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Fairings versus Helical Strakes for Suppression of Vortex-Induced Vibration: Installation, Maintenance, and Economic Considerations

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Abstract

While technical performance, initial capital investment, and installation costs are often considered during suppression device selection, maintenance costs and their impact on the total net present value cost of suppression devices are often ignored. This paper discusses various installation and maintenance aspects of suppression devices selection, and then presents results from a fairly straightforward economic analysis of the various trade-offs that should be considered during device selection. These results should produce more thoughtful and mature decisions on suppression device trade-offs and their ultimate design. Hybrid systems should continue to grow in popularity, as both helical strakes and fairings can enjoy advantages depending upon the geographical location, performance criteria, cleaning methodology, and water depth.

Introduction

The vast majority of vortex-induced vibration (VIV) suppression systems for deepwater tubulars consist of either tall helical strakes or short fairings, or a combination of these (called “hybrid” systems). Selecting the best system for a given tubular involves consideration of technical, installation, maintenance, and economic issues.

Technical considerations for suppression device selection are presented in the first part of this (two part) series. Allen, Lee, and Henning (2008) discuss the performance of helical strakes and fairings for basic isolated tubulars, tubulars with marine growth, and tubulars downstream of adjacent tubulars. The effect of various coverage lengths and densities are also presented.

While the first paper in this series focuses on technical considerations for VIV suppression device selection, this paper focuses on installation, maintenance, and economic issues. Clearly, it is imperative that a suppression system meet the technical performance criteria for a given application, but the system must also be installable in a safe, cost-efficient, and reliable manner. Maintenance costs for suppression systems are often overlooked, despite the fact that virtually all applications of helical strakes on deepwater tubulars require significant maintenance over their design life.

Required installation and maintenance costs are important factors in an economic analysis of a suppression system. Unfortunately, these costs are often ignored during the suppression device selection process, since project teams are often measured strongly by minimizing the capital required to put a deepwater production system in place.

The next section discusses installation considerations for VIV suppression system selection. Various types of installations and related applications, with their impact on suppression device selection, are surveyed. The following section discusses maintenance of suppression devices including maintenance costs that are easily overlooked. This discussion is followed by a section that presents results from an economic analysis of the various trade-offs that should be considered. Finally, some conclusions from this work are drawn. Note that while this paper focuses on helical strakes and fairings, most of the economic analysis is not device dependent. The various trade-offs between capital investment and maintenance expenses may be applicable to a number of suppression device economic decisions in the future.

The focus of this paper is on suppression for production systems. All common deepwater tubulars are within the scope of this work, with the exception of drilling risers. A straightforward analysis of drilling riser economics has been recently