

Turbidity Curtain

Definition

A turbidity curtain is a flexible, impermeable barrier used to trap sediment in water bodies. This curtain is generally weighted at the bottom to ensure that sediment does not travel under the curtain, which is supported at the top through a flotation system. Staked curtains are available for applications with very limited exposure to water flow or wave action.

Description and Purpose

Turbidity curtains prevent the migration of sediment from a work site in a water environment into the larger body of water.

The practice is also sometimes referred to as 'turbidity barrier' or 'silt curtain'.

Pollutant(s) controlled:

- Suspended Solids

Treatment Mechanisms:

- Settling

Advantages and Disadvantages

Advantages:

- Allows for containment of sediment-laden water within a work area;
- Protects contained water from turbulence, allowing particles to fall out of suspension.

Disadvantages:

- Can fail when subjected to significant water flows or wave action;
- Cannot be used as a filter across stream flow;
- Possible mobilization of fine sized settled particles after removal.

Location

A turbidity curtain is generally used when construction activity occurs within a waterbody or along its shoreline and is of short duration, generally less than one month. Curtains are used in calm water surfaces. **Turbidity curtains are not to be used across flowing watercourses.**

General Characteristics

- Turbidity curtains should be oriented parallel to the direction of flow;
- For sites not subject to heavy wave action the curtain height shall provide sufficient slack to allow the top of the curtain to rise to the maximum expected high-water level (including waves) while the bottom maintains continuous contact with the bottom of the water body. The bottom edge of the curtain shall have a weight system capable of holding the bottom of the curtain down and conforming to the bottom of the water body, so as to prohibit escape of turbid water under the curtain;
- For sites subject to heavy wave action, the curtain height shall provide sufficient slack to allow the top of the curtain to rise to the maximum expected high-water level (including waves) while the bottom remains one foot above the bottom. The weight system shall hold the lower edge of the curtain in place so as to allow one foot of clearance above the bottom at mean low water, so that the curtain does not stir up sediment by repeatedly striking the bottom;
- The curtain should be constructed of nonwoven material;
- Materials should be of bright colors, when applicable, to attract attention of boaters or swimmers using areas near the work site.

Materials

- Rope or cable with floats;
- Anchors;
- Pre-manufactured Turbidity Barrier (which generally consists of a woven geotextile with a polymer coat).

Design Specifications

- The turbidity curtain shall be located beyond the lateral limits of the construction site and firmly anchored in place;
- The alignment should be set as close to the work area as possible but not so close as to be disturbed by construction equipment;
- The height of the curtain should be designed to account for expected wave action and water level fluctuations as a result of storm events. At a minimum, the curtain height should be 20 percent greater than the depth of the water;
- The area that the turbidity curtain protects shall not contain large culverts or drainage outlets which may cause the curtain to fail during flow events;

- If water depth is less than two feet, and flow at the designed alignment is minimal, the toe can be anchored in place by staking. Refer to the 'shallow' installation in Figure 1;
- If water depth is greater than two feet, or if high flow exists, the 'deep' Turbidity Curtain design must be used. Refer to Figure 2;
- Hard armor (i.e., concrete barriers) may be necessary to protect the curtain on the upstream side in certain flowing water applications.

Construction Guidelines

1. Assure that all necessary permits for work within a water of the state are obtained from the DEQ Land and Water Management Division prior to starting work;
2. The area of proposed installation of the curtain shall be inspected for obstacles and impediments that could damage the curtain or impair its effectiveness to retain sediment;
3. All construction materials shall be removed so they cannot enter the water body;
4. Shallow installations can be made by securing the curtain by staking rather than using a flotation system;
5. Supplemental anchors of the turbidity curtain toe shall be used, as needed, depending on water surface disturbances such as boats and wave action by winds.

Monitoring

1. The turbidity curtain shall be inspected daily and repaired or replaced immediately.
2. If the curtain is oriented in a manner that faces the prevailing winds, frequent checks of the anchorage shall be made.
3. While inspecting, look for areas where turbid water is escaping into the larger water body.

Maintenance

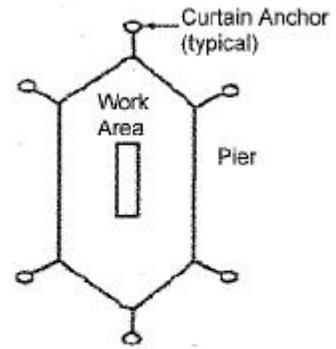
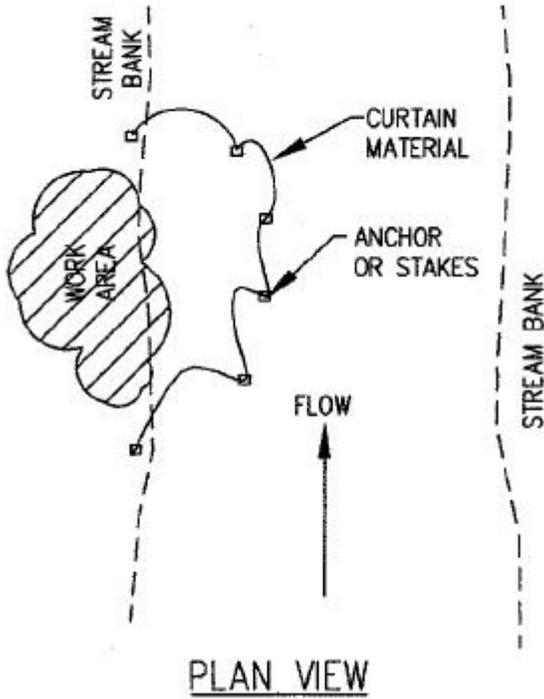
- It is not normally necessary to remove sediment deposited behind the curtain; but, when necessary, removal is usually done by hand prior to removal of the barrier. All removed silt is stabilized away from the water body;
- The barrier shall be removed by carefully pulling it toward the construction site to minimize the release of attached sediment;
- Any floating construction or natural debris shall be immediately removed to prevent damage to the curtain.

References

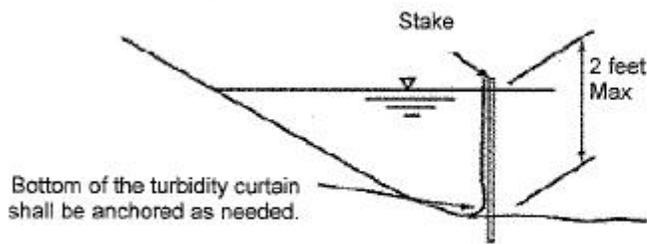
- MDOT, 2006. *Soil Erosion & Sedimentation Control Manual*.
DMB, 2003. *Soil Erosion and Sedimentation Control Guidebook*.

Figure 1:

Shallow Turbidity Curtain



In-Stream Construction

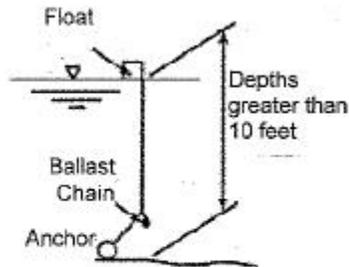
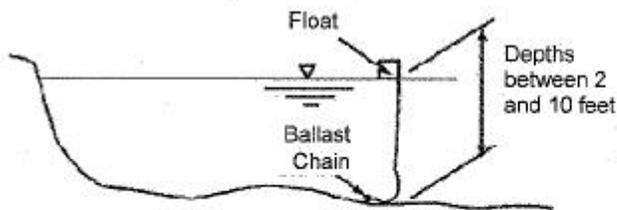


When water is less than 2 feet deep and has low flow, a shallow turbidity curtain may be used. Curtain shall be securely fastened to stakes.

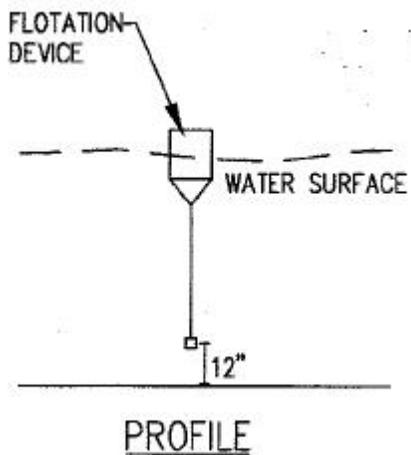
Shallow Turbidity Curtain

Figure 2:

Deep Turbidity Curtain



Deep Turbidity Curtain



Source: Adapted from Michigan Department of Transportation 2006 Soil Erosion & Sedimentation Control Manual and Michigan Department of Management and Budget 2003 Soil Erosion and Sedimentation Control Guidebook