



## The Challenges of a Cyclonic Region for the Construction of a Viaduct with a Launching Girder

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### Abstract

The construction of the viaduct of the Nouvelle Route du Littoral (NRL) connecting Saint-Denis to La Grande Chaloupe in La Reunion is particularly challenging in terms of wind environment. In addition to being built in a cyclonic region, the 5.4 km long viaduct is being built in open sea, at 100 to 150 meters from the coast. The gust wind speed can go up to 64 m/s at deck level during a cyclone event. The height (10 meters) and length (270 meters) of the double truss launching girder makes it particularly sensitive to turbulent wind and induces significant additional wind load on the viaduct and the cantilever at construction during a cyclonic event. The 120-meter-long span and relatively large width (28 meters) of the deck also play an important part in the dynamic response of the whole.

The paper will first present how the local wind conditions and the aerodynamic properties of the deck and the launching girder were determined. The methodology used to perform the time history simulations of the viaduct during construction phase will then be described, as well as the main results for one of the studied configurations.

**Keywords:** viaduct; construction; launching girder; turbulent wind; wind-tunnel; dynamic response; time history wind simulations;

### 1 Introduction

The New Coastal Road will allow the inhabitants of the Reunion Island to connect quickly and safely Saint-Denis with its commercial harbour situated twenty kilometres further west. It will replace the current coast road with 4 lanes at the foot of the cliff.

The viaduct of the Nouvelle Route du Littoral (NRL) is made of seven independent viaducts, for which the main spans are equal and 120m long. The deck is totally precast and assembled

following the cantilever construction method with a 278m long launching beam supported by two lattice towers and a front leg.

The paper will present the methodology used to study the response of the viaduct with the launching beam to cyclonic turbulent wind at construction stage with SOFISTIK® version 14.14.

The purpose for computing the response to turbulent wind at construction stage is to check the stability of the bearing devices of the deck on the pier head and the design of the pier bases