PERSPECTIVE

Authentic Renderings Build Trust When Designing Signature Bridges

by Michael Fitzpatrick and Jimmy Vincent, HDR

Figure 1. Sketch-level renderings are produced for early conceptual design. The image of the bridge is structurally correct, but cables are depicted as prominent black lines rather than as full, colored, realistic shapes. A sketch-level depiction works well enough for early design exploration. All Figures: HDR.

A signature bridge—new or replacement—is an opportunity for a community to express its identity and create a public space that resonates with both local residents and visitors. The aesthetics and design of these community landmarks can create beloved icons.

Generating scrupulously authentic renderings of a proposed signature bridge is a vital tool to develop a clear design identity that matches the vision of the community stakeholders before the project proceeds to final design or construction, when changes can be prohibitively expensive. Vividly communicating the design in its environment promotes honesty in decision-making as the project progresses.

How do you create an authentic representation of a proposed new bridge asset? By paying close attention to how users will experience a structure. Instead of idealizing the result by showing a helicopter view on a perfectly sunny day, it is often more useful to depict how the structure will look to the community in its surroundings from typical viewing angles and in typical weather. Such depictions should meticulously demonstrate the materials and structural details.

A Practical, Powerful Visualization Tool for Design and Engagement

New or replacement bridges are generational investments that can cost hundreds of millions of dollars and take years to develop. When a community-driven approach is used from the very beginning of design, signature bridges can incorporate aesthetics and the user experience. As project teams explore the wide range of options a community may consider, realistically depicting those concepts as they might actually look and feel helps build engagement, trust, and credibility for a successful signature structure.

Realistic renderings are also practical tools that can be built into the project development plan from the start, much as aesthetics are integral from the start. These renderings are proof of concept—they provide evidence that the design concept is feasible by showing how it will look once constructed. Therefore, they are a key part of a smart, carefully tailored approach to the design of each project. Designers can use the images in ongoing dialogue with owners, builders, and communities as the design is developed. The images help convey an intimate understanding of the site, illustrate how a new bridge structure affects the environment, and showcase what makes a bridge iconic. This philosophy promotes open communication with the public about how the bridge will look and feel, and what the public's experience will be.

Figure 1 is an example of a rendering produced for early conceptual design. It is structurally correct and communicates the form of the bridge. However, the cables are depicted as simple, prominent black lines rather than as full, colored, realistic shapes. A sketch-level depiction such as this works well enough for early design exploration, but it does not communicate the subtle visual aesthetics of the end result.

Figure 2 portrays this same bridge with more life to it, using a photo backdrop and the engineering model of the bridge. In this view, the cables virtually disappear because the actual surfaces of the cables are rendered in the proposed materials and colors. The bridge is also shown from the distance and vantage point of a typical viewer; from this distance, the cables will appear almost transparent to the human eye. This context shows stakeholders the visual cues that help communicate the design.

Figure 3 shows a fully developed, realistic image of how the bridge will look. It can almost be mistaken for a photograph. It shows the shadows, reflections, and typical weathering that one would expect on a bridge in this environment. For example, the piers show the demarcations from actual concrete placements, as well as the staining that would appear at the waterline as the water level rises and falls. These details are subtle, and a viewer might not notice them consciously. However, such details register subliminally, telling the viewer that this image shows the finished reality they can expect.

Figure 2. Rendering an engineering model into a photo backdrop creates a more lifelike image of the bridge to share with stakeholders. Because the bridge is shown from the vantage point of a typical viewer, the cables virtually disappear when the actual surfaces of the cables are rendered in the proposed materials.

Built on Project-Specific Knowledge

The most effective images combine three-dimensional models, high-quality photography, and matte painting, applied with a cinematic eye.

Creating images begins with research about the site and location. There are a multitude of details to get right for the work to be effective. For example, the sky is important: Are there normally clouds? What do they look like? Also, what is the normal prevailing weather, and what are the typical trees and vegetation for the location? The answers to these questions will obviously be different in Honolulu than they would be in Minneapolis. These details are significant in developing an authentic backdrop that helps communicate the design.

The model from the structural design team is an indispensable building block, which must be married with images for the backdrop that establish the atmosphere and location. The model comes with details about the structure's features such as structure depth, geometry, materials, and appurtenances that must be portrayed. Once the model is incorporated, adding the fine points of localized details, such as highway signage or vegetation that will appear around the project site, truly brings the image to life.

Designed in Context, Committed to Transparency

Authentic visualizations can be customized to their audience. Images intended for public discussions may show the bridge in a community context from typical viewing points, whereas images for a construction planning review might focus on specific construction phases, forms, or traffic patterns. But in all situations, scrupulously authentic depiction contributes to building trust, open discussion, and well-informed decisions.

Realistic renderings show communities that project owners, developers, and designers are meeting them where they live. Their bridge is designed in context. The approach promotes transparency and helps build public support. It is a valuable design tool for conveying aesthetics and design intent. And it is integral to a commitment to delivering a signature bridge that is an asset to the community, meets targets for cost and performance, drives community engagement during the design process and also with the completed structure, and contributes to overall quality of life.

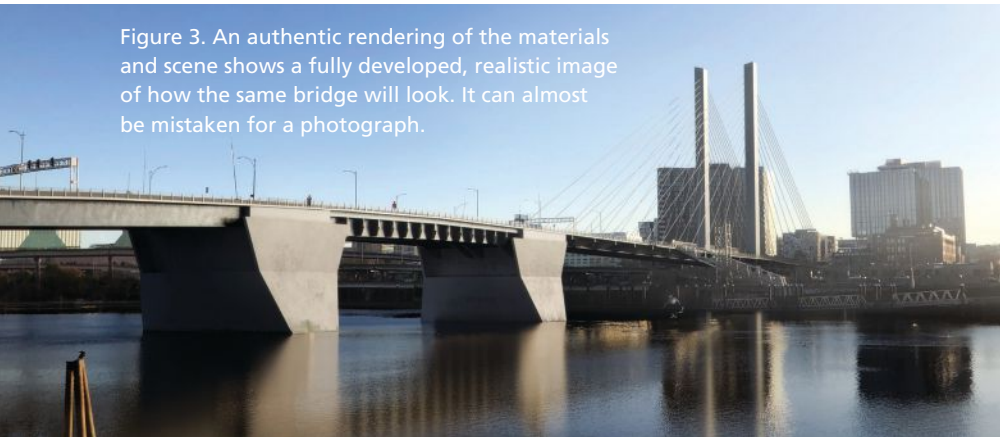
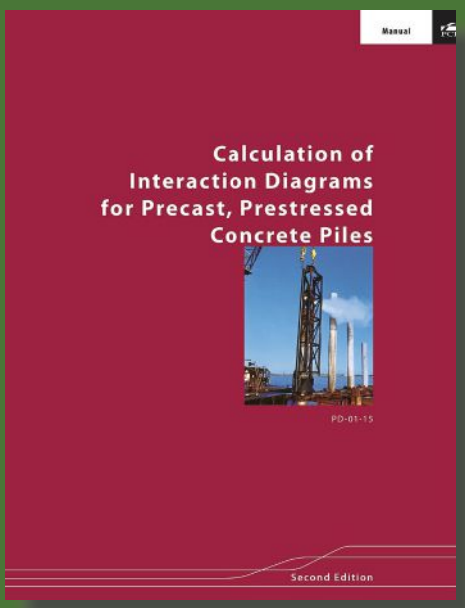


Figure 3. An authentic rendering of the materials and scene shows a fully developed, realistic image of how the same bridge will look. It can almost be mistaken for a photograph.

The Second Edition of



This free eBook, *Calculation of Interaction Diagrams for Precast, Prestressed Concrete Piles*, provides context and instructions for the use of the 2015 revised version of the Microsoft Excel workbook to compute pile stresses, plot interaction diagrams, and compute lifting points of precast concrete piles.

There is no cost for downloading *Calculation of Interaction Diagrams for Precast, Prestressed Concrete Piles* or the 2015 workbook. However, registration is required so that users can be contacted when updates or revisions to the workbook are necessary.

The Appendix of *Calculation of Interaction Diagrams for Precast, Prestressed Concrete Piles* contains detailed instructions and solved example problems using the 2015 workbook. Examples are also solved using Mathcad to validate the workbook solution, and a table of results compares the two methods.

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8770 W. Bryn Mawr Ave. | Suite 1150 | Chicago, IL 60631-3517 | 312-786-0300 | www.pci.org