

Designs and associated carbon footprint – showcasing Mumbai Trans Harbour Link

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Abstract

The introduction of sustainability as part of the evaluation criteria in Design-Build projects broadens the requirements to both designer and contractor and reinforces attention to the choice and source of material, embodied carbon in material, in transport and installation and reinforces the need for having a technically efficient design even further.

To showcase the influence of efficient design examples are presented from the near complete Mumbai Trans Harbour Link (MTHL) project in Mumbai, India. The project was split into three contracts of which COWI provided design services to package I for contractor JV consisting of Larsen & Thoubro and IHI and with Mumbai Metropolitan Region Development Authority (MMRDA) as end client.

Keywords: Sustainability, carbon footprint, efficiency of design, Mumbai Trans Harbour Link (MTHL).

1 Introduction

The MTHL project is used to illustrate the impact key design decisions have on the achieved efficiency of the design and therefore on the associated carbon footprint.

The tender process for the MTHL project was characterised by several tender addendums and clarifications that significantly altered the basis for the design and influenced key design decisions. Examples of how clarifications directly impacted tender design will be given with CO₂e as a measure of impact.

The project site is to a large extent governed by the seismic load combinations. To provide an optimal design the influence of the articulation on the

overall consumption of material and therefore CO₂e was investigated in detail during tender by the contractor JV and COWI as designer. The investigation led the package I team to choose an articulation with a floating deck structure for the marine concrete viaducts. The floating deck articulation gave significantly lower quantities in comparison with an articulation with rigid connections between deck and piers.

In conclusion it is reflected on how the development of designs always should seek to identify optimisation potential and seek towards finding optimal and efficient design that in the end drives down CO₂e.