The effect of wave passage on immersed tube tunnels - Busan Geoje Fixed Link in South Korea

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Summary

A special feature of the Busan-Geoje Fixed Link in South Korea is the foundation of an immersed tube tunnel in a trench of soft marine clay. The tunnel is subject to wave loads due to 9.2 meter high hurricane waves which jeopardize the stability of the tunnel. Analytical analyses, scale model tests and numerical analyses have been made to investigate this problem. This paper gives an overview of the analyses, performed from schematization of the non-linear waves to pressure variations at seabed, modelling of the wave induced groundwater flow and its effects on the tunnel buried in the seabed. This is followed by a discussion of the results and consequences for the design of the tunnel.

Keywords: immersed tube tunnel; wave effect; numerical modelling, non-linear waves

1. Introduction

1.1 Introduction of the project

The Busan Geoje Fixed Link consists of an 8.2 km long motorway with two large cable stayed bridges and a 3.3 km long immersed tube tunnel as main structures. The tunnel is being constructed in South Korea, where it will connect Busan with Geoje Island.

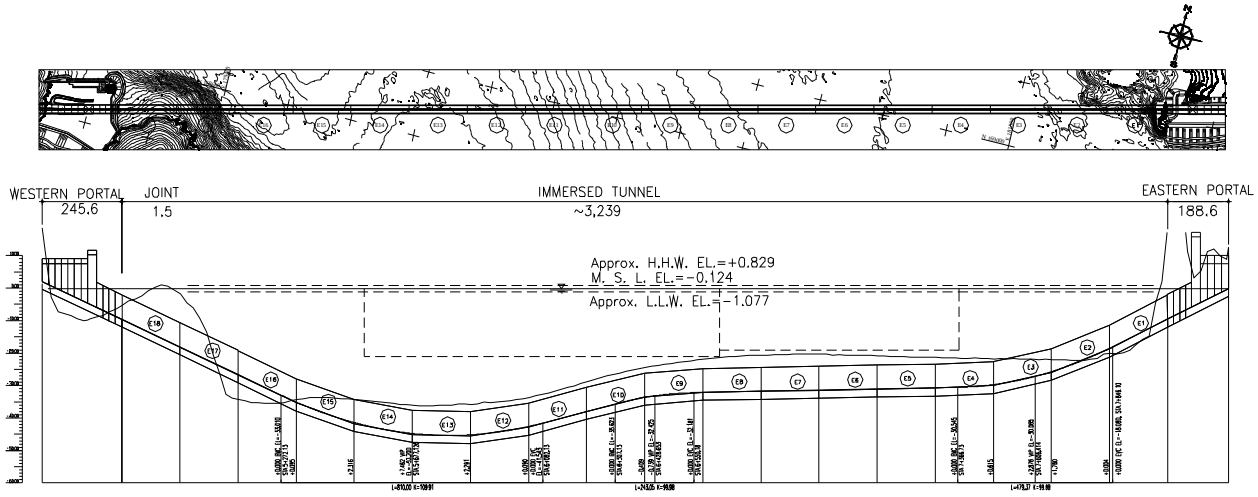

Fig. 1 *Lay-out of the tunnel*

The depth of the tunnel, up to 50 m below sea level, poor ground conditions, the possibility of earthquakes, typhoons and tsunamis make this project extremely challenging. The project is developed as a Public-Private-Partnership project where GK Fixed Link was awarded the

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