



Regeneration, development and
creation of marine environments

HABITAT



hábitat units

HÁBITAT UNIT

(Patent nº P200500902)



Hábitat Unit

Introduction

One of the tools to increase natural resources is creating artificial reefs, which will be a part of the local ecosystem in the future, enriching it with refuges, feeding and fixing zones for both animal and vegetal species. This strategy is one of the most efficient one for the conservation of biodiversity. The installation of one of these structures as an artificial reef will mean a benefit for the marine ecosystems and for fishing resources increasing their biomass and biodiversity, as shown by the results of former studies.

Restoring and renovating ecosystems through artificial reefs allow the recovery of certain damaged zones and bring some additional advantages:

- They will provide refuges, not only for fries, but also for adult animals.
- They will influence currents and marine dynamics of the zone. Artificial reefs parallel to the coast diminish the surge and avoid beach sand migration.
- They will attract great amounts of micro-organisms which will be the sustenance for different marine species, which means a recovery of the existing ecosystems in the zone.
- They will be a zone for the fattening of local and migrating fish.
- They will help to maintain the local fish industry.



Recovery of the ecosystems

The HABITAT unit is an artificial piece conceived for the regeneration, recovery and renovation of marine environments. This piece will be installed, in possible degraded zones. It will provide substratum for many marine species, keeping, restoring and increasing the biodiversity in those damaged zones of our coasts.

Characteristics of the Habitat Unit

The definition of the pieces to be used for the formation of artificial reefs is one of the most important points of all the process. Their design, composition, disposition and strategy are the most important characteristics to consider for a future restoration of the ruling ecosystems in the zones of study.

Design: The design of this unit is based on the creation of an irregular surface with solid forms and rounded edges where different colonies can settle. The irregular texture of its surface makes it easier for the different benthonic organisms to colonise the reef. In its numerous holes, fish can find refuge, some of them can breed there as well. These cavities are an important advantage for colonising species, by becoming a fixed fish habitat, a food resource and a reproduction zone.

The structure has enough holes to consolidate the settling of species. The surfaces have been designed with mellowed geometrical elements, since sharp edges, points and regular holes in shape or size do not attract any marine life, they do not seem natural and could be dangerous.



The surface shows different textures.

In order to increase the tictotropic stimuli, ropes and plastic elements can be installed since they disturb the water flow and generate undulations, producing an effect of organism concentration.



Tictotropic stimuli

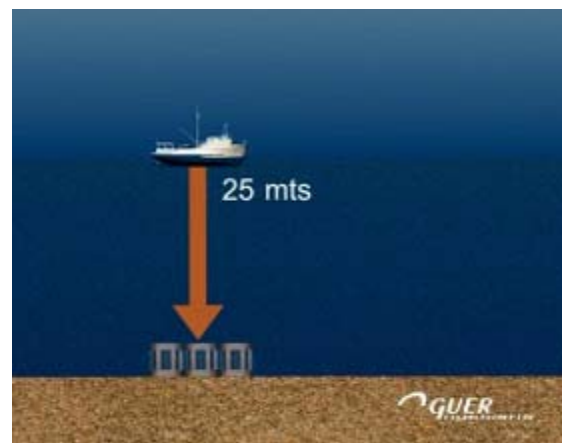
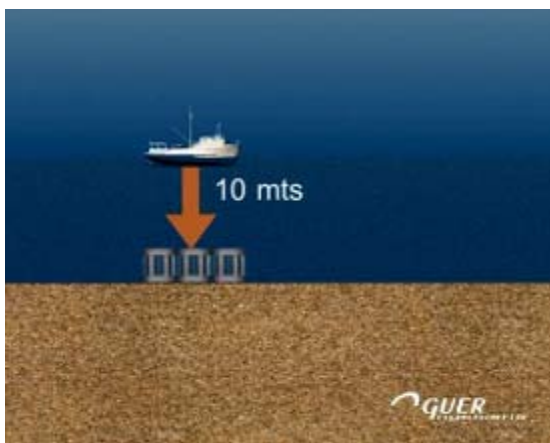
A good design of the elements used for the construction of an artificial reef is fundamental to attract animal life and to make weed, fish, molluscs, etc. quickly settle on its surface and environment; but also to support the impact of the sea.

Composition: The concrete used for the construction of a reef must be durable and resistant enough to allow its correct installation. Since seawater has a pH between 7,5 - 8,4, the concrete has to be much more basic than the one used for concrete structures on ordinary building sites, in order to make its colonisation by marine organisms easier. Moreover, it must be prepared with non toxic additives, so that there is no alteration of the environment.

HABITAT unit bottom part is made with reinforced concrete HA-30/P/20/III_b + Q_b +E. The top cap and cylinders uniting both parts are made with porous concrete; dosage 200 Kg/m³ (cement MR). This porous concrete enables the settling of several species on its surface.

The porous concrete used for the structure enables the settling of several species on its surface. The porosity and roughness are determined by the gravel size and the proportion of water and cement, so these effects can be enhanced to their maximum level by choosing the right concrete composition.

Disposition: The HABITAT units used for future artificial reefs should be moored in depths between at least 10 metres to avoid surge and 25 metres at most so that the colonies settled on the structure and their evolution can be observed by autonomous divers. In any case, the reef can be installed in greater depths as well



The Habitat units should be placed in a depth between the 10 and 25 metres

The HABITAT structures can be placed where the sea bottom has a low biodiversity, like on sandy substratum or in zones that already form small reefs, such as rocky zones.

Strategy: These artificial reefs will be secured with some protective structures that stick out from the artificial reefs to avoid the fishing nets.

That zone without fishing activity will have to be preserved until the establishment of species in the new reef is complete.



Preserving the zone from fishing activities until the complete species fulfillment

Pursuit: Once the new HABITAT reefs are created, it is important to perform **periodical observations**, not only in short terms but also in long terms, from the moment of their installation on, to follow the evolution of already existing and newly settled species.



Periodical observation of the existing communities

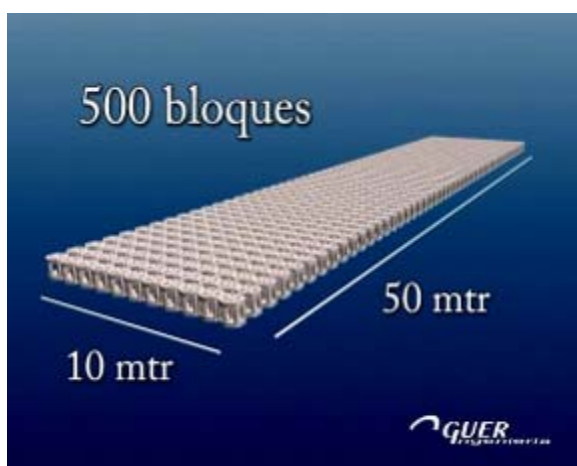
Situation and setting the HABITAT unit

We propose building artificial reef platforms with HABITAT units, 50 units long and 10 units wide. You can shape these reefs any way you wish but the best is to adapt them to the geomorphology of the corresponding zone.

The Habitat units should be placed in a depth between the 10 and 25 metres.



At first, its structures and the zone of settling will have to be protected very well, since the first colonies are crucial for the reef's viability. The purpose of artificial reefs is to restore the fish banks in zones of over-exploitation and the benthonic communities of the sea bottoms.



Forming artificial reef platforms

Another interesting aspect of such structures is their value for sport divers who may wish to visit them, thus providing a playful lure which will help its economical maintenance and avoid poach fishing in the HABITAT unit reefs.



A Playful lure

To development this piece we have collaborated with the AEMÓN07 OCEANOGRÁFICO company and its multidisciplinary team of marine biologists, graduated in sciences of the sea, civil engineers and technical architects, with deep training and experience in these fields.



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