

SUCCESS STORY

MARINE Production Systems, Brazil



The oil exploration on offshore platforms represents an activity of high investment, where the risk of fails must be minimized. In the oil exploration process, there are cables composed by hydraulic tubes, power conductors and signal cables, which represent the so-called "umbilical cables" (Submarine Electro Hydraulic Umbilical).

The circulating current at the power conductors may cause induced voltages at the signal cables, as well as a heating higher than the operational temperature limit of the others components (thermoplastic hoses).

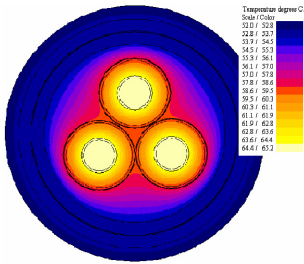
In order to ensure that the cable design complies with the specification and is suitable for its operation conditions, MARINE PRODUCTION SYSTEMS DO BRASIL, a company from the OCEANEERING MULTIFLEX GROUP, uses Flux to perform thermal and electrical analyses of the umbilical.

The Challenge

A subsea umbilical cable can be composed of steel tubes, hydraulic hoses, optical, power and signal cables. It may be used to power submerged pumps to overcome ultra-deep water pressures, low reservoir pressure, long offsets connections from a central platform, high produced fluid viscosities, extend the life of mature fields or accelerate production on new fields.

Adding power cables to an umbilical can create some difficulties: temperature increase, electrical interference, limits to the length of the cable (splices). Moreover, power cables can generate interference in signal cables due to its circulating current.

"Different cables are designed in order to minimize the effect of the induced voltages and guarantee the applicability of the product during its operational service life from an electromagnetic and thermal point of view", says Rosianita Balena, Subsea Analyses Engineer.



The Challenge

Ensure the operational service life of umbilical cables from an EM and thermal point of view.

The Solution

Model umbilical cables in Flux to analyze the induced voltages and the temperature distribution inside the cable.

The Results

*Fast and Accurate solutions.
Cost reduction during the design stage.*

The Solution

Due to the complex geometry of umbilical cables, which contains different components and materials in a helicoidal arrangement, the use of analytical formulations based on applicable standards can give some results that do not correspond to the values obtained on tests.

Furthermore, the production of prototypes requires high investments and time consuming.

Application of Finite Element Method represents the best solution in this case. The advanced tools such circuit coupling and parametric solving available in Flux enable to perform accurate electrical and thermal analysis of the umbilical considering its helicoidal topology, even using 2D simulations.

The modelling of the umbilical on Flux "enables us to obtain fast results when preparing the product quotation to our customers", notes Rosianita Balena. Using the results obtained from the simulations, "we can choose the best configuration of the umbilical that corresponds to the requirements of our customers".

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● The Results

»» Fast and Accurate Solutions

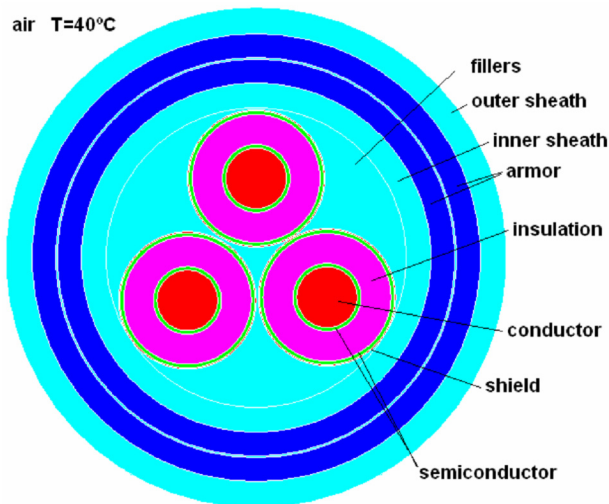
"The main advantage, says Rosianita Balena, is that we can give faster and more accurate solutions to our customers", based on the results from the numerical models in Flux.

»» Cost reduction during the design stage

"Computer modelling offers a cost effective solution for designing different cables. Modelling and simulation has proven its ability to predict cable behavior with high accuracy at different design levels."

« Modelling with Flux offers a cost effective solution for designing different cables

Mrs. Rosianita Balena,
Subsea Analyses
Engineer.



Learn more about MARINE Production systems at:

<http://www.oceaneering.com>



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