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An Analysis of Long Spans of Fixed Link Crossings

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ABSTRACT

This paper examines the long spans associated with fixed link crossings. An overview of existing fixed links globally, including information such as total lengths, maximum span lengths, materials and types of construction is given. Data for well-known major bridges such as the Oresund crossing as well as the more recent Çannakale Bridge are included. An overview of historical fixed link long spans will be given as well as a look to the future with an overview of some of those currently in design and construction stages. The use of prefabrication is investigated as a means of mitigating risk and increasing safety. The construction methods required to surmount the challenges associated with these long spans is examined. Finally, the paper looks at some of the long spans proposed for some of the more notable and long mooted fixed links.

Keywords: Bridges, fixed links, long-span, construction methods, prefabrication

1 INTRODUCTION

This paper examines the long spans of fixed link crossings around the world, investigates construction methods and looks at some notable future fixed links. Fixed links are defined as unbroken connections across the sea or a strait, and may comprise bridges, tunnels, causeways, or a combination. The paper considers 28 existing crossings where long spans feature, and why they have done so. Construction materials, bridge types and construction methods are also examined, where information is available.

2 EXISTING FIXED LINKS

The fixed links examined in this paper are shown in Table 1, and shown in terms of maximum span, with the recently completed **Çanakkale 1915 Bridge**, the world's longest span, topping the table. The two longest cable stayed spans, Russky Island Bridge and Sutong Bridge, also feature in this list near to the top. Of the author's database of fixed link crossings, 28 are included here as having significant navigation spans. It can be seen that some of these are bridge only crossings, while some form parts of bridge tunnel crossings. Some crossings such as the **Hong Kong Zhuhai Macao (HKZM) Bridge** and **Donghai Bridge** have multiple navigation channels requiring long spans

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