



## Sustainable Bridge Infrastructure Procurement

**Mohammed Safi**

*Ph.D., Infrastructure Economist, FOLKBRO & ÅF AB, Stockholm, Sweden*

**Guangli Du**

*Ph.D., Researcher, Danish Building Research Institute (SBI), Aalborg University, Denmark*

**Peter Simonsson**

*Ph.D., Bridge Specialist, Swedish Transport Administration, Sweden*

**Raid Karoumi**

*Ph.D., Professor-Head of Division, KTH Royal Institute of Technology, Stockholm, Sweden*

Contact: [Mohammed.safi@folkbro.com](mailto:Mohammed.safi@folkbro.com)

### Abstract

The lack of a flexible but systematic approach for integrating lifecycle aspects into bridge investment decisions is a major obstacle hindering the procurement of sustainable bridge infrastructures. This paper addresses this obstacle by introducing a practical holistic approach that agencies could use to procure the most “sustainable” (lifecycle-efficient) bridge through a fair design-build (D-B) tendering process, considering the main bridge lifecycle aspects: life-cycle cost, service life-span, aesthetic demands and environmental impacts.

**Keywords:** bridge; infrastructure; life cycle cost; life cycle assessment, sustainable; aesthetic; design-build contract; LCC; LCA.

### 1 Introduction

The use of design and build (D-B) contracts in bridge procurement is growing in Sweden and other European countries. Contractors benefit from such contracts since the design freedom provides scope for generating innovative solutions, while procurers (agencies) benefit from the more explicit responsibilities for contractors and greater opportunities to acquire such solutions. While evaluating bids, a procurer may have to choose from several proposals, all of which meet functional requirements but differ considerably in construction materials, type, layout, structural-members (BSMs) and (hence) initial investment (INV) cost, life-cycle measures

(LCM) cost, lifespan, aesthetic merit and environmental impact.

Due to the lack of other credible and transparent award criteria, the lowest bid in INV term is currently used when choosing a contractor. However, its use may often cause huge losses for agencies and societies they serve since it might result in implementation of proposals that are relatively cheap in INV terms but very expensive in LCC terms, and disadvantage proposals associated with lower LCM costs or longer lifespans. Besides, the most LCC-efficient option may not be optimal if other factors such as aesthetic merit and environmental impact are considered. Thus, bridge procurement decisions should be based on the overall assessment of all costs and