Uniting industry and academia

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Adel ElSafty grew up in Cairo, Egypt, surrounded by engineers. His father, brother, and uncle were all structural engineers, and in his city was a bridge that his father helped to design as a student. "Structural engineering runs in our family," he says. "It inspired me."

At 17, ElSafty followed in their footsteps. He received a bachelor's degree in civil engineering from Cairo University in 1984 and completed his master's degree with a focus on bridge engineering in 1988. Then he applied to several international schools to pursue his PhD in civil engineering.

After receiving scholarship offers from several universities, ElSafty chose North Carolina State University in Raleigh, where he was able to work under Paul Zia, a prestressed concrete pioneer, studying the behavior and design of link slabs for jointless bridge decks. He says he loved having the opportunity to work in the lab, testing beams and proving the durability and performance of precast concrete materials. It was his first taste of experiential learning, and it would shape who he became as a teacher and industry member.

After completing his doctoral work in 1994, ElSafty spent a several years working in industry, repairing bridges and conducting research on carbon-fiber-reinforcement (CFR) materials, before returning to academia for good. In 2003, he became the founding faculty member of the Civil Engineering Department at Florida State University's Panama City campus, then two years later moved to Jacksonville, Fla., where he's been a professor of civil engineering in the College of Computing, Engineering and Construction at the University of North Florida (UNF) ever since.

Recalling the excitement of working under Zia in the lab, ElSafty wanted to give his students the same opportunity to learn through experience. With limited funding, he eventually was able to acquire some precast concrete materials and later won a $125,000 grant from the PCI Foundation to establish a precast concrete design studio, which was the first engineering design studio in the United States. "The studio gives our students hands-on experience that would not be realized without the support of sponsors," he says.

That gained the attention of Gate Precast, a Florida precasting company, which donated many precast concrete beams to the testing lab, providing the materials students needed to hone their knowledge of precast concrete beams. In 2012, his students won first place in PCI's regional Engineering Design Competition—the Big Beam Contest—and fourth place nationally.

It was a turning point for ElSafty's work and for the students he taught. Grants started pouring in, and ElSafty began fielding requests from departments of transportation to help them test bridge elements and validate strategies for retrofitting damaged girders with CFR polymer and epoxy injections.

In his time at UNF, ElSafty has procured more than $2.3 million in state, national, and federal funds and has led faculty research teams from eight universities to publish more than 90 journal and conference papers.

"It has been a great way for me to advance my research, but more important was the impact it had on the students," he says. "Precast became part of the curriculum, and it gave students exposure to precast in the real world." Every year, ElSafty teaches two courses on precast concrete for graduate and undergraduate students, arranges field trips to jobsites, brings in industry guest speakers, and finds opportunities for students to observe and work on precast concrete research efforts.

ElSafty's efforts to introduce young people to the precast concrete industry have won him many accolades, including PCI's 2015 Educator of the Year Award; and they led to his appointment as chair of the PCI Foundation's Academic Council and membership on the Board of Trustees of the PCI Foundation. ElSafty also still regularly leads a team of students in PCI's annual Big Beam Contest.

He says he hopes his efforts will help raise awareness among young engineers about the quality, durability, and performance of precast concrete, though offering precast concrete classes won't be enough. "Industry members have to play a role in raising awareness," he says.

He says one of the best ways to build awareness about the many benefits of precast concrete is for PCI members to get more involved in academia, offering guest speakers, field trips, and materials that students can work with. "When students get to engage with the real world, it enhances their learning experience," ElSafty says. When his students talk to fabricators and project managers, they get a sense of how the business works and develop problem-solving and communication skills that they can't learn in the classroom. "If we can expose them to what's happening in the industry, we can create more highly skilled students who will bring out-of-the-box thinking to the workplace."