Operator, Concrete Placing Crew, Formwork Carpenters	Mechanical	L2 × S5 = 10	**10** HIGH	1) Engineering: daily inspection of hydraulic hoses, cylinders and pressure-relief valves before operation. 2) Administrative: operate strictly within the manufacturer's load/reach chart; establish an exclusion zone beneath the working boom arc. 3) PPE: hard hats	L1 × S5 = 5	**5** MEDIUM	Daily pre-use inspection plus independent annu boom certification

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								(ANSI Z89.1 / EN397) for all personnel within the placement area.			
5	Concrete Line / Boom Pumping Operations	Pressurised delivery of concrete through the boom/line pipeline	Pipeline blockage causing sudden pressure release ('blow-back') that ejects concrete and pipe fittings at high velocity, striking nearby workers	Pump Operator, Hose-End Nozzle Operator, Labourers	Mechanical / Pressure	L3 × S4 = 12	**12** HIGH	1) Engineering: fit pressure-rated clamps and relief valves matched to system working pressure; use rubber-cushioned couplings. 2) Administrative: written blockage-clearing procedure requiring full depressurisation before disconnecting joints; no personnel positioned in line with couplings during clearing. 3) PPE: full face shield and impact-padded gloves during blockage clearance.	L1 × S4 = 4	**4** LOW	Pre-pour pipeline pressure test and joint/coupling inspection
6	Concrete Line / Boom Pumping Operations	Priming the pump and cleaning the hopper/pipeline under pressure	Chemical burn to eyes or skin from splash contact with wet cement (highly alkaline, pH 12–13)	Pump Operator, Hose Handler	Chemical	L3 × S3 = 9	**9** MEDIUM	1) Substitution: use pre-blended, reduced-dust priming grout where feasible. 2) Engineering: fit splash guards on the hopper grate. 3) Administrative: written SOP and mandatory eyewash station within 10 m of the pump. 4) PPE: ANSI Z87.1 / EN166 safety goggles, face shield, and chemical-resistant gloves.	L1 × S3 = 3	**3** LOW	Daily toolbox talk and PPE compliance verification
3. Pump Hose, Pipeline & Reducer Handling											
7	Pump Hose, Pipeline & Reducer Handling	Manual handling and repositioning of the end/flexible delivery hose during pouring	Musculoskeletal strain or back injury from manually lifting and directing heavy, concrete-filled hose sections	Hose Handlers, Labourers	Ergonomic	L4 × S2 = 8	**8** MEDIUM	1) Eliminate: install mechanical hose supports/spring hangers to bear hose weight. 2) Administrative: manual handling training including two-person lift technique, job rotation every 60 minutes, and use of lightweight hose sections where available. 3) PPE: lumbar support belt made available on request.	L2 × S2 = 4	**4** LOW	Manual handling ri assessment review
8	Pump Hose, Pipeline & Reducer Handling	Coupling and uncoupling pipeline sections and reducers	Hand or finger crush injury from pipe-coupling clamps slipping or failing during connection/disconnection	Pump Crew	Mechanical	L3 × S3 = 9	**9** MEDIUM	1) Engineering: use only manufacturer-approved snap-on/screw clamps rated for system pressure. 2) Administrative: inspect all clamps and gaskets before each use; remove and replace any worn or deformed clamps immediately. 3) PPE: cut- and impact-resistant gloves (EN388).	L1 × S3 = 3	**3** LOW	Pre-use clamp and fitting inspection
4. Formwork Erection & Falsework Support											
9	Formwork Erection & Falsework Support	Erecting formwork panels and falsework/shoring prior to concrete pour	Formwork or falsework collapse during erection due to inadequate bracing, missing ties, or overloading before design capacity is confirmed, causing crush or fatal injury	Formwork Carpenters, Steel Fixers, Site Labourers	Structural / Mechanical	L2 × S5 = 10	**10** HIGH	1) Eliminate: use an engineer-approved formwork design with a defined tie/brace schedule before erection begins. 2) Engineering: install formwork strictly per approved shop drawings, including diagonal bracing and base plates. 3) Administrative:	L1 × S5 = 5	**5** MEDIUM	Formwork inspecti and written sign-of before each pour

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								formwork inspection checklist with engineer sign-off required prior to any concrete pour. 4) PPE: hard hats for all personnel in the erection area.			
10	Formwork Erection & Falsework Support	Nailing/fixing formwork panels and installing tie rods	Puncture or laceration injury from exposed protruding nails, tie-rod ends, or sharp plywood edges	Formwork Carpenters	Physical	L4 × S2 = 8	**8** MEDIUM	1) Engineering: bend over or cap all protruding nails and tie-rod ends immediately after fixing. 2) Administrative: continuous housekeeping SOP requiring removal of offcuts and debris throughout the shift. 3) PPE: cut-resistant gloves and puncture-resistant safety boots (EN ISO 20345 with midsole protection).	L2 × S2 = 4	**4** LOW	Daily housekeepin inspection
5. Formwork Striking / Stripping Operations											
11	Formwork Striking / Stripping Operations	Removing (striking) formwork panels and props after concrete curing	Premature or uncontrolled structural collapse if formwork is struck before concrete achieves sufficient design strength, causing crush injury or structural failure	Formwork Strippers, Adjacent Trades	Structural	L2 × S5 = 10	**10** HIGH	1) Eliminate: verify concrete cube/cylinder compressive strength test results meet the minimum striking strength before any stripping begins. 2) Engineering: follow a phased striking sequence approved by the design engineer, retaining back-props where required. 3) Administrative: formal striking permit sign-off by the Site Engineer. 4) PPE: hard hat and safety boots.	L1 × S5 = 5	**5** MEDIUM	Review of concrete strength test result before each strike operation
12	Formwork Striking / Stripping Operations	Manual and mechanical dismantling of formwork panels and shoring	Struck-by injury from falling formwork panels, props, or debris during dismantling operations	Formwork Strippers, Labourers Below	Mechanical / Falling Objects	L3 × S4 = 12	**12** HIGH	1) Engineering: lower heavy panels using controlled rigging/hoist rather than free-dropping. 2) Administrative: establish and sign-post an exclusion zone directly below the strike area; strip in a sequential top-down order per SOP. 3) PPE: hard hat and steel-toe-capped boots.	L1 × S4 = 4	**4** LOW	Toolbox talk and exclusion-zone barricade check before each strike operation
13	Formwork Striking / Stripping Operations	Stacking and storing removed formwork panels and props on site	Manual-handling strain injury and stack-collapse crush hazard from improperly stacked heavy panels	Labourers, Formwork Crew	Ergonomic / Mechanical	L3 × S2 = 6	**6** MEDIUM	1) Engineering: use a designated, level, racked storage area for stacked panels. 2) Administrative: enforce maximum stack height limits and mandatory two-person lifting for panels over 20 kg. 3) PPE: gloves and steel-toe boots.	L1 × S2 = 2	**2** LOW	Daily site housekeeping and materials storage inspection
6. Working at Height — Boom Pump & Formwork Platforms											
14	Working at Height — Boom Pump & Formwork Platforms	Accessing elevated formwork or pour platforms to guide the placing hose	Fall from height (above 1.8 m) from an unprotected formwork edge or working platform, resulting in serious or fatal injury	Hose Handler, Formwork Carpenters, Concrete Finishers	Fall from Height	L3 × S5 = 15	**15** HIGH	1) Eliminate: use a certified mobile scaffold tower or podium step in place of standing on formwork edges. 2) Engineering: install guardrails (1.1 m top rail, mid-rail, toe boards) on all working platforms. 3) Administrative: site-specific fall protection plan and permit-to-work for elevated tasks. 4) PPE: full-body harness with double lanyard (ANSI	L1 × S5 = 5	**5** MEDIUM	Daily edge-protection an platform inspectior

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								Z359.11 / EN361) where guardrails are not feasible.			
15	Working at Height — Boom Pump & Formwork Platforms	Working beneath the suspended/extended pump boom during concrete placement	Struck-by injury from falling concrete, debris, or dropped tools/materials from elevated placement positions	Ground Crew, Labourers	Falling Objects	L3 × S3 = 9	**9 MEDIUM**	1) Engineering: fit debris netting and toe boards at height where practicable. 2) Administrative: maintain a barricaded exclusion zone directly beneath the boom; mandatory tool lanyards for elevated workers. 3) PPE: hard hat (ANSI Z89.1 / EN397).	L1 × S3 = 3	**3 LOW**	Continuous exclusion-zone barricade check during pour
16	Working at Height — Boom Pump & Formwork Platforms	Climbing formwork/scaffold ladders to access the pour level	Fall from ladder due to improper securing or wet, concrete-slicked rungs	Formwork Crew, Pump Crew	Fall from Height	L3 × S4 = 12	**12 HIGH**	1) Engineering: secure/tie off all ladders and extend them a minimum of 1 m above the landing point. 2) Administrative: enforce three-point-contact rule and prohibit carrying materials while climbing. 3) PPE: non-slip-soled safety boots.	L1 × S4 = 4	**4 LOW**	Weekly ladder inspection tagging plus pre-use check
7. Site Traffic, Pump Truck Movement & Pedestrian Interface											
17	Site Traffic, Pump Truck Movement & Pedestrian Interface	Reversing and manoeuvring concrete mixer trucks and the pump truck on site	Struck-by/run-over injury to pedestrians or workers caused by reversing vehicles with restricted rear visibility	Site Labourers, Banksman, Pedestrians/Visitors	Vehicle / Traffic	L3 × S5 = 15	**15 HIGH**	1) Engineering: fit reversing alarms and rear-view CCTV cameras to all mixer and pump vehicles. 2) Administrative: certified banksman-controlled traffic management plan with segregated pedestrian routes. 3) PPE: hi-visibility Class 2 vest (ANSI/ISEA 107 or EN ISO 20471) for all site personnel.	L1 × S5 = 5	**5 MEDIUM**	Daily traffic management plan audit
18	Site Traffic, Pump Truck Movement & Pedestrian Interface	Concrete mixer truck discharging into the pump hopper	Crush injury between the mixer chute and pump hopper, or slip injury on spilled concrete/wet surfaces	Mixer Driver, Pump Operator, Banksman	Mechanical / Slip	L3 × S3 = 9	**9 MEDIUM**	1) Engineering: fit hopper grate guarding and lay non-slip matting around the discharge area. 2) Administrative: controlled discharge SOP directed by a dedicated signaller. 3) PPE: slip-resistant safety boots.	L1 × S3 = 3	**3 LOW**	Pre-pour discharge area inspection
8. Housekeeping, Washout & Waste Management											
19	Housekeeping, Washout & Waste Management	Washing out the pump hopper, hoses, and chutes after pour completion	Contact dermatitis or chemical skin burns from prolonged exposure to wet cement (caustic, pH approximately 12–13)	Pump Operator, Wash-Down Crew	Chemical / Skin	L4 × S3 = 12	**12 HIGH**	1) Substitution: use biodegradable release/cleaning agents where feasible. 2) Engineering: wash out only within a designated, bunded washout area. 3) Administrative: written maximum-exposure SOP and skin-care programme with barrier cream. 4) PPE: chemical-resistant gloves (EN374) and waterproof coveralls.	L2 × S3 = 6	**6 MEDIUM**	Periodic occupational skin-health surveillance
20	Housekeeping, Washout & Waste Management	Containment and disposal of washout water and residual concrete slurry	Environmental contamination and slip hazard from uncontained alkaline slurry runoff entering drains or soil	Site Workers, Environment / Public	Environmental / Slip	L3 × S3 = 9	**9 MEDIUM**	1) Eliminate: use a designated lined washout pit or settlement tank for all slurry containment. 2) Administrative: waste transfer manifest and disposal via a licensed waste contractor. 3) PPE: waterproof boots and chemical-resistant gloves during handling.	L1 × S3 = 3	**3 LOW**	Weekly washout p inspection and wa manifest review