

Boom Anchoring

Applications and Configurations

One of the most important factors in determining the effectiveness of boom is the deployment and proper anchoring to bear against hydraulic loads. Your One Clarion representative can discuss safe load conditions based on performance criteria and site-specific conditions at the deployment location. Performance, effectiveness and maintenance parameters require confirmation of your specified anchoring plan.



Factors

Construction factors affect performance and maintenance, and may require analysis of site specific anchor loads. These factors are:

- Current
- Waves
- Wind

Water Conditions

Calm water: Boom with in calm conditions may be anchored with stakes or tied off on opposing shores, bridge abutments, or anchored with light duty anchors as applicable.

Flowing water: In flowing water, anchoring should focus on orienting the boom so that it is parallel to the flow, and ensures adequate load bearing based on site conditions.



Deployment

In general, if there is no current and little to no wind, anchors may be set after the boom is towed into position. Otherwise, it is recommended that anchors are deployed before moving the barrier from the staging area, and that each anchor line is attached to a buoy for easy retrieval. Each section of floating boom may contain anchor points (with an anchor symbol) that are located on each connector and optionally at center location(s).

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Types of Anchors

We have several anchor types available that we recommend based on site-specific conditions.



Concrete Anchors

Concrete anchors rely on friction or suction, but since concrete loses 50% of its weight in water, concrete blocks or barriers are typically up to 2,000 lbs. Concrete anchors range in sizes, styles, and weights.



Fluke Anchor

Fluke-style, “navy” or “mushroom” anchors are readily available, and inexpensive. They require firm silt, mud, or sand bottoms. Bottoms with a “crust” or rocky floor may not be suitable for this type of anchor.



Earth Anchor

Must be driven in with available accessories through several feet of soil. This anchor is lightweight, stable, corrosion resistant, and an excellent option for both shoreline anchoring. If under water anchors are being used, the max depth without divers is 10 feet.

*Alternate anchors available at an additional cost include: navy, mushroom, grapnel, plow/CQR, Richter



Dual Anchoring

Orienting the boom in tidal or other conditions subjected to loading from either side, may require anchoring from both directions so that wind or current change does not compromise the loading, or boom configuration.

Boom Configuration

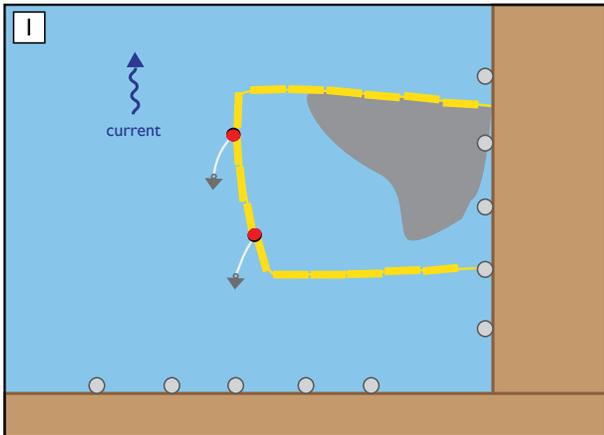
Prior to deployment, an anchoring plan should be developed based on hydraulic load, velocity, flow, and location of particulates or debris that would impact the performance of the barrier. The following illustrations elaborate on boom configurations. Oil booms, trash booms, debris booms, and turbidity curtains, may follow similar configurations. Your One Clarion

representative will help determine the right solution based on your project specifications.

Boom may be wound into reels and stored for easy access, and rapid deployment. The tow bridle is a floating boom accessory designed to aid the deployment process. Equipped to safely tow the curtain into position, these bridles feature a small flotation device and two attachment points to help distribute weight evenly across the boom. Depending on the size of the boom, this towing equipment is available in small, medium, large and heavy duty model options.

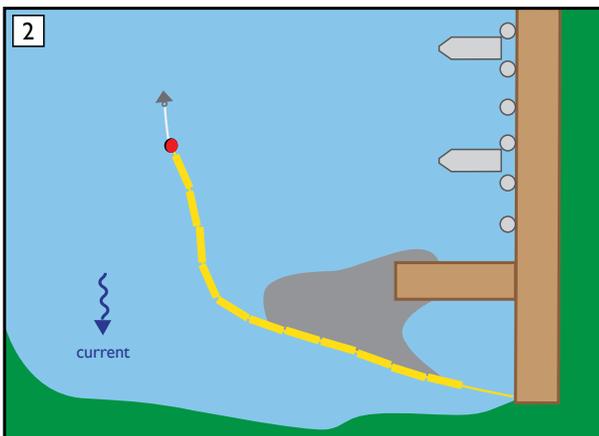
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The following are examples of effective boom configurations. The type of configuration depends on your site specifications. Our illustrations depict: containment, deflection, and exclusion.



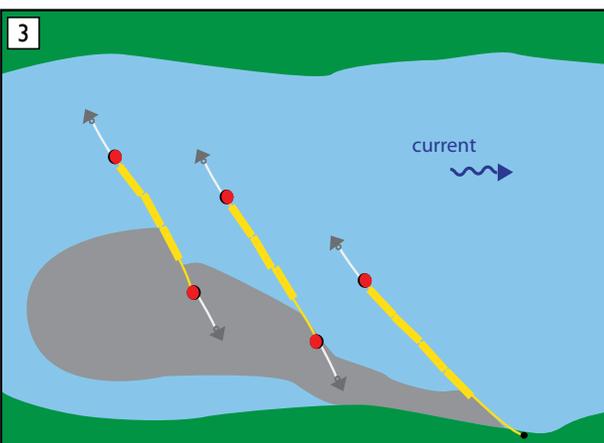
Containment

Figure 1 illustrates containment boom configuration. This type of anchoring method takes place when there is floating debris or spilled contaminant during calm weather, along with minimal current movement (no greater than 0.75 knots). A spill is contained by orienting boom across a waterway perpendicular to the path of the spill. Containment boom may also be used to encircle floating oil or debris so it can be collected and recovered at a specific location (such as a grounded barge, a vessel at the dockside, or a vehicle on shore). This configuration has 2 anchor points on the shoreline pier, and 2 anchor points underwater.



Deflection

A deflection boom, as shown in figure 2, is a protective boom strategy used to intercept, deflect, or move floating trash or debris towards a recovery site. This method is utilized when a stronger current is present. Entrapment may occur when the boom is placed perpendicular to a current of more than 0.75 knots. To increase the effectiveness of boom in such conditions, it must be placed at an angle. Orienting the boom in this way deflects the oil spill or floating debris towards the shoreline where current may be less severe. This configuration has one anchor point on the shore, and one in the water.

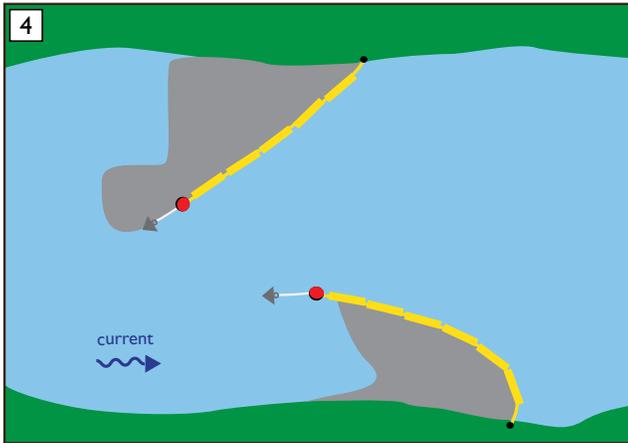


Other Types of Deflection: Cascade

As displayed in figure 3, boom is usually deployed in this configuration when a single boom is not sufficient because of fast currents or because it may be necessary to leave access for marine traffic. Additional anchor points are required to maintain this orientation as compared to single boom configuration.

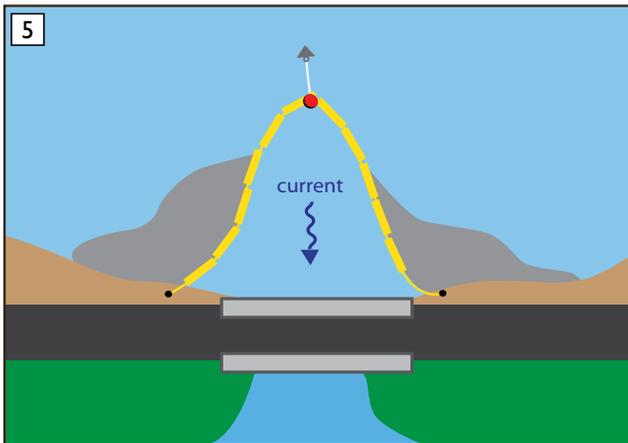
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Other Types of Deflection: Staggered Chevron

Oriented in areas with strong currents, the open chevron configuration displayed in figure 4 is used to divert spills or floating debris to two or more recovery areas. Booms are anchored separately mid-stream, with one anchor point upstream or downstream of the other, so that boat traffic may pass.



Exclusion

Figure 5 displays an exclusion boom configuration (or closed chevron), used as a measure to protect sensitive areas such as marshlands and water intakes, from spills, floating trash, debris, or seaweed. This method requires the area to be completely encased by boom, forming a protective barrier. Accordingly, a combination of exclusion and containment boom may be used to protect water intakes. Ideal for low current areas, this technique requires two shoreline anchor points, with one anchor in the center to create the point. Water outflow from a river or stream may assist in maintaining boom orientation.

For more complete information on One Clarion products and solutions, visit us at www.clarionmunicipal.com.

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