



Bridges: Sustainability

ANSWERED BY M. MYINT LWIN, RAY MCCABE, AND MALCOM THOMAS KERLEY, P.E.

Question: How do you see sustainability impacting the bridge industry five years from now?

SOME IMPORTANT QUESTIONS have complex answers and benefit from reflection and discussion. In this series designed to reflect that understanding, NSBA asks leading minds in the bridge community to weigh in on some of life's imponderables.

Answer: M. Myint Lwin

Director of the Office of Bridge Technology, Federal Highway Administration

In the design and construction of bridge projects, bridge engineers have been and are paying attention to (1) strength, durability and reliability; (2) compliance with environmental and preservation laws and regulations; (3) community involvement; (4) use of recycled and high-performance materials; and (5) minimizing negative impact to the environment. However, there are opportunities to do more with specific, targeted and measurable goals to contribute toward sustainable bridge projects.

In the next five years, we will see general acceptance and implementation of green designs and rating systems by bridge owners for reducing life-cycle costs, energy use, greenhouse gas emissions, pollution emissions, waste, and the use of non-renewable resources to sustainable levels. Bridge engineers will be integrating structural, durability and environmental considerations in their designs. There will be increased demand on the industry to supply construction materials, equipment, and methods in support of the sustainability performance goals of the bridge owners.

In 1987, the Brundtland Commission defined sustainable development as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. The past generations had done their shares in creating marvelous and long-lasting structures that met their needs. They had not comprised our ability to meet our needs. It is now our responsibility to meet the environmental, economic and social needs of our generation and future generations.

For Lwin's additional commentary on the five points listed above, go to www.steelbridges.org/onequestion.





Answer: Ray McCabe

National Director of Bridges and Tunnels, HNTB Corporation

There is a change under way in America's transportation industry and it is clear that sustainability in infrastructure planning, design, construction and maintenance has grown in importance in the last few years. One factor driving that change is the implementation of a sustainability rating system for transportation.

With that in mind, I don't envision sustainability having any game-changing impacts to the bridge industry in the next five years. However, I do believe that continued/new emphasis on sustainability will focus in the following areas:

- ▶ **Increased service life for major bridges**, meaning those with large capital investment and high traffic volumes. For new designs of major bridges that target 100- to 150-year service life, emphasis will be placed on more durable components and materials, better corrosion-resisting steels, use of fiber reinforced composites etc.
- ▶ **Rapid bridge construction**. More efficient and faster construction methods will lead to less energy consumption, less traffic disruption and associated pollutants creating smaller environmental impacts.

▶ **Preservation of existing bridge infrastructure**. First, we must evaluate existing bridges with preservation in mind. Rehabilitation design must incorporate better materials and rapid construction while guarding against unnecessary replacement and rehabilitation by using modern structural health monitoring techniques.

▶ **Improved methodology to evaluate sustainability effectiveness**. More research and better evaluation tools need to be developed to assist in determining what sustainability solutions are most effective. For example, while concrete may require less energy consumption in manufacturing than steel at its use stage, steel offers an energy benefit in its ability to be recycled at its end stage.



Answer: Malcom Thomas Kerley, P.E.
Chief Engineer, Virginia Department
of Transportation

Sustainability is not the first thing I think about when I think about impacts to the bridge industry in five years. Resources in the areas of both staffing and funding will continue to be the main concern for bridge engineers as they look to maintain our aging bridge population. However, the impact of sustainability on the bridge industry will depend on the ongoing discussions about that subject.

On its Sustainable Highways Self-Evaluation Tool website (www.sustainablehighways.org), the Federal Highway Administration defines sustainability and its goal in this way:

“Sustainability is the capacity to endure. The goal of sustainability can be described with the Triple Bottom Line concept, which includes equity, ecology, and economy.”

Sustainability, like climate change, will be a topic for discussion for several years. What does it mean? How does it impact what we do? What changes do we need to make? Obviously, the bridge industry will be impacted by these discussions.

Bridge engineers in both the private and public sector should be involved in these discussions as project selection, materials, manufacturing and construction techniques may/will be impacted. Bridge engineers should continue to look for new processes and systems that reduce project delivery costs and delivery time and protect the environment. **MSC**