Abstract

Fatigue failure by flexing is a common failure mode for cables in a high flex environment. As a result, the specialist cable supplier, Axon' Cable LTD found a need for a flex life analysis tool to aid the design process of their products.

The purpose of this project was to develop a fatigue analysis tool to predict cable flex life and this report looks at the steps taken to do so.

This was achieved by a calculation based model which considers material properties to generate flex life curves. The calculation model for metals was based on the Method of Universal Curves and for polymers based on an empirical fatigue method. Material properties, which were characterised by tensile and fatigue testing, unique to each individual material were incorporated in to these models to differentiate between material flex life performance.

The flex life curves were then validated by a flex life test programme carried out on two custom designed cable flex life test rigs which were developed using 3D CAD software.

Once validated at room temperature, flex life models and test procedures were expanded to incorporate temperature as a factor.

With the final development of a user interface to control the inputs and flex life models, the project concluded with Axon' Cable having a functioning design tool now used in the engineering department.