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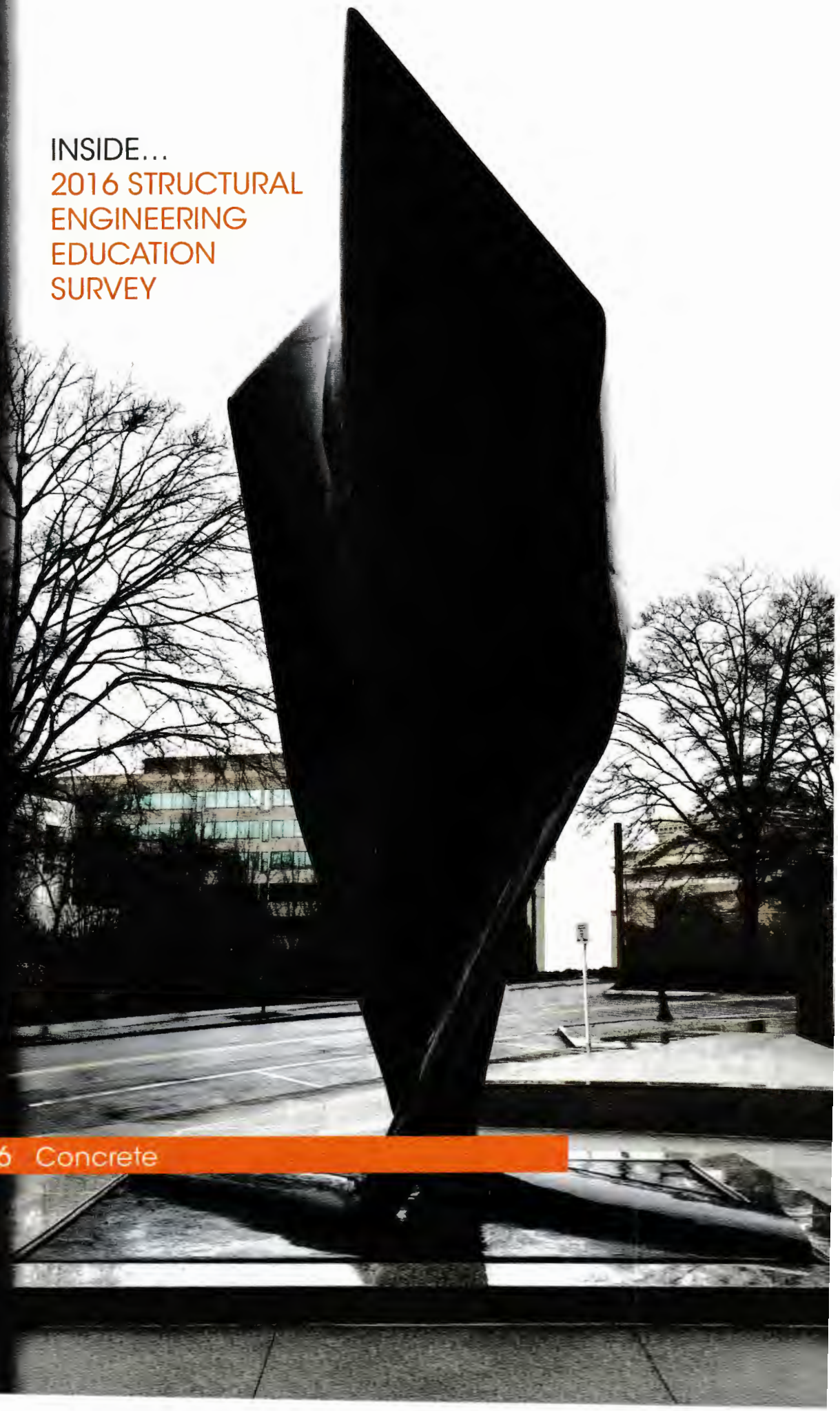
INSIDE...

2016 STRUCTURAL ENGINEERING EDUCATION SURVEY



September 2016 Concrete

Special Section
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Orlando, FL

2016 NCSEA Structural Engineering Curriculum Survey

By Brent Perkins, P.E., S.E., NCSEA Basic Education Committee Chair

The National Council of Structural Engineers Associations (NCSEA) is pleased to present the results of the 2016 NCSEA Structural Engineering Curriculum Survey. The survey is a triennial review of the recommended NCSEA Structural Engineering Curriculum at over 250 engineering schools throughout the country that offer educational opportunities for students desiring to become professional civil/structural engineers. Since 2002, the NCSEA has promoted the recommended NCSEA Structural Engineering Curriculum as the core subject matter deemed necessary by the profession for a sound educational background in structural engineering. The recommended curriculum consists of the following twelve courses: Structural Analysis 1, Structural Analysis 2, Matrix Methods, Steel Design 1, Steel Design 2, Concrete Design 1, Concrete Design 2 (Prestressed and Post-tensioned), Timber Design, Masonry Design, Dynamic Behavior of Structures, Foundation Design/Soil Mechanics, and Technical Writing.

The Survey Process

The NCSEA Basic Education Committee (BEC) began the process of planning for the 2016 Curriculum Survey soon after the results of the previous survey were published in the August 2013 Edition of STRUCTURE magazine. The list of schools that were contacted for participation in this year's survey was first verified by reviewing all engineering programs accredited by ABET as Civil Engineering, Architectural Engineering, Structural Engineering, Civil Engineering Technology, Architectural Engineering Technology, and other similar related programs. There were 251 ABET-accredited engineering schools and 47 ABET-accredited engineering technology schools invited for survey participation. After confirming schools for survey participation, the NCSEA BEC members verified existing or provided new, contact information for a professor/instructor at each of the schools to be surveyed. The school's professor/instructor contact was usually selected because they serve as chair of their department, or they taught structural engineering related courses.

The survey was developed by the NCSEA BEC and deployed in three phases to improve the response rate. Phase 1 of the survey was delivered to each contact via email, with the participant given the option to complete an online survey or to download and complete a downloadable PDF form. Phase 2 was a paper survey that was mailed to the contacts that did not respond to the Phase 1 participation request. The Phase 2 paper survey provided the option for the participant to provide responses using the online survey or for the paper survey to be completed and returned via mail, email, or facsimile. Phase 3 was conducted by the NCSEA BEC and its representatives using the internet to research the engineering schools that did not respond to Phase 1 or 2. It involved studying the school's website to determine the courses offered. Phase 3 was not utilized for the engineering technology schools that did not respond to Phase 1 or 2. After Phase 3 of the survey was completed, and before publication of the results, the NCSEA BEC emailed each Phase 3 engineering school to provide

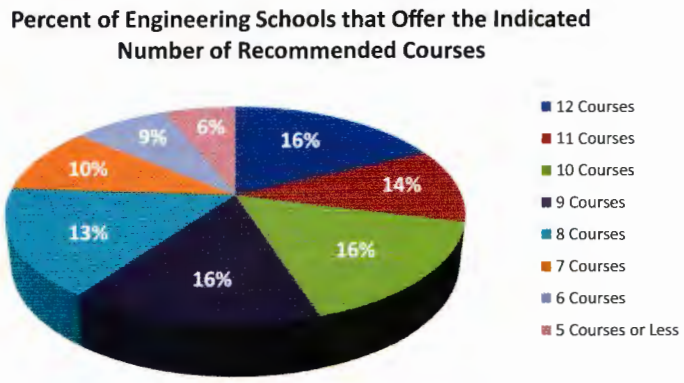

Figure 1.

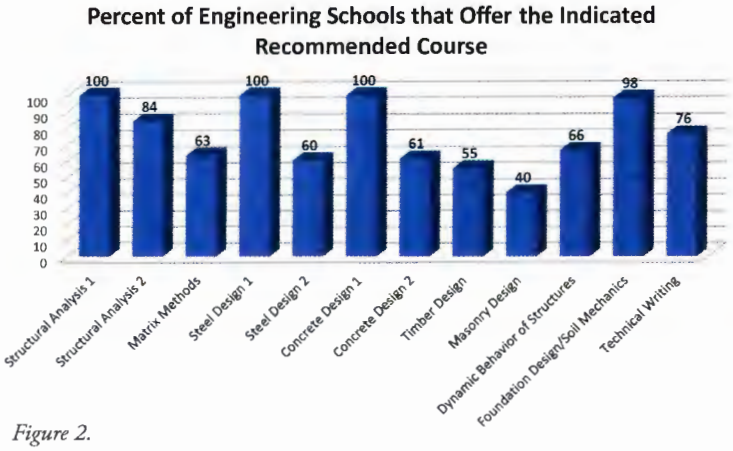

Figure 2.

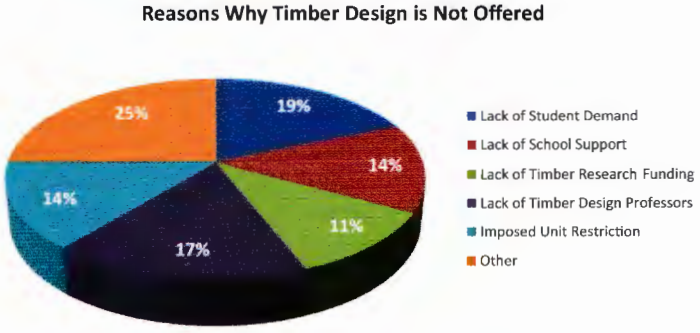

Figure 3.

SECB Education Certificate

See Page 8 for exciting news regarding recognition of student fulfillment of the SECB structural engineering curricula.

them with one final opportunity to review the survey results and report any corrections prior to publication.

The Survey Results

The NCSEA BEC considers the school-reported response to the survey successful, as 118 of 251 engineering schools self-responded to the survey by participating in Phase 1 or 2, for a response rate of over 45 percent. There were 16 engineering technology programs that also self-responded to the survey, and we appreciate their participation even though these results are not included here. The enclosed list indicates the number of recommended courses that are offered at each school. Schools that participated in Phase 1 or 2 of the survey are shown in **bold text**. Schools that did not directly participate in Phase 1 or 2, but were part of the BEC Phase 3 research, are also included. The percent of engineering schools that offer the indicated number of recommended courses is shown in *Figure 1*. The percent of engineering schools that offer each of the recommended courses is provided in *Figure 2*.

Past survey results have indicated that Timber and Masonry Design courses are not taught at nearly the same frequency as Steel and Concrete Design courses. The 2016 NCSEA Structural Engineering Curriculum Survey included additional questions as to why Timber and Masonry Design courses are not being offered in an effort to better understand the challenges schools face in offering these courses. *Figure 3* records the survey participant's response to why a Timber Design course is not offered at their school. Likewise, *Figure 4* indicates the survey participant's response to why a Masonry Design course is not offered. The survey also asked survey participants if their school offered any form of special acknowledgment for a student that concentrates in structural engineering. The special structural engineering acknowledgment results are presented in *Figure 5* (*page 13*).

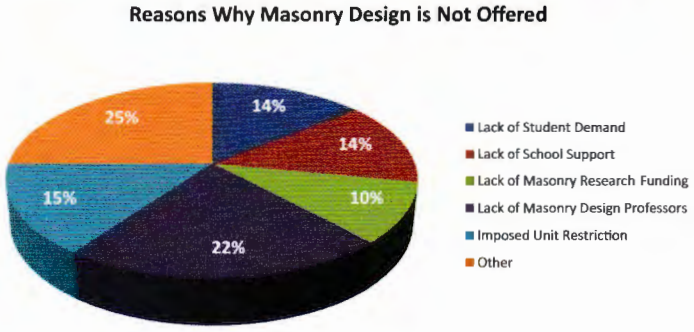

Figure 4.

The wealth of information collected as part of the survey process prevents publication of all results in this article. Further survey results, including a listing of the recommended courses offered at each school, and if the school offers any post-graduation acknowledgement of a concentration in structural engineering, is available in the electronic version of STRUCTURE magazine at **www.STRUCTUREmag.org**. Later this year, the NCSEA BEC intends to make all of the survey results, including a listing of additional structural engineering courses offered at each school, available on the NCSEA website at **www.ncsea.com**.

continued on next page

School	Recommended Courses Offered
Alabama A&M University	**6**
Arizona State University	9
Arkansas State University	6
Auburn University	**12**
Boise State University	8
Bradley University	9
Brigham Young University	**11**
Brigham Young University – Idaho	11
Brown University	7
Bucknell University	10
California Baptist University	6
California Institute of Technology	6
California Polytechnic State University – San Louis Obispo	**12**
California State Polytechnic University – Pomona	8
California State University – Chico	6
California State University – Fresno	**12**
California State University – Fullerton	9
California State University – Long Beach	**12**
California State University – Los Angeles	10
California State University – Northridge	6
California State University – Sacramento	**11**
Carnegie Mellon	**6**
Caribbean University	9
Carroll College	8
Case Western Reserve University	**8**
Catholic University of America	8
Central Connecticut State University	7
Christian Brothers University	6
Clarkson University	12
Clemson University	**12**
Clevelond State University	10
College of New Jersey	9
Colorado School of Mines	**11**
Colorado State University	**11**
Columbia University	12
Cornell University	11
Drexel University	**7**
Duke University	**8**
Embry-Riddle Aeronautical University – Daytona Beach	8
Florida A&M University/Florida State University	9
Florida Atlantic University	9
Florida Gulf Coast University	**6**
Florida Institute of Technology	**7**
Florida International University	9
George Mason University	10
George Washington University	**11**
Georgia Institute of Technology	10
Georgia Southern University	7
Gonzaga University	11
Howard University	7
Idaho State University	10
Illinois Institute of Technology	8
Indiana University – Purdue University Fort Wayne	5
Iowa State University	9
Jackson State University	9
Johns Hopkins University	9
Kansas State University	**12**
Lafayette College	11
Lamar University	**7**
Lawrence Technological University	**12**
Lehigh University	9
Lipscomb University	6
Louisiana State University	10
Louisiana Tech University	10
Loyola Marymount University	6
Manhattan College	**9**
Marquette University	**8**
Massachusetts Institute of Technology	9
Merrimack College	**8**
Messiah College	8
Michigan State University	9
Michigan Technological University	**10**
Milwaukee School of Engineering	**12**
Minnesota State University – Mankata	**7**
Mississippi State University	**11**
Missouri University of Science and Technology	12

Montana State University	**10**
Morgan State University	6
New Jersey Institute of Technology	5
New Mexico Institute of Mining & Technology	10
New Mexico State University	9
North Carolina A&T State University	12
North Carolina State University	**11**
North Dakota State University	10
Northeastern University	**10**
Northern Arizona University	7
Northwestern University	**8**
Norwich University	9
Ohio Northern University	**4**
Ohio State University	**10**
Ohio University	**12**
Oklahoma State University	**11**
Old Dominion University	**11**
Oregon Institute of Technology	**8**
Oregon State University	**12**
Pennsylvania State University	12
Pennsylvania State University – Harrisburg	9
Polytechnic University of Puerto Rico	**10**
Portland State University	**12**
Prairie View A&M University	7
Princetan University	8
Purdue University	12
Purdue University Northwest	**6**
Rensselaer Polytechnic Institute	**11**
Rice University	9
Roger Williams University	7
Rose-Hulman Institute of Technology	10
Rowan University	**11**
Rutgers	**12**
Saint Louis University	**9**
Saint Martin's University	8
San Diego State University	7
San Francisco State University	**8**
San Jose State University	5
Santa Clara University	**12**
Seattle University	10
South Dakota School of Mines and Technology	**10**
South Dakota State University	9
Southern Illinois University – Carbondale	**6**
Southern Illinois University – Edwardsville	**12**
Southern Methodist University	9
Southern University and Agricultural and Mechanical College	6
Stanford University	5
Stevens Institute of Technology	10
Swarthmore College	3
Syracuse University	**10**
Temple University	**11**
Tennessee State University	6
Tennessee Technological University	10
Texas A&M University – College Station	7
Texas A&M University – Kingsville	9
Texas Tech University	11
The Citadel	**12**
The City College of New York	9
The Cooper Union	10
Trine University	**10**
Tufts University	7
Turabo University	8
United States Air Force Academy	**8**
United Stotes Coost Guard Acodemy	7
United States Military Acodemy	10
University at Buffalo (SUNY)	9
University of Akron	**9**
University of Alabama	12
University of Alabama – Huntsville	6
University of Alaska – Anchorage	**11**
University of Alaska – Fairbanks	10
University of Arizona	12
University of Arkansas	**5**
University of Arkansas – Little Rock	**5**
University of California – Berkeley	11
University of California – Davis	**9**
University of California – Irvine	11
University of California – Los Angeles	**10**
University of California – San Diego	12
University of Central Florida	8
University of Cincinnati	**12**
University of Colorado	**12**
University of Colorado – Denver	7
University of Connecticut	10
University of Dayton	12
University of Delaware	9
University of Detroit Mercy	**9**
University of Evansville	7
University of Florida	**12**
University of Georgia	10
University of Hartford	**4**
University of Hawaii – Manoa	10
University of Houston	6
University of Idaho	**11**
University of Illinois – Chicago	**11**
University of Illinois – Urbana Champoign	10
University of Iowa	7
University of Kansas	**12**
University of Kentucky	**12**
University of Louisiana – Lafayette	**8**
University of Louisville	**10**
University of Maine	**11**
University of Maryland	6
University of Massachusetts – Amherst	10
University of Massachusetts – Dartmouth	7
University of Massachusetts – Lowell	**11**
University of Memphis	9
University of Miami	**11**
University of Michigan	**11**
University of Minnesota	**12**
University of Minnesota – Duluth	12
University of Mississippi	8
University of Missouri – Columbia	8
University of Missouri – Kansas City	9
University of Mount Union	**4**
University of Nebraska	**11**
University of Nevada – Las Vegas	10
University of Nevada – Reno	9
University of New Hampshire	**12**
University of New Hoven	**5**
University of New Mexico	**9**
University of New Orleans	11
University of North Carolina – Charlotte	**12**
University of North Dakota	**8**
University of North Florida	7
University of Notre Dame	5
University of Oklahoma	**10**
University of Pittsburgh	**8**
University of Portland	5
University of Puerto Rico – Mayaguez Campus	7
University of Rhode Island	**11**
University of South Alabama	**10**
University of South Carolina	**10**
University of South Florida	**12**
University of Southern California	**11**
University of Southern Indiana	6
University of Tennessee – Chattanooga	6
University of Tennessee – Knoxville	6
University of Tennessee – Martin	7
University of Texas – Arlington	9
University of Texas – Austin	**12**
University of Texas – El Paso	5
University of Texas – Rio Grande Valley	8
University of Texas – San Antonio	**9**
University of Texas – Tyler	10
University of the District of Columbia	8
University of the Pacific	**5**
University of Toledo	6
University of Utah	**11**
University of Vermont	**9**
University of Virginio	9
University of Washington	**12**
University of Wisconsin – Madison	8
University of Wisconsin – Milwaukee	11
University of Wisconsin – Platteville	**7**
University of Wyoming	**12**
Utah State University	11
Valparaiso University	**8**
Vanderbilt University	**8**
Villanova University	8
Virginia Military Institute	9
Virginia Tech	**11**
Walla Walla University	**8**
Washington State University	**12**
Wayne State University	**11**
West Texas A&M	10
West Virginia University	8
West Virginia University Institute of Technology	**7**
Western Kentucky University	9
Western Michigan University	**9**
Widener University	**5**
Worcester Polytechnic Institute	10
Youngstown State University	9

Application of the Survey

The results of the 2016 NCSEA Structural Engineering Curriculum Survey can be utilized in a multitude of different ways by high school students, college students, colleges, and businesses. For instance, prospective structural engineering high school students and their parents can use the survey to evaluate the breadth or number of recommended structural engineering courses offered by a school. However, it is important to note that the quantity of recommended structural engineering courses offered by a school should be only one of many factors utilized in determining a student's plans. College students might use the survey to aid in locating a school that offers a distance learning course they are unable to obtain at the school they are attending. Colleges can use the survey results as part of their evaluation process when comparing their course offerings to their counterparts. Businesses can utilize the survey results as part of their employee hiring process by becoming more familiar with the course offerings of a job applicant's alma mater.

The NCSEA BEC appreciates the efforts of the over 130 dedicated educators that participated in the 2016 NCSEA Structural Engineering Curriculum Survey. The survey would not be possible without their participation.

Questions or comments on the 2016 NCSEA Structural Engineering Curriculum Survey are encouraged and should be directed to **education@ncsea.com**.

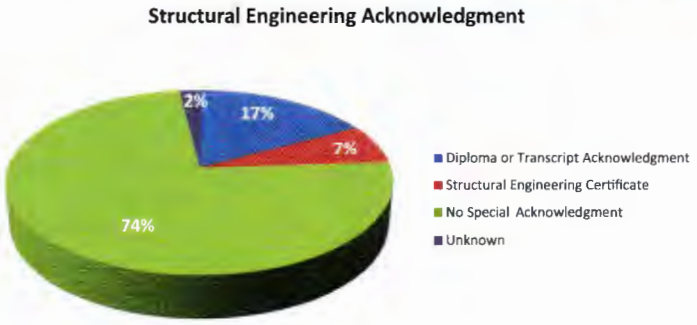

Figure 5.

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Your Opinion Counts!

See page 8 for an invitation to structural engineering practitioners to voice their opinions on the appropriateness of the NCSEA Structural Engineering Recommended Curriculum in today's environment. We encourage you to become a part of the discussion.