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Special construction features of the Cable-stayed Bridge between the islands of Cebu and Mactan (Republic of the Philippines)

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ABSTRACT

The Cebu-Cordova Link Expressway is a road concession project with a crowning achievement: the 653.00-m long cable-stayed bridge between the islands of Cebu and Mactan. This bridge is the longest cable-stayed span in the Philippines, and its construction posed several unique challenges, such as high seismic activity, geological variability, and frequent typhoons. Furthermore, the busy navigation channel below the bridge had to be kept open throughout the building process. This paper provides an overview of the construction process, highlighting these distinctive difficulties.

Keywords: Cable-Stayed Bridge, deck-closure, large diameter pile, tilt table, geometric control

1 INTRODUCTION

After an Early Contractor Involvement (ECI) process, the project design & build was awarded to the consortium of Acciona Construction, First Balfour, and D.M. Consunji on November 23, 2017. The bridge features an asymmetrical layout, with span lengths of 6.50-64.4-60.6-390-60.6-64.4-6.50. Its prestressed concrete box girder is 26.90 m wide and 3.5 m deep, anchored by 56stays, 14 pairs from each of two 139 m high pylons.

Figure 1. Aerial view of the CCLEX project.

The main construction features include 2.50 m diameter piles with offshore execution, massive pile caps, complex geometric shapes of piers and pylon facets, 40 m high stainless-steel iconic crosses with no visible inserts for aesthetic reasons, complex pier tables, and different deck closures.

2 FOUNDATIONS EXECUTION

The construction of the foundations found big challenges related to the offshore conditions, execution of massive and rebar congested piles and pile caps as consequence of the outstanding seismic and ship impact loads as well as variable geotechnical conditions. The geotechnical investigation executed during detailed design stage revealed complex and very disparate soil/rock

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