A CENTURY OF CIVIL ENGINEERING AT THE JOHN HOPKINS UNIVERSITY: 1913-2013
In his 1876 inaugural address as president of Johns Hopkins University, Daniel Coit Gilman cited the need, in well-populated areas, for civic or municipal engineers.

Indeed, in the decades that followed, the country experienced a transformation from an agrarian to an industrial society. The waves of immigrants, rise of a prosperous middle class, and mass production of the automobile all taxed the existing infrastructure. The need for a large cadre of college-trained engineers who could address immediately the technological requirements of a growing nation was all too evident.

By 1910, the State of Maryland was losing nearly 300 young men each year to engineering schools in other states, and it felt keenly the lack of a local training program that would supply an ongoing source of qualified engineers. That same year, perhaps fueled by public sentiment, the state offered to finance the addition of an engineering school at Johns Hopkins to coincide with establishment of the university’s Homewood campus. University trustees agreed, and a bill passed in 1912 that provided 129 full scholarships to the new school for Maryland residents.

The move met with hearty approval not just in Maryland, but across the nation. Those who sent letters of support included Woodrow Wilson, a university graduate and then governor of New Jersey, who commented, “The University, the State, and the country are to be most heartily congratulated on the action of the Legislature. Maryland will thus quicken and advance the industrial development of the nation.”

The university’s new Department of Engineering was first known briefly as the School of Technology, and the Committee on the School of Technology visited faculty at the principal engineering schools on the East Coast to discern what we now call “best practices” in instruction, curriculum, and laboratory work. Committee members also conferred with a number of prominent consulting engineers, examined entrance requirements at engineering schools, and even visited 27 county high schools to determine the qualifications of the graduates.

As a result, the university trustees and professors charged with establishing the engineering program at Johns Hopkins saw an opportunity to create an entity that would not only be a worthy addition to an already distinguished university, but one that would improve the methods of engineering instruction. They elected to offer instruction in three disciplines: electrical engineering, mechanical engineering, and civil engineering.
In 1913, Harvard alumnus Charles J. Tilden arrived from the University of Michigan to serve as the first professor of civil engineering; instruction in the discipline began in the 1913-1914 academic year. Of the first 60 students in the Department of Engineering, three chose to study civil engineering.

Professor Tilden taught three undergraduate courses: Engineering Drawing; Civil Engineering I: Structural Mechanics, Theory of the Strength of Materials, and Elements of Structural Design; and Surveying, a one-month summer course. He devoted much of his time to evaluating and procuring surveying equipment and machines for the materials testing laboratory at Homewood. He also collected enough relevant books, magazines, and photographs to establish a library.

The Mechanical and Electrical Building (renamed Maryland Hall in 1931) was the first home of civil engineering. The State of Maryland’s 1912 Technical School Bill also provided funds for the construction of a building specifically for the discipline. Sited directly across from Maryland Hall, the Civil Engineering Building opened its doors in 1916, at a cost of $150,000. The new building featured three laboratories in the basement, administrative and classroom space on the first floor (even room for a museum), three large drafting rooms on the second floor, and a single large room on the third floor for free-hand drawing and blueprinting.
In 1915, university president Frank Johnson Goodnow requested that the fledgling engineering program contribute to preparations for a possible war effort by instituting a series of “Night Courses for Technical Workers.” These courses provided immediate instruction to Baltimore artisans and technicians whose services would be needed quickly should the United States join the “Great War.” Thus civil engineering was an important component of the very first part-time program at Johns Hopkins. When the university formed the nation’s first Reserve Officer Training Corps (ROTC), Professors Tilden and J.H. Brighurst taught courses in military field engineering, map reading, and military topography.

By the 1916-1917 academic year, the civil engineering program had developed a four-year course of study and had begun its first research project, an investigation of cement mortars and concretes, which could be made from materials in Maryland.

A Growing Department

In 1919, the Department of Engineering became the School of Engineering, and civil engineering became a stand-alone department. That same year, Professor Tilden resigned to accept the chair of engineering mechanics at Yale.

During his tenure at Johns Hopkins, Tilden wrote an article justifying the institution of an engineering school in the university, pointing out that an engineer must possess qualities such as creativity, which are best developed in the atmosphere of a university. In his article, Tilden also commented that in the Johns Hopkins program of civil engineering, 24 percent of the degree requirements fell into the categories of the humanities and social sciences, more than at any other school in the United States.

Professor John H. Gregory became the second chair and directed the new department until 1930. He added practical experience to the civil engineering curriculum, sending students on inspection trips to municipal structures, such as water filtration and purification works and bridges, and to industrial and power plants. The students also presented a seminar in their final year. From extant copies of those presentations, we know that the senior class ranged in size from 10 to 19 during the 1920s.
Through the efforts of Prof. Gregory, the Department organized the student chapter of the American Society of Civil Engineers (ASCE) in 1921. The goal of the chapter – the 13th to be established in the country – was to “promote closer relationships between students and civil engineering and to assist in furthering original investigations.”

In 1930, J. Trueman Thompson succeeded Prof. Gregory as Department chair. A member of the engineering class of 1917, Prof. Thompson was an expert on roadways and took charge of building a new campus road system at Homewood. The Civil Engineering Building was renamed Latrobe Hall in 1931 to honor Benjamin Henry Latrobe, Jr., the 19th century engineer best known for his railroad bridges. In 1937, Abel Wolman joined the Department to help expand its program in sanitary engineering. With joint appointments in civil engineering and the School of Hygiene and Public Health, Prof. Wolman developed a graduate-level program that would achieve full status as the Department of Sanitary Engineering in 1946.
In addition to fulfilling their academic and research duties, civil engineering faculty participated in other university activities. In 1938, for instance, Prof. Thompson and Professor Thomas Hubbard agreed to supervise the transformation of what was considered a sub-standard playing field into the university's first baseball diamond, located on what is now Decker Quad. There is little doubt that the brand-new field was a factor in the beginning of a winning streak for the Blue Jays baseball team during the next several years.

As another world conflict threatened to involve the United States, university president Isaiah Bowman and others surmised that victory would depend on technology. The School of Engineering joined with the U.S. government and other institutions in a comprehensive instruction program that would be known as the Engineering, Science, Management, War Training Program. Several civil engineering faculty were instructors in the program; Professors Thomas Comber and Thomas Hubbard taught courses that included Engineering Fundamentals for Women. Other faculty served as consultants to state and federal agencies. For example, Prof. Thompson was director of the Highway Traffic Advisory Committee of the War Department. Civil engineering laboratories were repurposed to address research topics targeted for the war effort.

As might be expected, World War II curtailed student field trips, as undergraduates and graduates took advantage of accelerated programs that freed them for the war effort more quickly. The ASCE student chapter remained active, hosting the national convention in 1941 and the annual student chapter dance in 1942. The field trips resumed in 1949, this time sponsored by the ASCE student chapter rather than the Department. The war had significant consequences for the department: enrollment increased, graduate education grew in importance, and demand increased for civil engineers at all levels.
The Department continued to take pride in the well-rounded education it offered. Its course requirements allowed students a good number of electives, both within the Department and in other departments, particularly the humanities and social sciences. The proportion of non-engineering classes gradually declined, but the emphasis on a liberal education was renewed after World War II; in the decades of the 1950s and 1960s other universities followed Hopkins’ example in this regard.

In the 1950s, a number of significant changes across the engineering school signaled a shift from “practical” engineering instruction to one focused on fundamentals of the discipline. In 1960, a proposal was approved to merge the Departments of Civil Engineering, Mechanics, and Aeronautics into a single Department of Mechanics with George S. Benton as chair. The faculty of the three departments recognized that aspects of their disciplines had become obsolete, and that their common interests in the broad field of mechanics – fluid mechanics, solid mechanics, and several areas of classical physics – might flourish in an integrated environment.

In 1966, the School of Engineering merged with the Faculty of Philosophy to form the School of Arts and Sciences, diminishing the presence of civil engineering even further. Engineering alumni were understandably upset, and within a decade, it became clear to all that the merger had been a mistake. Through the efforts of many, including civil engineers and university trustees Willard Hackerman ’38 and F. Pierce Linaweaver ’55’65, the university made the commitment to create an academic center of excellence in the new engineering school. Mr. Hackerman was instrumental in securing a gift from the estate of G.W.C. Whiting, co-founder of the Whiting-Turner Contracting Company, to fund (and name) the new school.

Even though the engineering school was re-established in 1979, the civil engineering department was not yet back to full strength. Rather, it combined with materials science to form the Department of Materials Science and Engineering/Civil Engineering. This made sense, according to the late Robert B. Pond, Sr., materials science and engineering professor, because “so much of civil engineering is materials.”
A Renewed Department

It was the intent of the Whiting School to reconstitute the civil engineering department, and Dean V. David VandeLinde hired Northwestern University Professor Ross Corotis in 1981 to rebuild and lead the program. Prof. Corotis recruited faculty and even purchased the necessary furniture, including the acquisition of the now-infamous dental chair from the state’s surplus furniture warehouse.

On July 1, 1983, civil engineering was recognized officially as a full department in the engineering school. The Department’s fall 1983 newsletter, The Bridge, announced with pride, “The Department of Civil Engineering exists again!” The celebratory party included champagne and hors d’oeuvres on toothpicks stuck in a concrete cylinder. The new departmental status also meant a move back to Latrobe Hall, and the beginning of much-needed renovations to the building.

In spring 1985, the Department held the first Richard J. Carroll Memorial Lectureship in Civil Engineering to honor an alumnus and one of Baltimore’s leading structural engineers. The lectures have brought a number of renowned scholars to the Department to interact with students and faculty, including Professor Leslie E. Robertson, one of the structural engineers for the World Trade Center, the Bank of China Tower, and the Puerta de Europa.

In fall 1985, the Department dedicated the new 4,000-square-foot laboratory wing in Latrobe Hall, with facilities for undergraduate laboratories, graduate soil mechanics, structural dynamics, and structural testing. It also hosted a conference on “Civil Engineering Education and Research.”

In 1986, the Department created the Civil Engineering Advisory Committee, consisting of alumni and other prominent engineers. The group’s objectives were to act as a liaison with industry and government, to bring external guidance and advice on aspects of education and research, and to assist in long-range planning and identify support for the Department’s objectives. During this time, the Department applied for and received ABET accreditation, with the visiting committee commenting on the innovative features of the materials evaluation laboratory and the engineering systems design courses.
As the Department grew, so too did the faculty’s research efforts. In 1989, for example, active, multi-years grants awarded by corporations and government agencies totaled $1,693,886, and the faculty published 41 journal articles. By 1996, grants had increased to $2,804,646, with 81 journal articles. Faculty also hosted a number of national conferences, including the National Conference on Wind Engineering and the ASCE Engineering Mechanics Division Conference.

The ASCE student chapter participated regularly in local and national concrete canoe and steel bridge competitions. The chapter also continued to act as a connector between civil engineering students and industry professionals, providing assistance in preparing for job interviews and in securing employment. Students volunteered for Habitat for Humanity, using their practical skills to help renovate rowhouses in Baltimore City.

When not hard at work in the classroom and laboratory, graduate and undergraduate students combined their expertise in other areas to represent the Department in extracurricular activities. In 1997, the Civilians softball team posted an impressive record of 11 wins and two losses. That same year, the Civilians volleyball team won the regular season competition as well as the university tournament.

Through the years, Department faculty have received national and international acclaim for their achievements in the field. To select only one example from the many awards that have been conferred, four faculty have been elected to membership in the prestigious National Academy of Engineering: Professor Robert Scanlan (1987), Professor Bruce Ellingwood (2001), Prof. Ross Corotis (2002), and Professor Robert Dalrymple (2006).
In 2004, Professor Nicholas Jones, a former member of the civil engineering department and its chair from 1999 to 2002, returned to Johns Hopkins as the Whiting School’s seventh dean. It is fitting that he is the first to hold the title of Benjamin T. Rome Dean. Mr. Rome graduated with a bachelor’s degree in civil engineering from Johns Hopkins in 1925 and went on to lead the Hyman Construction Company, now known as Clark Construction Company.

**Civil Engineering at Johns Hopkins: 2012-2013**

Today, the Department is home to a vibrant group of faculty – 10 primary and five lecturers, researchers, and part-time faculty – whose research interests fall into three major areas: structures, systems, and mechanics of materials. While the graduate program has grown in the past several years to more than 50 students, undergraduate enrollment remains stable at approximately 60 students. The ASCE student chapter continues to host a variety of activities, such as the Student Night and Career Fair with the ASCE Maryland Section.
During the past several years, the Department has placed an emphasis on increased collaboration among research areas and disciplines. For example, civil engineering faculty hold leadership roles in the university’s new Systems Institute and the Hopkins Extreme Materials Institute. Faculty also have developed interdisciplinary courses, such as Professor Ben Schafer’s Perspectives on the Evolution of Structures, a popular offering that draws interest from students in the Krieger School of Arts and Sciences and the Maryland Institute College of Art.

Current research facilities include the Coastal Engineering Laboratory, the Thin-Walled Structures Laboratory, the Smart Structures and Hybrid Testing Laboratory, the Geotechnical Engineering Laboratory, the Computational Mechanics Research Laboratory (CMRL) and the Computing Cluster.

The Department is thriving and is well represented by the more than 1,200 living alumni, who lead successful and distinguished careers in civil engineering as well as in business, law, and medicine. It continues to exemplify the spirit of inquiry and discovery as evoked by Frank Johnson Goodnow in his 1915 inaugural address as the second president of Johns Hopkins:

“There are great advantages to be derived from the association of technical schools with the university, particularly where research and investigation, with the idea of enlarging the sum of human knowledge, are recognized as a part of the university’s work.”

Building on its achievements and the lessons learned during the past 100 years, the Department of Civil Engineering looks forward to its next century of teaching, research, and service.