

Les Youd Commencement Speech, August 17, 2017

Dean Jensen, graduating students, faculty, families and friends, I am honored to speak to you on this noteworthy occasion. Qualifying for a diploma from Brigham Young University, as you know, is a major accomplishment. Your diploma signifies not only academic competence but attainment of high moral character and a commitment to honor the principles and standards set forth in the aims of a BYU Education and in the gospel of Jesus Christ.

A major reason I was chosen to speak to you today is that in 2005, I was elected to membership in the National Academy of Engineering or NAE. In this country, election to NAE is the most prestigious honor an engineer or technologist can receive. About 60 new members are elected annually from a pool of tens of thousands of US engineers representing all disciplines. Thus, only a select few attain membership in NAE. I am the second faculty member from BYU to attain that distinction; the first was Dell Allen, a professor in the School of Technology, who was elected in 1984. Many major technological universities will have several members of NAE on their faculty and will tout that number as a measure of their stature and brilliance.

Now to the question of what must one do to become a member of NAE? In my case, the answer is--have lots of luck. My definition of luck, is preparation meeting opportunity. This definition may sound a bit frivolous, but there is another element--the love of God for his children. For those who love and trust God, He will bless them with ample opportunities to succeed. Thus, if we are prepared, and obey and love God, opportunities will come to allow us to attain success. We may not recognize God's hand in those opportunities, but in my case, He made sure the needed opportunities came.

A major stroke of luck for me was taking of the Graduate Record Exam, or GRE during my senior year at BYU. At that time, I worked for Prof. Ralph Rollins conducting soil mechanics tests for his engineering consulting business. One Saturday in November 1963, as I was working in the lab, Dr. Rollins came by and asked if I was planning to take the GRE. I answered no; it would cost \$25, plus I would miss a day of work, so I wasn't planning to take the exam. Prof Rollins urged me to reconsider and finished his appeal with this question: "what have you got to lose?" As I, continued working, I pondered that question and concluded that maybe there was something valuable that I could lose, so I signed up and took the exam.

As I completed the GRE, there was a form to fill out with spaces to list two universities to which the results would be sent at no cost. I was planning to continue my studies in civil engineering at BYU to attain an MS degree, but had given no thought to enrolling at another university. I knew that Dr. Rollins had received his PhD from Iowa State University, so I wrote that university in the first blank and, rather flippantly, wrote the University of New Mexico in the second blank, thinking that would be a warmer and closer place to go.

I did not feel that I had done well on the GRE and as I drove home to Spanish Fork, where my wife, Denice, and I lived, I felt dejected and without expectation that anything good would come from my taking the exam.

On a Sunday morning in March 1964, our Bishop, who was also the Spanish Fork Post Master, came to me after Priesthood Meeting and said that an important looking letter, addressed to me from Iowa State University, had come into the Post Office the previous evening. He asked if he could take me to the Post office after church to retrieve the letter. I accepted his invitation and we went to the Post office. When I returned home Denice and I opened the letter which contained an offer of a NSF Traineeship, a three-year fellowship, to study at Iowa State. After some thought and prayer, we decided to accept that offer, which provided enough support for me to pursue a PhD. I had not prayed for nor planned on this opportunity, but the Lord knew my potential and saw that the opportunity came.

The next stroke of luck occurred as I discussed my educational plan with Prof. Richard L Handy, head of the Geotechnical Engineering Group at Iowa State and my future advisor and major professor. He suggested that I not work on an ongoing ISU research project. Soil mechanics research at ISU focused on investigations of various chemical additives to stabilize soils for road bases and building foundations. Central Iowa does not have readily available sources of gravel, such as Utah's Point of the Mountain quarries, so Iowa must find other ways to strengthen bases for roads and buildings. Because my Traineeship provided \$600 per year for research, Dr. Handy suggested that I develop a new area of research for the university by taking on a project in soil dynamics, a relatively new field. Even though there were no professors at ISU with experience or expertise in soil dynamics, I agreed and set out on my own to develop a soil dynamics project. Soil dynamics became the foundation for my future career; I believe the Lord again placed this opportunity in my path.

As I graduated from Iowa State, I had several job offers, including faculty positions at the Missouri School of Mines, Kansas State University, the University of Arizona, and a research position at the US Geological Survey, or USGS, at Menlo, Park, California. I called Dr. Cliff Barton, Chair of the Civil Engineering Department at BYU, for his advice and with a hidden hope that he might say come to BYU. He did not mention BYU, but strongly encouraged me to take the research position. His reasoning being that with a strong research record, I could easily move into a faculty position; but developing a strong research record at a university would be problematical. I accepted his advice and took the research position.

I was amazed at how much freedom I was given at USGS to develop and pursue my own research interests. I initially pursued experimental research on dynamic compaction of granular soils, or sand, and prepared a journal paper on that topic from my research. As I was about to submit the paper, I asked myself the question: What is a farm boy from Spanish Fork doing trying to explain the mechanism of dynamic compaction of granular soils to the elite engineers of my profession? As I pondered that question, I concluded that if the paper was erroneous or trivial, some might laugh at me, but the paper would soon be forgotten. On the other hand, if my explanation was useful, I would be accepted and the profession would be benefited from my research. The latter was the case and the paper has been widely referenced and is still a primary reference on the topic of dynamic compaction. I mention this episode to urge all of us to overcome fear, put forth our best efforts and then let others judge our worth; we should not limit ourselves by yielding to own self-doubts.

With expertise in soil dynamics and living in California, I soon shifted my research interest to earthquake response of soils, particularly the phenomenon called liquefaction. Liquefaction is defined as the transformation of saturated granular material, or sand, from a solid state to a liquid state as a consequence of pore-water pressures generated by compaction that occurs during earthquake shaking.

For the past 40 years I have conducted research on liquefaction and related issues. My work has included post-earthquake investigations following about 20 major earthquakes worldwide and reviews of reports from several additional earthquakes to document liquefaction sites and effects. I have followed up those investigations with drilling and testing at liquefaction sites to develop case studies. From that research, I have written many technical papers on liquefaction and related topics.

Three of those papers are now landmark publications that are widely used and referenced by engineers and geologists worldwide. Those are the credentials that led to my election to NAE.

After 17 years at USGS, an invitation finally came in 1984 to join the civil engineering faculty at BYU. For the next 19 years, I taught courses in geotechnical engineering and continued my research on liquefaction. Two of the three landmark papers I noted above were written with students and associates, while at BYU. I am now retired, but still write on the topic of liquefaction, participate in research, and regularly consult on earthquake hazards with engineers and owners or developers of engineered facilities.

In conclusion, I bear testimony that God loves me and has led me throughout my career. I also bear testimony that He loves you and will guide you in your engineering and technology careers, if you will keep his commandments and love and serve Him. As engineers and technologists, we serve mankind in various ways and “when you are in the service of your fellow beings, ye are only in the service of your God (Mosiah 2:17). I leave these thoughts with you in the name of Jesus Christ, Amen.