

# Spanning bridge design

Sarah Fister Gale

Ed Wasserman may not have been the most scholarly student to ever traverse the halls of Vanderbilt University in Nashville, Tenn., but the lessons he learned there have helped to transform our nation's bridges.

Wasserman was born and raised in Nashville, and attended Vanderbilt's School of Engineering. "I did well in math and physics, but I was never near the top of my class," he says, laughing. "Working is where the real learning began."

When he graduated in 1965, Wasserman took a job at the Tennessee Department of Transportation (TDOT) as an entry-level bridge engineer. Except for a two-year tour of active duty with the United States Army Corps of Engineers, he stayed with TDOT for his entire career.

"The nice thing about working for the DOT, as opposed to being a consultant, is that you get to design the whole bridge," he says. Whereas his young peers in the private sector were tasked with designing a single substructure or support element, Wasserman got to oversee entire projects—with supervision—from day one. It gave him a unique perspective of the bridge design environment and where there were opportunities for improvement.

By 1976, Wasserman was head of structural design and by 1986, director of the Bridge Division. During his years with TDOT, he oversaw the planning and construction of more than 3500 bridges, approximately 94% of which were designed by in-house staff. These include the longest continuous concrete bridge in the United States at 2700 ft (820 m) and the longest jointless precast concrete bridge in the United States, 1175 ft (360 m).

Over his 47-year career, Wasserman witnessed dramatic changes in the bridge design environment. In the early days, he recalls hand calculating and detailing every design, using methods he learned in calculus class to determine necessary loads, then running punch cards through a computer to see if they were correct. "I spent 18 months designing my first two bridges this way," he says.

It was a time-consuming process, but he valued the experience. He says that today's engineers are so reliant on computer-aided design (CAD) that they don't always understand where the calculations come from. "A design might just require a tiny change, but if you don't know where it went wrong, it's sometimes hard to know what to do next."

He admits, though, that calculators and CAD have sped the design process significantly. It is one of many innovations that helped advance the bridge construction industry and made it possible to create longer, stronger, and more resilient structures. Other great advances include accelerated bridge construction, improvements in seismic-resistant designs, longer precast concrete spans, and ultra-high-performance concrete. "These are the innovations I am most excited about," he says.

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Wasserman also says that many of these advances can be linked back to PCI, which has collaborated with the Federal Highway Administration and supported ongoing research efforts, manuals, and committee work to push the precast concrete industry to new heights.

Wasserman is one of the many experts who contributed to these efforts over the years. He attended his first committee days in 1980 and was an active member for the rest of his career, becoming a PCI Fellow in 2011. Wasserman was a member of the Seismic Bridges Fast Team, chair of the subcommittee that produced the *Manual for the Evaluation and Repair of Precast, Prestressed Concrete Bridge Products* in 2006, and a member of the subcommittee that produced the PCI "Curved Precast Concrete Bridge State-of-the-Art Report" in 2012, among others. "PCI has been very influential for bridges and the building industry as well," he says.

Although Wasserman is now retired, he hopes the next generation of precast concrete designers, engineers, and business owners will continue to collaborate and volunteer with PCI. "It's a wonderful place to seek and cultivate relationships with those who are more informed than you," he says, "and it offers a lot of opportunities to help solve problems and improve the practice of design and construction."