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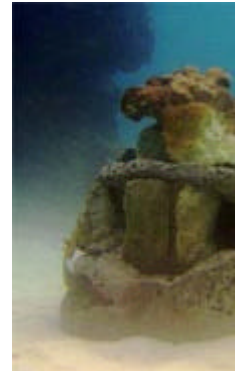


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Environment
Reef Balls:
A Concrete Solution
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Earth Day was celebrated all over the world, but in Thailand it went beyond the usual beach clean up. An exciting event took place in Phuket; Thailand became the 50th country to launch a reef ball. This is an important first in the race to protect the marine environment in Thailand. The Reef Ball Foundation, together with The Racha resort and Racha Seamaster Divers are the first in Thailand to make a commitment to this new reef conservation program. It started on Koh Racha Yai, one of Phuket's most visited diving sites and will hopefully be copied through all of Thailand.

It was a learning experience for all who participated: Phillip Goh, director of Racha Seamaster Divers, Jesada "Man" Na Ranong, a dive master working there, Sabine Brosch from Sea Bees Dive Center, some of the staff from The Racha and myself. At the end of the 4-day program, after completing Thailand's first four reef balls, we all received our official certification as Reef Ball volunteers, not to mention some invaluable education about reefs, making reef balls, handling and saving corals.



Layer Cake.

Committed to the environment

The Reef Ball Foundation was invited to Thailand by the new 5-star resort and dive shop on Racha Yai. The Racha, v by Sanctuary Resorts, is a company that aims to be environmentally responsible. The Racha along with the dive sho Seamaster Divers, have taken the initiative to protect, preserve, restore, and enhance the reefs at Koh Racha Yai. T aside a budget of two million baht for the initial phase of the Reef Ball programme.

Representing the Reef Ball Foundation and providing the training was Todd Barber, C.E.O. and founder of the Reef E which is a non-profit, environmental (NGO) organization. Its aim is to promote the concept of marine reserves and t around the world while promoting public awareness. As Mr. Barber said during the first day of the programme, which by some government officials, "we encourage the dignitaries here to take as many protection measures as possible.

His first idea for a reef ball came after covering a beach ball in cement over 10-years ago. However, after many yea research and development the beach ball covered in cement has evolved into a time and cost-efficient concrete reef structures usually resemble pyramids more than balls, with a heavy square base used to anchor them to the bottom in six different sizes, ranging from 15cm (6-inches) to nearly 2m (6ft). There are over 3,500 reef ball projects arour 500,000 reef balls in use. One huge advance took place when Todd met John Walch, an expert in coral propagation, way to transplant fragmented coral pieces on to the reef ball, giving it a head start for coral growth.

Even before making the reef balls, the first step, is to carefully decide were to put them. After surveying the bay in Racha, Seamaster Divers, Todd, John and Phillip decided on a sandy area not too far from some reef, about 8m (26 also suggested putting the reef ball on top of a discarded old tyre to cover it up. Their goal is to mimic Mother Natur possible while creating a natural environment.

Fibreglass

To construct a reef ball a fibreglass mould is used, we used one brought over from America and purchased by The Racha and Seamaster Divers. However, it is possible to buy pre-constructed reef balls or rent the moulds. The mould is three main fibreglass pieces held together with pins. Inside the reef ball mould, small inflatable balls are attached to create spaces in the reef ball. A large bladder surrounded by various sizes of inflatable balls to make holes, is inflated and placed in the centre of the mould so that the reef ball is hollow in the middle; this also acts as a flotation device to ease deployment of the reef ball once it is in the water. Because a porous surface is best for coral growth, sugar water is sprayed on the inside walls of the mould to stop the concrete drying with a smooth surface. The concrete used contains silica and has a similar pH to natural seawater. The silica helps give the reef balls an expected life of 500-years or more. When the concrete hardens there are small indentations, usually one ball will have about 18, which are used to hold the coral fragments that are transplanted.



Decorating the Layer C

The concrete is mixed and poured into the mould; we used our hands to help with getting the concrete around the balls. It took 4-6 hours for the concrete to set. Once the concrete was set the three pieces mould were easily taken apart and a reef ball was born. At first it was not a pretty sight and it is hard to imagine it l a mass of concrete, with a rough uneven surface, strange holes and an unusual shape. It is amazing that this object potential to improve the world's marine resources and within a few months will be more than just a lifeless grey obj Within a few weeks algae will be growing on the surface and it will soon become a marine habitat.

It was then ready to be deployed into the ocean. The bladder inside was left inflated to be used to control the reef b make it easier to manage in the water. Our reef balls, the mini bay balls, weighed approximately 135kg (298lb). Ou built on the beach and we rolled them to the ocean. Once there they floated easily with a little bit of guidance from Slowly they were deflated and sank down to the sandy bottom. They are designed to be bottom heavy so they can v heavy storms. Before the balls even hit the sand the fish were coming around to check out the new structures in the and determining who would be the first to move in.

Transplanting doomed corals

Next we learned how to save and transplant otherwise doomed coral and make coral plugs, to attach to the reef bal

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broken off the main growth, and is still alive it can be saved. For it to be saved it must be placed in a stable location not get moved around and where it will not touch other corals as many corals will engage in their own warfare if the each other.

John warned us that we were not accustomed to seeing what he was about do. He took down a pair of pliers and for coral, either dying corals or pieces that were broken off completely. He cut them into bits about 7.5cm (3-inches)-lc species and then put them into bags. Back on the surface the coral was placed in saltwater, even though the coral c amount of time out of saltwater once the polyps are retracted.

We set up a small station that was quickly assembled by Philip and The Racha staff. It was very basic and consisted pieces of plywood with some holes cut out to fit universal medicine cups, a large plastic ice chest filled with seawate cups a concrete mixture and some sand. This was the most important part of the training, learning how to transpar keep it alive. It took at least four people in assembly line fashion and did require some mixing skills. Small amounts mixture were poured into medicine cups to make the base and the coral was placed in the concrete before it started was in about five seconds. Once the coral fragment was securely placed in the concrete and the concrete started to John would say, it was placed back in a container of saltwater.

Coral Plugs

We decided to go back into the water for the third time that day to place the coral plugs in the reef balls. However b waves and surge had picked up. Luckily we had the experts with us and John was particularly protective of his new i He went in the Racha Seamaster inflatable and the rest of us went in scuba to the reef balls. From the boat John pu basket and lowered them to us and we carefully placed them on the reef ball and secured them with a particular adf important to only stick one type of coral on each ball.

There is another type of reef ball that can be made with the same mould. This second type does not use the inflatab much heavier, but so much fun to make. Known as the layer cake, it requires a bit more planning and designing but creative side of the volunteers. It starts with a layer of concrete and then a layer of sand to create spaces, instead o removable bladder. We also used rocks and some discarded construction materials like broken bricks to create pillar recycling didn't stop there: a large empty, plastic bottle was also "layered" in with the opening on the outside and ir the opening was the only part of it that was visible. The idea here was to create a home for an octopus. Philip addec newspaper to make a complex tunnel system and the top was decorated with some bits of shells and broken tiles. A hours the exciting part is the unveiling of the reef ball masterpiece. After that the sand is hosed off. Just like snowfl: balls are identical.

A large part of the success is continued monitoring, which can start from the second day. So the next day we went t plugs were doing. Within 24 hours it can be determined if the coral will survive. The majority of the corals we transp promising. If the coral does not grow naturally then it will just take a longer time before the reef balls have natural i initial reef balls were successful and we were very happy with our progress. Racha Seamaster Divers invited us to c monitor the balls as well.

Solid commitment

The Reef Ball Foundation will not start a programme unless there is a solid commitment for continued monitoring, w made by The Racha and Seamaster Dive Shop. "I have never seen one [a resort] more impressive in its concern for This is a great effort" said Mr. Walsh about The Racha. The plan is that the reef balls will be monitored by the govern and experts in Thailand. The Racha will be a place for marine studies and a conservation centre. They have offered i and offices for use by Thailand's marine authorities.

Now that the initial survey had been done and some reef balls positioned, the Reef Ball Foundation will begin to mal plan. The Racha and Seamaster Divers will be making and deploying reef balls continually and indefinitely. There wil volunteers and hopefully more reef balls will be used to preserve the reefs in Thailand.

It was inspiring to work with Barber and Walsh, because of their dedication and also to learn of the possibilities and reef ball projects have. Despite mans rapid destruction of coral resources there is some hope for preserving the mar Thailand is a top diving destination, but continued efforts such as this are needed to maintain this status.

Postscript

After the tsunami I was relieved to find out that all the staff and guest from The Racha Resort and Seamaster Diver: Although the resort and dive shop were damaged, Seamaster Divers is planning to be open in two or three months. not deter them with their initial plan to preserve the marine environment outside Racha Island. They are still fully d project. Anyone interested in supporting the project can contact them. It has also been reported that the first reef b claim, withstood the tsunami and is still standing upright in the bay. For further information please visit www.rachaseamaster.com.

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