



Bridge design. Can a methodological approach be defined to guarantee a good solution?

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Abstract

Every design process is intended to devise a solution (S) to a problem (P). Bridge design is a creative activity, more cognitive (deliberate or spontaneous) than emotional. A sequence of steps where a designer should stop to go from P to S can be set. Although they cannot guarantee that S will be the best of the solutions, following a methodological approach as the one outlined in this article, a good solution which satisfactorily meets all the project requirements shouldn't be a pipe-dream.

Keywords: bridge design; methodological approach; cognitive creativity; collaboration; optimum solution; disappearance of technical calculation and construction limitations

1 Bridge design and designer

Bridge design is understood in this article as a process that goes from the conception of a crossing to the production of the project documents necessary for its construction, including what sometimes is called architectural design and what sometimes is called structural design (separating them is difficult). This process requires a client who defines the commission and a designer. This designer can be an individual (in some small projects) or a multidisciplinary team formed by professionals of different degrees (from the same company or not), collaborating to achieve a common aim. When reading the word *designer* in this article, it will refer to the individual or team responsible for the development of the bridge project, from conception to definition for construction.

2 About bridge design process

The objective of every design process is to achieve a solution to a problem. In the specific case of bridge design, the way going from the crossing problem definition to a good solution is a creative one, more cognitive (deliberate or spontaneous) than emotional (far from the artistic-romantic idea that immediately solves everything). A good solution will require a skilful responsible team (owner and designer), and an allocation of economic and time resources which fit for the magnitude of the problem. Even being these conditions guaranteed, the necessarily complex approach requires, in addition to creativity, effort, technical knowledge in numerous fields, experience, honesty, sensibility... and a method. A sequence of general steps where a designer should stop to go from a problem (P) to its solution (S) can be set. Many of these steps are common to any design process (industrial, aeronautical, product, graphic, fashion...) and although they cannot guarantee that S will be the