



A 3D Modelling for Transversal Analysis and Local Effects

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Abstract

The 12,5 km long New Coastal Road at La Réunion Island is being built at sea. Half part of this project is a precast cantilever viaduct of 5.4 km along the seashore, supporting significant loads during construction and operation such as cyclonic events (wind and swells), seismic event, collision loads... The all road is separated into 7 viaducts of equal length to allow the displacements under temperature, creep and shrinkage per viaduct.

Dimensions of the segments brings to specific and precise modelling to tackle the different issues of the detailed design.

Keywords: bridge, coupling behaviour, storage of segments, lifting of segments, longitudinal analysis, transverse analysis, 3D modelling

1 Introduction

Due to the great width of the segments, the transversal analysis required to compute a 3D shell finite element model in order to solve technical issues that cannot be approached with a beam model (1D model).

For this reason, three 120m spans were modelled in 3D, then analysed and compared to the beam modelling to get a coherent behavior between both models.

The paper will give a description of the 3D model as well as results of normal stresses comparison on several points of the segments.

It will also show phenomenon noticed on such model where both directions longitudinal and transversal are coupled.

We will present the benefits of such modelling with regards to the transverse analysis and several other calculations.

2 Description of 3D shell finite elements model

SOFISTIK software was used for 3D shell finite element modelling. Model comprises five spans, length varies from 84m to 120m. Three and a half span have been modelled with shell finite elements. The rest is modelled with one-dimensional Finite Elements (beams) in order to reduce calculation time processing as shown on