A Feasible Concept of Bi-axial Controlled DP for FPSOs in Benign Environment

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Abstract

The idea of dynamic positioning using bi-axial control to reduce the power requirements was introduced and tested already in the late 1980s by Pinkster and Davison. The basis of this control is that the vessel is freely weathervaning, similar to single point moored vessels. This type of control is also called weathervaning DP. It must not be confused with the weathervaning mode of normal DP vessels, since bi-axial DP is a passive heading control. Computational simulations, model tests and full-scale tests have shown in the past that this principle is reliable, results in stable DP control and minimizes power consumption. For deep water, DP systems can provide a flexible and cost-effective station keeping solution compared to conventional moored systems. Recent studies have shown such a feasible and cost-effective design of a DP-FPSO with a conventional DP system in relative mild conditions. Compared to a mooring system, a DP controlled FPSO becomes cost-effective, when field installation-time and installation-costs are reduced, and thus earlier production revenues can be made. By applying bi-axial control, reduction of investment in DP equipment and reduction of operational costs are possible compared to conventional DP control. Combining well-established technologies, proven technical solutions, state of the art design practice and DP design experience, a feasible and cost-effective FPSO with bi-axial DP control has been designed. This paper outlines the theoretical hydrodynamic background and technical naval design aspects of the bi-axial DP controlled FPSO. A comparison is made with conventional DP control and with a conventional single point mooring system.

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