

The Reef Beach Company

(Erosion control solutions with Reef Balls and related technologies)

Sarasota Sailing Squadron
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Subject: Recommendations and Proposal for Reef Ball Wave Fence

Background:

Around 1985, the Sarasota Sailing Squadron installed a traditional horizontally slatted wave fence to protect the Squadron's marina from waves that are typically generated by non-speed restricted boat traffic using the channel to New Pass. This fence functioned adequately except for some of the larger waves that were able to penetrate below the fence protection. However, as with any wooden structure in the sea, the sea fence has fallen into disrepair and no longer offers adequate protection. The cost to re-install such a wooden structure is estimated to be around \$171,000 and the expected life of the structure will be much less than the 15-20 years obtained from the first wave fence since chemically treated wood is no longer allowed to be used underwater. Additionally, boat traffic has increased substantially over the years putting much more wave stress on the structure. The Squadron hired Dr. Lee Harris, a consulting Physical Engineer who is also a professor at the Florida Institute of Technology to assess the wave fence and to determine if Reef Ball technologies could be used to provide the necessary wave attenuation. At the same time, the Squadron consulted with Mr. Todd Barber, Chairman of the Reef Ball Foundation to determine if proposed solutions could also provide environmental benefits to Sarasota County and the National Estuary Program's goal of adding additional Reef Balls to the Sarasota Bay area as part of a long-term bay restoration effort.

Biological Recommendations:

The Reef Ball Foundation is very familiar with the biological workings of Sarasota Bay due to numerous monitoring studies, work with the National Estuary Program and a close association with the artificial reef programs of both Sarasota and Manatee Counties.

Because there are limited inlets into the Sarasota bay, there exists large tidal exchanges of water that daily moves between the Gulf and Sarasota bay. This movement generates a significant current in the area proposed for the artificial reef structures. High water flows, and particularly with the good water quality that is available near ocean passes creates excellent conditions for rapid artificial reef colonization. Additionally, artificial reef modules that can provide voids (or areas that shelter fish from strong current flows) do an especially good job of providing a place for fish to conserve energy between tidal events.

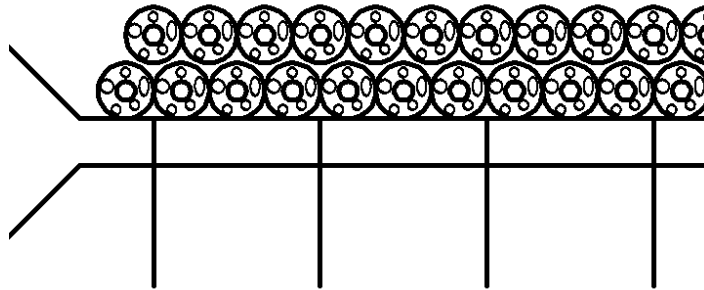
Therefore, the Reef Ball Foundation strongly recommends the site as ideal from a biological point of view. However, strong currents can also present design challenges from an artificial reef perspective. Although there is little concern about movement by a storm given that the site is within protected bay water, there should be consideration for possible scouring of the sand and/or possible settlement of modular units.

Engineering Recommendations:

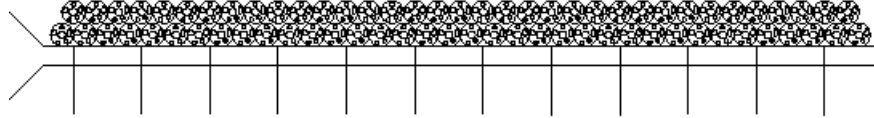
Dr. Harris considered a wide range of design alternatives including 5-10 foot tall, 5-10 feet wide cubed Reef Balls™, interlocking Reef Ball cubes™, Reef Balls™ with mangrove planting “pots” built onto the surface, and more standard traditional Reef Ball™ technologies.

After a review of tidal flow rates, it was determined that some of the more elaborate solutions such as the extremely large Reef Cubes™ or interlocking Reef Cubes™ would likely pose too much a risk for scour and differential settlement that could leave the Squadron with an ugly mess years down the road.

Dr. Harris concluded that the best solution was a hybrid between the existing Reef Fence to protect from smaller waves passing near the water surface with a layer of Goliath™ sized Reef Balls™ (6 feet wide, 5 feet tall possibly mounted on 1-6 foot tall cement pilings (depending upon final bottom survey results) to attenuate large waves traveling through the lower portion of the water column.



Dr. Harris recommends that the Squadron has the upper 6 feet of the existing sea fence repaired leaving the existing wood below that level that is still in good shape (i.e. removed any that are detached or loose). Next, we would add about 71-77 Goliath™ sized reef balls in a configuration of two tightly packed rows (total width of about 10 feet). Each ball on the outside row would actually touch two balls on the inside row. (see scaled CAD below)



This recommendation would include repairing the upper 2 meters of the existing sea fence. Such repair would likely be undertaken during the extremely low seasonal tides in the wintertime so that diving work might be avoidable.

County Biological/Permitting Issues:

Mike Solum of Sarasota County Artificial Reef program had a few additional biological/permitting suggestions. He suggested, if possible, that additional Reef Balls be placed under the dock and/or a series of hanging ropes with weights be used under the docks to provide extra fish habitat and perhaps a bit more wave attenuation. Hanging ropes would rapidly foul with a variety of marine life and serve to provide habitat and minor wave attenuation without putting too much drag on the structure itself. Reef Balls below the dock would add additional fish habitat without taking up any navigational space. This additional work could probably be done in conjunction with Booker High School as an “extra” bonus without too much additional costs.

Costs:

Because anti-settlement anchoring columns may be involved (pending survey work), you will need to obtain a cost quote from Reef Innovations, Inc. (Larry Beggs 941-650-2519) once a formal bottom survey has been completed to get an exact cost for the Reef Balls™. Standard Goliath™ Sized Reef Balls™ are \$375 each so if I assume an additional cost of \$50 for the anchoring columns the project would be about \$30,000 in Reef Balls™.

You will also need to get a deployment assistance estimate from Reef Innovations, but we presume you will be able to handle most of the costs for this using your own boats and perhaps a donated barge from your membership. I estimate that deployment assistance from Reef Innovations could be between \$2,000-\$10,000 depending upon how much work you would do on your own. If required, I would suggest that you leave the task of jetting in the anchoring system to Reef Innovations and underwater construction is involved and could be dangerous in the currents near the pass.

Booker would probably need expenses support. I would estimate it would cost about \$1000-\$4000 for them to make the Pallet Balls™ for you for installation under the dock. If you purchase the Pallet Balls™ from Reef Innovations, their cost is \$180 each or about \$3,000-6,500 depending upon density.

There will also be additional engineering and site surveying fees. It would probably take Dr. Harris and I one or two more days to complete the underwater survey work and jet probes. In addition to our daily fees (\$700/Dr. Harris and \$500/Todd Barber) there will be some minor expenses such as travel for Dr. Harris and rental of a jet pump for doing the probe work. Including the initial site visit, I would suggest an engineering budget of about \$5,000. Given that Reef Balls may be part of the mitigation for the buoy field, you might consider an additional monitoring program. Such a program would vary in price according to overall scope.

Therefore, the total project will likely cost you somewhere in the range of \$30,000-\$50,000...however that is subject to revision if bottom survey work finds conditions different than we expect or if the quotes from the various contractors are substantially different than expected.

Cordially,

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