MODEL OF A MOORED POWER CABLE AT OBSEA PLATFORM

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Abstract: New green energy sources deployed at sea in mobile platforms use power cables in order to transport generated energy at sea surface to the bottom. Theses power cables are exposed to the dynamic behaviour of the platform movements due to waves, currents and wind. OBSEA is a seafloor cabled observatory at 20 m depth in front of Vilanova, in Catalan coast, that captures data in real time like current, waves, wind among others.
In this paper, a model of a moored power cable installed at OBSEA is studied. The study is focused on the trajectory, tensions and deformation or curvature of cables about 0.1 m diameter and under real conditions collected from OBSEA sensors. Simulations are done with Orcaflex 9.4 environment. This software allows to model underwater structures and cables.
Figure 1 shows some results of a moored cable of length 45 m in a small depth (15 m) under sea waves of period 8s and height 8m. In particular the behaviour of top end cable (EndA) is shown: the horizontal (x), vertical (z) and tension as a function of time is shown.
Figure 2 shows some projections of the temporal results. In particular the trajectory of EndA and tension versus z are shown. Valuable information can be obtained easily like: EndA behaviour inherits the periodicity of sea waves, the oscillation of EndA describes an ellipse, at which vertical position the tension is maximum among other information.

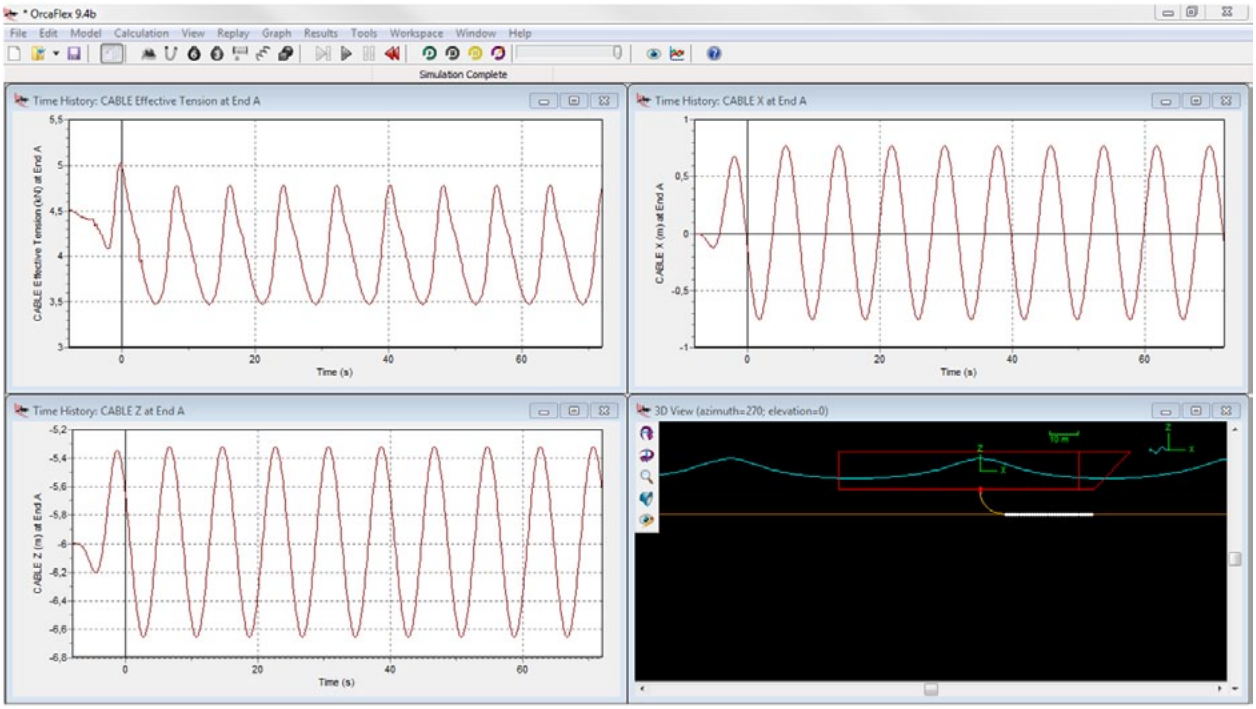

Figure 1. Cable tension and positions on top of cable. Sea depth 15m, cable length 45 m with diameter 0.1[m] and Bending stiffness 7 kN•m2. Periodic waves conditions: period of waves of 8 s and height 7 m.

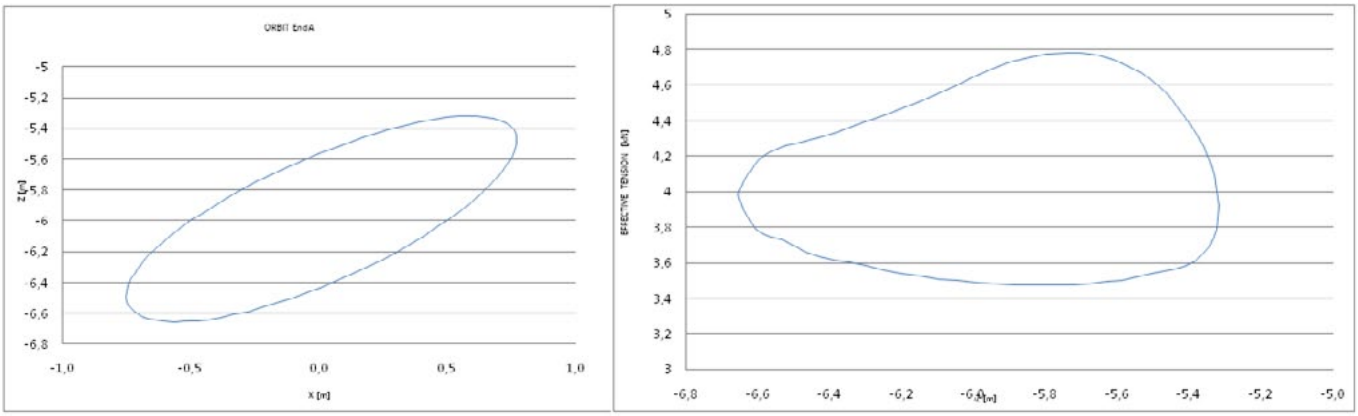

Figure 2. Projections of behaviour of top cable (EndA): Vertical coordinate z versus horizontal x. Tension versus z.