

Pipe Reel Design and Analysis

Solstad Conversion

Location:	Aberdeenshire / South America
Client:	Subsea 7
Value:	£25,000

Bennett Associates was asked to design two sizes of reels which would be used in a Subsea 7 project to convert a ship to lay pipelines. The two reels consisted of a 9.2m diameter and 8.6m diameter reel which needed to carry a maximum load of 210 and 180 tonnes respectively.

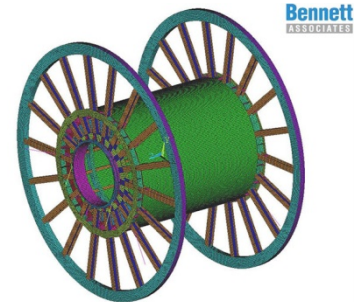
An initial design analysis of the drum design was carried out using STAADPro using loading and restraint conditions supplied by the client. Following the initial analysis, a more detailed finite element analysis was carried out using ANSYS. This allowed components not included in the STAAD model to be assessed and also allowed for a more detailed analysis of the structural members.

The 9.2m diameter reels carry a maximum product load of 210 tonnes, which was assumed to be loaded evenly around the drum. The design load cases were applied according to DNV deck cargo regulations, which were deemed to be acceptable for the design of the reels.

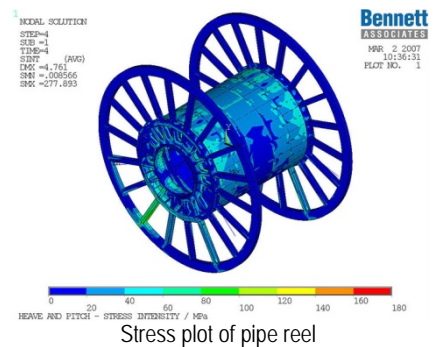
The smaller reel 8.6m in diameter has also been analysed, this is designed to carry a maximum load of 180 tonnes and is subjected to the same acceleration load cases as the larger reel. Structurally the two different reels are identical except for the diameter of the outer rim, this allows for simpler manufacture and it also means that the analysis of the two reels is almost identical.

Bennett Associates (originally founded in 1984) was acquired in 2008 by Atkins; bringing their proven technical expertise to the UK's leading engineering consultancy.

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Pipe reel element model



Stress plot of pipe reel



Pipe reel being lifted onto pipeline laying ship conversion