bridge aesthetics

sourcebook

Practical Ideas for Short- and Medium-Span Bridges

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Preface

This Sourcebook presents guidelines for improving the appearance of short- to medium-span bridges (those with spans up to about 300 feet). These structures constitute the great majority of bridges and are often referred to as "workhorse" bridges. The intended audience includes all of those engaged in advancing transportation projects: engineers, administrators, planners, environmentalists, and the general public. The goal is to encourage a common understanding of and terminology for bridge aesthetics that will encourage interaction among these individuals and result in more attractive and context sensitive bridges throughout the United States.

The Sourcebook begins by explaining why it is necessary to consider bridge aesthetics. It then provides practical, easy-to-apply ideas for design engineers and other professionals to use in developing elegant designs for the typical bridges on which they work every day.

This Sourcebook has been prepared by the Subcommittee on Bridge Aesthetics (AFF10(2)) of the Transportation Research Board (TRB). Full credits may be found at the end of the Sourcebook. The Sourcebook was approved by the subcommittee's parent committee, TRB's General Structures Committee (AFF10), at the January 2010 meeting of TRB.

The Sourcebook was presented for comment to the Subcommittee on Bridges and Structures (SCOBS) of the American Association of State Highway and Transportation Officials (AASHTO) at its May 2008 meeting. No comments were received from SCOBS members, so the Sourcebook was placed on the agenda of the May 2010 meeting for approval by SCOBS. Prior to the meeting, during preliminary consideration of the Sourcebook by the T-9 committee of SCOBS, one SCOBS member presented comments. This final version of this Sourcebook reflects responses to those comments. SCOBS approved it for AASHTO publication by electronic ballot in September 2010.

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Chapter 1

Why Consider Aesthetics?

The public is becoming ever more aware of the appearance of bridges and the effects they have in their communities. We need to respond to that concern. We cannot just worry about the structure and leave the aesthetics to someone else. Every structural decision is an aesthetic decision. If a decision affects the size, shape, color, or surface texture of a visible part of the bridge, it affects how people will feel about the bridge. For the same reason we would not build a bridge that is unsafe, we should not build one that is ugly. To ignore aesthetics is irresponsible. Of course, the first obligation is to build a bridge that is safe and meets the client's functional requirements. The designer's obligation then is to satisfy those requirements with the best combination of efficiency, economy, and elegance.

Frequent Objections to Considering Aesthetics:

It automatically adds cost

Most agency planners immediately associate bridge aesthetics with increased design and construction costs and additional construction time. While this is frequently the case, it is not always so. Whether it is so and the degree to which it is so varies widely depending on region of the country, owner preferences and practices, contractor capabilities, span length, size of project, community aspirations, and other project specifics. If increased cost is involved, then the relevant question is does the aesthetic improvement justify the additional cost? We make such judgments every day when buying a car or a suit. We can make them about bridges, too. If the affected community is involved, we can take advantage of their guidance as well. See Chapter 4, Background Information, for more on costs.

Figure 1-1 Often simply paying attention to proportions and details can result in an attractive bridge with no increase in cost. Canyon Creek Bridge, Anchorage, Alaska.

People cannot agree on what looks better

This is also not true. People have agreed for centuries on which paintings look better, which symphonies sound better, and which buildings are more attractive. A consensus has existed since the nineteenth century on which bridges look better and why. That consensus is embodied in this Sourcebook.

Figure 1-2 The aesthetic quality of Robert Maillert's Salginatobel Bridge was recognized by New York's Museum of Modern Art in 1949 and by many others since. Shiers, Switzerland.

My client/boss won't let me This Sourcebook presents a strong case that you may share.

I don't know how This Sourcebook will provide you with the knowledge and tools that you need.

What's the goal here?

The purpose of this Sourcebook is to make designers and all others involved in transportation development more knowledgeable about bridge aesthetics by providing a clear description of principles and terminology, supported by practical and easy-to-apply examples. The ultimate goal is to make every bridge an efficient, economical, and elegant feature in its community and environment by giving meaningful visual expression to loads, equilibrium, and forces.

Figure 1-3 An elegant feature in its environment. Brainerd Bypass over the Mississippi River, Brainerd, Minnesota.

Keys to Success

The shapes and sizes of the structural members themselves dominate people's impressions of a bridge. They are the largest elements of the bridge, therefore the first elements people see as they approach and the most strongly remembered. It is impossible to correct the appearance of a poorly proportioned or detailed structure by the application of "aesthetic treatments," though many have tried. There is no substitute for correctly proportioning and sizing structural members. With that in mind, the consensus on bridge aesthetics over the past century and a half can be boiled down to these basic criteria:

- Simplicity,
- Good proportions with an emphasis on thinness,
- Clear demonstration of how the structure works, and
- Fittting its context/surroundings.

Figure 1-4 Simplicity and thinness are often enough. I-95 over Pulaski Highway, Baltimore, Maryland.

Only after all of that is right, think about surface textures and ornamentation.

The final step is to look back over the entire design to ensure that choices made at later stages are still consistent with earlier decisions.

Aesthetics, like every other field of endeavor, has its own terminology. See Section 4.1, Fundamentals, for more on the use of words.

TIP