Modelling fiber rope load-elongation properties - Polyester and other fibers
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Abstract
Polyester fibre ropes are today widely used as mooring lines for floating offshore platforms, but other materials are now also proposed. Fibre ropes are also extensively used in other marine applications, such as SPM hawsers, where Polyamide (Nylon) is the preferred material.
Evaluating the response of the system requires a description of the load-elongation properties of the rope. This has been the subject of extensive investigations over the last 12 years, during which testing methodologies were developed, and applied to a wide range of products. The primary aims were to understand the response of these fibre ropes in the loading regime specific to these applications, and to provide pertinent data for design of the systems.
This paper presents an overview of the testing practices and describes the practical model that has been developed, initially for polyester ropes. Indeed this model was found well suited to describe the behaviour of ropes made from most fibres, based on both the traditional multi-filament yarns and more recently for new products using monofilaments, with different rope constructions. As to Nylon ropes, recent work has highlighted a somewhat more complex behaviour than other materials.

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