



COFFERDAMS AND TEMPORARY WORKS

Engineered Stability, Water Control, Access and Safe Removal

POLICY STANDARD

Cofferdams and temporary works shall be designed, erected, loaded, inspected, altered and removed only under the approved plan. Employees shall be removed immediately when water, movement, loading or damage exceeds the plan or threatens stability.

PHEIFER BROTHERS CONSTRUCTION CO., INC.

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Table of Contents

SECTION	TOPIC	PAGE
1	Purpose, Scope and Responsibilities	3
2	Engineering and Design Control	4
3	Preconstruction Planning and Coordination	5
4	Cofferdam Installation and Structural Stability	6
5	Water Control, Overtopping and Flood Response	7
6	Access, Fall Protection and Work Near Water	8
7	Temporary Works, Shoring, Falsework and Bracing	9
8	Loads, Equipment and Material Handling	10
9	Inspection, Monitoring and Change Management	11
10	Removal, Handoff and Closeout	12
11	Emergency Response, Training and Records	13
12	Daily Field Inspection Checklist	14
13	Test Your Knowledge	15

USE OF THIS POLICY

This policy establishes minimum company expectations and is not all-inclusive. Approved engineering, project specifications, manufacturer instructions, environmental permits and any more protective requirement also apply.

Primary Regulatory References

- 29 CFR 1926.802 - Cofferdams
- 29 CFR 1926.651 and 1926.652 - Excavations and protective systems
- 29 CFR 1926.703 - Formwork, shoring and reshoring
- 29 CFR 1926 Subparts L, M, R and CC - Scaffolds, fall protection, steel erection, cranes/derricks
- 29 CFR 1926.106 and 1926.1053 - Work over/near water and ladders

1. Purpose, Scope and Responsibilities

Purpose and Scope

- Applies to cofferdams, sheet-pile cells, bracing/wales/struts/tie systems, water-control systems, work trestles, temporary bridges/ramps, falsework, shoring, reshoring, temporary towers, working platforms and temporary structural bracing used on heavy-highway and bridge projects.
- This policy does not replace the Excavation, Fall Protection, Working Over Water, Crane, Confined Space, Concrete/Formwork or Steel Erection policies; all applicable programs apply together.

Management / Project Management

- Provide qualified design resources, current approved drawings, suitable materials/equipment, monitoring and time to follow the engineered sequence.
- Define the design engineer/engineer of record, temporary-works coordinator, competent persons and approval authority before mobilization.
- Coordinate owner, WisDOT/project, environmental, navigation and subcontractor requirements.

Temporary-Works Coordinator / Foreman

- Control current drawings/revisions, conduct pre-erection briefing, verify inspection/hold points and prevent unauthorized loading or alteration.
- Coordinate construction condition information with the designer and stop work when actual conditions differ.

Competent Person

- Perform required excavation, access and protective-system inspections before work, as needed during the shift, and after rain or another hazard-increasing event.
- Remove employees from a hazardous area until required precautions are completed.

Employees

- Follow drawings, sequence, load limits, exclusion zones and training; inspect assigned access/PPE and report leakage, movement, damage or changed conditions immediately.
- Every employee has stop-work authority without retaliation.

2. Engineering and Design Control

Approved Design

- Temporary works shall have a documented design appropriate to complexity and risk. Use a registered professional engineer (RPE) or qualified designer when required by OSHA, contract, owner, design method or company risk determination.
- Design shall address erection, in-service use, foreseeable construction loads, environmental loads, modification and removal - not only the final configuration.
- Identify design assumptions: soil/rock profile, water elevations and flow, scour, ice/debris, wind, vessel/vehicle impact, adjacent structures, equipment/crane reactions, surcharge, concrete pressure and load combinations.

Design Documents

- Maintain current drawings, calculations/criteria, notes, material grades, weld/bolt details, connection/tolerance requirements, monitoring points, load limits, hold points and removal sequence at the jobsite.
- Drawings/plans and all revisions for formwork, shoring, working decks and scaffolds shall be available at the jobsite as required by 1926.703(a)(2).
- Clearly mark design status: preliminary/not for construction, approved for construction, superseded or as-built. Remove superseded field copies.

Design Review

- Provide the designer accurate field dimensions, pile records, soil/water data, equipment loads and deviations. Do not conceal fit-up problems or substitute assumed values.
- Independent review/checking shall match project requirements and consequence of failure. Resolve comments before release.

Field Changes

- No cutting, welding, drilling, splicing, removal, relocation, jacking, preloading, shimming, component substitution or added load without documented authorization from the responsible designer/approval authority.
- Emergency stabilization may be performed only under qualified direction; document and incorporate it into the controlled design.

Design-Basis Exceedance

- Stop, evacuate as needed and notify the designer when water, movement, settlement, load, impact or damage exceeds an indicated limit or was not considered.

3. Preconstruction Planning and Coordination

Preconstruction Meeting

- Review approved drawings, sequence, roles, hold points, inspections, communications, load restrictions, weather/water triggers, evacuation signals and rescue arrangements with affected supervisors and subcontractors.
- Resolve interfaces with excavation, cranes, pile driving, concrete, steel erection, live traffic, utilities, railroads, waterways and public access.

Site Investigation

- Verify utilities/overhead lines, existing structures/foundations, access, bathymetry, soil/rock conditions, water depth/current, normal and forecast elevations, flood routes, scour/erosion, navigation and environmental restrictions.
- Compare actual conditions to design assumptions before and during installation. Report obstructions, refusal, loss of ground, unexpected seepage or unsuitable bearing.

Site-Specific Work Plan

- Identify installation/removal sequence, crane/equipment locations and mats, pile-driving setup, lifting/rigging, bracing installation, dewatering/pumping, sediment control and discharge requirements.
- Show exclusion zones, authorized access, two rapid exits, guarded walkways/ramps, PFD/rescue equipment, emergency assembly point and route clear of flooding/collapse.
- Establish who monitors forecasts/water, who orders evacuation, who shuts equipment down and who contacts emergency/navigation/environmental authorities.

Temporary Loads

- Prepare an approved load plan showing storage, vehicles, cranes, pumps, concrete lines, materials, personnel platforms and construction sequence loads.
- Post limits where crews can see them. Do not use braces, wales or struts as storage, walkways, rigging anchors or fall-protection anchors unless specifically designed.

Readiness Hold Point

- No employee enters or loads the system until required components, bracing, access, monitoring, pumping, warning signals and inspections are complete and the authorized release is documented.

4. Cofferdam Installation and Structural Stability

Installation Sequence

- Install sheets, piles, frames, wales, struts, anchors, seals and bracing in the approved order. Maintain stability at every intermediate stage.
- Verify pile type, orientation, interlocks, splice details, cutoff elevation, embedment/refusal criteria and tolerances. Record driving/installation data required by the plan.
- Do not excavate or dewater below the stage authorized for installed bracing and toe/embedment conditions.

Bracing and Connections

- Install all required bolts, pins, welds, blocking, wedges, stiffeners and connection plates. Use specified bolt grade/torque, weld procedure and qualified personnel.
- Seat struts and wales uniformly; prevent unintended eccentricity, local crushing and displacement. Apply preloads only by the specified method and document readings.
- Protect bracing from crane loads, buckets, trucks, floating debris, suspended loads and unplanned contact.

Stability Controls

- Maintain soil berms, interior fill, seal concrete, anchors and other stabilizing components until the design authorizes change.
- Provide support for adjacent pavements, foundations, utilities and structures where endangered. Excavation below nearby foundations requires the support or RPE determination required by 1926.651(i).
- Control loose material and keep spoil/equipment back from edges or use retaining devices. Provide stop logs/barricades/signals where mobile equipment approaches an edge without clear view.

Installation Inspection

- Inspect components for damage, corrosion, incorrect grade, distortion and connection defects before use.
- Complete design hold-point inspections before excavation/dewatering, after each brace level, after impacts or significant movement and before employee entry.

Restricted Areas

- Keep employees clear of pile-driving swing/fall zones, suspended loads, pinch points, unbraced walls and areas beneath installation work.

5. Water Control, Overtopping and Flood Response

Water-Control Plan

- Identify expected water elevations, inflow paths, permeability, pumping capacity, discharge point, backup equipment, power source, alarms, monitoring and acceptable drawdown rate.
- Use pumps, wells, sumps, cutoff systems, seal concrete and drainage measures compatible with the design. Control piping/hoses against movement, trip, electrical and discharge hazards.
- A competent person shall monitor water-removal equipment and operations when used to control accumulation in an excavation.

Redundancy

- Provide operating and standby pump capacity, backup power/fuel, suction/discharge components and trained personnel appropriate to inflow rate and consequence of failure.
- Use high-water/pump-failure alarms that can be heard/received by affected personnel. Test alarms and emergency power before entry and at planned intervals.
- Keep suction screens clear and prevent pump exhaust/electrical equipment from creating atmospheric, fire or shock hazards.

Overtopping

- Where high-water overtopping is possible, provide a means for controlled flooding of the work area as required by 1926.802(a). The engineered plan shall define when, how and by whom controlled flooding occurs.
- Controlled flooding shall not be improvised; address equipment shutdown, personnel evacuation, valves/openings, erosion, unequal pressure and safe re-entry.

Weather and Water Monitoring

- Monitor upstream precipitation, forecasts, dam/reservoir releases, tides where applicable, stream gauges, ice/debris and rapid seasonal changes.
- Establish alert, evacuation and design-limit elevations with sufficient time to remove employees. Do not use the top of wall as the only indicator.

Stop/Evacuate

- Evacuate for rapid/unexplained water rise, pump or power failure beyond redundancy, increasing boils/piping, soil loss, uncontrolled seepage, threatened overtopping or inability to maintain required freeboard.
- Re-entry requires correction, inspection and authorization under the plan.

6. Access, Fall Protection and Work Near Water

Rapid Exit

- Cofferdam walkways, bridges or ramps shall provide at least two means of rapid exit and guardrails meeting Subpart M, as required by 1926.802(c).
- Locate exits apart so one event is unlikely to block both. Keep routes illuminated, nonslip, unobstructed and above anticipated water where designed.
- Post and practice the emergency warning signal and evacuation route. OSHA requires the signal to be developed and posted.

Ramps, Walkways and Ladders

- Employee structural ramps are designed by a competent person; equipment ramps by a competent person qualified in structural design and built to that design.
- Secure ramp members against displacement, provide uniform surfaces and slip resistance, and guard walkways 6 feet or more above lower levels. Cofferdam routes receive guardrails as specifically required.
- Ladders meet the Ladder Safety Policy, extend/secure for safe transition and remain clear of pumps, hoses and lifting routes.

Fall Protection

- Install guardrails/covers or use personal fall-arrest/restraint as required. Anchorage shall be approved for its intended load and independent of components that may fail or be removed.
- Plan rescue before personal fall-arrest use; avoid swing fall, sharp edges, water immersion and conflicts with bracing/removal.

Working Over or Near Water

- Employees exposed to drowning wear a U.S. Coast Guard-approved PFD/buoyant work vest and inspect it before/after each use.
- Provide ring buoys with at least 90 feet of line at intervals not exceeding 200 feet and at least one immediately available lifesaving skiff where required by 1926.106.
- Account for cold water, current, entrapment under braces, pumps and limited egress in the site rescue plan.

Housekeeping and Lighting

- Secure cords/hoses, remove mud/ice/debris, protect openings and provide illumination without glare or deep shadows.

7. Temporary Works, Shoring, Falsework and Bracing

General Stability

- Design, fabricate, erect, support, brace and maintain temporary works to support without failure all reasonably anticipated vertical and lateral loads.
- Temporary condition stability is required during erection, loading, concrete placement, adjustment, partial removal and final removal.

Shoring and Falsework

- Inspect shoring before erection against drawings; do not use damaged equipment with reduced strength.
- Sills must be sound, rigid and capable of maximum intended load. Base plates, shore heads, extension devices and screws shall be in firm contact and secured when necessary.
- Prohibit eccentric loading unless designed. Do not adjust single-post shores to raise formwork after concrete placement.
- Inspect erected shoring immediately before, during and immediately after concrete placement; immediately reinforce weakened shoring.

Tiered Shores

- When single-post shores are tiered, use a qualified designer and inspection by an engineer qualified in structural design as required by 1926.703(b)(8).
- Align and splice shores against misalignment; brace in two perpendicular directions at splice levels and diagonally brace each tier.

Temporary Bracing

- Install required plumbing-up cables, guys, erection bracing and permanent connections in sequence. Do not release crane support until minimum connections/bracing are installed.
- Do not remove temporary bracing until the permanent structure can safely resist construction and environmental loads and removal is authorized.

Scaffolds and Work Platforms

- Scaffolds are designed by a qualified person and constructed/loaded accordingly. Platforms, access and fall protection meet Subpart L.
- Do not assume falsework members or forms are safe walking surfaces; provide designed access/platforms.

8. Loads, Equipment and Material Handling

Load Control

- Do not exceed individual member, bay, platform, trestle, ramp, soil or foundation limits. Include dynamic, impact, wind, current, buoyancy, uplift, concrete placement and construction sequence effects.
- Post load/occupancy restrictions and designate approved crane, pump, truck, material-storage and access locations.
- Remove unplanned loads immediately when safe and notify the temporary-works coordinator/designer.

Cranes and Lifting

- Verify crane setup reactions, mats, outriggers/crawlers and travel paths are included in the design. Keep cranes/equipment away from edges unless approved.
- Use qualified rigging/signal personnel and approved lift points. Do not side-load braces, sheets or temporary members with hoists/come-alongs unless designed.
- No employees under suspended loads. Control falling materials and prevent load contact with bracing/guardrails/pumps.

Concrete Placement

- Follow the approved rate, lift height, sequence and location. Monitor forms, shores, connections and settlement during placement.
- Stop for leakage, bulging, abnormal noise, movement, displaced shores or pressure exceeding assumptions. Keep unnecessary employees out of the placement zone.
- Do not strip forms/shores until plan conditions or appropriate strength testing confirms adequate capacity; install/retain reshoring as required.

Vehicle and Equipment Access

- Use designed ramps/trestles and observe speed, weight, spacing and one-way restrictions. Use spotters/stop logs near edges and blind areas.
- Inspect after impact, overload, settlement or route changes. Prohibit parking, refueling or unattended operation where it adds unapproved load or blocks evacuation.

Storage

- Secure materials against rolling/sliding/falling and distribute load. Do not store on braces, ladders, narrow walkways or emergency routes.

9. Inspection, Monitoring and Change Management

Required Inspections

- Competent person inspects excavations, adjacent areas and protective systems before work, as needed during the shift and after rain or other hazard-increasing occurrence.
- Temporary-works coordinator completes phase/hold-point inspections required by drawings. Qualified designer/RPE inspects or reviews where specified.
- Inspect after installation stages, dewatering, load changes, concrete placement, high water, severe weather, impact, vibration, fire, observed movement or extended shutdown.

Inspection Items

- Sheets/piles, interlocks, wales, struts, ties, anchors, welds, bolts/pins, bearing/contact, blocking, corrosion, distortion and missing components.
- Ground loss, boils, piping, settlement, heave, scour, erosion, leakage, water elevation, pump operation, alarms, backup power and discharge.
- Ramps, ladders, guardrails, platforms, lighting, PFD/rescue equipment, evacuation signs/routes and housekeeping.
- Temporary structures, adjoining structures, utilities, traffic controls and changes in adjacent crane/pile-driving/excavation operations.

Monitoring Plan

- Establish instruments/points, baseline readings, frequency, responsible person, action levels and reporting. Possible tools include survey targets, settlement points, load cells, piezometers, crack gauges and water-level marks.
- Protect instruments from damage; record time, conditions and readings. A missing/unreliable reading is not permission to continue.

Change Management

- Field request identifies reason, location, marked drawing/photo, loads/conditions and urgency. Responsible designer issues documented disposition before change.
- Brief affected employees and update controlled drawings, JHA, inspection/monitoring and removal plan.

Stop-Work Triggers

- Movement beyond limit; damaged/missing connection; loss of bearing/preload; unexpected soil/water behavior; pump/alarm failure; unapproved load/change; blocked exit; or any condition indicating possible failure.

10. Removal, Handoff and Closeout

Engineered Removal

- Removal is a designed construction stage. Follow the approved order for unloading, form/shoring removal, brace release, flooding/equalization, dewatering changes, sheet/pile extraction and site restoration.
- Confirm permanent structure strength/stability and required permanent connections before temporary support removal.
- Do not cut or release a loaded member. Determine load state, establish exclusion zone and use controlled unloading/support before disconnecting.

Cofferdam Removal

- Equalize water pressure/flood as designed before removing components. Control sudden inflow, trapped pressure, buoyancy and unstable soil.
- Plan crane/vibratory extractor position, rigging, pile release, swing path and falling-object zone. Stop for unexpected resistance, settlement or structure movement.
- Maintain navigation/public/environmental controls and prevent debris, oil or sediment release.

Handoff

- Before another crew uses or loads temporary works, document condition, approved use/limits, outstanding restrictions, inspection status and responsible contacts.
- Receiving supervisor verifies the handoff in the field; responsibility is not transferred by assumption or an outdated drawing.
- Shift handoffs include water/weather status, pumps/fuel, monitoring readings, alarms, access changes, incomplete work and stop-work conditions.

Closeout

- Remove abandoned anchors, projections and temporary hazards or protect them as approved. Restore drainage, banks, channels, roadways and access.
- Collect approved drawings/revisions, inspections, monitoring, material certifications, weld/bolt records, concrete strength data, changes, incidents and final condition/as-built information.
- Review lessons learned and recurring deviations for future designs.

Restart After Shutdown

- After flood, impact, significant weather, unplanned load, extended shutdown or emergency, require documented inspection and designer review as appropriate before re-entry/reloading.

11. Emergency Response, Training and Records

Site-Specific Emergency Plan

- List exact address/GPS/access, 911 caller, responder guide, muster/accountability, evacuation signal, two exits, flood route, severe-weather shelter and nearest hospital.
- Define high-water/pump failure, collapse/movement, fall, water rescue, utility contact, vessel impact, fire/hazardous release and night/remote response.
- Coordinate with controlling contractor, subcontractors, rescue/EMS, waterway/navigation authority and dam/operator contacts where relevant.

Emergency Actions

- Sound warning, stop equipment if safe and evacuate by posted routes. Account for personnel; call 911 for injury, entrapment, collapse, uncontrolled flooding or immediate danger.
- Do not enter a failing/flooded temporary structure or attempt technical rescue unless trained, equipped and assigned under the rescue plan.
- Protect the scene and prevent re-entry. Notify project management and responsible designer. Preserve evidence unless movement is needed to prevent greater harm.

Vessel Protection

- Where a cofferdam is close to a navigable shipping channel, protect it from vessels in transit where possible as required by 1926.802(d). Use authorized markings, lighting, fenders/barriers, communications or traffic restrictions as project/navigation authorities require.

Training

- Train employees before assignment on plan limits, sequence, access, fall/water controls, warning signals, evacuation, load restrictions, reporting and stop-work.
- Provide role-specific training/qualification for competent persons, temporary-works coordination, operators, riggers/signal persons, scaffold/fall protection and rescue duties.
- Toolbox talks reinforce but do not replace required training or engineering direction.

Records and Review

- Retain current design/revisions, approvals, inspections, monitoring, pre-task/handoff records, training, material/weld/bolt records, changes, incidents and corrective actions per company/contract requirements.
- Review policy at least annually and after incident, major change or regulatory update. Printed copies are uncontrolled unless formally issued.

12. Daily Field Inspection Checklist

Use with the project-specific engineered inspection form. A check does not replace required measurements, designer/RPE review or OSHA competent-person inspection.

ITEM	VERIFY / DOCUMENT
Current documents	Approved drawing/revision, sequence, load plan and emergency plan onsite
Water/weather	Current and forecast levels, inflow, freeboard, rain/release/ice/debris checked
Pumps/alarms	Operating and standby capacity, fuel/power, hoses, alarms and controlled flooding ready
Structure	Sheets/piles, wales, struts, ties, anchors, welds, bolts, bearings and blocking sound
Ground	No unexpected settlement, heave, scour, erosion, boils, piping or soil loss
Monitoring	Required readings within action limits; instruments protected and functioning
Access	Two rapid exits open; walkways/ramps/ladders/guardrails safe and illuminated
Fall/water rescue	Fall protection, PFDs, ring buoys/skiff/rescue plan ready as applicable
Loads	Equipment/materials/people within approved locations and limits
Coordination	Adjacent cranes, traffic, utilities, excavation, concrete and subcontractors controlled
Emergency	Warning signal posted/understood; muster, 911 access and contacts confirmed
Changes	No unauthorized cuts, welds, removals, adjustments, loads or substitutions

PROJECT: _____	DATE / SHIFT: _____
INSPECTOR: _____	WEATHER / WATER: _____
DEFICIENCIES / ACTIONS:	

13. Test Your Knowledge

Circle the best answer. Review missed questions with your foreman before performing this work.

1. Who may authorize a field design change? A. Any experienced employee B. Responsible designer/approval authority C. Delivery driver	2. How many rapid exits must cofferdam routes provide? A. One B. None C. At least two
3. What is required if overtopping is possible? A. A means for controlled flooding B. A taller ladder only C. No action	4. When are excavation inspections required? A. Monthly only B. Before work/as needed and after hazard-increasing events C. Only after an incident
5. May a brace be used as an anchor or storage shelf? A. Only when specifically designed/approved B. Always C. If convenient	6. What follows unexpected movement or a failed brace? A. Work faster B. Stop, evacuate as needed and reassess C. Paint a mark and continue
7. Who monitors pumping used to control excavation water? A. Any visitor B. The delivery driver C. A competent person	8. When may shores/forms be removed? A. After adequate strength/plan conditions are verified B. At lunch C. When the crane arrives
9. What must happen after an approved field change? A. Nothing B. Update documents and brief affected workers C. Hide the old drawing	10. Who may attempt technical rescue? A. Any available worker B. Trained, equipped and assigned responders C. Only the equipment operator

EMPLOYEE: _____

DATE: _____

ANSWER KEY: 1-B | 2-C | 3-A | 4-B | 5-A | 6-B | 7-C | 8-A | 9-B | 10-B