

AESTHETIC REQUIREMENTS FOR BRIDGES

Bridges on roads are the structures, beautiful enough to evoke wonder. Their primary function of bridging the gap adopts a symbolic function. Aesthetics and environmental considerations are increasingly becoming major factors in the selection of the type of structure, including its substructure to be adopted for a specific site. To achieve aesthetically pleasing view of bridges, attention should be paid to produce a clean, simple, well proportioned structured form, including harmony with the general topography of the site. Optimization in the use of materials, environmental preservation, level of pollution during construction and service, conservation of flora and fauna etc. also need attention. In most cases, achieving the desired structural quality may however, add little to the overall cost of structure.

Bridges dominate the landscape and whether we realize it or not, they play a very important role in our visual environment. There are a number of ways to make bridges aesthetically pleasing structures. These include the following:

- Make the bridge as invisible as possible to hide it in the surroundings.
- Make the bridge as distinctive as possible to stand out in the surroundings.
- Make the bridge as simple and elegant as possible to complement the surroundings.

The first of these approaches, although suited to smaller bridges, does not always encourage good design. The second approach can be expensive and perhaps better suited to urban situations. The third approach is a practical, cost effective objective for overpasses and major bridges and can lead to good looking bridges.

It often costs little or nothing to make a bridge look substantially better than what was envisaged during the design process. A minor alteration in the budget could make a bridge into something unique and special. A wide range of factors affect the potential longevity of a bridge. These include, the bridge's condition, traffic it carries, what it crosses, its size, its past maintenance, the land use around the bridge, its importance to the local, regional and national community. These all contribute to the length of time that the bridge will exist.

The aesthetics of a bridge starts with the design of the structure itself. These aesthetics are vastly improved when all the component parts of the bridge like piers, abutments, railings and the superstructure are designed to work together and complement each other visually. The bridge pier is a major element in forming the impression of a bridge and the beauty of pier design contributes to the aesthetics of the whole bridge. Those bridges that are considered to be the best examples of aesthetically-pleasing bridges are the ones whose primary structural systems represent the basic structural mechanics of how the structure transfers the applied loads to the foundations or ground. Therefore, a well-designed and aesthetically-pleasing bridge is not one which is based on an abstract physical form, but, rather, the one which expresses the natural physical properties to which people intuitively relate. Colours and textures are the other important consideration which enhances to the aesthetics of a bridge structure.

The complexity in the design of a bridge should be minimized, as a simple structure provides an aesthetically pleasing contrast with the natural textures of the backdrop. Enhancing the primary elements of a bridge and reducing road furniture

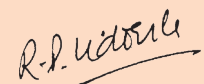
to the barest minimum is also important. When the colour of the surroundings is dark, light colours for bridge primary elements provide a good contrast. Bridges in a horizontal plane are generally preferable to bridges on a grade over flat simple areas and significant expanses of water. If this is unable to be achieved due to differing levels on either side of the water body, then fine tuning the location of the bridge should be considered, or adjusting the levels along the bridge approaches.

A bridge designed without consideration of aesthetics could also serve its function, but it would be unattractive and a visual barrier. A well-designed bridge appeals to everyone, not just the engineers and designers. The design of aesthetically pleasing bridges is not only a science but also an art. The designer must give due consideration to economy, transmission of forces to the ground, constructability, durability, environment and the adjacent structures. The design must emphasize on the horizontal elements of the bridge and strengthen the appearance of the bridge piers while concealing electrical conduits and drain pipes. Where one or more of these aspects is not sufficient, or not fully considered, the final design would probably be flawed, in some cases with distressing results.

The cost of aesthetic quality is not always higher than the cost of poor design. In any event, attractive

projects bring much greater long-term benefits to the public by increasing the development potential of communities. If additional funds are required for aesthetic design, they can usually be justified in terms of identifiable, long-range, economic benefits. Although few engineers today would dispute the importance of aesthetics, most of them have a singular lack of understanding of the subject and still tend to see aesthetic design as a simple extension of engineering design.

We have the expertise and drive to meet the challenges, we have the vision to continuously introduce innovations, new working methods and new materials/technologies/equipment, but, now it is more important to take into account the social aspects of transportation. The citizens pay for the systems and have to live with them, therefore, we must ensure that we design the structures which are lively and appreciated by the public. We have a duty to create structures which deserve to become part of our Heritage.



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