

Frequently Asked Questions

How does the Wavebrake work?

The **Wavebrake** works by disrupting the laminar flow of the wave and the resulting turbulence extracts the energy from the wave by a "canceling" effect. The energy is dissipated by this action with friction and the wave is attenuated. Energy is not directed in other directions to cause damage in another area. The multi faceted shape of the individual cubes, when connected, provides a porous face that accepts the wave and channels the water into the porous cavities between the modules. This space contains the turbulence and extracts the wave forces by a "canceling effect".

What are the details of the Wavebrake system?

Each cube weighs 17 lbs each with a 3/16" thickness. They are made of polyethylene. This material is extremely tough in cold or heat and is not brittle. We use recycled material for the black cubes and all materials are recyclable. We have chosen blue for visibility on the top rows and black for the cubes under the water. The cubes in the water do not get UV rays so there is long life. The blue cubes have a UV inhibitor added. The life is 20 to 25 years. Urethane can be used to increase UV blocking. The specific gravity of the polyethylene is .92 of water.

How is the system connected?

The lines used for connection and anchor attachment are double braided polyester, line within a line, and a special connector uniquely designed for the application. The placement of the line adds to the lateral strength of the **Wavebrake**. This line is designed to minimize stretch and will change diameter under stress to increase holding power.

How is the Wavebrake anchored?

Anchoring is a site specific issue. Any common method will work, as long as the breakout point of the anchor system selected exceeds the wind, current and wave loads of the site. Generally this system is determined with the customer at the site. There are pendants attached to the system that connect the anchor.

How can the Wavebrake system be used?

We originally intended Wavebrake as an offshore floating breakwater to mitigate storm damage to the shore and to replace the use of armor stone on a beach and bring balance to the shoreline. Other applications became apparent for marinas, to eliminate boat wake and wind driven waves, and homeowners creating a personal harbor for the protection of their boats and docks and the inherent safety of calm water. In general, any application that would use stone can use the **Wavebrake**.

What are the types of floating breakwaters?

According to literature from the journals of the American Society of Civil Engineers (ASCE) there are four groups of floating breakwaters - box, pontoon, mat and tethered float. We believe there is a fifth. A three (3) Dimensional porous space frame (**Wavebrake**). Wavebrake reduces the waves by dissipating energy in the structure and dampening mooring system to the sea floor anchors. The anchoring restricts and dampens the movement of the structure so that it will constantly interrupt the laminar flow of the water.

What are the environments for the Wavebrake?

The ability to configure the **Wavebrake** modules does not limit the size of the system. Further articles from the journals of the ASCE indicate the amount of wave attenuation is scalable to the size of the Wavebrake structure. The more cavities the water passes through, the more friction and wave attenuation. A study involving a box system has upper limits of 6 Ft waves and 4 - 6 second periods with a 50% reduction. Another project described in the journals involved a box with an extended porous fence deeper into the water and it realized an 85% reduction. The more width and depth of a **Wavebrake** system, the better the wave attenuation.

The **Wavebrake** could also be used in support of living shorelines, wetland protection, and shoreline protection from beach erosion

How is the Wavebrake installed?

Usually, the components are shipped to the site and then assembled in sections. A 50' system could be shipped fully assembled. They are launched and then connected to the anchoring lines. Tethers are installed to connect the anchoring system. A PWC or small boat may be used as the dry weight of a 27' standard section is only 800#s. There is no need for cranes or a barge, a boat ramp is sufficient for launching or retrieving the system. We also have a small barge system to install larger systems.

What is the Maintenance involved for the *Wavebrake*?

The system is built in sections for ease of handling. It may be readily removed to inspect the connections, anchor lines and to clean any growth from the system.

What about fouling?

Most of the time, the system is in constant motion and washes itself. The added weight of any growth (barnacles, algae, etc.) will only make the system work better. Urethane can be added to the cubes and lines to inhibit UV damage and fouling.

What are the permitting requirements?

All structures in a regulated zone require a permit or a letter of non-jurisdiction. Usually there is a joint application for all the governmental agencies involved. Your local USACE Districts may have the forms and requirements on their web page. The *Wavebrake* is **not a permanent structure** in its floating configuration and can be moved or repositioned with ease. Permitting for structures that do not rest on the bottom should be easier to obtain than for rock breakwaters.

What about lighting?

If lighting is required, the Coast Guard through the USACE or regulatory body will specify any lighting. Solar lighting is easily attached.

What depth of water is required for *Wavebrake* installation?

As the modules may be deployed at various depths, almost any application or depth of water will support a system, shallow or deep. It may be possible to accrete sand and build a beach under the right conditions. The depth of the floating system configuration is determined by the depth from the surface required to get the desired wave reduction.

What about ice in the winter?

If the site is located in an area that is not subject to flow ice and it is the custom to leave floating docks in the water over the winter, the *Wavebrake* may be left in the water. It is recommended, however, to remove the system if in an area which experiences flow ice. If flow ice occurs in the spring, then the system should definitely be removed in the fall.

Is the *Wavebrake* an eyesore?

Aesthetics is in the eye of the beholder. We have made every effort to maintain a low profile while maintaining functionality. We feel that the colors selected alert boaters and do not degrade the view more than any other possible structures. The system can be designed to be at the surface and only slightly visible. Markers would be attached in this instance.

Will *Wavebrake* help with beach nourishment or impact negatively on adjacent properties?

The positioning of the system is crucial to the success of beach accretion applications and in support of beach nourishment projects. With the movement of sand during storm events, the reduction of the velocity of the water allows for the sand to drop or settle out of the water returning the shore to its natural state. This is similar to stone breakwaters that break the waves and sand accumulates behind the revetment. This design is commonly used in many states in USACE designed projects. The *Wavebrake* is anchored to the bottom allowing the natural littoral drift of sand between beaches. Because the *Wavebrake* is adjustable, we are able to eliminate any damage to adjacent properties.

What about large storms and 20' wave heights?

As stated above, independent research indicates a possible 85% reduction in wave height for a porous floating breakwater. Stone breakwaters are designed to achieve an 80% reduction but are extremely expensive and may impact the environment in a negative fashion. The major issue with ocean or high flow rate installations is the anchoring. Determining the proper loads and the type of anchor is crucial to success.

As most *Wavebrake* configurations are based on workings of a stone revetment or breakwater, we would expect the same results without the negative aspects of a large stone breakwater in deep water.

What are the competitive advantages of the *Wavebrake*?

We have easy assembly and installation by hand without the requirement of heavy equipment. This feature lowers the total cost of the system and we believe we have the best price in the market for the most functionality. Larger and smaller systems are proportionately priced. There is not just one design configuration, but rather there are many for the varied applications. This flexibility and modularity only increase the value of the *Wavebrake* system.

How can I purchase a *Wavebrake*?

We are currently selling direct to the market. We are looking for dealer candidates who can provide full service sales, installation and service in a serviceable area.