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Exploring Transportation in Wisconsin

Pi in the Sky

Page 4 — At Northern Lakes Regional Academy we strive to make learning an out of this world experience. This was the case in a seminar that was held this spring called “Pi in the Sky.” In the seminar, myself and fellow students worked with our science instructor, Mr. Peterson to answer the following driving question: What can we learn about atmospheric gasses and open-source hardware by sending a helium balloon to the upper stratosphere? Our challenge was to design original experiments to learn about the layers of the atmosphere and engineer a payload to send up in a 1200 g helium balloon. This led to us launching three different helium balloons in the fall of 2015.



Memorial Student Sets Sights on Dream Career

Page 5 — Driver’s license in hand, 16-year-old Eric Lee now is aiming for the skies — literally. Eric, of Eau Claire, is learning to fly. His goal is to earn his private pilot certificate next March when he turns 17. Recently Eric practiced take-offs and landings in a four-seat, single-engine Cessna 172 Skyhawk. His parents, Doug and Becky Lee, watched from the ground. Flying five-minute circuits, Eric smoothly repeated the “touch and go” maneuver for slightly more than an hour Oct. 22, never completely stopping the small white plane on the runway until his final landing. Those spins through the skies marked the teen’s third solo flight.



Westosha Central STEM Aviation Program

Page 6 — The Westosha Central STEM Aviation Program is in its second year. Jim Senft, lead mentor, started building the program in 2014. In the spring of 2014 the school board officially approved the program and course. We started to building Falcon 1 in October 2014 and finished exactly 1 year, 1 month and 1 day from the time we set the first rivet. After over a year of hard work, the CHS STEM Aviation Program students were able to enjoy their first flight in the newly built “Falcon One” Vans RV-12 aircraft..

See more on Page 3

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The Night the *Edmund Fitzgerald* Sank

Page 9 — Some of the crew members who made their home in Thunder Bay went home for the evening and were to report back to the ship at midnight. I went home and returned at 2200 hours for a little rest before we got underway. When I came back aboard, the wheelsman called me into the wheelhouse. Right away, I heard the marine radio. “Calling Edmund Fitzgerald, calling Edmund Fitzgerald. Coast Guard Group Duluth calling. Over.”



Engineering and Design from Junior High to High School

Page 11 — Three Lakes Tech Ed Teacher Mike Gorney has his students learn about transportation principles through hands on work in several of his classes. One project that he uses to have students use multiple modalities of learning is his mousetrap car project. Gorney uses the mousetrap car in his junior high Transportation elective class, and then again in his Engineering and Design class. Students start out in the Transportation class with an inquiry based open-ended problem. Take a list of basic parts, and try to build the most efficient, farthest traveling car that you can.



Collaboration in Transforming Mr. Keiper's Truck

Page 11 — As an Automotive instructor there is never a dull moment and at the start of the year with classes full of new students with their own ideas and projects it is a very exciting time. I was contacted by our former school board president Mr. Keiper regarding a project he wanted help in completing. He acquired a 1995 Chevrolet pick-up truck that he wanted to transform into a tow vehicle for his Corvette which he takes to car shows. As an instructor of this capstone course I feel I am there to help guide these future technicians but it is important that they have a level of creative freedom.



Filling the pipeline with qualified, prepared students and future employees

Page 13 — When building Career Pathways at Badger High School about 8 years ago, we looked to add rigor and relevance to our Career and Technical Education programs by integrating industry standards and certificates, along with Advanced Standing technical college credit into the curriculum. The result in the BHS automotive program has been transformational, turning an elective program into a rigorous and invaluable program for those students pursuing careers or post-secondary education in the field of automotive maintenance and repair.



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PUBLISHER/EDITOR: Renee Feight

PUBLISHER/EDITOR: Larry Werner

EDITORIAL: Andria Reinke

PAGE COMPOSITION: Andrew Clausen

WEBMASTER: Scott Bayerl

Please direct articles, advertising, questions or comments to:

Transportation Today WI™

PO Box 1704

Eau Claire, WI 54702

Phone/Fax 715-839-7074

www.transportationtodaywi.com

Please direct all inquiries to:

renee@transportationtodaywi.com, or

larry@transportationtodaywi.com

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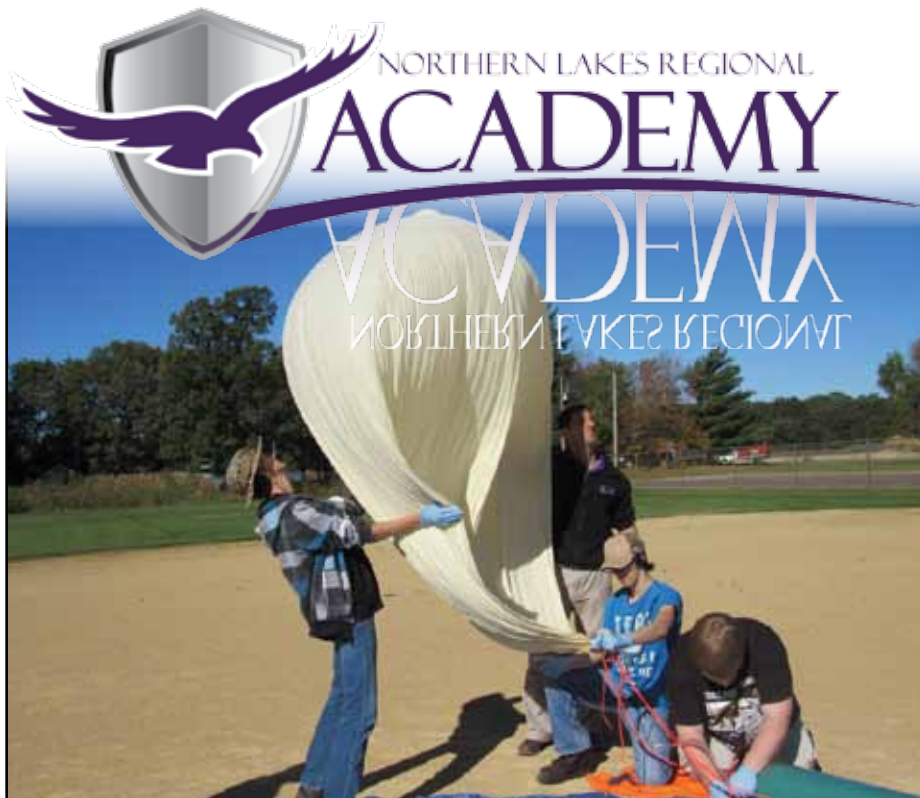
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Pi in the Sky: Students send a balloon to the edge of space



By Emily Jones-Palmer
Northern Lakes Regional Academy
Rice Lake Area School District

At Northern Lakes Regional Academy we strive to make learning an out of this world experience. This was the case in a seminar that was held this spring called “Pi in the Sky.” In the seminar, myself and fellow students worked with our science instructor, Mr. Peterson to answer the following driving question: What can we learn about atmospheric gasses and open-source hardware by sending a helium balloon to the

upper stratosphere? After participating in numerous inquiry-based labs meant to teach us the fundamental gas laws, our challenge was to design original experiments to learn about the layers of the atmosphere and engineer a payload to send up in a 1200 g helium balloon. This led to us launching three different helium balloons in the fall of 2015. Thus followed countless hours of planning, engineering, and experimenting.

Our payloads consisted of the following:

- Styrofoam box
- GoPro Camera



The balloon's payload dropped into a tree, making retrieval a little difficult for the students.

- Vernier LabQuest 2 with temperature probe and barometer
- Raspberry Pi with camera unit programmed to take pictures each minute
- Arduino programmed to make a loud buzzing sound
- Spot Tracker GPS
- Hand warmer
- 155 cubic feet of helium

The most complicated variable of this project was the weather. We used a predictor website called Habbub.org to estimate the flight path, and how much helium that would be needed to fill the balloon.

Changing wind patterns and speeds also meant a change in where the balloon was going to end up, and the balloon cannot be filled on windy days.

We attempted to send a balloon up three times and succeeded twice. On the first launch everything went smoothly, but it was the retrieval that tripped us up. The payload landed in a skinny tree in the forest that could not be easily climbed; we not only had to find which tree it was in but we also had to somehow get the payload out of said tree. Our rescue mission ended in success using a stick with rope on it to catch the box out of the tree. The only downside of that launch was one of the camera devices and a few data taking devices came unplugged leaving us with limited data. We were able to determine that our balloon traveled to the upper stratosphere, roughly 30,000 meters above sea level.

The second launch ended before it ever began. The process went smoothly until we began filling the balloon with helium, then the wind whipped the balloon around cutting off the helium flow to the rest of the balloon and popping it, therefore ending our launch for the day. After, the failed launch two students realized there might be a better way of filling the balloon; they 3D printed a device that goes into the neck of the balloon to help keep the balloon open during the filling process. Determined to end the project on a good note, we set back at it again. It was at the very end of the fall though, meaning a huge cold front was coming that would send our balloon spiraling all the way to Michigan. In order for the balloon to land near our school we decided to launch from a small private school past Minneapolis, Minnesota. The filling of the balloon went perfect, but then on the launch, the payload



The view from the upper stratosphere, 30,000 meters above sea level.

box was dropped, unplugging our camera unit again. Luckily, both times we successfully launched we also had a GoPro camera in the payload so we still received stunning pictures. Again, the payload landed in a tree the only differences were, this time the tree was on the outskirts of a farm so we found the tree holding our box almost immediately, but this tree was much taller than the first tree. My fellow students and I looked on in horror and suspense as our advisor scaled the massive tree, and successfully collected the payload box.

This project was immensely fun and challenging, allowing me and my fellow classmates to branch out, and open our minds to new ideas that we may never have thought about before. To learn more about this project or Northern Lakes Regional Academy go to our website listed at the end of this article where you can watch a video documenting the process and results of our launches. For those interested in learning more about this project or in participating in a professional development seminar this summer on high altitude helium balloon projects, contact our instructor, Jeremy “Pete” Peterson at peteronje@ricelake.k12.wi.us.

northernlakesregionalacademy.org

Memorial Student Sets Sights on Dream Career

An Eau Claire teenager takes to the skies in his pursuit of his dream career



Blythe Wachter

Driver's license in hand, 16-year-old Eric Lee now is aiming for the skies — literally.

Eric, of Eau Claire, is learning to fly. His goal is to earn his private pilot certificate next March when he turns 17.

The Memorial High School junior dreams of becoming a jet fighter pilot. After graduating, he hopes to attend the U.S. Air Force Academy in Colorado Springs, Colo.

His aspiration took wing at a young age.

For a teenager to take flying lessons is “not super rare,” said Paul Anderson, a commercial pilot and Eric’s flight instructor.

“It’s less common now than in years past as the cost of aviation has gone up immensely since the ’70s,” said Anderson, 60, of Eau Claire.

Finding time to fly often is difficult for teens busy with school, sports and other activities. “School comes first,” Anderson stressed.

“It gets a little difficult,” Eric acknowl-

edged.

He is a National Honor Society member and an Eagle Scout. He runs with Memorial’s cross country team and formerly competed on the swim team. He belongs to Chippewa Valley Nordic Ski Team and is a new Civil Air Patrol cadet.

When he ran cross country this fall, he rose at 6 a.m. to fly before school. Anderson likes students working toward a pilot certificate to fly at least twice a week at first to review skills.

Getting off the Ground

Recently Eric practiced takeoffs and landings in a four-seat, single-engine Cessna 172 Skyhawk. His parents, Doug and Becky Lee, watched from the ground.

Flying five-minute circuits, Eric smoothly repeated the “touch and go” maneuver for slightly more than an hour Oct. 22, never completely stopping the small white plane on the runway until his final landing.

Those spins through the skies marked the teen’s third solo flight.

Eric started in-air lessons with Anderson July 15. After completing 12 hours of flight with Anderson, he made his first solo Sept. 1.

“It was great, best feeling ever,” he said.

In the plane’s narrow cockpit, Eric showed

instruments including an altitude indicator that “shows the horizon if you’re in the clouds,” airspeed and vertical speed (rate of descent or climb) indicators and a heading indicator that informs direction along with a magnetic compass.

Eric proved himself capable during his first solo flight, when he got off his approach marks coming up behind another plane.

He realized he was approaching the runway a little too high and fast, Doug Lee recalled, and flew off in another circuit rather than attempt to land.

“He built a lot of self-confidence on his first flight,” Doug Lee observed.

Letting students fly solo for the first time is a little nerve-racking, Anderson said. “It’s like cutting them loose in the car.”

Students must be able to handle aircraft in different situations and not panic. A lot of self-assessment is involved, he said.

Eric said he doesn’t get rattled flying because “you know exactly what you’re going to do and how you’re going to do it.”

And, he said, the air traffic control tower “knows what you’re doing so you don’t run into someone or get run into by someone.”

Continued on Page 6



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Westosha Central STEM Aviation Program



Josh Engberg, Student
Westosha Central High School

The Westosha Central STEM Aviation Program is in its second year. Jim Senft, lead mentor, started building the program in 2014. In the spring of 2014 the school board officially approved the program and course. We started to building Falcon 1 in October 2014 and finished exactly 1 year, 1 month and 1 day from the time we set the first rivet.

The program involves STEM:

S, science, in learning the science of flight and the principles of aircraft operations.

T, technology, in learning how to build an aircraft and the complexity of the tools and techniques.

E, engineering, in that we have a fully glass cockpit. Students learn to program the flight display and all the wiring needed to interlink all the flight systems. M, mathematics, the fun part. We use math to make sure all the parts and pieces are cut and fabricated to the correct specifications as described on the blueprints.

The program involves building the aircraft, aeronautics, ground school, field trips, and flight instruction, all at no direct cost to the school or student. This first plane, Falcon 1, will stay local and student get to use it for flight instruction, "F2" will be sold and the money will go back into Eagle's Nest of fund "F3" and other programs around the country. "F2" will take us a little bit longer than Falcon 1, because we enhanced the program with more opportunities for students. The goal is to have F2 done before summer 2017.

This program is supported by Eagle's Nest foundation and many local sponsors. By their generous donation, this program has given us a chance to improve the educational opportunities

available to our students, and to encourage those with technical abilities to pursue STEM careers.

There are some excellent benefits gained from our program. Students gain pride to build and fly an aircraft as high school students. They earn a true STEM education, with having to use both their mind and their hands to solve problems. The ultimate secret goal, however, is we build students, with morals, ethics, integrity, respect, and teamwork, to maintain a standard of excellence the students can use throughout their lives. In this, students also develop a sense of community, and the importance of paying it forward. The program lives on mentors donating their time and knowledge and on companies donating money and products, for which we are ever grateful. Students will in turn then volunteer their time giving back to the community.

The program has grown and continues to do so. Because of the nature of the work and the serious consequences if something is not done correctly, and also having limited knowledgeable mentors, we have a limited number of students we can work with. We have accepted sixteen students into this year's program.

After over a year of hard work, the CHS STEM Aviation Program students were able to enjoy their first flight in the newly built "Falcon One" Vans RV-12 aircraft. To date, most of the students have been able to experience flight with Jim Senft. They are excited about the unique and rare opportunity they have in STEM education.

Many are thankful for the advantage this gives them for future careers.

In celebration of this great accomplishment the program hosted a banquet on January 9, 2016. In attendance were students and their families, mentors Jim Senft, Ron Chisholm, Kan Pai, CHS principal Lisa Albrecht, and program donors.

"Falcon One" is currently in the shop being painted, thanks to the donations of a local body shop.

After much elbow grease including painting, scrubbing, building and wiring, we are very excited to be settled in our new, permanent workspace. We are now located on the southwest corner of the Central High School campus. The contributions of many new donors have helped us to organize and be equipped for our next building venture. We are thrilled to have begun "Falcon Two" on February 27, 2016.

Please see our Facebook page to follow our progress within the last year.

www.facebook.com/pages/Central-High-School-STEM-Aviation-Club/591524597584424

If you have any questions about the program you can contact the Club mentor Jim Senft at senftj@westosha.k12.wi.us.

www.westosha.k12.wi.us

Memorial Student Sets Sights on Dream Career Continued from Page 5

Winging it at School

Along with flying lessons, Eric took a class at Memorial last year to advance along his flight path.

Technology and engineering education teacher Scott Erickson described Eric as "super serious" about the aviation class.

"I have kids that just take it because they don't know what it's about. Kids like Eric are more driven," Erickson said.

The semester-long class is an elective offered for .5 credit. It is open to all grades, and typically one session is offered each year. The average enrollment is 20 students.

North High School also offers an aviation class.

Probably one or two students go on to flying lessons within a couple of years of taking the class, Erickson said. He has had flying lessons but did not try for his pilot's license.

For a textbook, the class uses a private pilot manual designed to teach people how to fly small airplanes. In addition, six computer-based flight simulators give students a feel for flying.

It is a rigorous class, Erickson said, with topics including weather, fundamentals of flight, flight and engine instruments and reading sectional charts.

Tests are designed to be similar to those

taken by prospective pilots during the certification process.

"So much in a class like this is not as simple as you think," he said, noting the material connects to science, math and physics.

Earning a License

While the Federal Aviation Administration allows 16-year-old student pilots to make solo flights, they cannot get a private pilot certificate until age 17. However, applicants for a private pilot glider certificate can be 16.

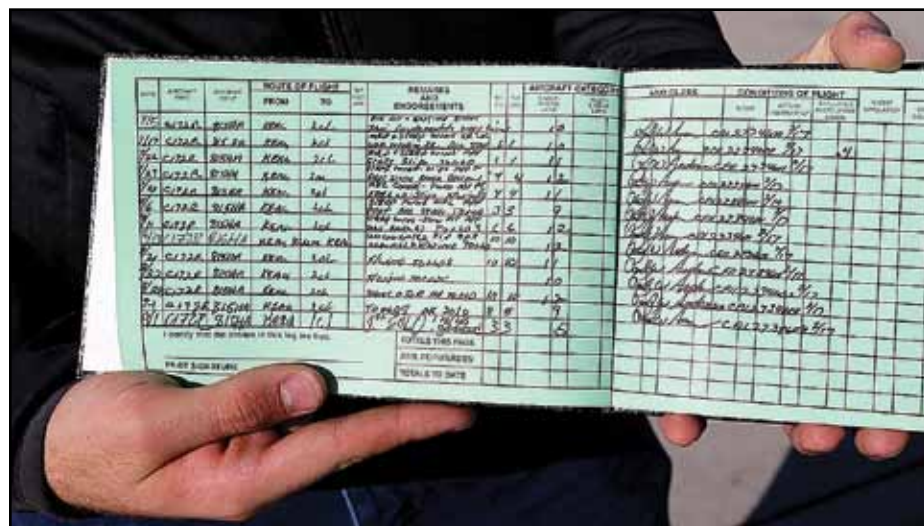
Student pilots are prohibited from transporting passengers.

A private pilot can command aircraft for noncommercial purposes. Eligibility requires logging at least 40 hours of flight instruction and solo flight — the national average ranges from 50 to 60 flight hours, Anderson said.

Flight time must include flying at night and cross-country and maneuvering solely by reference to instruments rather than with GPS systems. The farthest Eric has flown on this day was to Merrill and Wisconsin Rapids.

Applicants must pass a written knowledge test with a score of 70 percent or better and a practical test with oral and flight portions.

The FFA has a pool of about 1,600 questions examiners can ask, with topics such as weather,



regulations and aircraft systems, Anderson said.

In addition, applicants must demonstrate proficiency in maneuvers such as short field landings, crosswind landings and emergency procedures. They also need a medical certificate from an aviation medical examiner.

Eric attended an engineering camp in Milwaukee to explore that field. After flying fighter jets, he plans to work as a pilot or engineer.

Flying is a feeling hard to describe, he said. "It's a great way to pass the time."

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Note – This is part of a larger article. To read the entire article see <http://www.leader-telegram.com/News/Front-Page/2015/11/16/Soaring-at-16%28copy%29.html>

www.ecasd.us/Memorial-High-School/Home

FAST FACTS: Asphalt Is The Top Choice For Airport Runway Pavements

Airport operators want super-smooth, durable runways that can be constructed and rehabilitated quickly, to minimize runway downtime. The strengths of asphalt pavement construction coincide exactly with what the aviation industry demands from its pavements:

- Smoothness
- Speed of construction
- Low maintenance
- Less complexity than concrete
- Low initial and life-cycle costs

More advantages of asphalt pavement construction:

- The maintenance process permits a runway to be shut down during off-peak hours for rehabilitation.
- Building super-smooth pavements of asphalt is much easier and more cost-effective than any other pavement type.
- The surface can be customized to increase skid resistance, lower the risk of hydroplaning, decrease splash and spray, or absorb noise.
- Perpetual Asphalt Pavements serve many well. In a Perpetual Pavement, the pavement structure remains intact for many years. The only maintenance required is to mill off the surface (usually about 2 inches) at infrequent intervals, recycle

the material that has been removed, and resurface the pavement.

In fact, Baltimore-Washington International Airport in Maryland and Eareckson Air Force Base in Alaska were recognized with Perpetual Pavement Awards in 2002 for their long-lasting pavements.

Asphalt pavement runways support the high volumes of heavy planes landing at some of the nation's busiest airports, including Baltimore-Washington International, Lindbergh Field in San Diego, McCarren International (Las Vegas), Memphis International, Newark International, Oakland International, O'Hare International, Pearson International (Toronto), and San Francisco International.

Asphalt pavement is also used extensively on runways at many general aviation airports.

Asphalt Pavement For Airports – Questions And Answers

Q. Can asphalt be used to pave the runways at airports?

A. Yes. In fact, only asphalt can provide a super-smooth, durable surface that can be maintained during offpeak hours and returned to service quickly.

Q. At big commercial airports, is asphalt tough enough to take the punishment of heavy planes?

A. Yes. Just ask the people who operate some of the busiest airports in the country. Some of the commercial airports with asphalt runways include Baltimore-Washington International, Lindbergh Field in San Diego, McCarren International (Las Vegas), Memphis International, Newark International, Oakland International, O'Hare International (Chicago), and San Francisco International.

Q. Is the surface of an asphalt pavement good for landing planes?

A. Certainly. An asphalt pavement surface can be designed and constructed to increase skid resistance, lower the risk of hydroplaning, decrease splash and spray, and even absorb noise.

Q. Does the contractor have to do something special so that the pavement can withstand airplane traffic?

A. Yes, and with asphalt, it's simple. Research conducted over the past 15 to 20 years has given us the knowledge to make asphalt pavements strong enough to hold up under the pounding.

Q. Do airports need something different from what road users need?

A. Yes and no. Motorists want smooth, durable, safe, quiet roads — and asphalt can provide those. Airport operators also want super-smooth, durable runways that can be con-

structed and rehabilitated quickly, to minimize runway downtime. In that sense, the needs of both are the same. On the other hand, asphalt pavements can be customized to the exact requirements of the particular airport.

Q. What happens when an airport shuts down a runway for maintenance?

A. With asphalt, it may not be necessary. Just as asphalt roads can be rehabilitated during off-peak hours, so can airport runways.

Q. How much does smoothness matter at an airport?

A. A lot! A smoother surface provides takeoffs and landings that are safer and more comfortable.

Q. Can Perpetual Pavements be used for airport runways?

A. The Perpetual Pavement principle — a pavement whose structure lasts indefinitely, with a surface that can be renewed at infrequent intervals, is extremely useful for airports to minimize downtime of a runway, and is cost-effective.

From: www.asphaltisbest.com/wp-content/uploads/2014/02/Asphalt-is-the-Top-Choice-for-Airport-Runway-Pavements-Fast-Facts.pdf Used with Permission.

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The Saint Lawrence Seaway Development Corporation

Adam Schlicht,
Nancy Alcalde
Joy Pasquariello

Saint Lawrence Seaway Development Corporation, U.S. Department of Transportation

The Saint Lawrence Seaway Development Corporation (SLSDC) is an organization within the U.S. Department of Transportation and is responsible for the operations and maintenance of the U.S. portion of the St. Lawrence Seaway between Montreal and Lake Erie. Its mission is to serve the marine transportation industries by providing a safe, secure, reliable and efficient, and competitive deep draft international waterway, in cooperation with its Canadian counterpart the St. Lawrence Seaway Management Corporation. This includes managing the operations of Eisenhower Lock and Snell Lock in the town of Massena, in the far northwest corner of Upstate New York, as well as performing trade development functions focused on driving economic activity across the Great Lakes St. Lawrence Seaway System.

The SLSDC is committed to elevating maritime commerce in North America via trade on the Great Lakes. The Great Lakes Seaway System connects North America's 'Opportunity Belt' to the world. This is a period of unique infrastructure investment, technological innovation, and new ships that are transforming the Seaway. Due to these modernizations, new emerging market opportunities are positioning the waterway for future growth.

To understand the importance of binational cooperation in the Great Lakes St. Lawrence Seaway System, one only needs to

look at its geographic and physical characteristics. These features not only make binational cooperation desirable, but outright imperative. Extending from the Gulf of St. Lawrence at the Atlantic Ocean as far as the twin ports of Duluth/Superior in Minnesota, the Great Lakes Seaway System is 2,342 miles long, and borders two countries, eight U.S. states and two Canadian provinces. A vessel transiting the system crosses the international border 27 times. The Seaway System provides direct access for inland and ocean-going vessels to major U.S. and Canadian ports, including the ports of Montreal, Hamilton, Toronto, Duluth, Toledo, Green Bay, Milwaukee, Chicago, and Cleveland.

In 1954, the SLSDC was created with the passage of the Wiley-Dondero Act, and lock construction began. This most important waterway route opened to navigation in 1959. Upon its completion, 15 U.S. and Canadian locks were operational, filled and emptied with water naturally by gravity. This spectacular lift system raises vessels 180 meters above sea level and bypasses Niagara Falls. Shipping has continued on the Great Lakes since the Seaway's opening over 55 years ago. Since then, nearly 3 billion metric tons of cargo has moved on the St. Lawrence Seaway, valued at over \$400 billion.

The Great Lakes Seaway System generates billions of dollars in revenue and hundreds of thousands of jobs in the region. According to the October 2011 study Economic Impacts of the

Great Lakes-St. Lawrence Seaway System:



- Shipping on the Great Lakes is one of the key drivers of the U.S. and Canadian economies
- 227,000 jobs are created by shipping on the Great Lakes
- \$35 billion in business revenue is generated by the maritime industry on the Great Lakes
- \$14 billion in annual personal income is garnered in the United States and Canada
- \$5 billion in federal, state, provincial, and local tax revenues are added

In fact, \$3.6 billion in cost savings is realized for businesses using maritime when compared to alternative modes of transportation.

Marine shipping is the most environmentally efficient and socially responsible mode of transportation. Cargo is carried by a modernizing and diverse fleet including U.S. and Canadian Lakers, and hundreds of international vessels. According to the January 2013 study Environmental and Social Impacts of Marine Transport:

- The Seaway-size fleet can move its cargo 24% farther than rail and 531% farther than truck.
- The Seaway fleet is nearly 7 times more fuel efficient than trucks and 1.14 times more fuel efficient than rail.
- From a capacity standpoint, one Seaway-size vessel can carry the same amount of goods as 301 rail cars or 963 trucks in a single trip.

Businesses are looking for ways to be more competitive and to gain an edge in the global market place. HwyH2O is the binational marketing brand utilized by the SLSDC and other Great Lakes stakeholders, including experts in marine logistics, to increase knowledge of Seaway System worldwide. Greater utilization of the Great Lakes Seaway System provides new economic development opportunities and jobs throughout the region. Career opportunities are available at the SLSDC as well as throughout the region. The Great Lakes maritime workforce supports ports and landside operations in both the United States and Canada, offering incredible opportunities for those interested in merchant mariner careers. More information can be found on the Seaway's interactive binational website — www.greatlakes-seaway.com or on the SLSDC's website, www.seaway.dot.gov and Facebook page, www.facebook.com/usdotslscd.



The Night the Edmund Fitzgerald Sank

Capt. Richard D. Metz
U.S. Navy (ret.)

Editor's note: This story was submitted by Great Lakes Capt. Richard Metz, a Rhinelander resident who had a long career aboard U.S. and Canadian steamboats and was working on Lake Superior 40 years ago — the night the *Edmund Fitzgerald* sank.

Nov. 10, 1975

We had just finished loading 26 rail cars full of newsprint in Thunder Bay and were getting ready to depart the dock for Superior. By the time all the cars were chained to the deck, the Northeast wind had freshened.

I checked the Mafor (coded marine forecast), and found that northeast gales were posted for Lake Superior. Then a special marine warning was broadcast over Channel 16 — storm warnings were up. It wasn't a night to go anywhere. The *Incan Superior* would stay right where she was because of the approaching storm.

Some of the crew members who made their home in Thunder Bay went home for the evening and were to report back to the ship at midnight. I went home and returned at 2200 hours for a little rest before we got underway.

When I came back aboard, the wheelsman called me into the wheelhouse. Right away, I heard the marine radio. "Calling *Edmund*

Fitzgerald, calling *Edmund Fitzgerald*. Coast Guard Group Duluth calling. Over."

The call was repeated. No answer!

I stayed on the bridge to find out why the *Fitzgerald* did not answer. After several more calls, she still didn't answer. "Must be the bad weather," I told the wheelsman. "Radio signal's not carrying very well. I'm going down to my room to take a nap." I thought nothing more about it, because this situation had happened many times before in bad weather. The USCG new Mafor called for the winds to switch to the Northwest and storms warnings were then posted. We waited a few hours to let the northeast sea died down, with the northwest gales we would be in the lee of the land and have a good ride to Superior, Wis.

The crew had all returned before their scheduled time was up. We cast off our lines and departed the safety of our dock and went out into the bay. There were about a dozen ships that had entered the bay during the night to wait out the storm at anchor. I also noticed the *Fitzgerald* still hadn't answered the radio call.

We hauled around Angus Island and set her on course for Rock of Ages Lighthouse, some two hours distant.

Over and over, the Coast Guard called the *Fitzgerald*, but she still did not answer. Then came the most chilling announcement I ever heard in all my 30 years at sea.



"Attention, all ships. *Edmund Fitzgerald* is reported missing with all hands aboard."

I could not believe my ears. That was impossible in this day and age, just impossible. This couldn't happen in 1975! We all kept our ears glued to the radio that night and into the next morning. Our ship was heading for Superior following close to the north shore to keep in lee of the land.

After the gruesome announcement, we all sat in silence. No one said a word; each man was thinking his own thoughts. The only sounds were of the cold wind and blowing snow and seas hitting our ship's sides and forming ice on the railroad cars as the spray washed over our decks.

"How in the world could any man launch a lifeboat in those raging seas? It would be an impossible task," I thought. Then I said a silent prayer for each of those poor souls. "If I were out there on that storm-tossed ship without a prayer of getting into a lifeboat, what would I do?" I asked myself. "I think I would grab a bottle of vodka and head for my room and lock the door behind me."

The next day, we arrived in Superior encased in blue ice. All the shore radio and television stations were broadcasting the sinking of a ship in Lake Superior the night before. They didn't know the name of the ship that went down. There were a few ships on the big lake that night, and many families ashore did not know whether it was their loved one's ship that had sunk. We called our company right away to tell them we were fine, and the company called the families of every one of our crew to let them know we were tied up in Superior — to their great relief.

Because of all the snow that had fallen during the storm, we could not unload or load. So that night I went down to The Main, a local sailors' hangout. I ordered a drink, and then another, and another. I could not erase from my mind what had happened. I looked up to see people dancing and singing with not a care in the world. They probably didn't know that 29 men were lying in their ship at the bottom of Lake Superior.

After a few more drinks, I couldn't stand

the feeling any more. I walked over to the stage and up to the microphone. "Does anybody know a ship went down last night carrying its entire crew to the bottom of Lake Superior?" The music stopped and so did the dancing. You could hear a pin drop.

"Finally," I thought, "now they know, now someone cares." I asked the band to play something fitting for the *Fitzgerald* and her crew. They chose a song called "Sea of Heartbreak." I bowed my head, then walked out and returned to my ship.

Next morning, the deckhands were out on deck chopping thick ice with axes and shoveling the broken pieces of ice over the side of the ship. The train arrived with 26 empty boxcars for our return trip. We off loaded the full cars and loaded the empties. Then we headed back to Thunder Bay for another load.

Life carried on as usual.

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A picture of Capt. Richard Metz in 1975



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Wisconsin's County Trunk Highway System: One of the Nation's Best



A long proud history:

The roots of the County Trunk Highway (CTH) system stemmed from state highway laws enacted in 1907. Under these laws, towns were given the opportunity to make an appropriation for road improvements and receive a match from county government. Under this system, the county was responsible for selecting the system of highways on which improvements would be made and electing a highway commissioner to carry out the improvements. Initially, only 20 counties participated in the improvement program, but the early changes created significant improvements in earlier road conditions and set the stage for the development of future advancement in Wisconsin's highways.

Later in 1917, the state legislature directed the State Highway Commission to establish a State Trunk Highway (STH) system with the goal of connecting every county seat and city with a population of 5,000 or more. In order to develop this new system, desirable routes were proposed, mapped, surveyed and analyzed. Public hearings were held and discussion ensued regarding issues such as populations served, the alignment and grades of existing routes, and the supply of local deposits of minerals and aggregates that would be used in construction. As a result, an entire 5,000-mile system was developed and that was the public's first introduction to the

(STH) system.

The first county highways were independent of the state's Trunk Highway System and lacked the state's legislative approval. By 1924, every county in Wisconsin had set up its own county highway system, with the state authorizing county highways for the first time in 1925. Since that time, County Trunk Highways have become the system of highways under complete jurisdiction of the county and maintained solely at the county level. At the local level county boards and or highway committees were responsible for laying out the system. Any CTH systems laid out prior to legislative approval became recognized as part of the official CTH system. Each county board was responsible for conferring with neighboring counties to ensure continuity and continuous lines of travel. Currently in Wisconsin, every county maintains its own CTH system.

Labeling our County Highways:

Wisconsin Counties use letters as route designations for their county roads. Routes may be labeled with a single letter (CTH-Z), double letter (CTH-ZZ) or triple letter (CTH-ZZZ). While the designation of some county highways may cross into two or more counties, any individual letter will appear many times in different parts of the state.

County Highways are typically labeled sequentially, though there is leeway to have the letter designation stand for the initials of a road, geographical feature, or in honor of a person. Today, there are occurrences where some imagination has gone into the designation of county highways. For example, the County Trunk Highway, which runs along the county line between Kenosha and Racine county is CTH-KR, the former US-12/US-18 in Madison running along Broadway is CTH-BW (for **BroadWay**), and CTH-LO (formerly STH-99 until January 1999) was named in honor of former Waukesha County Board Chairman Lloyd Owens.

Route designations may or may not be repeated within a single county, mostly depending on the size and population of the county. Designations also may or may not continue over a county line. Usually the letter designation remains the same when the route is a former Wisconsin State Highway that has undergone a "jurisdictional transfer" and has been turned over to the county.

Funding:

Funding of the CTH system is provided through county levy dollars, generated through property tax and sales tax assessments at the county level. In addition, the State of Wisconsin provides General Transportation Aids (GTA) to assist local units of with their transportation costs. GTA is the share of funds provided to local government generated primarily through vehicle registration fees and gasoline tax collections. Payments are divided among municipalities based on either a percentage of eligible highway-related expenditures or a per-mile payment, whichever results in a higher payment. Counties receive GTA payments based on a share of eligible highway-related expenditures and are not eligible for a per-mile payment.

Importance of the County Trunk Highway System on Commerce:

We all know that Wisconsin's rural and urban economy is dependent on a vibrant and well-funded CTH system. The CTH system is critical in bringing products to and from market and for citizens traveling to work in both rural and urban areas. This system is also the backbone of Wisconsin's billion-dollar agricultural industry. Most agricultural operators depend on the CTH system whether their operation is located on a town road, county highway, or on a state highway. With the changing face of Wisconsin's agricultural industry, more heavy equipment is being used on Wisconsin's county highways in both urban and rural counties. Thus the need for increased

CTH funding is rapidly rising. The use of additional heavy equipment also generates increased wear and tear on the CTH system, which has become a safety issue in many areas of the state.

The CTH system is an important for many reasons. Hopefully, this column has given you an appreciation of the history, uses, funding mechanisms and importance of the system.

Looking to the Future, Thoughts on Wisconsin's Segregated Transportation Fund:

According to the Wisconsin Department of Transportation (WisDOT), Wisconsin could face a \$600 to \$700 million shortfall in its Segregated Transportation Fund in the 2015-17 state biennial budget.

- New transportation revenue sources are necessary to shore up the declining potency of the state's gas tax and vehicle registration fee.
- New revenue sources applicable to the segregated transportation fund would free up general fund dollars for other state programs and reduce the state's level of debt service.
- New revenue sources will minimize the practice of employing one-time measures, such as bonding or general fund transfers, to support Wisconsin's transportation programs.



Engineering and Design from Junior High to High School

Al Votis

Three Lakes School District

Three Lakes Tech Ed Teacher Mike Gorney has his students learn about transportation principles through hands on work in several of his classes. One project that he uses to have students use multiple modalities of learning is his mousetrap car project.

Gorney uses the mousetrap car in his junior high Transportation elective class, and then again in his Engineering and Design class. Students start out in the Transportation class with an inquiry based open-ended problem. Take a list of basic parts, and try to build the most efficient, farthest traveling car that you can. Students are supplied with a mousetrap, string, wooden frame pieces, and cd's for wheels. From these materials, students work through different iterations finding the best setup to make their cars go as far as possible. Students are learning firsthand about how changing one variable affects performance, as well as scientific terms such as force, impulse and momentum. Students are free to explore, trying different ways to set up the mousetrap in order to power the car, either front wheel or rear wheel drive, exploring how length and width of car affects balance and how straight the car goes down the track, and how weight affects performance as well. The project culminates with a competition testing all the cars

to see which will go the farthest, and straightest. Students also spend time analyzing and reflecting on their car's performance, what went right and wrong, and most importantly, why. Also, students reflect on what other changes they could make by comparing other student's cars and taking the best ideas out of all of them. This project gives Mr. Gorney's junior high students a great, practical application the engineering design process to work through.

Once students get into high school, they have the option of taking Gorney's Engineering and Design class. This class gets to see the mousetrap cars again, but at a higher level. Now, students aren't limited to the same materials that they used in junior high. Gorney has the students explore much deeper, with students able to use the Fab Lab to make pieces of their cars, whether that is the wheels, making their own designs and cutting them on the laser and then comparing their characteristics and performance, to adding gearing to the cars to try to increase performance, which they again design and create in the Fab Lab. From the extra freedom and exploring, students are able to use SolidWorks to design their car and parts, and then create them, really working through the entire design process as an engineer and then testing to see the real world results. "In the junior high class, most cars



Students in Mike Gorney's Transportation class show their "Mousetrap Cars" designed from a group of simple materials, including a mousetrap.

look the same, with just some minor differences in performance, but in the Engineering and Design class, student models are all very different, and the students really see how design and testing go hand in hand to create a product that does what it is supposed to as efficiently as possible" says Gorney. "This is a project that really whets students' appetites to do more, and to dive into the engineering

design process, we're laying the foundation here for students to evaluate more than just the looks of vehicles, but also how and why they work the way they do" says Gorney.

www.threelakesd.k12.wi.us

Collaboration in Transforming Mr. Keiper's Truck



*Josh Zalewski, CTE Instructor/Department Chair, E4E Coordinator
Unified School District of Antigo*

As an Automotive instructor there is never a dull moment and at the start of the year with classes full of new students with their own ideas and projects it is a very exciting time. As we near the end of the school year and I reflect on this year's projects I must include a rare opportunity that my students had this year. I was contacted

by our former school board president Mr. Keiper regarding a project he wanted help in completing. He acquired a 1995 Chevrolet pick-up truck that he wanted to transform into a tow vehicle for his Corvette which he takes to car shows. Now a two wheel drive mid-90's two door long box is nothing that special however this truck was in mint condition with only 32,000 miles on it and the same bright red color as his Corvette. If it was going to be worthy of a tow vehicle to car shows it needed some modifications to

make it stand out.

This brings us to the process. Mr. Keiper had shared some ideas with me but I wanted to give some creative freedom to my capstone students. And so it began. I shared some ideas with the students in our Automotive Technician II dual credit class and turned them loose to do research. They were to individually create a presentation for Mr. Keiper including but not limited to lowering, interior, and performance modifications. We then invited Mr. Keiper to class and each student presented their ideas for him. As an instructor of this capstone course I feel I am there to help guide these future technicians but it is important that they have a level of creative freedom. In this project I really wanted to take a step back and let the students take the lead. Our presentations included everything from lowering the truck in every way possible including notching the frame, to supercharging, to lambo door conversion kits, which coincidentally he had on his corvette. Their presentation had to include parts, prices, and an overview on how to install with advantages and disadvantages of each. Mr. Keiper took notes and made his decisions based on the presentations. When it was all said and done we decided to:

- Lower the rear with shackles to level

the truck

- New tires
- New rims
- New lug studs
- Custom hood graphics
- Pin striping
- New carpet
- New seat upholstery
- Painted brake calipers
- Headers
- Custom true dual exhaust
- Cold air intake
- Trailer hitch
- 7 round trailer wiring harness with custom hidden bracket
- Turn signal light bar under tailgate
- Tune-up with new plugs and wires

Collaboration in education is vital to your programs success. We partnered with our Red Robin Graphics class to design a custom vinyl decal to match the one on the Corvette but sized it to fit the hood on the truck. We also collaborated with local parts stores and a tire and exhaust specialty shop to support our efforts with needed items. In order to have a successful program you

Continued on Page 13

Operating Engineers Launch First Virtual School Targeting Students in Grades 9-12



Rachel B., a second-year apprentice in her early 20s, earns \$50,000 annually as an Operating Engineer running heavy construction equipment.

By *Dave Backmann*
Communications Director,
Operating Engineers Local 139

The first-ever, online career technical school that will give Wisconsin high school students a tuition-free path to high-paying jobs in industries that are experiencing a skilled worker shortage, including construction, will open in September.

Destinations Career Academy of Wisconsin is a public charter school formed through a partnership that includes the International Union of Operating Engineers Local 139, Fox Valley Technical College, and the McFarland School District. This virtual school is open to students statewide in grades 9-12. DCA also offers career paths in business management and administration, health science, and information technology.

According to the school's founders, students will be able to get a head start on their careers by earning technical and specialty trade credentials, college credits, and work-

place experience along with their high school diplomas.

Launched in February, the unique educational model holds potential to become a national prototype for technical education, said Local 139 President/Business Manager Terry McGowan, who also is a board member of the Wisconsin Technical College System. "This revolutionary new school helps meet our state's critical workforce development needs," he said. "Our state and our nation must focus on increasing education and job opportunities for the next generation."

DCA students may enroll in the academy full-time, or they may take selected courses while pursuing a high school diploma elsewhere, including home-schooling, said Laura Cataldo, a workforce consultant to Local 139.

"Career technical education is really making a comeback," Cataldo said. "DCA is especially helpful to students living in districts that lack the resources to provide

technical education in specialized fields, such as construction, that offer incredible career opportunities and average annual salaries that exceed \$56,000."

DCA students can simultaneously earn credits in high school and through Fox Valley Technical College, said the Head of School, Nicholas Sutherland. He serves in the same capacity for Wisconsin Virtual Academy, a full-time, tuition-free, online public charter school for grades K-12, authorized by the McFarland School District.

Fox Valley Technical College Associate Dean Mike Cattelino added, "We are proud to partner with DCA and support this important effort. In growing and competitive industries, we need to expand our support to students and empower them with employable skills so they can succeed in the workplace."

Established in 1902, Local 139 has about 6,400 active members throughout Wisconsin who primarily run heavy construction equipment and service the machines. Local 139 runs a state-of-the-art training center on 400 acres near Coloma, in Waushara County. The school, called the Joseph J. Goetz Jr. Training Center, and

Local 139's apprenticeship program, are certified by Fox Valley Technical College.

Apprentice and journeymen Operating Engineers come to the Coloma facility to learn basic equipment-operation skills as well as to add to their skill base. Classes are held mainly in winter, when construction is at a low-point in Wisconsin.

A 51,000-square-foot indoor arena which opened this year, allows students to operate cranes, bulldozers, scrapers, motor graders, excavators, wheel-loaders, tractor loader-backhoes, and other machines regardless of weather conditions outside.

Plans are for some 10 to 12 DCA students who demonstrate significant interest and proficiency in their construction classes to be considered candidates for a "summer equipment camp" at the training center, McGowan said.

DCA uses digital curriculum and academic services developed by K12 Inc.; a for-profit education company based in Herndon, Va. K12 Inc. also provides the curriculum for Wisconsin Virtual Academy.

For more information visit:
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Operating Engineers
Local 139,
Terrance E. McGowan
President/
Business Manager



Local 139 Instructor Woody Wickersheim shows Monona Grove High School students how to operate an earth-moving simulator.



Filling the pipeline with qualified, prepared students and future employees

By Marie Collins
Badger High School CTE Coordinator

When building Career Pathways at Badger High School about 8 years ago, we looked to add rigor and relevance to our Career and Technical Education programs by integrating industry standards and certificates, along with Advanced Standing technical college credit into the curriculum. The result in the BHS automotive program has been transformational, turning an elective program into a rigorous and invaluable program for those students pursuing careers or post-secondary education in the field of automotive maintenance and repair.

Instructor Tom Sheeley was among the first teachers in the Gateway Technical College consortium to gain transcripted credit status for his classes. His persistence to align his curriculum to that of the college and apply for transcripted credit was not without roadblocks, but the end result is a 3-year automotive curriculum that packs in 10 transcripted credits, two industry-based competitions and exams, and a school-based enterprise. Sheeley said the process justifies itself. "The curriculum is based on industry standards, and it's just what the kids want," he said. He added that it was a "no-brainer" for him to adopt proven curriculum rather than spending hours developing his own and aligning it to standards.

In an auto shop outfitted with a 4 service bays with lifts, computer diagnostic equipment and Snap-on tools, students progress from general maintenance to basic and tire service in Automotive Technology I, to brakes, steering and suspension in year 2, and finally to electronics, computer, ignition, fuel, and emission systems in year 3. The curriculum follows National Automotive Technicians Education Foundation (NATEF) Automotive Service Excellence (ASE) standards and students take an online qualification exam for the opportunity to participate in the Technicians of Tomorrow competition sponsored by the Automobile Dealers Association of Mega Milwaukee (ADAMM). Other competitions are available for students to test their abilities through the Career & Technical Education Service Organization (CTSO) SkillsUSA.

Sheeley regularly participates in trainings to stay current, many of which provide the program with swag to add to the tool crib. He had to become certified ASE Technician during the transformation of the program. With support from both Gateway and area dealerships, he is now preparing students for both college and work, seeing an average of 6 graduates going on for further training each year and an additional 1 or 2 stepping right into the workforce.

This year is no different. Seniors Mitchell Tornow and Ezequiel Espinoza are planning



to complete their own pathways out of Badger and into college and careers. After graduation, Mitchell is planning to start at Gateway for Automotive Repair. Due to scheduling difficulties, this is his first year in automotive, but it has made an impact on him already. "I always liked working on cars with my dad and getting my hands dirty underneath the hood but never had an opening in my schedule until now. Being in the classes made it real," he said. Block days are his favorites when he gets to work in the shop. "In class it's a learning aspect but in the real world it's learn as you go, so it's very valuable to be in a class."

Ezequiel will take advantage of his Gateway credits and enroll for classes in the fall. He said that the combination of Badger classes and the credits he's earned made Gateway a good choice for him. As a child he watched his dad working on cars and learned a little here and there. Upon completion from Gateway he hopes to work for a dealership as an automotive technician. Ezequiel said that being enrolled in

automotive classes has helped him in his other classes, too, especially math where he sees relationships between what he's learned through automotive classes and what he's learned in math class.

Students here feel fortunate to have a district that is supportive of CTE. "It would be very boring to be in a high school that didn't have an autos program," Mitchell said. "In fact my shop classes are the ... ones I look forward to."

"It is very gratifying to see the hard work Mr. Sheeley has put into this program paying off for our students," said Marie Collins, CTE Coordinator. "When a student leaves Badger with almost a semester of college credits in their pocket, it is a win-win. Kids and their are saving money and we are filling the pipeline with qualified, prepared students and future employees."

www.badger.k12.wi.us

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Transforming Mr. Keiper's Truck

Continued from Page 11

need to have support from your business and industry partners. Any time I can buy local to help support them I make sure to do so.

Through this process the truck really took a much more aggressive look and sound. Our students were able to take leadership roles in working with Mr. Keiper as he came to the shop weekly to deliver parts, check on progress, and at one point he even got his hands dirty and helped teach the students how to apply the pin stripe. It was hard for me to differentiate him from the students sometimes as they were all diligently working grinning from ear to ear. In my teaching experience I have learned that in each project you want to take before,

during, and after pictures to document the projects and students build. This turned out to be a show worthy tow vehicle that we are excited to see at car shows this summer. Seeing the pride the students take in their projects is what keep educators going and I am fortunate to have supportive advisory committees, administration, local business and industry, and most importantly a great group of students. As with any project it is never truly complete as the students, Mr. Keiper, and I still have some ideas and tricks up our sleeves for next year.

www.antigo.k12.wi.us

“On the Move” a History of Transportation in the Chippewa Valley



Todd Kornack
Socials Studies Teacher
Chippewa Falls Senior High School

The idea for the “On the Move: A Going-Deeper Project” came from a collaboration between the American Club and the Chippewa Valley Museum. The exhibit is a self-contained unit made up of four panels that will be displayed at the museum for the next year. The display talks about the challenges of travel in the Chip-

pewa Valley from the horse and carriage to the automobile. The exhibit looks at how our ancestors dealt with the challenge of travel during the various time periods. The students selected artifacts, topics, and completed the research. The students were separated into three groups. The first group investigated the use of horse and carriage in the Chippewa Valley from early 1800’s to early 1900’s. The second group investigated the foundation of road systems in

Wisconsin from the earliest dirt roads to the formation of the interstate highway system. The last group looked at the challenges of winter weather and transportation. The American Club was in charge of approving the designs that the museum created.

The museum has always been interested in helping students of all ages and that included those of us earning advanced degrees. My relationship with the museum started in 2006; I appreciated the way they presented and explained history. Because of this, I instituted “learning by doing” projects in my classroom. I have never been a fan of the lecture-style of teaching, so these projects interested my students where they get to do the work of a historian. This was the foundation for the creation of the American Club.

The purpose of the American Club is to make connections with the community through historical research. For the past four years, I have been teaching in Chippewa Falls; prior to this I taught in Independence, where I created the History Club. The American Club is an extension of my progress in Independence. The American Club has slowly been building rela-

tionships within Chippewa Falls. A few projects we have completed include interviewing veterans at the local veteran’s home. We also created a museum piece for a special veterans’ viewing of the movie Unbroken.

The past two years we have worked with the museum, creating the “On the Move” display. Carrie Ronnander of the museum provided tireless efforts of assistance and without her the American Club could not have created this piece. Ronnander came to our school to train the students in the proper way to create museum pieces. This fit in nicely with the work the club had done in previous years. The president of the American Club, Allison Prill, was in charge of the various groups and made sure the work was being completed on time. My job was to be a liaison between the club and the museum and be a sounding board for the students.

“On the Move” opened on display March 11th, 2016 at the Chippewa Valley Museum and will be displayed for the next year.

cfsd.chipfalls.k12.wi.us

Student Transportation Video Contest

Congratulations to our 2015
Video Contest Winners!



Category One winner: “Metro Rail” – De’Jia Long-Hillie, Montgomery Blair High School, Takoma Park, Maryland



Category Two winner: “ARTBA Contest Video” – Alexis Gamboa, University of North Texas, Denton, Texas



The 2016 contest is now open and accepting applications!

Submit a video for a chance to win a \$500 cash prize!

There has been a lot of talk about transportation and infrastructure lately, ranging from debates in high school to debates in Congress. The American Road and Transportation Builders Association (ARTBA) would like to know what you think. Now in its fifth year, the Transportation Video Contest has just opened, and students of all ages are encouraged to apply!

Video Submission Deadline: August 31, 2016

The top two student videos (one winner in each category), as selected by ARTBA, will each be awarded a \$500 cash prize. The winners, along with other submitted videos, may be shown at the ARTBA National Convention. Entrants may work in teams, but only ONE prize is awarded per video. Submitted videos may also be featured on the ARTBA website, screened on YouTube, and/or other promotional venues. Entrants should create an original two (2) to four (4) minute video examining any aspect of transportation in the United States. Some suggested topics include:

- U.S. Transportation Infrastructure 101
- How infrastructure is built and paid for

View previous Contest Winners at: www.artba.org/video-contest/video-contest-winners

- What are the costs and financing needs of transportation infrastructure
 - What are the impacts of congestion and changing travel demands
 - What are the “man on the street” impressions of the industry versus reality
 - Recent transportation and urban design/development patterns
- ARTBA is looking for creativity, so stretch the bounds of your imagination! Entrants must submit a video in one of two categories based on their school attendance through August of 2016:

- Category One: Entrants are in elementary, middle or high school. This includes high school students who graduated in 2016 but may be planning to continue their studies at a post-secondary institution. Teachers/directors of elementary, middle, or high school students are eligible to participate with their class/program; however, the video must primarily be the work of the students.
- Category Two: Entrants are currently enrolled in a post-secondary, college or graduate school program.

Questions? Contact Úna Connolly at uconnolly@artba.org. More details about this contest can be found at the website below.

Deadline: Video Submission Deadline: August 31, 2015

Website: www.artba.org/video-contest



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Engineers Take Pride in Their Work

Kevin W. McMullen, P.E.
President
Wisconsin Concrete Pavement Association

I recently attended a couple of public informational meetings on the reconstruction of Interstate 39/90 between the Illinois/Wisconsin state line and Madison. While, it has been some time since I had to run one of these meetings, it is always very apparent that roadways are very important to the public. I always marvel how everyone is engaged in these meetings. Nobody is bored and they are all listening closely. The people range from users of the roadway to the properties owners who will be impacted by the construction. And, in front of the room is a group of engineers that have to tell people everything they know about the project. The challenge is to take everything they learned in engineering school and present how this roadway is going to be built to those who are not engineers and to understand how construction is going to impact people and their livelihoods. I sure hope these engineers truly appreciate the responsibility they have to society and take pride in the job they do. The public is intrigued with roadways, it is very common that when I tell people what I do for a living that a long conversation follows about their most commonly travelled road.

The other interesting aspect of these

meetings is that early in my career I spent two summers on construction and two years in the design office devoted to this very section of road. The memories that came back on learning how to survey and layout the road, the math, the geometry, the methods of construction and the materials testing. Learning to compute, measure and estimate the construction items and the quantities of each were all great testaments to the great training I got in Civil Engineering at the University of Wisconsin-Platteville. The result of all of this reminiscing and thinking back on my work? Pride. We make a difference in the lives of the people in Wisconsin. We make their travels easier and safer.

So, how does engineering school sound to you? If the math and sciences come easy and/or an interest of yours, give it a thought. To be able to say I designed that or I built that can be a huge source of pride and accomplishment in your life.

I now work for many construction companies and I see a wide variety of highway and airport construction projects each year. I only concentrate on the design and construction of concrete pavement, but it is what the vehicles ride on. I talk with engineers, construction company owners and management, construction laborers, materials suppliers and



producers and I will submit to you that everyone across the board has the same commitment and pride in their work. I was just talking with a group of men from one of the large construction firms. They were preparing to go back out for a summer of construction. They asked me about the reconstruction of Interstate 39/90 from Beloit/Janesville to Madison. A couple of the guys were on the project when it was rebuilt the last time in the 1980s, a few of them

knew that their fathers were on the project. As I listened and watched the same pride I have was coming through with this group. While our roles of engineer and construction laborer are very different, the pride is the same and they know they make a difference in Wisconsin.

The 2016 construction season is here. Let's make it happen. Be safe out there!

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Pictured Here: Monroe Avenue (State Trunk Highway 29) in the City of Green Bay. It was constructed by Wisconsin Department of Transportation, the City of Green Bay and WCPA Contractor Member Vinton Construction Company. It was the recipient of the 2015 Gold Award for National Excellence in Concrete Pavement in the Category of Municipal Streets and Intersections, Greater than 30,000 SY.

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Phone: 608-240-1020 • Fax: 608-240-1019 • www.wisconcrete.org

Compressed Natural Gas Fueling Stations

Unlike gasoline or diesel stations, compressed natural gas stations (CNG) are not “one size fits all.” Building a CNG station for a retail application or a fleet requires calculating the right combination of pressure and storage needed for the types of vehicles being fueled. Making the right choices about the size of compressor and the amount of storage at the station will make a big difference in the cost of fuel and range for vehicles.

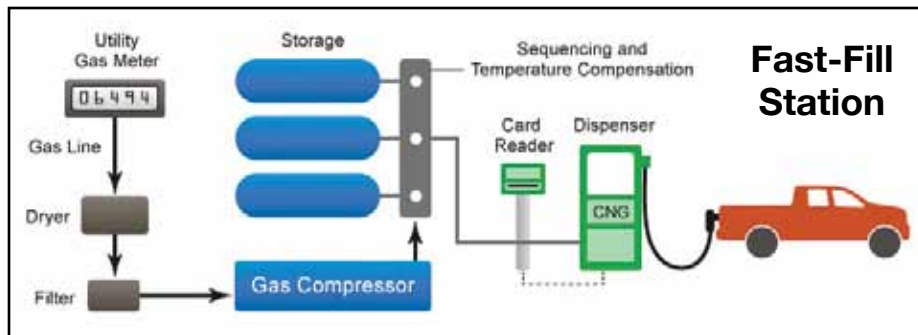
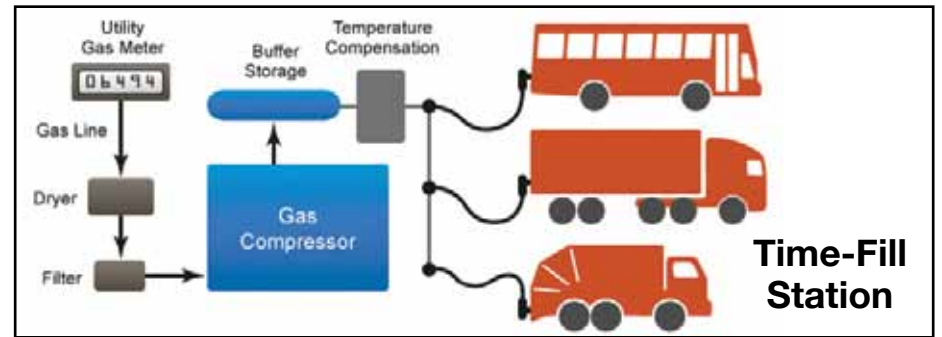
Types of Stations

There are two types of CNG infrastructure: time-fill and fast-fill. The main structural differences between the two systems are the amount of storage capacity available and the size of the compressor. These factors determine the amount of fuel dispensed and time it

takes for CNG to be delivered.

Fast-fill: Generally, fast-fill stations are best suited for retail situations where light-duty vehicles, such as vans, pickups, and sedans, arrive randomly and need to fill up quickly. The space needed to store the equipment measures about the size of a parking space. CNG can also be delivered via dispensers alongside gasoline or other alternative fuels dispensers. Fast-fill stations receive fuel from a local utility line at a low pressure and then use a compressor on site to compress the gas to a high pressure. Once compressed, the CNG moves to a series of storage vessels so the fuel is available for a quick fill-up.

Drivers filling up at a fast-fill station experience similar fill times to a conventional gasoline fueling station—less than 5 minutes



for a 20 gallon equivalent tank. CNG at fast-fill stations is often stored in the vessels at a high service pressure (4,300 psi), so it can deliver fuel to a vehicle faster than the fuel coming directly from the compressor, which delivers fuel at a lower volume. Drivers use a dispenser to transfer CNG into the tank. The dispenser uses sensors to calculate pressure and measure the number of GGEs delivered to the tank, taking temperature into account.

Time-fill: Time-fill stations are used primarily by fleets and work best for vehicles with large tanks that refuel at a central location every night. Time-fill stations can also work well for small applications, such as a fueling appliance at a driver’s home. At a time-fill station, a fuel line from a utility delivers fuel at a low pressure to a compressor on site. Unlike fast-fill stations, vehicles at time-fill stations are generally filled directly from the compressor, not from fuel stored in tanks. The size of the com-

pressor needed depends on the size of the fleet. Although there is a small buffer storage tank, its purpose is not to fill vehicles, but to keep the compressor from turning off and on unnecessarily—wasting electricity and causing undue wear and tear on the compressor. The storage tanks are sometimes used to “top off” vehicle tanks during the day.

The time it takes to fuel a vehicle depends on the number of vehicles, compressor size, and the amount of buffer storage. Vehicles may take several minutes to many hours to fill. The advantage of using a time-fill station is that the heat of recompression is less, so you usually get a fuller fill than with a fast-fill station. Also, with a time-fill station you can control when you fill the vehicles. This means you can choose to run the compressor during off-peak hours (like at night) to achieve lower electricity rates.

From the U.S. Department of Energy

Today's Trucking Company

Drivers

Trucking is growing faster than companies can keep up, and the end result is a nationwide shortage of drivers. This means there are trucking jobs of all types available all across the United States.

Over the Road / Long-Haul Drivers operate heavy trucks and drive for long periods of time, either interstate (between states) or intrastate (within one state). Some over the road truck drivers travel a few hundred miles and return the same day; others are away from home overnight, or for several days or weeks at a time. Some drivers work in teams, including husband and wife teams.

Pick-up and Delivery (P&D) / Local Drivers operate light, medium or heavy trucks and work in route-sales or pick-up-and-delivery operations. These drivers have more contact with customers than over the road drivers and usually make more stops each day. Those P&D drivers often need sales skills in addition to driving skills.

Specialized Trucking involves specialized trucks that handle unusual, oversized or sensitive loads. Drivers cover local and long-distance routes, and need extra training to operate their equipment. Examples of specialized trucking include auto carriers, dry bulk carriers, (permitted) oversized and overweight loads, or double and triple trailers. Other permits may be needed.

Hazardous Materials Drivers need additional training. Drivers need to know about the content of the loads they are hauling, how to handle the loads safely and what to do in an emergency. Truck drivers who transport hazardous materials must also take a special test when applying for the CDL that certifies them as a hazardous materials driver. Examples of hazardous materials drivers include tank truck, over the road or P&D drivers carrying hazardous materials. Other permits may be needed.

An Owner-Operator or Independent Driver owns his or her equipment, anything from a straight truck to a flat-bed tractor-trailer, and hauls freight on a contractual basis. Husband-and-wife owner-operator teams are very common, especially in the household goods moving industry. It is possible to make a good living as an owner-operator, but like many businesses, the competition is tight and there are many overhead expenses involved – equipment purchases, maintenance, fuel and insurance, to name just a few. Most owner-operators begin their careers as salaried drivers with a motor carrier before starting their own business.

Truck Mechanics and Diesel Engine Specialists

Mechanics' duties vary with shop policy as well as the type of equipment they work on. In engine-building shops, some Mechanics repair and adjust engines to restore them to good working order. Others retrofit or replace engines and exhaust systems to reduce emissions to meet environmental regulations. Mechanics

who work in garages or heavy equipment shops usually have more varied duties. They may work on engines, transmissions, differentials, chassis, brakes, steering gears, and front ends for both conventional and alternative fuel vehicles. They also work on motors, compressors, and hydraulic and electrical systems. They dismantle, clean, repair, refit, assemble, and test the equipment according to manufacturers' manuals and specifications.

Mechanics' work has become increasingly complex as vehicles are using alternative fuels and more electronic components. To perform their duties, Mechanics use a variety of tools, such as gauges; hand-held or laptop computers; electric, pneumatic, hydraulic, and computer-based diagnostic tools. They also use oscilloscopes, voltmeters, ammeters, ohmmeters, frequency and special generators, and common hand tools like hammers. As technologies become more advanced in alternative fuel vehicles, additional tools and test equipment may be required.

Logistics

Trucking logistics is the research and planning of trucking operations. Typically, the logistics of trucking takes into account all the factors involved in the transportation of goods by truck with the goal of maximizing productivity and efficiency. This may include planning the most efficient routes for truck drivers, selecting optimal fuel types according to market trends, choosing the best kind of trucks for the particular task, and hiring an excellent staff of truck drivers.

Logistics is a term that historically was used for the preparation of military operations. Advantages in logistics and planning could help gain the best results in a prospective campaign by considering all possible factors involved in any operation. Logistics has developed as a concept and may now be utilized for the analysis of any aspect of a business. Trucking logistics uses this same thorough and extensive scope of analysis and applies it to the specific requirements of the trucking industry.

Human Resources Management (HRM)

The HRM department members provide the knowledge, necessary tools, training, administrative services, coaching, legal and management advice, and talent management oversight that the rest of the organization needs for successful operation.

In a fully integrated talent management system, the managers play a significant role in and take ownership responsibility for the recruitment process. They are also responsible for the ongoing development of and retention of superior employees.

Dispatcher

Dispatchers answer calls and communicate with mobile units to send the appropriate



response. Dispatchers are used in the semi-truck shipping industry, taking orders for trucking companies and sending truckers to pick up and drop off materials.

- **Communication Skills:** You will be listening and speaking to people by radio and phone, often in some state of distress. Your ability to listen, speak plainly and communicate effectively will be necessary.

- **Ability to Multitask:** Dispatchers often are moving a lot of people around at the same time, tracking their movements and keeping tabs on what they need.
- **Problem-Solving Skills:** You will need to be able to prioritize the most important situations, and think quickly on your feet.

At Marten Transport . . .

One of the cornerstone philosophies at Marten Transport, Ltd. involves providing employees with quality, up-to-date and safe equipment. We believe that our drivers deserve every advantage and we work hard to make sure they have the best possible tools to do their job. Our equipment is constantly updated and meticulously maintained. We utilize the latest temperature control technology and observe regular trade cycles.

We view safety as a priority — and our track record proves it. We've been named Grand Prize Winner for Fleet Safety by the Truckload Carriers Association twice ('02 and '04) in the past four years and placed among the top three in the contest seven of the last eight years.

The Georgia Motor Trucking Association awarded us their Grand Champion Safety Award honors for General Commodities Truckload Division in 2002 and 2004. We also earned top safety distinction from the Wisconsin Motor Carriers Association in 2004.

In addition to our Safety Department, we have a Safety Committee in place. This committee has representation from the Safety Department, Risk Management, Maintenance Department, and a person from each of the outlying Marten terminals. It is a ten member committee that elects a Chairman, Co-Chairman and Secretary yearly, with the Safety Manager as the advisor.

MARTEN Fleet Management
Customer Service
Brokerage & Intermodal Operations
13 Terminals Nationwide



Find out how Marten Transport became a leading company in the trucking industry!

www.marten.com



The Technology Education Program at Viterbo University



The Viterbo University Technology Education program is a joint program between our university and Western Technical College both located in La Crosse, WI.

All technology education students must complete the Core Curriculum (Basic Studies) courses, education courses (including student teaching), and general technology courses as prescribed by W.T.C. Technology education students also select a technical emphasis from one of the following areas: Engineering/Manufacturing, Graphics/Communications, Power, Energy, and Transportation, Construction/Woods, or General Technology.

Tech ed undergraduates can complete the program in eight semesters with some needing a ninth semester to student teach. Each student is unique. Technology education students range from new freshmen, to transfer students from another four-year school, to those who have completed or partially completed a technical college



degree. The latter two types of students have credits that transfer into our four-year program. Some of our technology education students have had real-life experience that may then be translated to credit for some required technology courses.

All of our technology education graduates who want jobs, have jobs. In the last year, two of our graduates have had school districts competing to hire them. One district actually offered to buy out the newly signed contract of a tech ed pre-service teacher who is still completing his student teaching. The need for technology education teachers is great!

Educating Future Leaders

Earn your Technology Education teaching degree at Viterbo University

Viterbo's NCATE accredited and Wisconsin DPI approved Technology Education teaching degree and licensure program prepares teachers for leadership and success in the classroom. Coursework includes the use of a variety of teaching techniques to help students learn and develop skills related to a specific occupation or career in the areas of:

- Manufacturing/Engineering
- Construction/Wood
- General Technology
- Graphic Communications
- Power, Energy, and Transportation

Viterbo also offers a post-baccalaureate teacher licensure program in technology education for those individuals with a non-education college degree that want to enter the teaching profession.



For more information contact admission@viterbo.edu, call 608-796-3010 or online at www.viterbo.edu/teched

CAREER CENTER

What would you like to do in Transportation?



- Aircraft Pilot
- Airport Operations Crew Member
- Air Traffic Controllers
- Bus Driver
- Captain
- Chauffeur
- Deckhand
- Deck Officer
- Dispatcher

- Flight Instructor
- Flight Engineer
- Fork Lift Operator
- Helicopter Pilot
- Import/Export Clerk
- Import/Export Manager
- Import/Export Supervisor
- Industrial Tractor Operator
- Inventory Control Analyst
- Inventory Control Clerk
- Inventory Control Manager
- Inventory Control Supervisor
- Locomotive Engineer

- Motor Racer
- Operations Manager



- Packaging Engineer
- Pilot
- Production Scheduler
- Public Transportation Inspector
- Rail Car Repairer
- Railroad Brake Operator
- Railroad Conductor
- Railroad Yard Worker
- Rail Yard Engineer
- Refuse and Recyclable Material Collectors
- Sailor
- Scheduler

- Top Distribution Executive



- Top Inventory Control Executive
- Traffic/Rate Analyst
- Traffic Clerk
- Traffic Director
- Traffic Manager
- Traffic Supervisor



- Distribution Center Manager
- Distribution Director
- Distribution Manager
- Driver/Sales Representative
- Driver/Sales Workers
- Engineer
- Equipment Director
- Estimating Manager
- Expeditor



- Logistics Analyst
- Logistics Coordinator Jobs
- Logistics Manager
- Logistics Specialist



- Train Crew Member
- Transportation Director
- Transportation Manager
- Transportation Planner
- Transportation Supervisor
- Travel Coordinator
- Travel Manager
- Truck Driver Supervisor
- Van Driver
- Yardmaster



- Shipping and Receiving Clerk
- Shipping and Receiving Supervisor
- Shuttle Car Operator
- Streetcar Operator
- Subway Operator
- Taxi Driver



- Marine Cargo Inspector
- Marine Oiler
- Materials Control Manager
- Materials Handler
- Materials Handling Supervisor
- Materials Planner
- Merchant Mariners
- Motorboat Operator



- Fleet Manager

Please note: This represents a broad and not conclusive list of careers within the world of transportation

Explore Transportation Careers at

www.transportationtodaywi.com

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