

News Magazine of the Western Society of Engineers

Summer 2011



MARTIN C. JISCHKE, PH.D.

2011 RECIPIENT OF THE WASHINGTON Award

PAGE

100 Years of Octave Chanute's Contributions to Aviation and Engineering



National Engineers Week Foundation expands new faces of engineering program to spotlight top engineering students

They may be young but they are hard at work as they prepare for

a future filled with unexpected challenges and opportunities. They are today's engineering students, and soon they will be asked to address, and potentially solve, our most pressing challenges, including energy resources, infrastructure renewal, and national security.

Reflecting the increasingly important role engineers play in today's society, National Engineers Week Foundation is broadening its annual New Faces of Engineering program that for eight years has honored the nation's most promising young engineering professionals. Now, for the first time, the popular initiative will also recognize the best and brightest college engineering students whose academic successes and contributions to the industry are already poised to make an impact.

The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) spearheaded the launch of New Faces of Engineering in 2003 and has submitted nominations every year since the program started. This is ASHRAE's legacy project for 2011 as the chairing society for Engineers Week.

Now live on on Facebook (www.facebook.com/collegeedition), *New Faces of Engineering: College Edition* recognizes the achievements of third, fourth, and fifth year engineering students and provides a forum where students can communicate with the Foundation throughout the year. The page also provides a source of academic and professional development opportunities available to them from National Engineers Week Foundation's engineering association, university, and corporate partners. Students can meet with their engineering peers in every field and learn about other events, internships, jobs, competitions, engineering associations, and more.

The College Edition application will be available August 15, 2011, and will require the student's photo (jpg format), list of accomplishments, and a short essay. The deadline for submissions is October 7, and finalists are announced on October 28. Students must also be affiliated with one of the following engineering associations:

- ACEC (American Council of Engineering Companies)
- AIChE (American Institute of Chemical Engineers)
- ASABE (American Society of Agricultural and Biological Engineers)
- ASCE (American Society of Civil Engineers)
- ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers)
- ASME (American Society of Mechanical Engineers)
- IEEE-USA (Institute of Electrical and Electronics Engineers)
- IIE (Institute of Industrial Engineers)

- NCEES (National Council of Examiners for Engineering and Surveying)
- NSPE (National Society of Professional Engineers)
- SME (Society of Manufacturing Engineers)
- SPE (Society of Petroleum Engineers)
- USACE (United States Army Corps of Engineers)

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2011 Washington Award

Images from the Celebration





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WHO NEEDS WSE?

Is your membership going to ensure your place in history as part of the pantheon of engineers whose heroic accomplishments have changed the course of history? Will it speed your promotion to CEO or at least get you a raise? Will it make you an Engineer Among Engineers, the guru to whom others turn for insight and wisdom?

Most likely none of these honors awaits just because you belong to this Society. Why bother then? Whey spend your time and money chasing glory that may never be?

It's simple, really.

Western Society of Engineers will make you a better engineer and help you grow professionally and personally.

It will happen. But there's a caveat. It will only happen when you make it happen.

To achieve the promise, you must contribute—your expertise, a bit of your time, your presence. You can't sit back and wait for benefits to rain down upon you; you have to become the rainmaker.

Be a mentor to others. More important, be open to mentoring from others—from those younger and older, from engineers working in fields radically dissimilar from your own, from women and from men, from those whose backgrounds are richly different from yours, from those whose success is known, and from those who are only now stepping onto the ladder.

Share your knowledge. Let others know what's going on in your company and within your engineering discipline. Remember that although your WSE companions may work in totally different applications from yours—or may have moved out of the field of engineering entirely—they remain interested in science and technology. Question and listen.

Lend a hand. Join with your colleagues to create occasions for growth, fellowship, and the advancement of your profession. Don't wait to be asked for your help.

Speak up. Congratulate those whose work enables you to learn and profit from your membership. And when you see missed opportunities for enriching and improving WSE, make your voice heard.

Western Society is not just about dinners and special events. It's a place for the expansion of knowledge, a place where experience is a commodity to be shared, where friendship is a treasured reward. JK

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Challenge,
autonomy,
purpose. The
engineering
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his and more.

Martin C. Jischke, Ph.D. President Emeritus of Purdue University and the 2011 recipient of the Washington Award

The following is Dr. Jischke's address presented at the Chicagoland Engineering Awards Banquet, February 25, 2011

Thank you very much to the Western Society of Engineers for this special Washington Award. I am genuinely honored by this recognition. As you can see in your program, the list of previous recipients is a stunning list of engineers, whose impact on our nation and the world has been quite, quite profound. And, indeed, I count some of these past recipients as good friends, including the three Purdue graduates that Chris Burke referred to earlier: Mike Burke; Gene Cernan, who by the way also went to Proviso High School-he's a little older than I am; and Neil Armstrong. One of the past recipients, Fred Hovde preceded me as the eighth president of Purdue.

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Henry Heald, the 1952 recipient, was president of my alma mater, the Illinois Institute of Technology. So it is extraordinarily flattering, humbling, to be included with these people and to be compared with them in terms of accomplishment. So thank you very much indeed.

I also want to thank and congratulate the Western Society of Engineers for recognizing and encouraging these young people who are here with us tonight. These young people really embody the promise of our nation's future and the future of our engineering profession. These United States have been a source of hope, inspiration, and opportunity for now more

than two centuries. Each generation of Americans has its chance to seize this opportunity and, I believe, the responsibility to pass it along to the next generation. Tonight, we bear witness to this idea and this ideal as the Western Society of Engineers builds hope and inspiration in these young people who are here. And to you young men and women who are here tonight, I dearly hope that this experience here raises your hopes. I hope it inspires you. And I hope it opens your eyes to the amazing, amazing opportunities that await you in the engineering profession. All you have to do is seize these opportunities. Remember what Isaac Asimov

once said, "Science can amuse and fascinate us, but it is engineering that changes the world." You can change the world as an engineer.

This is a remarkable and very special evening for me. I'm joined by my wife, Patty, my best friend, dear friend for 40 years. And we're gathered just a few dozen blocks from where I grew up near 69th and Halsted. While the physical distance between the University Club and 69th and Halsted is reasonably short, by lots of other measures it is an extraordinary distance. I have truly come a long way. To think about my journey from 69th and Halsted to this podium says a lot about opportunities in America.

I am in a very real sense a product of the Great Depression. My father grew up in rural Door County, Wisconsin, in the 1930s. Upon graduation from high school, he had no other choice but to leave home to look for work, and he came to the city of Chicago. His dream of going to college and becoming a medical doctor was one of millions of casualties of the Great Depression. He simply never had the chance. He met my mother in Chicago near the stockyards, or what were the stockyards. And I was the first of six children that issued from that marriage.

My dad worked as a meat cutter and a grocery store manager. I worked with my father in those meat markets and grocery stores while I was in grade school and high school. And for a time, I thought I would end up in the same line of work. I learned two important life lessons in those meat markets and grocery stores. The first big lesson I learned was what it meant to put in a hard day's work. There were evenings when I would go home from working with my dad so tired I would go straight to bed. I was too tired to eat. And I learned the importance of education.

This second lesson was the how important education is. The importance of education was vividly and indelibly made clear to me in an incident when I was all of 12 years

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Martin C. Jischke, Ph.D., President Emeritus of Purdue University

old, and it was taught to me by a wise but uneducated man. I was working in a meat market with my father on a day when we received a truckload of beef hindquarters and forequarters. Each of these quarters of cow weighs about 160 pounds and is carried into the store by the truck driver. He'd put it on his shoulder, walk from the truck into a huge refrigerated cooler, and then hang this quarter of beef on a big steel hook. The driver that day was a little guy. He was about 5'6" tall, and I would guess he weighed less than 150 pounds. And as I watched him carry these huge quarters of beef, he bet one of the butchers in the store \$20.00 that he could carry two of them at once, one on each shoulder, and hook both of them in the cooler. Now \$20.00 in 1953 was a lot of money. I estimate it was somewhere between \$150 and \$200 in value today. This is a big bet. Well, this butcher took the bet. To his amazement and mine, the short, little truck driver did it. He carried these two hindquarters, one on each shoulder, from the truck to the cooler and hooked each of them. I was dazzled. This was an amazing feat of strength. As he collected his \$20.00, I looked at him and said, "Wow." When he walked out of the store with his \$20.00, the truck driver called me over, put his arm around my shoulder, and said this, "Young man, do not be impressed. This is backbreaking work. I do it because I can't do

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anything else. If you are smart, you will get out of here and get an education. It's the only way to get ahead." I can still picture vividly that moment 57 years ago. This Hercules of a man, this hero and strong man was telling me, a very young and impressionable boy, not to be swayed by the superficiality of his brute strength. That a bright future for me hinged on my getting a good education.

Well, I took his advice to heart and decided that I would focus on being the good student. I went from DS Wentworth Grade School at 69th and Sangamon to Proviso High School, now Proviso East in Maywood. I did well. And thanks to scholarships from the State of Illinois, the Cook County Foundation, and IIT Freshman Competitive Scholarship and Loans from the government, I enrolled at IIT as a freshman just 30 blocks south of here at 31st and State. I was the first person in my extended family to go to college. I had little idea about what to expect, and I didn't know much about what to choose as a major. So in my innocence I told my assigned advisor I kind of enjoyed math and science and I wanted something general. He looked at me and he said, "You should study physics." So I ended up a physics major.

My time at IIT was a remarkable period of growth and opportunity. The work ethic I learned in the grocery store served me very well as a student. I knew how to work hard, and I did work hard and got good grades. I also had some time for extracurricular activities. I joined a fraternity and competed in sports. I was a radio announcer. I organized the first homecoming celebration at IIT, and I was elected president of my senior class. I was surrounded by very smart people and encountered teachers for whom learning was a calling, a lifelong commitment. And I learned to learn it.

It pleases me enormously that the IIT shield is over there on that wall. It's one of the universities that's part of this University Club, and I couldn't be more pleased that John Anderson, the current president of IIT; John Rowe, the chairman of our board; Craig Duchossois; and Russell Betts, who is the dean of the college within which the physics department lies; and other IIT graduates are here tonight. I'm very proud of that university and enormously grateful for the education I received.

When I graduated from IIT, I could have taken a number of jobs, but I decided to follow the truck driver's advice and the advice of my advisor at IIT: I decided to continue my education in graduate school. Luckily, I had several options and ended up accepting a fellowship to study aeronautical engineering at MIT. It was the beginning of the space age, Sputnik. It was an exciting time to be in aeronautical engineering. It had a lot of appeal and excitement. My good fortune continued as a student at MIT when I came under the tutelage of a professor named Judson R. Baron. This was a remarkable human being and truly a deep-thinking intellectual. He was a gifted teacher, an inspiring scholar. And for me, he was a role model. I became his teaching assistant, and he was my supervisor for both my master's and Ph.D. theses. I spent five years at MIT working with him, and it was the beginning of a 40-year friendship with this amazing, amazing teacher.

I hope, particularly for these young people who are here tonight, those of you from high school and junior high, that each of you has the great joy of encountering one such change-your-life teacher in your educational journey. It can make all the difference. It's the stuff of the richest kind of education.

I also had a little time for extracurricular activities at MIT. I was social chairman of the graduate residence hall, Ashdown House. In this role, I became well known and appreciated for purchasing a new pool table for the graduate students and organizing monthly social hours to bring a little fun into the challenge of graduate life at MIT. More importantly, though, I participated in an inner-city tutoring project in Roxbury. For those of you who know Boston, Roxbury is an economically depressed area where our goal was to help minority youngsters in the grade schools learn mathematics. If the truth be known, the original reason I did this was I was hoping that I would meet some attractive young women tutors from some of the other universities in the Boston area. That actually did not happen. But I did learn two important life lessons, new lessons. First I found out that I enjoyed teaching. I enjoyed trying to help people learn. And the second lesson, maybe more important, my students actually learned some mathematics. I could help them learn this subject.

When I finished my Ph.D. at MIT, I had a pretty important decision to make. What next? What would I do with all of this education? I had offers from the commercial airplane industry, from defense contractors, and from the University of Oklahoma as an assistant professor of aerospace and mechanical engineering. As Robert Frost wrote, I took the path less traveled. Even though it was the lowest



salary I was offered, the Oklahoma faculty position seemed to me to be more challenging. It certainly offered a lot more freedom to do research. And for me, empowering young people through education had deep societal purposes and more meaning for me than anything else I could do. Now after having made that choice, many decades later, I actually believe I could have pursued the other opportunities I had. But being an educator, as Frost also wrote, has made all the difference. Maybe most importantly, it's how I met Patty at Oklahoma 40 years ago. And for the past 25 years, I've served as president and chancellor of four major American research universities: the University of Oklahoma, the University of Missouri-Rolla, Iowa State University, and Purdue University. So I am also pleased that some of my friends from Purdue are here tonight: Vice Chair of our board David Powers and his wife and our distinguished Dean of Engineering Leah Jamieson and her husband George.

I've also had the privilege of serving our country through two presidential appointments: one as a White House Fellow under President Ford and one, as you heard earlier, on the President's Council of Advisors for Science and Technology under President Bush. So my journey from 69th and Halsted to this University Club has been nothing short of amazing. I believe it's the fulfillment of the American dream. I could not be more grateful. And my mother-in-law could not be more astonished.

What are the broader lessons of my journey? First, the beef hauler was right. Education unlocks the doors of opportunity in America. I believe education is the key to the promise of our great democracy. And if it was true 53 years ago, it is even truer today than when I was encouraged by

that short, strong truck driver to get an education. There's a second big lesson. I believe. And that is if all of our young people, including all of those that are recognized here tonight, are to be able to take advantage of this opportunity here in America, like me, they will need some help. My family simply could not afford to send me to college, but thanks to scholarships and loans and summer jobs, I was able to go. I believe we must continue to find ways to help young people go to college with financial aid, scholarships, loans, part-time jobs. I would have not attended IIT, I would not have attended MIT without scholarships and loans I was awarded. I believe the distribution of talent in America and the distribution of promise in America are much, much broader than the distribution of wealth in America. Not all of our talented young people can afford the education that is available and for which they are fully qualified. And investing in education of young people has better returns than anything we can do collectively for the future of our country. Education empowers people. It frees them from the tyranny of poverty. It opens the golden doors of freedom. And not only does education improve the lives of those we educate but also gives those we educate a much greater opportunity and, I would argue, a responsibility to be a difference maker in improving the lives of others. That Patty and I, working together in higher education over our careers, have been able to directly contribute to the education of more than a quarter million students is a source of enormous satisfaction to us. And we believe it has made a lot of difference for those students and for our world. Education empowers one to find a deeper purpose in your life by enabling greater service to others.

I want to conclude these remarks tonight with a special message to the young people who are here. That you are here tonight is quite a compliment to you, to your family, and to your potential. So congratulations to each of you. I suggest you're particularly talented academically. And because you're academically talented, you have many possible career paths that you can pursue.

While having real choices is usually seen as a good thing, it can also be a bit of a conundrum. How should you think about the possibilities that await you? What should you study? I would like to urge you to seriously consider engineering as a profession and field of study. Why? There are several reasons. First, engineering is challenging. It's a field that's constantly evolving, constantly offering new and interesting problems to be solved. In my experience, it has never been dull, and it's never routine. I believe you never master engineering; rather, you continuously learn and grow, and there are always, always new and interesting problems to be tackled. My engineering career began with the Race to the Moon in the 1960s. It moved to hypersonic aircraft in the 1970s. I tackled nuclear power plant safety and tornados in the 1980s. I embraced virtual reality engineering in the 1990s, and nanotechnology in the first decade of the 21st century. This is really neat stuff. It's always changing.

It's always interesting, never easy. It is exciting and always, always challenging.

Second, I believe engineering as a profession offers a really wide range of opportunities for creativity, and with creativity comes independence and autonomy. The important problems tackled by engineers offer amazing opportunities to be creative and inventive. I got a little taste of that this evening, watching the projects of the students. And creative engineers, in my experience, have the freedom to pursue their own ideas. As an engineer, you can be your own person. I have never had a boss tell me what to work on. It's an amazing statement, but in tackling a particular problem, all I had to do was use my abilities to solve the problem. That freedom has made my work a source of enormous joy. In fact, I have rarely thought of it as work. It was too much fun. It was too interesting to be characterized simply as work. The joy of discovering and tackling previously unsolved problems, thinking outside the proverbial box, has made engineering and engineering education a delightful choice and career for me.

Third, and most importantly, engineering, as a profession, serves the needs of society and fulfills the need we all have for meaning and purpose in our lives. Engineering uses our understanding of science, the tools of analysis and experimentation, to solve really important problems, to create exciting new opportunities that are important not only to those of us who solve the problems but also to those who benefit from those solutions. You young people here tonight are the most talented of your generation. A very important question for each of you is what will you do with this gift of talent that you have been given? How will you use your special abilities and the opportunity you have been given? My experience is that if you use your talents to make this a better world by, for example, enhancing the environment, by helping to feed the hungry, by making the world safer, or by a million other ways engineering can make our world better, you will find a deeper purpose in your life that will make all the difference to you and a big difference to lots of others.

Challenge, autonomy, purpose. The engineering profession offers all of this and more. Notice I have not yet said a word about money. My experience personally is that if you can master the challenges, if you have the creativity to become autonomous and devote your talents to broader societal purposes, the money takes care of itself. But if, instead, you make money the first priority, you undertake a pretty serious risk that you will not have the challenge and autonomy of purpose from which really fulfilling lives are built. Money alone will not drive the passion and the energy from which all excellence and impact derive. At best, money is the reward for excellence and impact, not the cause. So I hope each of you young people will give the engineering profession a very careful look. Our world desperately needs your engineering talents. And you will likely find, as I have in my career, that it is the stuff of a very satisfying and fulfilling life. WSC



In our present, fast-paced world where we take international air travel for granted, it is easy to forget that it was a little more than 100 years ago when the Wright brothers made their first successful flight from the dunes of Kitty Hawk, North Carolina. And how many remember that it was a member of Western Society of Engineers whose early experiments in aviation helped the Wrights finally achieve their goal? Wilbur Wright, as a matter of fact, said of this fellow aviation pioneer and mentor, "If he had not lived, the entire history of progress in flying would have been other than it has been."

The man to whom Wright referred was Octave Chanute, a civil engineer who was admitted to the Western Society of Engineers as one of its founding members in 1869. Thirty-two years later he served as the Society's twenty-third president. Throughout the later years of his career, Chanute was closely associated with many innovative developments in land and air transportation.

Born in Paris in 1832, Chanute sailed with his parents to his new home in the United States at the age of six. After completing his education in New York, he began to work at the age of 17 on the Hudson River Railroad. The company offered him \$1.12 per day, and the young Chanute thought his fortune was made. Not that he was completely wrong: in later years he often said that was the only position he had actually applied for in his entire life and that he was continuously employed from that moment on without ever again having to seek work.

In 1853 Chanute left New York for what was then still considered the West to build a series of railroads in

The man who helped the Wright Brothers fly

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> Illinois and neighboring states. His contact with prominent railroad men resulted in his receiving a commission to build a bridge across the Missouri River at Kansas City. Overcoming a series of engineering challenges, Chanute completed the bridge in 1869, and it generated widespread interest as the first bridge ever to span the rapidly flowing, turbulent Missouri River.

> Earlier Chanute had submitted a competitive proposal for the Union Stock Yards of Chicago. When his design was selected, he became the Chief Engineer of the Yards and supervised their construction in addition to his railroad duties.

> Returning east, Chanute next tackled New York City's rapid transit problem. Many projects for superseding horse cars had been proposed, but none was satisfactory. Chanute developed a plan that was subsequently carried out: building four lines of elevated railroads to be operated by steam locomotives along the avenues.

> During the time he was building and supervising rail systems and stock yards, Chanute developed an interest in aviation. But it was not until 1889 when he moved to Chicago that he found the time to pursue his interest. He began an extensive international correspondence with other engineers and gathered and systematized important information on aviation topics. This culminated in the publication of a series of articles entitled "Progress in Flying Machines," first published in trade journals and later in book form.

> Chanute, however, did not confine his research to merely reading about aviation experiments. He began building and

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personally flying gliders. He made more than 200 flights from Marquette Park at the dunes in Gary, Indiana, perfecting his biplane glider that was later to become the model for the Wrights' airplane. In 1936 the city of Gary, in cooperation with the Western Society of Engineers and others, dedicated a monument within the park celebrating Chanute's achievements.

A new biography

Because of continuing interest in the influence and impact of Octave Chanute's pioneering work in transportation, Simine Short, an aviation historian who has researched and written extensively on the history of modern flight, has written a new biography of Chanute, *Locomotive to Aeromotive: Octave Chanute and the Transportation Revolution*. Published by the University of Illinois Press with a publication date of August 1, 2011, this biography explores Chanute's professional accomplishments and personal relationships. Through the reflections of other engineers, scientists, and pioneers in various fields who knew Chanute, Short explores Chanute's life and establishes his significant contributions to the fields of engineering and transportation from the middle of the nineteenth century to the early days of aviation.

Following are two excerpts from *Locomotive to Aeromotive*. Excerpt 1 outlines some of Chanute's activities with the Western Society of Engineers and the American Society of Civil Engineers. Excerpt 2 describes the establishment of the Chanute Award.

Excerpt 1 from pages 154 through 158:

The Western Society of Engineers: Preparing for the World's Columbian Exposition

Many easterners were convinced that Chicago, a "cowtown" situated one thousand miles west of the Hudson River, could not stage a successful World's Fair, but Chicagoans put forward their claims with great nerve and bombast. The "Windy City" not only won the political struggle to host the World's Columbian Exposition but also profited from staging the prestigious affair.

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The overall goal of the Columbian Exposition was to illustrate the progress of transportation in all its branches, on land, water, or in the air. To achieve this, Chicago Mayor DeWitt Cregier asked WSE members to participate on the planning committee. Several engineers, including Chanute, subscribed to the fair's capital stock by "investing" \$1,000, but their goal differed a bit from the mayor's. They wanted to stage an engineering congress, the first such congress to be held in the United States, and possibly in the world. Chanute was convinced that the civil engineer would emerge from the lower plane of a trade into a true profession if this Congress would prove a success. To help this happen, he accepted the presidency of the General Committee of Engineering Societies, working closely with WSE President Elmer Corthell, but he also became first vice chairman of the World's Congress Auxiliary that would coordinate the various congresses, scheduled during the World's Fair, under the motto "Not things, but men."

To create an engineering triumph that dwarfed all its predecessors, American engineers had to trump Eiffel's tower. Charles Hastings from Kansas City proposed a tower that would shine in the daylight or by electricity during the night. George Morison suggested "The Chicago Sky-Piercer," a 1,120-foot-high steel structure, similar to the Eiffel tower but all-around bigger. Then, George Washington Ferris of Pittsburgh proposed a huge rotating wheel, or a tower connected at each end to form a circle, from which visitors could view the entire fair and the city in the distance. The Ferris project was so grandiose that the committee dismissed it as unrealistic, but several WSE members, including Chanute, were intrigued. Organizers finally granted the concession to Ferris in December 1892, and workers erected the 264-footdiameter Ferris Wheel in the Midway Plaisance, becoming an instant success with the visiting public.

With all the talk about engineering in the daily press, the Chicago commissioner of public works asked the



WSE for the names of three engineers to look into a new waterworks tunnel project. This request stirred controversy within the WSE, as some members thought it unprofessional to accept such an appointment.

Chanute strongly disagreed and explained that ASCE members had frequently made investigations of public works, and WSE members should comply because they were best qualified to perform the required tasks.

Going back and forth, the WSE president determined that the investigation of public works was a function for members to exercise. Chanute's motion was adopted and the president presented several names to the commissioner. This project set the stage for future civic involvement by WSE members.

The 1892 annual WSE banquet provided a good reason to celebrate, and more than 150 members attended, with most

involved in the planning for the upcoming fair. Thousands of visitors were expected to come, as Chicago's rail network was second to none, but the local transit system was inefficient and outdated. In an effort to ease the local commute, two Chicagoans, Max Schmidt and Joseph Silsbee, had invented a multiple dispatch railway. With the help of several WSE members they formed the Multiple Speed and Traction Company of Chicago, and Chanute became a director. Chicago city fathers briefly considered this moving sidewalk but then favored the construction of an electrically powered elevated railway. When the fair opened on May 1, 1893, the "brain-numbing noisemaker," later known as the "L," became a commuting success for Chicagoans, while the moving sidewalk with seats running between the Lake Michigan dock and the exhibition grounds became an attraction to fairgoers. The Traction Company dissolved in April 1894, paying each incorporator a profit of \$1.50.

American Society of **CIVIL ENGINEERS**

Ever since joining the ASCE in 1868, Chanute wanted every competent civil engineer to be a member, wherever they lived. Claude Kinder, a British civil engineer working for the Imperial Railways of North China, applied for membership in spring 1886, but did not include the names of five ASCE members to verify his qualifications as a civil engineer, so the directors did not act upon his application. Chanute heard of this accidentally, made some inquiries, signed the application, and then forwarded it to the ASCE board for action. Curious how this engineer handled railroad construction through virgin land in north China, Chanute contacted him. Kinder then described the infancy of railways in China and

mentioned that the Chinese empress had been reportedly warned in a dream to beware foreigners. Kinder had adopted the American principle of building the line quickly and improving it later, and he did not think that American civil engineers were needed. The ASCE elected Kinder a member in 1890.

Late in 1890 Chanute received for a second time the nomination for the ASCE presidency, and this time he accepted. His election in January 1891 went uncontested; Chanute received 690 votes out of 694. Members knew that the society had to emerge out of its organizational rut, but Chanute also knew that he needed strong support from the membership for the upcoming engineering congress.

As president of the prestigious national society, Chanute received an invitation to speak at the American Patent System Centennial Celebration. He looked forward to participating as one of the prominent speakers and to meet the many visitors, but he came down with a high fever and had to ship his talk to Washington. Howard Gore from Columbia University read Chanute's paper, "The Effect of Invention upon the Railroad and other Means of Intercommunication," in which he discussed the many inventions that created a better life for everyday people.

One month later, Chanute delivered his presidential address on the progress of engineering at the annual ASCE convention at Lookout Mountain, outside Chattanooga, Tennessee. In his lengthy address, paying splendid attention to detail but sometimes lacking "writerly finesse," he discussed the leading engineering works, illustrated with "stereopticon views." Chanute also stressed that members should submit quality articles to the various engineering publications, not only to the ASCE Transactions. Looking ahead, he recalled the hospitality extended by European engineers in 1889 and hoped to return the favors during the World's Fair in 1893. Chanute's final statement was reminiscent of what he had said in 1880: "If the present high standard of professional honor and integrity be maintained, there are good grounds for believing that there will be results within the next few years, and this will show a marked improvement in the independence, in the standing, and in the emoluments of the civil engineer." An enthusiastic crowd of more than 250 engineers attended, and Chanute hoped that each of these competent engineers would attend the upcoming Engineering Congress in Chicago.

During his term as ASCE president, Chanute made many trips to New York to preside over the twice-monthly meetings. When he handed the gavel to his successor, Mendes Cohen, Secretary Bogart announced that the society now had more than 1,400 members, the largest membership in its history, with 156 new members added during 1891. Chanute considered this his accomplishment and felt proud of it.

Excerpt 2 from page 170, regarding the establishment of the Chanute Award:

The feature of the after-dinner talks [at the Western Society of Engineers' annual dinner meeting in 1901] was the announcement by President Finley that Chanute, the retiring president, had presented the society with a check for \$1,000 to be used as an endowment for three engraved medals to be given annually for the best papers on civil, mechanical, and electrical engineering presented by members to the Society during the past year. These awards were an important milestone for the engineering profession, which still lacked the breadth of published material needed to grow the profession and the development of its members. The criteria for the "Chanute Medal" changed over the years, but the WSE still presents it more than a century later.

Chanute's leadership as president or chairman of societies, including the American Society of Civil Engineers in 1891, the General Committee of Engineering Societies in 1892 and 1893, the Association of Engineering Societies between 1893 and 1895, the Western Society of Engineers in 1901, and vice chairman of the World's Congress Auxiliary Committee in 1892 and 1893, were major accomplishments. Here Chanute met, encouraged, and influenced the careers of many engineers, and their thinking influenced him.

Today the Society bestows up to three awards each year to members for meritorious papers in all fields of engineering. A list of rules governing the Octave Chanute Award can be obtained from the WSE office. See **News for the Western Society of Engineers** on page 15 for additional information. Papers must be received no later than July 31, 2011.

Excerpts reprinted by permission of Simine Short from *Locomotive to Aeromotive: Octave Chanute and the Transportation Revolution* published by University of Illinois Press, August 1, 2011. For more information, go to www.press. uillinois.edu



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TOPICS, TRENDS, AND TRANSITIONS

NEWS FOR THE WESTERN SOCIETY OF ENGINEERS

We have moved. The Western Society of Engineers has moved into a new suite in the same building. Our new address is

1111 Burlington Avenue, Suite 108-G Lisle, Illinois 60532

Washington Award Benefit

On February 25, 2011, Martin C. Jischke, Ph.D., President Emeritus of Purdue University, received the 2011 Washington Award at the Chicagoland Engineering Awards Banquet. Dr. Jischke was chosen for his dedication and leadership at Purdue University and other academic institutions in promoting engineering research, institutional development, and the pursuit of excellence in education.

Dr. Jischke retired as Purdue University's tenth president in July 2007. A Chicago native, he received his bachelor's degree with honors in physics from the Illinois Institute of Technology and earned his master's and doctoral degrees in aeronautics and astronautics from the Massachusetts Institute of Technology.

A prominent higher-education administrator and advocate, he formerly was president of Iowa State University; chancellor of the University of Missouri-Rolla; and faculty member, director, dean, and interim president of the University of Oklahoma.

In 2006 President George W. Bush appointed Dr. Jischke to the President's Council of Advisors on Science and Technology. He has held numerous national leadership roles in service to colleges and universities and has served as president of the Global Consortium of Higher Education and Research for Agriculture. Dr. Jischke is a Fellow of the American Association for the Advancement of Science and American Institute of Aeronautics and Astronautics. He is recipient of the Centennial Medallion of the American Society for Engineering Education. The Illinois Institute of Technology, the National Agricultural Univer-

sity of Ukraine, Anderson University, and the University of Evansville have awarded honorary doctoral degrees to him. He has also received the Illinois Institute of Technology's Professional Achievement Award and the Ukraine Medal of Merit from that nation's president for outstanding service by a foreign national. He received the U.S. Department of Agriculture's 2004 Justin Smith Morrill Award. In 2006 he was elected to the Indiana Academy and received both the C. Peter Magrath Institute/WK Kellogg Foundation Engagement and Outreach Award and the Commission on Human Resources and Social Change Distinguished Service Award from the National Association of State Universities and Land Grant Colleges.

Dr. Jischke has served on numerous civic, state, and corporate boards during his academic career. Additionally, he has been a science advisor and consultant to a range of state and federal agencies, government officials and corporations, including a term as a White House Fellow and Special Assistant to the Secretary of Transportation. He serves on the Board of Directors of Vectren Corporation, Wabash National Corporation, and Duke Realty. He is a trustee of the Illinois Institute of Technology.

The Chicagoland Engineers Week Committee and the Western Society of Engineers congratulates Dr. Jischke and all of the students who were recognized for their achievements at the awards banquet.

WSE monthly dinner meetings

The Western Society of Engineers holds its monthly dinner meetings on the second Tuesday of each month at Parthenon Restaurant, 314 S. Halsted Street, Chicago. For more information about the monthly dinner meetings, contact the WSE office at wse@wsechicago.org, 630/724-9770, or 630/241-0142 fax.

Nominations for awards

The **Washington Award**, established in 1916 by WSE president John Alvord, is conferred each year upon an engineer whose professional attainments have advanced the welfare of all peoples. The purpose of the award is to express recognition of devoted, unselfish, and pre-eminent service in advancing human progress. A list of rules governing the Washington Award and nomination forms are available at www. wsechicago.org or in the WSE office. Nominations must be received by July 31, 2011.

The **Octave Chanute Award** is given annually to the Western Society member whose paper on an engineering topic is judged meritorious. In 1901, during his term as WSE president, Chanute, an aviation pioneer, funded the cost of awarding a commemorative medal to the Society member who presented the best research paper before the Society each year. The following year, as retiring president of the Society, he established an endowment to fund future awards.

Chanute Award Criteria/Rules

Papers may be co-authored by non-members, but awards are made only to the author(s) who are WSE member(s).

Awards shall be given, annually for up to three outstanding papers as judged by:

- Originality
- Applicability (practical or theoretical)
- Value as a contribution to the business or practice of engineering
- Logical development of contents, conclusiveness, completeness and conciseness.

The recipient will be selected by the WSE Awards Committee, and approved by the WSE Board of Trustees. Since WSE supports engineers working together, we do not require the WSE member to be the sole author of the paper; however, only the WSE member is eligible to receive the award. Nomination forms are available at www.wsechicago.org or in the WSE office. Papers must be received by July 31, 2011.

The **Charles Ellet Award** is presented annually to a member of Western Society of Engineers who is 35 years of age or younger and who has made outstanding progress in his or her professional development. The award was established in 1929 as a memorial to Charles Ellet, a Civil War hero and an engineer, who was considered to be the father of the modern suspension bridge. The recipient of this prestigious award receives a certificate, a small honorarium, and possession of a silver loving cup for one year. The cup is engraved with the names of each winner dating back to 1930. The recipient will be selected by the Awards Committee and approved by the Board of Trustees.

The Landmark Award was established in 1992 to recognize an outstanding engineer's body of work and contributions

to the profession. WSE members, their coworkers, and clients are eligible for nomination. Applicants are judged on their technical and ethical insights; sharing of knowledge; promotion of engineering training; and participation in technical societies, publications, and seminar presentations. Nomination forms are available at www.wsechicago.org or in the WSE office. Nominations must be received by July 31, 2011.

To download a nomination form, click http://www.wsechicago.org/awards.asp or please visit http://www.wsechicago. org/about_wse.asp (Awards Link) or you may request alternate formats by calling 630-724-9770. Questions may be directed to Tim Seeden, WSE Executive Director.

Continuing education and license renewal

The American Society of Civil Engineers offers ongoing courses, seminars, and webinars to help engineers renew their licenses and keep their knowledge up to date. For information about offerings and schedules, go to www.asce. org/archived-webinars, or www.continuingeducation@message.asce.org, or call 800-548-2723 (703-295-6300 international).

Civil engineering professions see growth, high ranking as "Best Jobs in America"

Population growth and an overhaul of existing infrastructure are making the civil engineering profession popular, said American Society of Civil Engineers President-elect Andy Hermann, echoing a national survey that predicts strong growth in the profession.

"One of the reasons the civil engineering professions are listed in the Best Jobs in America report is the satisfaction received from seeing civil engineers' work become reality and actually improve our social, environmental, and economic condition and protect the public," stated Hermann. "The median income of a civil engineer is \$85,000, according to the Bureau of Labor Statistics (BLS). The anticipated growth also is a reflection of the backlog of demand in the infrastructure sector based upon the economic slowdown and the focus on residential and commercial sectors."

The report by *MONEY* and compensation experts *Pay-Scale.com* used Bureau of Labor Statistics growth forecasts for 7,000 jobs, identified industries with the biggest increases in jobs requiring bachelor's degrees, and ranked them by 2008-2018 growth and pay.

Civil engineers are expected to have employment growth of 24 percent between 2008 and 2018, according to the report.

2011 WASHINGTON AWARD FEBRUARY 25, 2011





Left to right: Tim Seeden, Dr, Jischke, and Patrick Seeden



Left to right: WSE member Vic Smith, Dr. Jischke, Mrs. Jischke, and WSE member Kent Novatny





Left: Many schools participated in the Engineers Week competitions.

2 O I I WASHINGTON A W A R D







Many schools participated in the Engineers Week competitions.





2 O I I WASHINGTON A W A R D





Many schools participated in the Engineers Week competitions.



Continued from page 15

Environmental engineers are also expected to have growth higher than the average for all occupations, 31 percent over the next decade, according to BLS figures. Environmental engineers ranked number five on the report. Consultants feel that the environmental engineering profession is seeing significant momentum worldwide because companies want to be branded as good stewards of the environment. Sustainability is a major goal in today's job market.

Hermann said ASCE's internal data also suggested the increasing need for engineers. The ASCE's Report Card for America's Infrastructure, an assessment by professional engineers of the status of the nation's infrastructure, assigned an average grade of D for 11 of 15 categories of infrastructure.

"Civil engineers are needed in all 15 categories.... With 11 Ds and four Cs, there is a lot of room for improvement," Hermann said. "In addition to water and the environment, transportation and energy are also categories that need improvement. Many civil engineers work in the public infrastructure area-designing, building, and maintaining roads, rail, pipelines, water and sewer treatment, etc.," he added. "With our growing population and considering that much of our infrastructure is aging and overused, there is a demand to repair and replace this infrastructure. This will be accelerated in the near future as the economy recovers (because our economy is fueled by our ability to move goods and people and provide adequate water). Over the past two years, with tax revenue down, infrastructure projects have been put on hold in many places, so there is also a latent demand. Once revenues start picking up, so will the infrastructure work."

NCSEA emphasizes importance of seismic codes

The National Council of Structural Engineers Associations (NCSEA) expresses its deep sorrow for the devastating losses suffered by the people of Japan in the March 11th earthquake and tsunami that struck Sendai and the surrounding areas. It is our hope that assistance of the United States and other countries around the world helps to alleviate the suffering to the greatest extent possible.

Most of the damage in Japan appears to have occurred as a result of the tsunami, rather than direct earthquake shaking. As we have seen in recent years in Indonesia, Samoa, and now Japan, tsunamis triggered by offshore earthquakes can cause extreme losses. However, their direct effects are limited to coastal areas. Most of America is not at risk from tsunami but rather from the direct effects of earthquake shaking.

The earthquake and tsunami in Japan, as well as earthquakes in Haiti, Chile, and New Zealand just in the last year demonstrate the critical importance of designing structures

MILESTONE

WSE Member and **Trustee Allen G. Behring** died on March 27, 2011.

in seismically vulnerable regions to meet the requirements of modern seismic codes, like the ones used by structural engineers in the United States and Japan for almost 40 years. In addition to proper design, the process of construction and inspection must strictly enforce the design intent to ensure that the structures will protect the safety of the occupants in the event of a major earthquake.

In the United States, even higher standards are set in our codes for critical buildings, such as hospitals, police and fire stations, and other structures needed for immediate postearthquake response. The damage to structures not affected by the tsunami would have undoubtedly been much more devastating had Japanese structural engineers not designed the buildings to these modern standards.

Under U.S. building codes, we design our structures for the most severe earthquakes expected to occur in a 2,500 year period. Many have argued that this is unrealistically conservative and unnecessary. Scientists now recognize that the earthquake that struck Japan in March last occurred approximately 1,400 years ago, reinforcing the importance of designing for events that seem incredible but that can have devastating impact. This is a particularly important lesson for the mid-south and mid-central U.S., where we know very rare earthquakes, like this one, can occur.

The Pacific Northwest is also faced with vulnerabilities very similar to that of Northeastern Japan, with a large subduction zone fault system plate boundary just offshore that is capable of generating earthquakes of a size similar to the M8.9 that shook Japan in March. In the event of a large earthquake on this fault, low-lying coastal areas of Washington, Oregon, and Northern California are vulnerable to tsunamis of the type that occurred in Japan, and there will be precious little time for evacuation. Structural engineers are presently working on developing designs for evacuation structures that will provide refuge to local residents who do not have time to reach high ground prior to the onslaught of the killer waves. While these structures will not limit the damage to the vast majority of buildings and infrastructure in the coastal regions, they will help provide a means of limiting the loss of life in these areas.

Beyond the coastal regions vulnerable structures still exist in the U.S., similar to those that collapsed in Japan, Haiti, New Zealand, and Chile. In the U.S., these structures are unreinforced masonry and nonductile concrete frame buildings built before the mid-1970s. Structural engineers now have the tools, however, to evaluate and design retrofit schemes that can make these vulnerable structures safe from collapse.

Some government agencies, major corporations, and other building owners have taken steps to mitigate the hazard posed by vulnerable existing buildings, but more needs to be done if major cities and small towns in seismically vulnerable areas of the United States are going to be resilient enough to avoid the types of devastation suffered in other countries when a violent earthquake strikes.

Other helpful information on earthquake resiliency and structural engineering can be found at the following websites: http://www.spur.org/publications/library/report/theresilientcity_part1_020109 and http://www.celebratingeqsafety. com/

Construction expert simplifies complex world of government contracts

Many independent contractors, architects, engineers, and construction vendors understand the potential gold mine federal construction contracts can prove to be. Yet multimillion-dollar construction company owner Stan Uhlig warns the process can be tough to maneuver if unprepared. He simplifies the complicated process of federal construction contracts in his easy-to-understand guide, *Principles of Federal Construction Contracting* (ISBN 1453734309).

Written in the style of a simple manual, this book helps readers find the answers to construction questions on each page. Federal regulations are dissected for readers and are based on practical experience, with an emphasis on what it takes to succeed in the government construction contracting marketplace.

Stan Uhlig, a civil engineer, has worked in design as a chief engineer, project/program manager, and general manager of operations for companies around the world. As the owner of a multimillion-dollar construction company, he has completed some of the biggest and most complex government contracts, including underground aircraft hangars, nuclear weapons storage facilities, and an underground 250-

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Calendar of Events

August 9 • Monthly dinner meeting at Parthenon Restaurant, 314 S. Halsted Street, Chicago. For more information, contact the WSE office at wse@wsechicago. org, 630/724-9770, or 630/241-0142 fax

October 18–October 20 • EMC Practical Applications Seminar and Workshop. Northbrook, IL, Hilton Hotel. For more information, call 847-537-6400 or go to www.dlsemc.com/1001

October 20–October 22 • ASCE's 141st Annual Civil Engineering Conference. Memphis, TN. For more information, visit www.asceannualconference.org

November 29–December 2 • Ground Water Expo, sponsored by the National Ground Waer Association. Las Vegas, NV. For more information, go to www. ngwa.org/DEVELOPMENT/conferences/details/5026/ index.aspx

bed hospital. Now semi-retired, he specializes in changeorder disputes and has helped companies settle more than 700 claims in federal construction.

The book seeks to show readers that it is not enough to simply be successful in your construction services; companies must also be knowledgeable and prepared. Uhlig thoroughly explains the structure of a federal construction contract in a way that can help companies minimize risk and enhance their ability to satisfy clients. He goes through some of the most common terms and conditions used in federal construction solicitations in a language that is easy for construction professionals to understand.

As an experienced federal government construction contractor, Uhlig explains where to find federal construction projects to bid on, what makes a winning proposal, and how to be successful in federal construction contracting.

"I designed this book to be a complete reference for the rules, regulations, procedures, and processes of doing business with the federal government in construction contracting," Uhlig says. "I hope contractors will pick up this book just like they would a hammer."

"During one of my client consultations," Uhlig says, "a question arose about a potentially disastrous \$500K problem the company was having with the U.S. Army Corps of Engineers. After discussing the problem, I referred the client to the pertinent information in the book where they could have precluded this problem. After hiring me to successfully negotiate the claim against them, my client ordered 37 copies of the book for his office and field management staff and told them all to read it and use it."

For more information go to the website: www.FCCon-tractingBook.com

Did you know...

about the turboencabulator? Click the video to the right to learn about this vital example of cutting-edge engineering and design.

For more information, go to http://en.wikipedia.org/wiki/Turboencabulator

Turbo Encabulator



On the lighter side

20 Adult Truths

- 1. I think part of a best friend's job should be to clear your computer history immediately if you die.
- 2. Nothing is worse than that moment during an argument when you realize you're wrong.
- 3. I totally take back all those times I didn't want to nap when I was younger.
- 4. There is great need for a sarcasm font.
- 5. How are you supposed to fold a fitted sheet?
- MapQuest really needs to start their directions on #5. I'm pretty sure I know how to get out of my neighborhood.
- 7. Obituaries would be a lot more interesting if they told you how the person died.
- 8. I can't remember the last time I wasn't at least kind of tired.
- 9. Bad decisions make good stories.
- You never know when it will strike, but there comes a moment at work when you know that you just aren't going to do anything productive for the rest of the day.
- Can we all just agree to ignore whatever comes after Blu-ray? I don't want to have to restart my collection... again.
- 12. I'm always slightly terrified when I exit out of Word and it asks me if I want to save any changes to my ten-



page technical report that I swear I did not make any changes to.

- 13. I keep some people's phone numbers in my phone just so I know not to answer when they call.
- 14. I think the freezer deserves a light as well.
- 15. I have a hard time deciphering the fine line between boredom and hunger.
- 16. How many times is it appropriate to say "What?" before you just nod and smile because you still didn't hear or understand a word they said?
- 17. I love the sense of camaraderie when an entire line of cars team up to prevent a jerk from cutting in at the front. Stay strong, brothers and sisters!
- 18. Shirts get dirty. Underwear gets dirty. Pants? Pants never get dirty, and you can wear them forever.
- 19. Sometimes I'll look down at my watch three consecutive times and still not know what time it is.
- 20. Even under ideal conditions people have trouble locating their car keys in a pocket, finding their cell phone, and Pinning the Tail on the Donkey; but I'd bet everyone can find and push the snooze button from 3 feet away, in about 1.7 seconds, eyes closed, first time, every time.

THE WESTERN Society of Engineers

he objects of this Society shall be the advancement of the theory and practice of engineering, the improvement of the status of engineering practice as a profession, and the maintenance of high professional standards.

> —FROM THE WSE CONSTITUTION Adopted May 31, 1922



THE WSE SEAL

The suspension bridge; sounding party; Polaris, the guiding star for those who seek the true meridian; and its assistant, the Dipper, are emblematical of Civil Engineers. Mining Engineers are represented by some of their working tools: the sledge, pick, and drill; while the castle and cogwheel are the universally adopted emblems of Military and Mechanical Engineers, respectively.

These several designs are enclosed in four fields produced by the construction of the famous 47th problem of Euclid, probably the most prominent and useful problem in geometry, wherefore this has been deemed the most appropriate representative of that important branch of science.

Algebra and higher mathematics, the calculus, are also represented by well known signs pertaining to these branches.

Finally, the motto Per ardua ad metam translated means Through Difficulties to the Aim, intended to indicate the universal purpose of all the different branches of the engineering profession.

> -G.A.M. LILJENCRANTZ WSE SEAL DESIGNER MARCH 7, 1882

Western Society of Engineers

Statement of Purpose

The Western Society of Engineers is a multidiscipline engineering society whose purpose is to actively encourage the development of engineering leaders and to promote engineering excellence and innovation; to educate the general public about the practice of engineering; to recognize the achievements of its member engineers; and to promote high professional and ethical standards.

The Society serves its constituencies and accomplishes its mission and vision in several wavs:

Western Society of Engineers provides a forum for exchange of ideas between individual and corporate members, allowing them to maximize their impact within the Chicago region and to effectively and efficiently use their resources.

Western Society of Engineers influences the practice of engineering within the Chicago region to accommodate changes in society and technology.

Western Society of Engineers offers high quality educational products and services for members pursuing leadership and management goals.

Western Society of Engineers enhances the image of engineering professionals as leaders in business and society.

Western Society of Engineers is recognized as a preeminent engineering and engineering management organization within the Chicago region.

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Patrick J. Hennelly	President
Vic Smith	First Vice President
Kent Novatny	Second Vice President
Chris Tapas	Treasurer
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Alan W. (Bud) Wendorf

Weldy-Lamont Associates Pat Hennelly

IT ALL STARTS HERE.



With the right systems—and technology partner—everything is possible. Every aspect of manufacturing is getting faster. But what happens to your business if you aren't? We can help make sure that nevers happens by enabling your innovation with technology that works hard—and smart. From rapid prototyping to lightning-fast design revisions, we provide optimal solutions that empower your productivity, enhance your sustainability strategies, and better your bottom line. Let us show you how.



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