



ANALYSIS OF TOWED PIPELINES IN RANDOM SEA

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INTRODUCTION

Offshore pipelines are conventionally installed using either lay barges or reel barges. In the first case, prefabricated pipeline segments of around 12 m in length are welded together on the barge as the pipeline is being laid. In the second case, up to 25 km of prefabricated pipeline is wound on a large diameter reel and the laying operation consists of unwinding the reel and straightening the pipe. The reel barge method avoids the need for large scale offshore welding operations but has the disadvantage of being applicable only to relatively small diameter pipelines. A third approach, which is applicable to pipelines of arbitrary diameter, is to fabricate the pipeline on shore and then tow the resulting lines to the offshore site.

In planning a pipeline tow, care must be taken to ensure that the pipeline will not be damaged by either wave action or the manoeuvring which occurs at the launch and final installation stages.

In this paper, the response of a long towed pipeline to random spreading seas is considered. A dynamic model was used according to the type of Tow method and nonlinear response of the pipeline is carried out in both time and frequency domains. Distribution of bending stress that made with random waves and related to wave excitation was shown to analyze the motion of the pipeline. The responses of the pipeline mooring system related to wave excitation was done to analyze the motion of the unit with its mooring system.



Fig. 1(Pipeline Tow Method)

TOW METHODS

In order to use the tow methods, the pipeline is normally constructed at an onshore site with access to the sea. Once the pipeline sections are welded together to a determined length and