

## Towards a new agenda for Integrated Design

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instructions)



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### Summary

Large Span Bridges are the pinnacle of infrastructure. Designing them requires concerted effort between several specialized disciplines. The working method of Integrated Design has proven to be a successful model for producing signature designs: it leads to the realization of not merely a structure, but to the creation of a landmark, which is source to inspiration to everyone experiencing it. With the focus on infrastructure moving towards the great urban conglomerates like Delhi, Mumbai and Kolkata, designers will have to come to terms with the fact that large scale landmark bridges will be set in densely populated areas. Boldly, the driver's view will be experienced as often on a daily basis or even exceeded by the experience of the soffit view by those living and working in utmost proximity to the structure. Does this call for a new chapter in Integrated Design?

**Keywords:** Integrated Design, Designers, Megacity

### 1. Integrated Design

#### 1.1 A historic approach

In the third volume of his “Four Books on Architecture”, Andrea Palladio (30.11.1508 – 19.08.1580) describes four different designs for wooden bridges spanning rivers without the help of supporting columns. Discussing these four beautiful designs, Palladio describes the spacing of structural members as being proportionally to the width of the river. He draws attention to detailing of the joints and suggests an arrangement of members according to the flow of forces. However, he concludes:

*“ These four types of bridges can be build as long as necessary by scaling up all the components in proportion. ”*[1]

Almost sixty years after Palladio's death, in his “Dialogues Concerning Two New Sciences” published in 1638, Galileo Galilei (15.02.1564 – 8.01.1642) discusses the relation between size of an object or building and economic use of material.

Galileo concludes that certain types of construction are only feasible within a certain range of sizes, thus arguing against Palladio's statement that all bridges could have an unlimited span, as long as their internal proportions remained constant.

#### 1.2 Designers rather than architect or engineer

The separation of the disciplines of architecture and engineering is a relatively modern situation, which served to differentiate utilitarian engineering projects from the art of architecture. This included bridges, which were often reduced to a status of ‘engineering structure’ that did not otherwise make any contribution to the built environment. This is counter intuitive given the abundance of historic bridges that make a highly significant contribution to the character and ‘sense of place’ of our towns and cities. Only in the late 20th century did bridges begin to re-enter the sphere of architecture in any significant way. The built environment is made and improved through the understanding of context and urban planning issues, not just isolated functional object design.



This is important. Bridges are a highly visible and notable part of the built environment occupying sites that are open and public by their very nature, crossing obstacles that are otherwise uncluttered by man-made structures. Their relative complexity is in contrast to the immediate legibility of a bridge, which is often a popular and recognisable part of the urban landscape.

Bridges can be employed to cure some of the ill-effects of an underdeveloped infrastructure, requiring a wide understanding of urban design issues, and a broad design approach. It is not just the bridge but the public realm of which the bridge is a part that is most important.

## **2. The challenge of urbanization**

According to the Internet, 6.1 billion people currently live on the earth, 3 billion of them in cities. By 2030, the population of the world will have increased by 2 billion (+33%). This increase will be stem almost exclusively from the growth in urban population. Every day, 190,000 new city-dwellers are added all over the world, 2 in every second. In the year 2030, 4.9 billion people will live in cities: A roof and an address in a habitable area are the first step to a better life.

### **2.1 Creating public realm**

Public realm is an efficient, transparent man-made system in which a mutual concern for minding the build environment and the people living therein creates the safety necessary for development and preservation of society, opportunities and wealth – a habitable area.

It is evident that this renders the area around bridges as attractive to those in need of opportunity, yet deprived of the means to seek it by lack of existence of public realm within this space.

It is my belief that we, as designers of large infrastructure objects do have the obligation to use our influence and ingenuity as consultants to utilize this space and make it available to the creation of a public realm.

This requires consideration from start, demanding from the designers an understanding of the dynamics, interest and shifting ownership of initiative in a design process, as well as insight into the reaction of external, yet decisive factors or groups like media or the public. Additionally, designers have to be able to forecast the project's potential of transforming the area surrounding it.

## **3. Discussion**

Designing a bridge is about far more than providing a solution to the physical problem of crossing a void. Bridges are 3-dimensional objects. We experience them as abstract objects on the skyline but also on them, around them and beneath them.

It is certainly not always the case that a bridge needs to make a major visual statement – but, it needs to be of service to both, it's function as well as it's surroundings. Too often in the modern era, project planners and designers have sought the regenerative effects of some celebrated bridge projects by creating deliberately 'inflated' design statements. Decorating approach piers will not improve the long-term prospect for utilization of the space beneath the structure. However, tapping onto its services such as drainage in a controlled way, might.

In an Integrated Design effort, knowledge has to be challenged and developed in order to meet the requirements of the future. With large span bridges being or becoming part of the urban environment, a sustainable Integrated Design approach calls for widened insight to the design team. How do cities develop and how do we wish them to develop – how can large span bridges and the area claimed by them contribute to this rather than creating voids in the public realm?