



# The New Little Belt Bridge – the role of the physical model and it's digital twin

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## Abstract

The New Little Belt Bridge, designed by the consulting engineers Christian Ostenfeld and Wriberg Jønson, was to be Denmark's first suspension bridge. The construction of this Danish piece of engineering history took place between 1965 and 1970 and could only succeed with the help of tests on physical models. Most of the physical models have disappeared, only the three-dimensional dynamic model of the bridge has survived. This paper looks at the question which role the surviving and other models played in the planning process. The model still existing is a store of knowledge of engineering practice and shall be recorded and evaluated as one of the last witnesses of model statics. Therefore, the authors will create a digital twin of the model to examine aspects like boundary conditions, structural parameters of all bridge components and the well-documented research results.

**Keywords:** New Little Belt Bridge, New Lillebælt Bridge, suspension bridge, physical model, static and dynamic model tests, structural modelling, digital twin.

## 1 Introduction

The existing, old bridge over the Little Belt, as the strait between the Jutland peninsula and the island of Funen in Denmark is called, was inaugurated in 1935. The old truss girder bridge with two railway tracks and two traffic lanes soon became too small and could no longer cope with the increasing

demands of the 20<sup>th</sup> century, so it was necessary to build a new bridge over the Little Belt. The New Lillebælt Bridge should become the new motorway bridge and accommodate six traffic lanes. Thus, the consulting engineers Christian Ostenfeld and Wriberg Jønson, who were commissioned with the overall design of the project, were to build Denmark's first suspension bridge for the client, the Ministry of Public Works [1].