

Dynamic Response of a Net Cage Induced by a Sudden Mooring Line Failure in Regular Waves and Currents

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ABSTRACT

Over the recent two decades, despite the engineering technology of marine fish cages in Taiwan having been well-developed, incidents of mooring line failure still occur sporadically. Once successive failures of mooring happened, the entire mooring system will crash resulting in the net being entangled and structures being damaged. The massive number of farmed fish may die or escape, which not only brings enormous economic losses but also has an irreversible ecological impact. Therefore, this study aims to investigate the mechanism of mooring line failure on the net cage through model tests and numerical simulations. The influence of one mooring line failure on a net cage was studied by [1]. The influence of successive failures of two mooring lines on a net cage was studied by [2]. Following the previous study, this study focuses on the influence of mooring line failure on the net cage under regular waves and currents. The results show that after the failure of the upstream mooring line, the tension in the remaining mooring line increases substantially. Both the experimental and numerical results show similar trends, that the maximum tension value after the failure increases with wave height and wave period.

REFERENCES

- [1] H.J. Tang, R.Y. Yang and H.C. Yao, “Experimental and numerical investigations of a mooring line failure of an aquaculture net cage subjected to currents”, *Ocean Engineering*, Vol. **238**, 109707, (2021).
- [2] H.J. Tang, H.C. Yao and R.Y. Yang, “Experimental and numerical studies on successive failures of two mooring lines of a net cage subjected to currents”, *Ocean Engineering*, Vol. **266**, 113243, (2022).