



# Office of Spill Prevention and Response

## How is oil contained?

Oil spilled on a body of water is best contained by a floating physical barrier known as boom. This old, but proven device is able to prevent movement by working at or near the surface level, because oil floats on water.

### Components

Boom comes in different shapes and sizes to accommodate varying spill scenarios, but each type is made up of five common components:

- Flotation device – keeps the boom at surface level to trap floating pollutants
- Freeboard – the part that rises above the surface to prevent waves from washing pollutants over the top
- Skirt – the part that prevents water currents from pulling floating pollutants under the boom (similar to freeboard, but underwater)
- Ballast – the weight at the bottom of the skirt that keeps it hanging vertically against a current.
- Tension line or strength member – cables, chains or lines extending the length of the skirt or freeboard

### Specifications

Boom length is measured in feet, and it's not unusual for thousands of feet to be deployed for even a modest spill. Sizes are described in inches of freeboard and skirt. For instance, a 6-by-12 boom has a six-inch-high freeboard and 12-inch-deep skirt. Boom typically comes manufactured in high-visibility colors, such as white, yellow or orange, for easy tracking by response teams and for the safety of nearby vessels.

### Properties

Boom is not a perfect containment device. Waves can carry oil over a boom and a current may force oil under it. But if deployed effectively, boom helps concentrate oil in thicker surface layers that make it easier to recover, and reduces the magnitude of potential shoreline pollution.

Limitations on the use of boom include the time required to get it to the scene, load it on boats, carry it to the spill and deploy it. Boom also has to be stored within reasonable traveling distance of a potential spill. Once used, boom has to be de-contaminated of the waste oil or chemical before it can be stored. If sorbent boom is used, it has to be disposed of safely once it has been contaminated with oil or chemical waste. Some types of boom have operational limitations, such as the loss of ballast or buoyancy, if the water- or air-filled sections are breached by abrasion or handling.

### Tasks

A single string of boom will often serve several purposes simultaneously. Typical tasks for boom include:

- *Encirclement* – the process of laying one or more barriers of boom around the source of the spill to keep it from spreading, or around a section of slick to hold it in place for recovery. (Tankers transferring cargo may be encircled by boom as a precaution, even when there is no spill).
- *Diversion* – setting one or more lines of boom at angles into or across a moving slick's path, to guide it toward an area where it can be confined and recovered, or to let it safely pass a sensitive area. Diversion is primarily used near shore on rivers and is most effective when there are weak currents or little wave action.
- *Collection* – towing boom in a "V," "U," "J," or teardrop configuration through or around a slick to gather oil together for recovery or burning.



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- *Recovery* – placing sorbent boom where it will contact floating oil and absorb or adsorb some of it for later recovery, or similarly using weir boom to catch oil and transport it to a skimmer.
- *Exclusion* – stringing boom around non-polluted areas to keep oil out. This process may also be used to divert moving oil from a sensitive area.

## Types

Fence boom has a high freeboard and short skirt; used in circumstances where the pollutant has a better opportunity to move across the surface.

Curtain boom has a longer skirt and shorter freeboard; used where underwater currents are stronger and the pollutant has a better opportunity to move below the surface.

Tubular containment boom has at least two sections: one consists of air-filled tubes that lie above the water for flotation to keep oil from crossing the boom on waves, and the other has one or more water-filled tubes that lie below the water for ballast and keeps oil from passing beneath the boom.

Sorbent boom is made of an absorbent or adsorbent material to collect and hold oil within the boom itself. It's most effective with thin layers of pollutants and light winds or currents. Once soaked to capacity, the boom can be recovered and the collected oil squeezed out. Sorbent boom requires strong supporting lines, chains or cables because of its tendency to break under pressure of wind or current. Once soaked, it is heavier than simple barrier boom, thus requiring extra effort to remove it from the water.

Recovery boom, such as three-weir boom, has four sections:

- [1] An air-filled tube extending above the water for buoyancy and to keep oil from passing over the boom;
- [2] A water-filled tube extending below the surface for ballast and to keep oil from passing beneath the boom;
- [3] A discharge tube which collects oil from inlets between the air- and water-filled tubes and moves it the length of the boom to a recovery device; and,
- [4] A smaller air-filled tube to keep the discharge tube afloat.

Recovery boom not only holds floating pollutants in place, but takes an active role in recovering pollutants from the water.

**In closing:** A frequently-encountered problem with boom is that each end of the device must be anchored in place. On a small stream, it can be tied to trees or rocks on land; in a harbor, it may be attached to piers or seawalls. On open water, however, the ends must be literally anchored, using lines attached to weights on the lake or sea bottom, OR they must be attached to boats. The use of a boat to anchor one end of a boom means that vessel cannot be used for any other assignment. This can be problematic, especially when boats are in short supply.