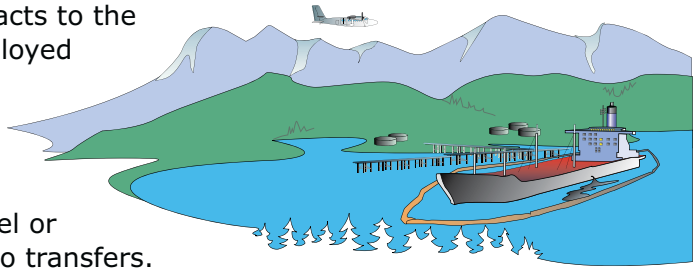
CONTAINMENT BOOM

OBJECTIVE & STRATEGY

C

Containment Booming is a fixed-boom tactic. The objective is to corral spilled oil on the water, usually near the source, thus minimizing spreading and impacts to the environment. It is usually deployed in association with a recovery tactic, either Marine Recovery or Shoreside Recovery. Containment Booming is often associated with vessel-to-vessel or vessel-to-shore fuel or oil cargo transfers. This tactic can also be deployed for any oil spill migrating downstream or downhill to water or through water.



The general strategy is to:

1. Identify the location and trajectory of the spill or potential spill.
2. Select a deployment configuration that best supports the operating environment and available resources.
3. Mobilize to the location and deploy the tactic.
4. Place boom, using secure anchor system or mooring points.
5. Monitor the boom on an appropriate basis.
6. If oil collects in the boom, utilize an appropriate recovery tactic to remove it.

TACTIC DESCRIPTION

Containment boom systems are comprised of the appropriate oil boom for containment and concentration, and anchoring systems to hold the boom in place. There is considerable variation in how these systems are configured depending on the operating environment, type of oil, state of weathering, and available deployment platforms.

Operating Environments

OPEN WATER

Containment boom systems may be difficult to deploy and maintain in the open water environment because of the high probability of fixed-boom failure and the difficulty of anchoring in this environment. The On-water Free-oil Recovery tactic may work better in this environment, due to its inherent mobility.

Containment Boom

Containment boom system components (boom and anchor systems) for open water operations should be able to withstand seas up to 6 feet and winds up to 30 knots.

PROTECTED WATER

Boom and anchors for protected water containment boom systems should be able to withstand seas up to 3 feet and winds up to 25 knots. Vessels deploying containment boom systems may be deep draft or shallow draft, depending on the water depth.

CALM WATER

Calm water containment boom systems are composed of boom and anchors that can operate in seas of 1 foot and in winds up to 15 knots. Vessels deploying calm water containment boom systems typically work in depths as shallow as 3 feet.

FAST WATER

Containment boom systems are not recommended for the fast water environment, where currents exceed 0.8 knots, because of the high probability of fixed-boom failure and the difficulty of anchoring in this environment. The Diversion Boom tactic may work better in this environment because of its ability to move oil into calmer water for recovery. Containment boom systems may work well in calm water adjacent to fast water to keep the oil from moving into the faster water. Examples of this include trapping oil in a slough or eddy until it can be recovered.

BROKEN ICE

Containment boom systems are not recommended for the broken ice environment, because of the high probability of fixed-boom failure and loss due to ice encounters.

Deployment Configurations

Anchoring systems are often deployed first and then the boom is set from one anchor to the adjacent anchor. Figure C-1 depicts the standard components of an anchor system.

Boom can be placed from shoreline to shoreline around a vessel at dock or around a spot where oil is running off the land into the water (See Figure C-2). This configuration can be used to trap oil in a natural collection point such as a slough, inlet, or backwater.

Boom is placed around an anchored vessel or underwater pipeline leak in a diamond or hexagon shape (See Figure C-3).

To some extent, boom angles can be used to deflect debris and concentrate oil into a suitable skimming pocket.

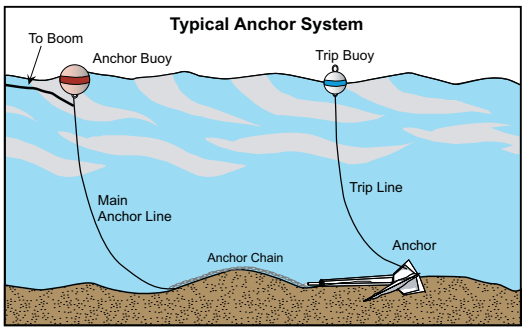


Figure C-1. Anchor system components.

Containment Boom

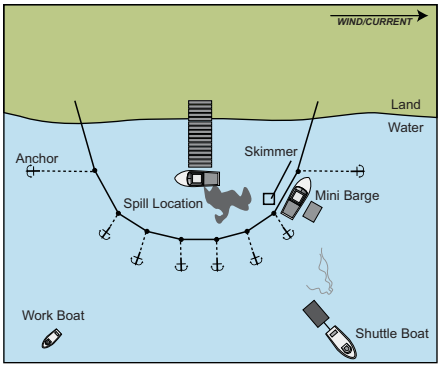


Figure C-2. Containment boom of a vessel at dock.

A second layer of containment boom, outside the primary boom, has two advantages:

1. It breaks the sea chop and reduces its impact on the primary boom,

2. It may capture oil that has escaped if the primary boom fails.

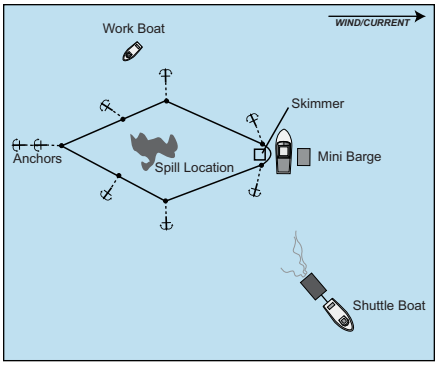


Figure C-3. Containment boom of a submerged pipeline spill.

DEPLOYMENT CONSIDERATIONS AND LIMITATIONS

SAFETY

- Daily weather evaluations are recommended, and should include distance to safe harbor, transit times and exposure of vessels.
- Vessel masters should have experience in the appropriate operating environment. Local knowledge is preferred.
- Vessels setting and tending the boom shall be able to safely transit seas which exceed the boom's operating limitation.
- Vessels, including skiffs, must have a minimum of two crew aboard.
- If possible, vessels in transit to/from an operation or staging area should transit in pairs.
- A communications schedule should be established and followed, between vessels in transit and the Operations Section or Radio Dispatcher.
- Extreme care should be used when taking strains on anchoring systems using the aft cleats of small vessels and skiffs.
- Buoy lights should be considered for night operations.
- Anchor trip lines should be made of material strong enough to handle a moderate strain during boom reconfigurations. Responders normally use the trip line to reposition and reset the anchors.
- Response personnel should wear PPE as required by the incident-specific Site Safety Plan.

DEPLOYMENT

- It is often advisable to "line" the containment boom with sorbent materials (passive recovery) to recover the sheen and reduce decontamination costs.

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- If the oil slick is moving, due to wind or current, consider containment at the source and ahead of the leading edge.
- If spill is moving in excess of 1 knot, or if the spill site is exposed to potential wave conditions greater that 2 feet, consider the Diversion Boom Tactic.
- Anchor systems must be selected based on the maximum stress that might be expected to occur on the boom array, considering stronger currents and winds than when the anchor is set.
- The scope of the anchor line should be at least 3 times the depth of the water. If the anchor fails to hold, try increasing the line scope to five times the depth of the water and/or double the length of the anchor chain. Finally, if additional anchor holding is required, anchors can be ganged or set in series.
- Anchor vessels fore and aft, before deploying containment boom around them. Estimate the boom length at 3 times the vessel's length.
- Site conditions will influence deployment configuration options.
- Combinations of Containment Boom and Diversion Boom tactics are often used together to optimize success.
- Logistics for monitoring fixed boom should be considered.
- All screw pin shackles shall be seized with wire.
- If wildlife or historic properties are encountered, see Wildlife Checklist on page A-19 or Historic Properties Checklist on page A-20.

REFERENCES TO OTHER TACTICS

Other tactics associated with Containment Boom include:

- SR • Shoreside Recovery
- MR • Marine Recovery
- PR • Passive Recovery
- DV • Diversion Boom

EQUIPMENT AND PERSONNEL RESOURCES

Commonly used resources for this tactic include vessels, boom, anchoring or mooring systems, response personnel, and associated equipment and materials. Configuration and specific resources required will be determined by site conditions, spilled oil type and volume, area of coverage, and resource availability. Resource sets may need to be refined as site-specific requirements dictate.

Open Water Containment Boom System

Typical Equipment	Function	Quantity	Notes
Oil boom, > 36" height	Contain and concentrate oil	Site-specific	Depending on configuration, currents, sea states, and oil concentration
Large anchor systems, moorings, or shore-based anchors	Secure boom in selected configuration	1 per 200 ft. of boom	Depending on configuration, currents, and sea states
Typical Vessel	**Function**	**Quantity**	**Notes**
Class 2, 3, 4 or 5 At least one vessel with a crane is recommended	Deploying/tending anchors and boom	2 to 4	Depending on configuration, currents, and sea states. Boom rollers and deck winches may also be useful when heavy response equipment is used.
Typical Personnel	**Function**	**Quantity**	**Notes**
Field Team Leader	Supervises operations	1	May not always be on-site
Vessel Operators, open water	Masters of response vessels	2 to 4	Depending on number of vessels
Skilled Technicians	Crew vessels and operate response equipment	2 to 4	Depending on number of vessels
General Technicians	Work under the direction of skilled technicians or vessel operators	2 to 8	Depending on number of vessels, configuration, and boom type

Protected Water Containment Boom System

Typical Equipment	Function	Quantity	Notes
Oil boom, 18" to 42" height	Contain and concentrate oil	Site-specific	Depending on configuration, currents, sea states, and oil concentration
Small anchor systems, moorings, or shore-based anchors	Secure boom in selected configuration	1 per 200 ft. of boom	Depending on configuration, currents, and sea states
Typical Vessel	**Function**	**Quantity**	**Notes**
Class 3, 4, 5 or 6 At least one vessel with a crane is recommended	Deploying/tending anchors and boom	2 to 4	Depending on configuration, currents, and sea states
Typical Personnel	**Function**	**Quantity**	**Notes**
Field Team Leader	Supervises operations	1	May not always be on-site
Vessel Operators, protected/calm water	Masters of response vessels	2 to 4	Depending on number of vessels
Skilled Technicians	Crew vessels and operate response equipment	2 to 4	Depending on number of vessels
General Technicians	Work under the direction of skilled technicians or vessel operators	2 to 4	Depending on number of vessels, configuration, and boom type

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Calm Water Containment Boom System

Typical Equipment	Function	Quantity	Notes
Oil boom, 6” to 24” height	Contain and concentrate oil	Site-specific	Depending on configuration, currents, sea states, and oil concentration
Small anchor systems, moorings, or shore-based anchors	Secure boom in selected configuration	1 per 200 ft. of boom	Depending on configuration, currents, and sea states
Typical Vessel	**Function**	**Quantity**	**Notes**
Class 3, 4, 5 or 6	Deploying/tending anchors and boom	1 to 3	Depending on configuration, currents, and sea states. Vessel may not be necessary – some water bodies can be waded.
Typical Personnel	**Function**	**Quantity**	**Notes**
Field Team Leader	Supervises operations	1	May not always be on-site
Vessel Operators, protected/calm water	Masters of response vessels	1 to 3	Depending on number of vessels
Skilled Technicians	Crew vessels and operate response equipment	2 to 3	Depending on number of vessels
General Technicians	Work under the direction of skilled technicians or vessel operators	2 to 4	Depending on number of vessels, configuration, and boom type