MnDOT staff doing the hands-on "seed ball" activity at the MPS STEM & Career Exploration Expo

DEPARTMENT OF TRANSPORTATION

MnDOT STEM Education Outreach

April 2018

MNDOT.GOV/STEM

Civil Engineering Day at SMM

The roads you drive on, the bridges you cross, the building in which you study or work, the power behind your lights and anything you can plug in, the water you drink – they're all possible because of civil engineering!

The Science Museum of Minnesota, with help from a number of civil engineering organizations, is hosting Civil Engineering Day on Saturday April 28, 2018 from noon to 4pm.

On Civil Engineering Day, you'll meet with civil engineers and tinker with activities that address the challenges civil engineers face every day.

Round out your visit with the must-see *Dream Big: Engineering Our World* Omnitheater film. You'll meet four civil engineers who make a living finding solutions to make life better for people around the world.

Civil Engineering Day festivities are included with exhibit gallery admission. Admission to *Dream Big* requires an additional ticket.

Civil Engineering Day is part of a larger initiative at the Science Museum of Minnesota. The museum has declared 2018 as the "Year of the Engineer."

MnDOT will be hosting an activity booth at Civil Engineering Day, and we would love to see you there! Bring your friends and family, and enjoy a fun-filled day at the museum. Don't forget to check out the amazing *Dream Big* Omnitheater film. I promise you won't be disappointed.

Here are the basic details for the day:

- Science Museum of MN
- Saturday, April 28, 2018
- Noon to 4pm
- Included in gallery admission
- *Dream Big* film (separate ticket)

Questions?

For more information or to get involved, email outreach@ascemn.org. Or you can contact:

Nicole Bartelt
STEM Education and Outreach Coordinator
stemoutreach.dot@state.mn.us
651-366-4474

MACGILLIVRAY FREEMAN'S DREAM BIG ENGINEERING OUR WORLD

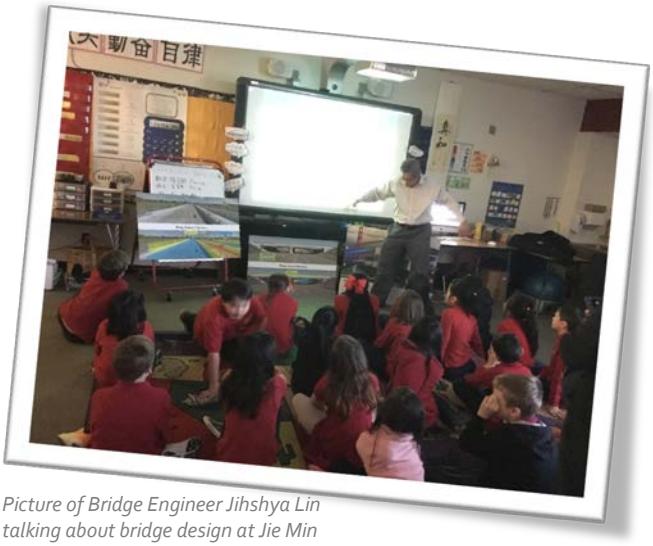
MnDOT engineer teaches bridge activity in Mandarin

By: Diana Flores

MnDOT engineer Jihshya Lin was excited to teach a full classroom of 4th graders at the Jie Ming Mandarin Immersion Academy in St. Paul on February 1, 2018. They did the bridge-in-a-bag activity together, plus a fun presentation, all in Mandarin! His great success sparked the interest in possibly doing more presentations in other languages, such as Spanish, or Somali.

MnDOT's STEM Outreach program engaging with students in multiple languages and through multicultural presentations is part of MnDOT's efforts to promote more diversity. Currently, the Bridge UP! pamphlets are available in a variety of languages, including Hmong, Somali and Spanish.

Jihshya did an amazing job explaining the bridge-in-a-bag activity to the students in mandarin and it was pretty evident that the children had fun too. Bobbi Johnson, Principal, wrote, "You bring the real life experience to our classroom to make it real and relevant to our students." Not only did they have tons of fun, but along the way the students were able to understand the concepts of tension and compression forces a lot better with the bridge as a real-life example.



Picture of Bridge Engineer Jihshya Lin talking about bridge design at Jie Min Academy.

The visit to the school was such a success that the Academy is interested in the possibility of a field trip to a bridge. The bridge activity also exposed the students to the importance of teamwork, communication, and problem-solving. Jiefang, a 4th grade teacher, commented, "Looking forward to your wonderful presentation for our Jie Ming students next time!"

MnDOT STEM OUTREACH PROGRAM

Interested in our program and what we could offer to your school? www.mndot.gov/stem

STEM EDUCATION AND OUTREACH COORDINATOR
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7-8th grade students get a taste of MnDOT District 3, including the materials lab, surveying, and maintenance areas.

Outreach opportunities

Check out our events page for a further preview of upcoming events!

STEP-UP STEM pipeline event

April, 14, 2018
FAIR School
Minneapolis, MN

The Minneapolis STEP-UP Achieve program is one of our many partners. MnDOT will be running two of four "escape rooms" for students to complete an engineering challenge. It should be a fun event!

North Trail Elementary

April 10-16, 2018
North Trail Elementary
Farmington, MN

MnDOT staff will do the bridge-in-a-bag activity with 4th graders at North Trail Elementary in Farmington, MN.

Mentoring

Do you have students that are interested in talking to a civil engineer, surveyor, or technician? Whether it is a single conversation, job shadow opportunity, or an ongoing mentoring relationship, we can help get you connected to the right person.

For more information contact:

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STEM Education and Outreach Coordinator
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2017-2018 Year in review

by Nicole Bartelt

As the 2017-2018 school year starts to wind down, we wanted to take a look back at what we've been able to accomplish this year.

Here are the hard numbers for April 2017-April 2018 (we are engineers after all):

- Over 70 events
- Over 35,000 students, educators, participants reached

Events ranged from our hands-on bridge activity to STEM Expos. They took place all over the state, with a wide variety of ages. Here are some highlights from some of our favorite events.

3rd graders from across the metro competed in a "Tallest Tower challenge" at the MnDOT room of the Creativity Fest.

MnDOT helped Roseville elementary schools celebrate National STEM Day with the bridge-in-a-bag kits. "The impact that your team had on our students was immediate (direct quote: 'My favorite part was building the bridge') as well as long term (direct quote: 'I think I want to be an engineer'). Miles Lawson, Roseville Area Schools curriculum coordinator

Pillager 7th and 8th graders toured the D3 offices, including seeing cool demos!

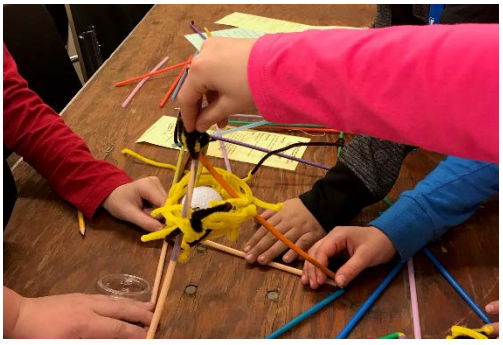
None of this would have been possible without the MnDOT employees who staffed the events. Many thanks to these volunteers:

Scott Allen
Mike Arseneau
Justin Attipou
Lori Bakken
Melissa Barnes
Nicole Bartelt
Amber Blanchard
Alyssa Boock
Beth Burton
Rodney Carter
Rob Coughlin
Casey Crisp
Tiffany Dagon
Darlene Dahlseide
Nancy Daubenberger
Richard Davis
Brandon Day
Petra DeWall
Desiree Doud
Mike Dougherty
Arielle Ehrlich
Lisa Elliott
Girma Feyissa
Joe Fishbein
Diana Flores
Kyle Fritz
Yihong Gao
Breanna Gonzales
Duane Green
Curtis Haglin
Jim Hallgren & D3 staff
Nancy Hanzlik
Candy Harding
Wendy Hickey
Matt Houghton
Keith Jakober
Sarah Jarman
Julie Johnson
Todd Kjolstad
Molly Kline
Andy Kubista
Scot Larson
Jary Lee
Kyle LePage
Jessica Leslie
Michael Ligday
Jihshya Lin
Heather Lukes
Christina Markeson
Shauna McIntire
Cal Merrick
Paul Miller
Mohamoud Mire
Chris Moates
Chris Morris
Michelle Moser
Bill Nelson
Chelsey Palmateer
Bonnie Peterson
Farrell Potter
Eli Ramirez
Aislyn Ryan
Laurie Ryan
Dave Schilling
Rick Shomion
Michael Sjodin
Sarah Sondag
Tom Styrbicki
Brad Swartz
Scott Theisen
Marilee Tuite
Kong Vang
Lillian Vassar
Juanita Voigt
Kevin Western
Carlos Zhingre

EVENTS FROM 2017-2018

MPS STEM Expo

The VR and snow plow simulator was a big hit with 8th graders at the MPS STEM & Career Exploration Expo.



Tallest tower challenge

Students worked hard to beat the clock and each other at the Creativity Fest in January 2018 at the U of M.

Bridge UP!

Roseville Area students enjoying the bridge-in-a-bag activity.

Getting to know Angela Fonkert

By Diana Flores

We asked fellow MnDOT employee, Angela Fonkert, a series of questions regarding STEM (Science, Technology, Engineering, and Math.) She did a fantastic job answering each question thoughtfully and sincerely. Below you can read the questions asked and Angela's responses to each.

- **What is your Job Title?**

  I am a Transportation Specialist in Surveys.

- **Where do you work?**

  I work in District 3, St. Cloud office.

- **What is your STEM field?**

  I think it's a combination of engineering and math.

- **What is your job about? What does your function/department do?**

  I started my career with MnDOT in 2004 and worked on a field survey crew for 6 years. During this time, my job tasks included construction staking, location surveys, setting aerial photo targets, and right-of-way surveys. I have worked in my current position, Surveys Office, for almost 8 years. I perform various tasks, some of which includes processing raw survey data to create or update 2D final design mapping and 3D tin files, aerial photo targets, organize and research survey data, and respond to requests for survey data. I'm on a computer daily using MicroStation, GEOPAK, and ProjectWise to complete my job tasks.

- **What degree(s) or certifications do you have? What was your college major?**

  I earned a 2-year degree in Land Surveying/Civil Engineering and a 2-year degree in Sales, Management and Marketing both from St. Cloud Technical and Community College.

- **What were the courses you took in school that are now the most useful in your job- or a previous job?**

  The Advanced Survey course and all of the CADD courses have given me a solid foundation for my position in Surveys. Advanced Survey was an introduction to past and current surveying methods and equipment. The course gave me experience using survey equipment to perform tasks such as level loops and topographic surveys. The CADD courses gave me experience using drafting methods to create drawings, download field survey data, produce maps, and create a subdivision design.

- **What do you like most about your job?**

  What I like most about my Surveys Office role is the variety; the survey requests and locations vary from week to week. I could be processing drainage/pipe data for a future construction project one week then processing an ADA survey at a different location the next week. I also enjoy that my work relates to the transportation system in Minnesota.

- **What do you find frustrating about your job?**

  The weather! You have no control over the elements which can disrupt plans and delay work. Also, it's not fun staking on cold, rainy days!

- **What kind of people do you think would do well in your field?**

  People who like math, geography, and technology should consider a career in Surveying. Much of the survey equipment and CADD software used today is state-of-the art with high quality and accuracy that continues to advance. Also, many individuals in the surveying profession enjoy the outdoors and engage in outdoor hobbies.

- **Give me a reason why I should go into a STEM field!**

  There will always be a need for surveyors! Currently, there are many surveying jobs throughout Minnesota and opportunities for career growth once employed. Education options include earning a 2-year degree in Civil Engineering/Land Surveying or a Bachelor of Science degree in Land Surveying/Mapping Sciences. Job tasks can vary based on level of experience and education. Individuals interested in land boundaries or the transportation system should apply for a summer job or internship in surveying to determine what job tasks they enjoy and what degree to pursue.

Picture of the Women in STEM, at Albany High School in December 2017. Angela Fonkert is pictured on the far left. Picture courtesy of Angela Fonkert.

Civil Engineering Day

Saturday April 28, 2018

SAVE THE DATE!

Civil engineers will be taking over the Science Museum of Minnesota and we want you there!

- See Dream Big: Engineering Our World in the Omnitheater
- Experience hands-on activities with civil engineering companies and societies
- Explore the Science Museum

For more information or to get involved, email

outreach@ascemn.org

Science Museum of Minnesota®

NEW WEBSITE, VIDEO INVITE KIDS TO EXPLORE CIVIL ENGINEERING

Have you experienced difficulty hiring new engineers and technicians? The Minnesota Local Road Research Board, in partnership with MnDOT, has produced a new video and website to spur more kids to enter this in-demand field.

The engaging, animated video invites middle school-age students to explore the world of a civil engineer and learn what civil engineers do, such as building skyscrapers and tunnels; designing road, rail and air systems; building transportation systems to get people to work; and developing water purification systems.

The video highlights the various subdisciplines within civil engineering, such as transportation, municipal and structural, and focuses on what today's young people are interested in:

Solving problems

Working with the latest technologies

Making the world a cleaner and safer place

Math and science, but also creativity

The accompanying website helps students learn more about the field and how to become an engineer or technician. Information is also available on engineering-related student activities and games.

The LRRB and MnDOT are working with STEM educators to get this resource into schools, but need your assistance getting the word out! Please share this resource with teachers you know, and consider using the video and website if you are invited to present about your job at a local school or career fair.

Video and website available at

becomeacivilengineer.com