



Slide and Turn Gracefully and Economically – A Tale of Four Bridges

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Abstract

A mechanical opening bridge brings to the art of bridge design the fourth dimension – time, and with it the visual excitement of movement. In terms of cost, in the context of navigation clearances, it can offer savings over a high clearance fixed bridge with its ramps and approaches. An opening bridge can be designed to have a minimal impact on, for example, a historic urban context. This paper presents 4 openable bridges designed by the author with teams of engineers. Two of them, Copenhagen (sliding) and Gdansk (turning), both set in a protected urban context, were competition winners. Two examples in London were studies for Transport for London (TFL), the London transport authority. The recently completed Copenhagen bridge took years to build mainly due to client's weaknesses in the process of managing its procurement and construction. As such it offers useful lessons. This paper presents some aspects of its design and construction process. The competition winning turning bridge in Gdansk is at detailed design stage and is yet to be built. There are no immediate plans to advance any of the two London bridge concepts.

Keywords: bridge, movement, movable, sliding, turning, energy use, urban context, navigation clearance, elegance, purposefulness

1 Introduction

An opening bridge is a valid proposition in locations where high navigation clearance is required, complex urban constraints are to be met and the intensity of water course navigation is not in conflict with the intensity of traffic that is to cross over the bridge. There now exists also a relatively new driver, that of sustainable mobility. This covers urban scale - the routes of most energy efficient travel in urban environments, both on land and water, which leads to bridges being used as tools of 'urban acupuncture'. In such cases an openable bridge is frequently the only practical option. On the other hand bridge

designers have to address energy used while operating opening bridges. It is a great challenge but also a great fun to design and resolve in detail an opening bridge.

2 Inderhavnen Bridge, Copenhagen

In October 2009 Studio Bednarski (architects) and Flint & Neill (bridge engineers), with their team, won this project in a high profile invited two stage competition, to which 10 top bridge design teams were invited from a worldwide expression of interest. Recently completed, almost 7 years after the competition, this project has had an unfortunate and prolonged birth. While winning this competition and being entrusted with the