

ILLINOIS URBAN MANUAL
PRACTICE STANDARD

COFFERDAM

(no.)
CODE 803

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(Source: XXX)

DEFINITION

A cofferdam is a temporary structure within a waterway or body of water designed to contain disturbed soil and/or suspended sediments within a construction area from entering surrounding waters. Water is either intercepted upstream and discharged downstream or diverted around the work site.

PURPOSE

The purpose of this practice is to allow work to be performed in water while minimizing turbidity and sedimentation in adjacent and/or downstream areas. Cofferdams may also be utilized in areas where turbidity is not an issue to allow work to be performed in otherwise unsuitable conditions.

CONDITIONS WHERE PRACTICE APPLIES

This practice is to be used as a temporary measure whenever work will be conducted in a waterway (stream, river, or other linear feature that conveys water) or body of water (lake, pond, or other impoundment). Typical activities requiring the use of cofferdams include: shoreline stabilization of a water body;

installation or replacement of a culvert, bridge, pier, or abutment; open-cutting for the installation of utilities, stream restoration projects, etc. For situations in waterways where cofferdams are impractical or undesirable, please refer to practice standard TEMPORARY DIVERSION 976.

CRITERIA

General

Cofferdams must be constructed of non-erodible materials such as stone, metal, geosynthetics, or other approved products. The cofferdam materials shall be free of potential pollutants such as soil, silt, sand, clay, grease, or oil. Any substance used to assemble or maintain diversion structures shall be non-toxic and non-hazardous. Any material used to minimize seepage underneath diversion structures, such as grout, shall be non-toxic, non-hazardous, and as close to neutral pH (7) as possible.

No construction activities may take place in standing or flowing water except for the construction of the cofferdam.

Prior to the installation or removal of a cofferdam, a SILT CURTAIN 917 shall be installed to contain turbid water and allow suspended sediments resulting from the installation of the cofferdam to settle out.

Following cofferdam installation, water in the work area shall be removed by pumping methods in order to work under dry conditions. Pumping of water may be required throughout the construction activities in order to maintain dry conditions. Practice standards DEWATERING 813 and SUMP PIT 950 may be installed in order to achieve dry conditions.

Water pumped from the work area shall be filtered or cleaned to ensure that discharged water is free of sediments. Methods for cleaning water discharged from the work area include: Practice standards PORTABLE SEDIMENT TANK 895, TEMPORARY SEDIMENT TRAP 960, or POLYACRYLAMIDE FOR SEDIMENT CONTROL 894, or sediment dewatering bags.

All water pumped from, or diverted around, the work area shall be discharged to the creek or waterway on an energy dissipating surface and must not contribute to, or cause, erosion.

All temporary materials must be removed after the completion of construction activities. Prior to cofferdam removal, the work area must be stabilized with appropriate vegetative and/or structural practices in accordance with plan

specifications and be stable enough to accept flows.

When using an upstream and downstream cofferdam, removal of the downstream structure shall occur first.

Cofferdams shall be designed to withstand the 2-year 24-hour storm event to accommodate fluctuations in water depth or flow volume due to tides, storms, flash floods, etc. If information is not available, the ordinary high water (OHW) mark can be used as an indicator.

The exterior of vehicles and equipment that will encroach on a water body within the project shall be maintained free of grease, oil, fuel, and residues. Stationary equipment such as motors, pumps, etc. located within or adjacent to a water body shall be positioned over drip pans or other confinement area. All equipment shall be stored outside of the floodplain when not in use to avoid inundation during a high water event.

Cofferdams used in linear water features shall provide for emergency overflow at the center of the dam to prevent erosion along the banks.

Cofferdams are a temporary measure and should not be left in place for extended periods of time.

Avoid or minimize impacts by scheduling construction during periods of low flow or when the stream is dry. Scheduling shall also consider seasonal releases of water from dams, water demands due to

crop irrigation, and timed to minimize impacts on fish and other aquatic life. Cofferdams shall not be used across a stream bed at times when fish passage is an issue.

When coffering in a linear water feature, every effort should be made to coffer only a portion the waterway rather than block the entire flow in order to maintain the movement of and lessen impacts to aquatic life. Blocking the entire flow and bypass pumping around the work area should only be done when absolutely necessary. A full cofferdam should only be used in intermittent streams and waterways that have low flow frequency, duration, and volume. Perennial streams and any non-low flow waterway shall use a partial coffer or diversion.

When any artificial obstruction is being constructed, maintained, or placed in operation, sufficient water shall be allowed to pass around the work area in order to maintain aquatic life downstream. Stream velocity below the cofferdam shall be maintained at a rate similar to existing, pre-installation flow conditions above the cofferdam.

The activities of this standard may constrict the waterway which can obstruct flood flows and cause flooding or washouts. Structures shall not be installed without identifying and addressing potential impacts to the stream channel.

Disturbance or removal of vegetation shall not exceed the minimum necessary to complete operations. Precautions shall be taken to avoid

damage to vegetation by people or equipment. Disturbed vegetation shall be replaced with the appropriate soil stabilization measures.

Cofferdam – Bladder

Inflatable bladders should only be used in situations where there is a relatively flat base material. Large variations in the base elevation will result in an improper seal, which will allow water seepage.

Inflatable bladder cofferdams are ideal for large cofferdams in waterways or large water bodies.

Inflatable bladder cofferdams shall be constructed in accordance to manufacturer specifications. The specific sizing, installation requirement, maintenance, and other pertinent information shall follow manufacturer specifications. All cofferdams should be dual-chambered to avoid rolling.

Cofferdam – A-frame

A-frame cofferdams should only be used in situations where there is a relatively flat base material. Large variations in the base elevation will result in an improper seal, which will allow water seepage.

A-frame cofferdams are ideal for large cofferdams in waterways or large water bodies.

A-frame cofferdams shall be constructed in accordance to manufacturer specifications. The specific sizing, installation

requirement, maintenance, and other pertinent information shall follow manufacturer specifications.

Cofferdam – Stone and Liner

Stone and liner cofferdams should only be used in low flow channels and partial cofferdams of larger linear water features.

This cofferdam method could be a possible option in areas where underground electrical and gas lines may be present. It may also be a good option for areas with an uneven, stone or bedrock base material.

To install a stone and liner cofferdam, first place the impermeable liner on the bottom of water. The liner should extend out past the edge of the future cofferdam a sufficient length so that it can be pulled back over the placed rip rap and secured at the bottom. This will create a seamless barrier on the water side with the opening seam on the work area side. It will likely be necessary to hold the liner in place when the rip rap is placed to keep the fabric in position.

Cofferdam – Steel Sheet

Steel sheet and liner cofferdams should only be used in low flow channels and are not recommended for partial cofferdams used in larger creeks and rivers or bodies of water.

Steel sheet and liner cofferdams should not be used in areas where underground electrical and gas lines may be present. In areas with stone

or bedrock base materials, the use of steel sheet for cofferdams may be difficult or impossible.

Steel sheet should be a minimum of ¼ inch in thickness.

Steel sheet shall be driven into the base material a sufficient distance to avoid undercutting.

The fabric should be wrapped around the bottom of the steel sheet and driven into the base material with the steel sheet to ensure a secure seal.

CONSIDERATIONS

Liner Material – The liners used in this standard should consist of one of the following materials:

- 1) rubber liner with a thickness of at least 45 mil. This material elongates up to 100% and has good UV resistance. A solvent weld is necessary to affix material into larger sections.
- 2) polypropylene liner with a thickness of at least 40 mil. This material elongates up to 80%. A heat gun is necessary to weld pieces together.
- 3) polyvinyl chloride (PVC) liner with a thickness of at least 40 mil. High elongation properties but not UV stable. A solvent weld is necessary to affix material into larger sections.

Cofferdams are temporary and should not be left for long periods of time. Additional considerations may have to be incorporated for long-term cofferdam usage (ice flow, fish passage, built to withstand the 10-year storm event)

When using this measure across a stream channel it may be necessary to install one cofferdam upstream and another downstream of the work area to prevent water from entering the work area.

Cofferdams can be used in a variety of situations and as such, require a variety of different practices based on the individual site conditions and work to be performed. All other appropriate cofferdam methods not listed in this standard should be designed by an engineer and constructed to meet the requirements of the local, state, or federal regulations, whichever is more stringent.

PLANS AND SPECIFICATIONS

Plans and specifications for cofferdams shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. The following items shall be included in the plans:

- 1) The location of the cofferdam
- 2) Normal water elevation
- 3) Required material specifications
- 4) Installation, inspection, and maintenance schedules with the responsible party identified.

Standard drawing [IL-XXX COFFERDAM –FULL](#) or [IL-XXX COFFERDAM – PARTIAL](#) may be used as the plan sheet.

OPERATION AND MAINTENANCE

Because the potential for washout is high the cofferdam shall be monitored daily, and must not be left unattended for any 24 hour period. Weather reports must be followed. If a storm event is expected, the site shall be stabilized in preparation as appropriate. All repairs shall be made immediately to prevent further damage to the installation.

Inspect cofferdams for sediment accumulations and remove sediments when the depth reaches one-third of dam height. Dispose of sediments in an approved area and stabilize the removed sediments with appropriate methods.

Remove the cofferdam only after accumulated sediments have been removed and disposed of in an approved manner. Sandbags must be removed by hand to prevent breakage and further disturbance of the streambed.

All disturbed soil within the coffered area shall be returned to original condition prior to the removal of the dams. The side slopes shall be reseeded and stabilized with an appropriate erosion control blanket and the substrate shall be restored to pre-construction conditions. Stabilization of all remaining disturbed areas shall be initiated immediately following the removal of

the cofferdams. In no instance shall areas adjacent to water features be left disturbed overnight.