

Service Life Performance Design of Chacao Bridge

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Abstract

To ensure the service life performance of an exceptional bridge like the Chacao Bridge, it has been paramount to the owner MOP in the design to take care of all aspect of the future operation and maintenance of the bridge. The goal is to ensure a future service life with low operational costs and high and safe bridge availability for traffic. Therefore, unlike design of conventional bridges, the Chacao design build project integrates durability, access and future operation in the design process.

This paper described how an adequate service life performance design can be achieved in the design build contract for the Chacao Bridge. The overall goal is to minimize the life cycle costs of the bridge with a service life of more than 100 years. The bridge design applies modern durability design approaches, control and monitoring systems, access facilities – all aspect which will be documented in an Operation & Maintenance Manual with instructions on how to operate the bridge in the future.

Keywords: Suspension Bridge, performance design, enhancement of durability, operation and maintenance, structural health monitoring.

1 Introduction

1.1 The Bridge Project

Dirección de Vialidad Ministerio de Obras Públicas (MOP) has contracted the task of building the Chacao Bridge to the design-build consortium, Consorcio Puente Chacao (CPC) comprising Hyundai, OAS, Systra and Aas-Jacobsen. The RyO-COWI consortium has by MOP been awarded the contract for review of the design and construction supervision.

The bridge is planned to have a service life of 100 years. The large public investment means that the Chilean society is not only concerned about the

construction costs but also about the benefits and costs for bridge operating over the 100 years, [1].

The focus on service life aspects has called upon a performance based design taking into account operational risks, environmental issues and the operation and maintenance (O&M) of the bridge. Previous design-build examples of such design approaches include bridge projects such as Great Belt, Stonecutter, Busan-Geoje, Messina Strait Bridge, Izmit Bay Suspension Bridge and Tappan Zee Bridges. Design emphasis has been put on durability, access, inspections facilities, and information gathering by use of a structural health monitoring systems (SHMS), an O&M system for planning and managing activities in a systematic way, and providing the MOP with an efficient tool for operation.