Design of Movable Aquaculture Net Cage at Multi Sea Site Based on Joint Probability Distribution of Environmental Loads

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Abstract

As a modern fishing model, ocean ranching has experienced rapid development worldwide in recent years, but it also faces problems of fishery resources declining and ecological environment damage at the ranch area. Based on the service characteristics and technique status of net cages at deep waters, the main aquaculture facilities in marine ranches, a mobile service concept suitable for large-scale aquaculture development at multi sea area is proposed. Using a joint probability distribution methodology to feasibly analyze the environmental loads at three given locations in a typical ranch sea area, compare and verify the load effects, and provide the sensitivity of environmental loads of different levels of components in the net cage to guide the modular classification design of the cage structure. The towing stability and hydrodynamic characteristics of the modular type net cage are analyzed, and a temporary stability reinforce measure is put forward to ensure that the net cage can flow safely to the next service location. The movable net cage by reducing the breeding time of offshore net cages in fixed sea areas could achieve self-purification and restoration of the aquaculture area. Meanwhile, the modular design of the net cage could improve the overall economy of the marine ranch for the benefits of batch procurement, construction and installation.

Key words

Aquaculture Net Cage, Hydrodynamic Characteristics, Load Effects, Towing Stability, Modular Design