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Opinion Article

Consequences of Waves and Currents on Floating Fish Farms

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DESCRIPTION

Waves and currents are created by the energy that flows through the water, moving it in a circular motion. But water doesn't really move like a wave. Waves transmit energy across the ocean, not water, and waves can traverse the entire basin unless constrained by something. Waves are most commonly caused by the wind. Wind waves and surface waves are caused by friction between the wind and surface water. As the wind blows across the surface of the sea or lake, continuous disturbance creates the summit of the waves. These types of waves are found in the open ocean and along the coast around the world.

Marine fish farms are increasingly being relocated to more exposed regions. The fish farms will be subjected to stronger currents and more intense waves. In addition, the size of the fish farms is likely to grow, and new designs will emerge. As a result, the importance of marine technology will rise. Damages and collapses of floating fish farms have resulted in fish escape and, as a result, significant economic losses. Operational failures, mooring line breaks, anchor draw out, interactions between chains or ropes and the net, and accidents with ships can all result in damage. Escaped farmed salmon may breed with wild salmon, contaminating the wild fish's genetics. Another issue is salmon lice. Multitrophic aquaculture is a method of dealing with faeces and feed spillage from fish net cages in order to provide nutrients to mussels and kelps, for example. To avoid salmon lice and reduce pollution, closed fish farms have been erected.

In a cage, adequate water exchange is important for the fish's health and growth.

1. Available oxygen support in relation to the size and weight of the fish.
2. Natural stream velocity for exercise and well-being of the fish are important elements.

Wave and current loads on net caged floating fish farms are studied before moving on to closed fish farms. The impact of a well boat in waves and currents on a floating fish farm with a net cage is part of the analysis. A well boat's approach and departure are not handled. Feed barges and feed hoses, both essential components of most fish farm systems, aren't included. Bio-fouling and icing are also absent.

Floating fish farms with net cages come in a range of shapes and sizes, including circular plastic collars and interconnected hinged steel fish farms. High-Density Polyethylene (HDPE) pipes make up the floater of the circular plastic collar fish farm. The solidity ratio is important netting metric that is defined as the ratio of the area of the shadow cast by wire (twine) meshes on a plane parallel to the screen to the entire area encompassed inside the screen frame for plane netting. To ensure that the net cage has enough volume, a bottom weight ring (sinker tube) is frequently utilized instead of bottom weights.

The idealized fish farm was anchored with a genuine mooring line system and consisted of a flexible bottomless net cage with sinker weights at the bottom and attached to an elastic circular floater at the top. Physical connections between the well boat and the floater, as well as potential contact forces, were all taken into account. The natural period for rigid body motion along the E-axis was substantially longer than the considered wave periods due to the connection between the ship and the net cage with mooring. In waves and currents, the behavior of traditional-type fish farms with net cages and closed fish farms is discussed. For net cages and closed membrane-type fish farms, hydro elasticity is crucial. In model tests, the latter feature is frequently overlooked. Many net cages operate in close proximity, raising problems concerning current and wave environment spatial fluctuations, as well as hydrodynamic interaction between the net cages. For closed fish farms, wave interaction becomes crucial.

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