

## Development of an environment-Oriented “Eco-Wharf”

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Coastal areas that played an important role as a living place of mankind have been developed and fixed to a great extent in the process of industrial development. Currently, however, it can be hardly said that their environmental conditions and ecosystem are satisfactory. Following the spirit of the times, the authors originated an “eco-wharf” in consideration of the environment when harbors are improved, and conducted proving tests for two years off Port of Han-nan (Kishiwada City). The tests consisted of eight 3-month seasonal examinations, aimed at confirming the basic effect of the eco-wharf. The present report summarizes basic effects revealed by the proving tests.

The “eco-wharf” is an environment-oriented marine structure based on a new idea, aimed at creating living space ranging from the splash zone to the sub-tidal zone for a variety of creatures by constructing an artificial rocky beach in the lower space under a pier-style wharf. Such an original wharf can be applied not only to a newly constructed wharf but also to an existing one by remodeling the lower space of a wharf.

The present survey disclosed that, compared with the reference district (caisson-type vertical wall), twofold species of adhesive animals appeared, forming a highly diversified ecosystem in the eco-wharf. The community structure of adhesive animals was more stable in the eco-wharf than in the reference district. This is because structural characteristics of the eco-wharf helped predators of mytilus gall provincials settle down and prevented excessive growth of mytilus gall provincials. As a result, species appeared in abundance and a stable food chain was formed. This suggests that the eco-wharf has also an effect of preventing deterioration of bottom materials due to falling off of mytilus gall provincials observed in the reference district in summer.

In addition, about two and a half as many as kinds of fish appeared around the eco-wharf in comparison with the reference district. Furthermore, in the eco-wharf, stratified habitat segregation of fish in response to their growth stage was observed and it was confirmed that the eco-wharf provides fish with places for living, growing, feeding and spawning and that it is highly effective to gather fish as a fish bank.

From the above-mentioned, as the eco-wharf is thought to create a food chain system centering on fish, based on a highly diversified ecosystem, it is also expected that new nutrients will be increasingly carried from coast to offing as fish grow and migrate, which indicates that the eco-wharf has a function of environmental restoration in the inner harbor

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