

Integrating Community-Based Learning and the Classroom

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Professor & Students' Activity (1)

Dr. ElSafty taught and advised his students to design, fabricate, and test Prestressed concrete (PS) beams to teach the students the behavior of PS behavior.

UNF students had 2 Design Teams who worked diligently to come up with a design that would be both practical and economical, but also innovative.

Students had a great learning experience seeing the test done and being involved in the step by step process of designing a beam to meet certain specifications.

Students experience at Gate through PS Big-Beam contest



UNF students prepare beam forms at Gate



Shipping and unloading the beams at UNF lab



Beam testing at the Structures lab



EISafty examines the failure mode



Beam under testing

Students give thumbs up to start testing



Collaboration between the industry & UNF

- We are so pleased with the great outcome of such *technical collaboration between the industry (GATE) and UNF* to better educate and train our engineering students.
- UNF undergraduate students team won the **2nd place** regionally out of 10 participating teams in the Big-Beam Competition.

Faculty advisor: Adel ElSafty

Student team: Craig Jones, Richard Fisher, John Baker, Kyle Reader,
Alex Lazowick and Chris Price

PCI Sponsoring Producer: Gate Precast Co., Jacksonville, Fla.

Award: \$750 and other prizes

What Did Students Learn?

- When our group signed up to participate in the Big Beam Contest, we had no idea what we were getting into. None of us had ever taken a class on concrete, let alone prestressed concrete. Some of us had never even heard of Prestressed concrete, so we were going into uncharted territory.
- Our very brief introduction into prestressed concrete came when we had a brief lecture by Dr. ElSafty. We had no idea how much design work we had actually signed up for and were both excited and stressed.
- As we started our design we realized that we desperately needed to increase our knowledge of the subject in order to properly design a functional beam. We spent a lot of time in the library working and researching into the subject and trying our best to translate what we were learning into our design.
- This experience really taught us the value of team work and the importance of carrying our own weight. This especially came in handy when it came time to get the beam in place for testing and moving it around.

What Did Students Learn? (cont.)

- The whole process of participating in the Beam Contest taught us many things. We learned that teamwork is a must in engineering world whether it's your coworkers or the companies providing necessary services.
- We also learned that prestressed concrete is much more capable of holding higher loads than concrete with standard reinforcing because the cables pull on the concrete so as to give it more strength. We're lucky enough to actually go on site to Gate concrete plant and see how beams are actually cast.
- Most of all we learned that there is a lot of pride and joy in getting to see and test something that we worked hard to design.
- It is a great learning experience seeing tests done and being involved in the step by step process of designing a beam to meet certain specifications.

Activity (2)



- Dr. ElSafty organized a one-day workshop for concrete repair.
- It included both technical presentation and lab demonstration of cracks epoxy injection.
- Engineers from Jacksonville & students were invited to attend.





Activity (3)

**\$125,000 (PCI – Foundation) Grant
to establish
Engineering Design Studio**

September 2009

Adel ElSafty

University of North Florida



Dean Gwin

Foundation Industry Partner -
President & COO - Gate
Construction Materials Group



How did these 3 activities evolve to winning the grant? And what are you planning to do with your new studio?

- I will make sure that our design studio offers students and engineers a *true and authentic learning experience* of PS that benefit from and aligns well with research, industrial partners' experience, and experts' knowledge.
- We are providing three main sets of activities; (1) Offering PS design courses at the undergraduate and graduate levels; (2) workshops on PS; and (3) Research and laboratory testing
- I will also make sure that the PS design studio activities have a **beneficial impact** and the **greatest potential** to improve the design and knowledge of practicing engineers thus reflecting on higher quality of life for individuals as well as society as a whole.

How authentic will your students' learning experiences be in your engineering studio?

- The essence of the authentic learning experience is that it typically focuses on real-world, complex problems and their solutions, using problem-based activities, case studies, participation in practice, *Multiple sources and perspectives*, and collaboration with experts.
- The design studio is:
 - ***Paving the road for what constitutes authentic learning*** in PS, and how industrial partners support and share their expertise & technology.
 - ***Integrating all the ingredients for success*** (Academic institution environment/industrial partner expertise/PCI-foundation support/experience from the industry);
 - ***Building intellectual connection***, between the academic institution/industrial partner/PCI-foundation,
 - ***Motivating students by solving real-world problems, and Learning-by-doing***, designing, seeing, touching, and interacting. Design studio helps learning become more **intertwined with actual design, real projects**, and industrial experts' judgment.
 - Offering students a more authentic learning experience based on intensive workshops, more offered PS courses, hands-on experience on testing and experiments, experts' input, and real collaboration between academic institutions/industrial partners/PCI-foundation.
 - Offering a **multidisciplinary** learning environment.

How do you assess the Course Learning Outcomes?

The learning outcomes of the course activities are assessed through evaluation of student performance and their final design.

*Activity/course outcomes link to some of the
CBTL learning outcomes:*

- Students viewed design issues from multiple perspectives (Materials, design, manufacturer, shipping, testing, report). They are exposed to real world problems
- Students established mutually beneficial partnerships with industrial partners whose backgrounds are different from theirs.
- Students were able to articulate the interconnection of UNF design team, Gate company and the PCI.

Questions?

International Service Learning to Ghana

