SPRING/SUMMER 2017

# TRANSPORTATION TODAY WI™

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# Exploring the World of Transportation

## Eleva-Strum's Transportation Program Evolving Into a Student-Run Business

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## Northwest Fab Lab Consortium

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## Fatigued Driving

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## Solo Success!

**Page 6** — I watched as he taxi'd back to runway 29, did a short run up, then was airborne! Josh's first solo flight went off without a hitch, in fact for such a nice day, I was surprised there was no one else taking advantage of the weather. Josh and N904EN had the entire airport to themselves. Josh came around the pattern and after slipping the plane on final to lose some altitude, he made what looked to be a great landing.

See more on Page 3

## What do you want to be when you grow up?

**Page 6** — So, what do you want to be when you grow up? Well, if you are considering a career in aviation, don't limit yourself to any single occupation or university. Explore the vastness of the industry and the comprehensive collegiate aviation programs that can enable you to lay a foundation for success."

## Concrete Pavement Curing, A Brief Overview

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## Plymouth Auto Program

**Page 13** — As the community has given to the PHS auto program, the students have in turn given back to the community. Each fall for the past 20 years, students have provided free vehicle winterization inspections, checking fluid levels, wipers, belts, hoses, batteries, tires and lighting system. PHS students also have organized a community Auto Show each May since 2012.

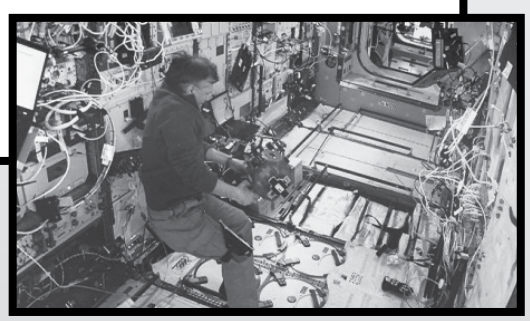
## City Stadium Automotive

**Page 9** — The automotive industry in the United States and Wisconsin is forecasted to remain a growing industry. Recognizing the need for a skilled automotive workforce, the Green Bay Area Public School District expanded the automotive technician lab at Green Bay East High School in 2015 to form City Stadium Automotive.

City Stadium Automotive

## Rigor, Relevance and Robotics

**Page 10** — Recently, the Craig High School "Rock 'n' Robot" programming team placed among the top 10 teams in the world in Zero Robotics. Zero Robotics teams create code for small robots to fly aboard the International Space Station (ISS). The students did amazing work, and put in a tremendous amount of effort in the competition.



## Transportation & Logistics Management

**Page 15** — The Transportation and Logistics Management bachelors' degree program was designed with the aid of business educators and industry leaders. The program is the only one its kind in Wisconsin and has been continuously growing since its inception in 1998. At UW-Superior, you'll learn the business of efficiently moving people, information and money.

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# Northwest Fab Lab Consortium

*By Mark Beise*
*Rice Lake Area School District*

On December 8th, a group of twelve educators gathered at Northern Lakes Regional Academy in Rice Lake for the initial meeting of the Northwest Fab Lab Consortium. The goal of this group is to develop a network of educators in the northwestern part of the state who can be resources to each other as the Fab Lab concept continues to grow in our schools. The night was hosted by Mark Beise and Jeremy "Pete" Peterson, at the Rice Lake Area School District's Fab Lab located at Northern Lakes Regional Academy. NLRA is the district's public based charter school for grades 9-12. The school has a STEAM (Science - Tinkering - Engineering - Aesthetics - Math) approach. The school also looks to break down the silos of content areas and take an interdisciplinary approach.

The evening was broken down into three sessions. Session One was general introductions and a tour of the Fab Lab at NLRA. Beise and Peterson discussed some of the funding that help provide materials and equipment for the facility. Session Two was a lengthy discussion about Fab Lab curriculum and projects. The staff of NLRA displayed several projects and curriculum that they have developed over the past four years. Some of this curriculum and projects is teacher led, others are developed by students in a project based learning model. One nine week course that Peterson and Beise discussed was a class called "High in the Sky." This class was co-taught between Beise and Peterson and consisted of all new students to NLRA, the majority being freshmen. Peterson, who is a chemistry and physics teacher, taught the class first. He discussed Newton's Laws of Motion with the students and also some basics of flight, including Bernoulli's Principle. After a couple weeks of learning the physics about rocket flight from Mr. Peterson, the students then rotated to Mr. Beise. Mr. Beise is a technology and engineering teacher. He used this course as an avenue to give all the new students some basic skills to use in the Fab Lab. Some basic engineering drawing skills were introduced. Then the students learned how to use Adobe Illustrator and SolidWorks. Once the students understood how to create 2-D and 3-D geometry, the students were able to use the Laser Engraver and 3-D printers. Students had built kit rockets earlier in the class to get the idea of rocket components. The students then built "scratch" rockets after they had gained some Fab Lab skills. Students were provided with only a body tube, and were charged with creating nose cones, fins and other rocket components. The students then assembled and tested their rockets for stability. Of course, the class concluded with a successful launch of the student's rockets.

The third session of the evening was a question and answer session. The group discussed specifications and thoughts on certain machines, policy and guidelines on public/community use of the labs, vendors for purchasing equipment and the stage of Fab Lab development for each group in attendance.

Moving forward, the goal of the group is to grow with participants and have other host nights. There was also discussion about professional development options. The idea of creating "build days" for low cost staff development seemed like a viable option.

If you would like more information about this group and how to share in their discussion, please contact Mark Beise at beisem@ricelake.k12.wi.us.

**www.ricelake.k12.wi.us**

# Eleva-Strum's Transportation Program Evolving Into a Student-Run Business


Eleva-Strum's Tech Ed teacher Craig Cegielski continues his mission to turn his transportation program into one similar to the highly successful Cardinal Manufacturing program currently in place at the high school.

In addition to having an automotive lift installed on the shop floor they have they have improved the transportation program setting for a more professional look by taking down some walls, installing new windows and giving the whole area a new coat of paint. A new furnace, new lighting, new air conditioning, and a stereo system have been added. Parents, Retired Professionals and Students all volunteered to remodel the entire transportation area.

Tech Ed teacher Craig Cegielski said that acquiring a lift had been in the works for several months leading up to the purchase. When the opportunity arose, Cegielski took advantage of business connections to bring in a quality piece of equipment at a very low price. The lift is a great demonstration piece. Instead of trying to cram fifteen students under a single car to examine an exhaust system, the lift allows Cegielski to teach without such restraints.

A full time maintenance person who has many years of experience in auto repair has been hired and he is there to assist students. They can rely on him to help with evaluating or finding a solution to fix a tricky situation.

Along with the professional setting students have been working on their soft skills. Employability, professionalism, hand shaking, eye contact, attitude, and attire are key. Being a problem solver is very important in the transportation industry and is a big focus in Craig's program. There are 10 commandments about work ethics that the students are encouraged to follow.

Work is being done with an architect to create a virtual "Dream Shop" that will become a reality. The students are already receiving true business experience. Like Cardinal Manufacturing, they have a student area to run all arenas of the business: marketing, engineering, a project manager, and more!

In the Cardinal Manufacturing program students learn to bid on projects, work within deadlines, work with paying customers, and design parts. They are actually working for a paycheck. The program is also self-sustaining and requires no funds from the school district.

While students in the Transportation Program are doing small repairs for now and are learning many aspects of running a business the goal is to have another successful endeavor operating in the Eleva-Strum Technical Education classrooms.

Another facet of Craig's program is auto ownership, and everything that goes along with it. From purchasing, to maintenance, insuring, licensing, trading in, leasing, and everything else an informed consumer should know. A vehicle is one of the larger investments his students will ever make and he wants to make sure they are informed and make good decisions. Some of the topics covered are:

- How to locate a vehicle
- Private sales and working with a dealership (what to ask, what to look for, trade ins, warranties, and more)
- How to finance a vehicle (the terminology and the responsibilities involved)
- Insurance (the terminology, how to ask the right questions to understand their coverage, what to do if they have a claim)
- Understanding the legal laws and the results of breaking them.
- How to maintain your vehicle and to be ready for all of the seasons

*Craig Cegielski grew up in Marshfield WI, and went on to earn a degree in Technology Education from a Wisconsin University. After Graduation, he taught welding and machining at Antigo High School and stated a very successful student-run manufacturing company called Red Robin Machining. Moving closer to family in western WI, Cegielski went back into manufacturing as a welder/machinist. After a year, he was able to re-enter the world of teaching as the technology education teacher at the Eleva-Strum High School, where he teaches various levels of CAD, welding, machine tool, automotive, construction, and woodworking.*

**www.esschools.k12.wi.us**

# Fatigued Driving

*By Meemic Insurance Company*

Research shows that more than 20 percent of fatal car accidents are due to fatigued drivers. This finding confirms what experts suspected, which was that drowsy drivers are more commonplace than other statistics suggested before. More than 83 million Americans admitted to being consistently deprived of sleep and still driving every day.

Experts recommend drivers learn and remember the signs of fatigue to avoid injuring themselves and other motorists.

Researchers also found that crashes due to drowsy drivers have serious consequences. Injuries resulted in more than 30 percent of the crashes, and approximately 6,000 crashes end in one or more fatalities. Prior findings from top research reports showed that drivers between the ages of 19 and 24 were more likely to admit they were drowsy. However, drivers younger than 18 and older than 75 were less likely to admit when they were drowsy.

The dangers of drowsy driving have led the National Highway Traffic Safety Administration to broaden the impaired driving definition to encompass drugged, distracted, drunk and drowsy drivers. An estimate from NHTSA shows that non-property damages of drowsy driving accidents totaled about $109 billion annually.

Safety officials across the nation agree that the problem is growing and must be addressed more aggressively. Their main challenges are measuring drowsy driving and finding ways to prevent it. They also point out that law enforcement officials lack adequate training on recognizing drowsy driving on the road. When crashes occur, drivers may not always report their drowsiness. Unlike alcohol and drugs, there are no clear tests to show drowsiness as a cause of impairment.

Research also showed that more than 90 percent of Americans said they thought it was unacceptable for people to drive while drowsy, but nearly 30 percent admitted to doing just that in the past 30 days. It is important to know how to identify the signs of drowsy driving. This includes the following:

- Not being able to recall the last several miles of driving.
- Difficulty focusing on the road and blinking frequently.
- Thoughts that seem disconnected or wandering.
- Continual yawning every few minutes.
- A feeling of heaviness in the head.
- Absentmindedly drifting out of the lane or driving on rumble strips.
- Missing traffic signals or traffic signs.
- Inadvertently tailgating vehicles to the front.
- Feeling irritable, becoming restless or having difficulty keeping the head up.

When drivers feel tired, experts recommend finding a safe place to pull to the side of the road. It is important to do this if any of the previous symptoms are noted. To keep safe on the road, experts recommend the following tips:

- Get at least seven hours of sleep before a long drive.
- Take a break every 100 miles or every two hours.
- Drive during times when normally awake.
- Travel with a passenger who is alert and take turns driving if needed.
- Avoid eating heavy foods.

- If chronic fatigue is an issue, consult a sleep specialist.
- Whenever possible, avoid taking medications that may cause drowsiness.

Drowsy drivers make the road unsafe for themselves, their passengers and other motorists. Being alert is important to avoid other disasters such as icy roads, deer and large bits of debris in the road.

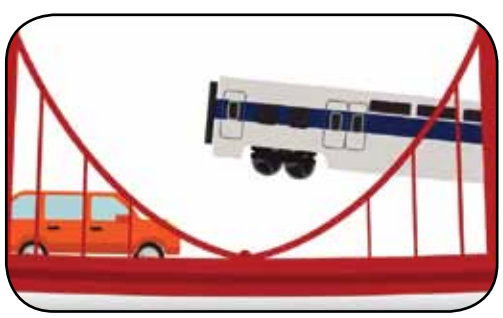
For more information on driving safety, visit Meemic's Safety & Information Center at www.Meemic.com/Safety.

# Student Transportation Video Contest

American Road & Transportation Builders Association

## Congratulations to our 2016 Video Contest Winners!


Category One winner: "Seattle's Developing Transit" – Josh Jaffe, 11th grade student at Seattle Academy.



Category Two winner: "ARTBA Infrastructure 101" – Timothy Gersten, a Film and Television major at New York University

## The 2017 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 15, 2017

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
- 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 of 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 Lital Shair Nada at lnada@artba.org. More details about this contest can be found at the website below.

**Deadline:** Video Submission Deadline: August 15, 2017
**Website:** www.artba.org/video-contest

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

WTBA WISCONSIN TRANSPORTATION BUILDERS ASSOCIATION

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**www.wtba.org**

# Solo Success!

## *Westosha Central High School student does his solo in a plane that he helped build*

*Josh Engberg*
*Westosha Central High School*

The partnership between Central High School's STEM Aviation Program and Eagle's Nest Projects has provided our students an exciting and truly unique education experience and a venue for further developing knowledge and skills in the areas of STEM. The Eagle's Nest program emphasizes the importance of setting goals, planning, teamwork, and respect as students work "hands-on" on complex processes and problems in the same way accomplished scientists and engineers perform their jobs. The program also motivates, empowers, and encourages students with technical abilities to pursue STEM careers. The combination of teamwork, the challenge of learning so many skills, and accomplishing something as unique and outstanding as building a flying aircraft really instills something that's incalculable and invaluable to the students. Eagle's Nest Projects is a life-changing program.

### *From Josh:*

I felt nervous as I began my first solo flight, but it quickly turned into one of the most exciting and rewarding experiences of my life. Being the only passenger in the plane made it handle very differently, it felt very light and maneuverable. I feel blessed that God put Mr. Senft, Mr. Putra and the Eagle's Nest Project in my life because I want to pursue an aviation career. All the mentors and donors are so dedicated to the students. I know only a handful of students get this opportunity, it's amazing that I'm one of them!

### *From Mr. John Putra CFI:*

We have had a real good stretch of weather the last week, and February 21 was no exception. It was 60 degrees in South East Wisconsin. All the snow had melted, and I was even able to enjoy some "Dairy Air" from the farm fields surrounding the Burlington Airport. The winds were 250 at 4 knots.

Josh Engberg has been a quick learner, and he has always grasped the concepts quickly. His solo flight was delayed a few months due to FAA paperwork issues as well as an unforgiving 2 months of bad flying weather - In stark contrast to today. Josh and I met just after 3pm, and after a thorough preflight inspection and reviewing his pre-solo-written, we fired up RV-12 N904EN and headed out for a short dual lesson. Josh flew the traffic pattern well, and performed the requisite tasks (Simulated engine failure, go-around, and 3 normal landings). I told him to drop me off, gave him instructions to do 3 more traffic patterns, and reminded him how well the plane might perform without my dead weight sitting next to him.

I watched as he taxi'd back to runway 29, did a short run up, then was airborne! Josh's first solo flight went off without a hitch, in fact for such a nice day, I was

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## *What do you want to be when you grow up?*

# Careers in Aviation

*Ken Polovitz*
*Assistant Dean John D Odegard School for Aerospace Science*

"Since you were old enough to understand the question, you have been asked, "What do you want to be when you grow up?" And, like most, you probably blurted out something that seemed really exciting and glamorous but really didn't have the first clue what it really was or how you become a fireman, rock star, ballet dancer or pilot. Now that you are older and wiser and considering your options after high school, the question now goes like this: "Where are you going to college and what are you going to major in?" And, you may be like most----still clueless and confused! Determining a career and selecting a college can be some of the most difficult decisions we ever make.

For almost twenty years as Assistant Dean for Student Services within the Odegard School of Aerospace Sciences at the University of North Dakota, I've been advising young people who are considering a career in Aviation. And, when asked what specifically they would like to do in aviation the vast majority respond: "Airline Pilot"! That's certainly exciting and specific, but most have really no clue about how you become a professional pilot. Or, about the many other occupations within the industry like air traffic controllers, maintenance and avionics technicians, airport managers, military options, helicopter pilots, corporate pilots, airline operations managers and the list can go on and on. Like many career fields, the aviation industry is so large and diverse that it can leave many clueless and confused---again!

When considering a career within the aviation industry, it's best, in my opinion, to first turn toward those colleges and universities that have the degree options covering all or most of the occupations you should explore. This approach can help determine the quality of the school but just as importantly, allow you to explore and become more knowledgeable about the many, many occupations within the aviation industry--including becoming an airline pilot!

It is very important that you find and explore degree options in professional flight--both airplane and helicopter, air traffic control, airport and aviation management, aviation systems management (maintenance/avionics/dispatch), engineering, ROTC programs and the newest degree option, unmanned aerial systems (UAS) operations.

Collegiate aviation has become the main avenue for individuals to follow to as they consider establishing a career within the aviation industry.


Consequently, not only is it important to choose a school with comprehensive degree options, it's also very important to choose a university with a strong reputation within the aviation industry. This, of course, gives you an advantage with job placement upon graduation.

So, what do you want to be when you grow up? Well, if you are considering a career in aviation, don't limit yourself to any single occupation or university. Explore the vastness of the industry and the comprehensive collegiate aviation programs that can enable you to lay a foundation for success."

# Concrete Pavement Curing, A Brief Overview

*Heath Schopf, P.E.*
*Director of Construction Engineering*
*Wisconsin Concrete Pavement Association*

Concrete is one of the most durable construction materials used today because of its ability to resist weathering, chemical attack, abrasion, and other forms of deterioration. There have been several advancements in concrete pavement technology focused on durability since the first concrete pavement was placed in 1892 and many more advancements on the horizon. Curing and the materials used to cure the pavements is one of the areas that has seen several advancements in technology over the past 125 years.

The process of properly curing concrete and its impacts on durability cannot be emphasized enough. By definition curing is the process in which freshly placed concrete is protected from loss of moisture and kept within a reasonable temperature range for a period of time immediately following finishing allowing the concrete to fully hydrate. Proper curing of concrete is one of the most important steps in achieving strength, abrasion resistance, deicer resistance, low permeability and resistance to freezing and thawing. Proper curing can also mitigate shrinkage cracks which can severely impact the durability of the concrete since the open cracks allow harmful materials to penetrate the surface.

The first concrete pavements were cured by placing wet earth and sand over the top to help retain the moisture and temperature. Beginning in the 1930's the industry began curing by ponding. Ponding was achieved by constructing earth dikes on top of and alongside the slab and ponding a minimum of 2-inches of water over the slab. As equipment became more advanced and placements became larger other methods of curing came on the scene such as wet burlap and paper sheet curing. With the invention of the slipform paver in the 1960's and its widespread acceptance in the 1970's and 1980's wet curing was no longer practical due to the large surface areas created with increased production rates and white pigmented curing compounds became the preferred method of curing.

Curing is more critical today than in the past due to the low W/Cm ratio mixes, the increased use of admixtures, the increased use of supplementary cementitious materials, and the increased application of deicing chemicals to the surface of the concrete. Looking at W/Cm ratio alone the amount of water that is introduced into most paving mixes is not much more than what the concrete mixture needs to hydrate the cement.

Moisture needs to be maintained in the mix until the cement has a chance to fully hydrate.

A clear understanding of the type of work being performed and what the end result will be is critical to specifying or selecting a type of material for curing. Typical recommendations for curing of concrete pavements allow the use of plastic sheet curing, moist curing, or the application of a membrane forming curing compound. The most common and economical form of curing today is the application of a membrane forming curing compound. There are

**Continued on Page 13**

# Shawano Community High School Introduces New Sport

*Sam Kobs*
*Shawano High School*

Shawano High School is trying to start a new sport that will hopefully spread across Wisconsin. The new Legend race car series is bound to catch the eyes of many, not only students, but citizens in the community.

The purpose of the new sport is to get a team of mechanics from the school, build a race car that will perform effectively and race it out on the track. It is not a head-to-head race. It is more of a race against the clock, trying to get the best time possible around the track.

The car is a 5/8 scale model of the actual size Ford sedan with a steel racing frame. There will be a Yamaha 1250 cc motor out of a crotch rocket powering the beast.

Senior Zach Berry is an important part of the build.

He stated, "As you build the car and drive it you'll learn things, not only about mechanics but body work and how to drive a race car. Plus you can't help but smile when you drive this car."

Zach plans on going to school to be a mechanical technician.

"I enjoy working on cars and always doing something different to each one."

He loves working on cars and bringing his knowledge to the table when it comes to building the car.

As some may wonder, who is going to drive this crazy torque machine? Most would think a professional driver that knows the ropes of racing and how it feels for their back tires to not have any traction to the pavement. But that would be the wrong answer. The students helping with the build on the race car will have a chance to race around the track.

Junior Gage Pillsbury says that he is not scared to crash.

"I trust that I am a decent driver and if anything were to happen, I trust that god would get me through it."

Pillsbury liked racing around on a four-wheelers as a kid. This might of spiked his interest for racing. As he enters his teen years being able to drive a vehicle wouldn't help the urge to race.

"I enjoy racing for the adrenaline rush it gives you when you are behind the wheel- the edge that the car puts you on is unlike anything you can ever explain."

The build and racing is not the only thing the race team is doing to get this sport off the ground. Racing is a very expensive sport, it would be nearly impossible for the school to fund the whole thing. The team plans to go around town and get sponsors from local businesses to help the car not only perform adequately but also help make it look professional before the race season begins.

SCHS is the first school in the state to take an interest in this sport, which is pretty impressive, not only to us as a school. It also brings great recognition to our automotive program here at SCHS. We hope as a school that the uniqueness of this program will catch the eyes of other schools across the state, and if all goes well, to have other schools start participating in the program as well.

*Reprinted with permission from the Shawano Hawks Post*

**www.shawanoschools.com/schools/high**

# Revving Up for the Future


*Jacob Moesch*
*Shawano High School*

On Wednesday February 15, the Shawano SkillsUSA club traveled to the largest car show in the nation. A group of 47 departed on a coach bus at 7 a.m. destined for McCormick Place, Chicago.

If a student worked the Customs and Classics auto show in September, they received a free ticket from the SkillsUSA club, otherwise they had to purchase one.

Companies from all across the world came to the car show to give people an idea of what the future of the auto industry will be like. There were nearly 1,000 models ranging from everyday commuters, super cars or concept cars.

The best part, of course, was being able to get in the driver's seat to get a better feel of the vehicle, and for some even driving them around the test track.

Shawano Auto teacher, Mr. Jeremy Hodkiewicz said, "I like to see what the future of the auto industry holds. I want to see what is going to come into my shop one day."

This is a great opportunity for students coming from a small town to get a look at many automobiles that never make their way up by them.

The show took up both east and west buildings of the McCormick Place. On one side, Ford spent big money to put their display front and center.

The Chicago Auto Show was not just a battleground for the most luxurious cars, it was also an opportunity for companies to show their advancements in technology. For example, Volvo brought a new all-wheel drive hybrid concept that would include the gas engine powering the front wheels and the rear wheels being powered by the battery.

Nissan took advantage of the coincidence between the Nissan Rogue and the Star Wars movie Rogue One and had a Star Wars themed area. This area featured two limited edition Star Wars themed Nissan Rogues.

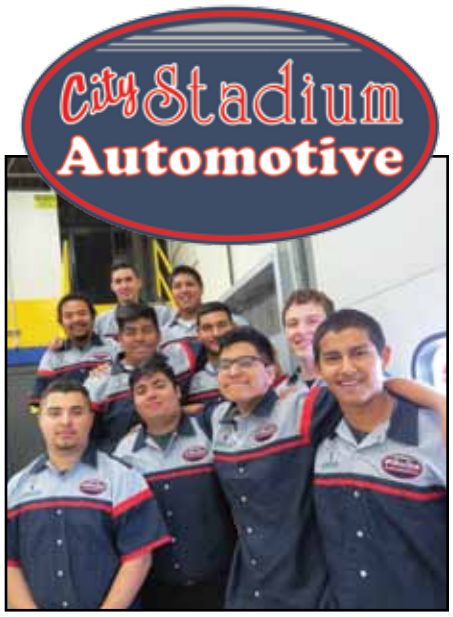
To promote abilities of their vehicles, many companies had test tracks where people could get in and ride up hills and over ramps. Many people lined up to take rides they were world famous rollercoasters.

With all the new technology these cars possessed, the future is here, and it is exciting.

*Reprinted with permission from the Shawano Hawks Post*

**www.shawanoschools.com/schools/high**

# City Stadium Automotive




*Green Bay Area Public Schools*

The automotive industry in the United States and Wisconsin is forecasted to remain a growing industry. Recognizing the need for a skilled automotive workforce, the Green Bay Area Public School District expanded the automotive technician lab at Green Bay East High School in 2015 to form City Stadium Automotive®. On November 4, 2016, City Stadium Automotive ® celebrated its first anniversary.

Students enrolled in City Stadium Automotive® focus on the diagnosis and troubleshooting of faults in automotive systems while receiving high school and college credit through Northeast Wisconsin Technical College (NWTC). The hands-on, real-world experience students receive centers around technical research, automotive workplace skills and practices, and preparation for post-secondary education and employment.

Students who complete Vehicle Service 1 through 3 taught by Automotive Service Excellence Certified Instructors will receive transcribed credit for "Auto Service Fundamentals" at Northeast Wisconsin Technical College. All GBAPS students are eligible to take these courses, which are offered at East and Preble high schools.

## Available Courses:

**Auto Ownership (Semester):** Grades 10–12
Topics covered include buying a car, insurance, system identification, basic maintenance, and the Auto Repair Industry.

**Small Engines (Semester):** Grades 9–12
Topics covered include basic engine operation and maintenance, repair and troubleshooting of single cylinder engine equipment.

**Vehicle Service 1 (Full Year):** Grades 10–12
Topics covered include every system in the vehicle including maintenance and basic repair.

**Vehicle Service 2 & 3 (Full Year):** Grades 11–12
Topics covered include each system of the vehicle including maintenance, repair and basic diagnosis and troubleshooting.

City Stadium Automotive® at East High is one of only 14 high schools in Wisconsin to be certified by the National Automotive Technician Education Foundation (NATEF) for Maintenance and Light Repair Program Standards. NATEF is an organization that examines the structure, resources, and quality of training programs and evaluates them against standards established by the industry. Students who receive NATEF certification are prepared to work in the automotive field, enroll in technical school, or both.

At the instructor's discretions, students can bring their own cars into the shop. This opportunity allows students to receive hands-on problem solving skills for a variety of automotive issues on a day-to-day basis, while allowing them to work with contemporary shop equipment. The equipment includes: car lifts, computer diagnostic tools, basic hand and air tools, oxy acetylene torches, and more. Students learn about everything from changing the oil and installing new brakes, to rebuilding engines and diagnosing electrical problems.

The program also allows students to guide their own learning experience by developing projects that revolve around their own interests. Currently, students are working on making a 1970 Volkswagen Beetle that spent 15 years under water drivable once again. Others are improving the engine of a 1970 Buick Skylark with hopes of racing it at the track. Glenn Buelow, City Stadium Automotive® Instructor, says, "The projects aren't easy, but students do their best and with enough effort will be able to accomplish their goals while learning along the way."

Both City Stadium Automotive® Instructors have previous experience in the automotive field and understand the real-life value of the skills taught in the course. They incorporate their experiences into the classroom and create a program that's not only helpful for students with hopes of pursuing a career as a mechanic, but for other students as well. One of the courses offered, Auto Ownership, teaches students how to handle tasks that any car owner faces, such as handling car insurance and basic car repairs. In the future, instructors hope to expand the program and continue to increase student involvement.

To learn more, visit gbaps.org/CSA.

**www.gbaps.org**

# Rigor, Relevance and Robotics

*Janice Bain*
*Teacher and Club Advisor*
*School District of Janesville*

There is a lot of talk about rigor and relevance in education. Sometimes the lessons come outside of regular classroom instruction. A great example would be the Rock 'n' Robotics and the LEGO Robotics clubs hosted at our schools after school regular hours. Over the years, many students have participated in the clubs, achieving a level of success that other clubs envy. The clubs have been so influential that a class was developed to extend Robotics to all high school students as a course option for credit. Classes are now being developed at the middle and elementary levels as a part of the expansion of the School District of Janesville's STEM initiative.

Recently, the Craig High School "Rock 'n' Robot" programming team placed among the top 10 teams in the world in Zero Robotics. Zero Robotics is a robotics programming competition for high school students sponsored by the Massachusetts Institute for Technology (MIT), NASA, the Center for the Advancement of Science in Space (CASIS) and the European Space Agency (ESA).

Zero Robotics teams create code for small robots to fly aboard the International Space Station (ISS). The robots, called SPHERES—roughly the size and shape of a basketball — run on compressed gas, and can be programmed to spin, revolve, hover, and navigate through the air. Researchers use SPHERES to test maneuvers for spacecraft by performing autonomous rendezvous and docking. They fly inside the ISS cabin autonomously under the supervision of an astronaut. Each is self-contained with power, propulsion, computing, and navigation equipment.

The games are played with units called SPACE SPHERES. Students were tasked to build surveying satellites that would orbit Mars. In the game, the satellite pieces were launched into orbit and teams programmed their spheres to collect these pieces into "assembly zones" to earn points. During the game, students had to be alert to rival teams intent on stealing the satellite pieces their team had already collected.

This year's competition began in September 2016 with several phases. Both the Craig and Parker High School teams made it past the top 100 round, with the Craig team reaching the Alliance portion of the contest. In this stage, they had to create an alliance with two other teams of high school students from at least one other continent. Craig's Rock 'n' Robot team joined with the FermiFloating team from Italy and the ASIJAsteroids team from Japan. The new team name became the Fermi-Astroid-Craig alliance.

The alliance submitted their final code to MIT on January 6, 2017. The Fermi-Astroid-Craig alliance reached the top 10, and were invited to the finals hosted at MIT on Friday, January 27, 2017. While there, they watched (via live transmission) their programming code utilized to fly the spheres and were judged by astronauts aboard the ISS. Their competitors hailed from around the world, including teams from the USA, Europe, Romania, and Australia.

The students did amazing work, and put in a tremendous amount of effort in the competition. Their collaboration with peers from other countries, problem solving skills, and positive attitudes were essential in helping them reach the finals in this prestigious event.

The event was hosted by MIT faculty members and students learned from special guest speakers like 2010–2011 Astronaut Cady Colman as well as the engineering crew responsible for the Mars Rover.

The Robotics club and participating in the Zero Robotics competition are great opportunities for our students. They allow our students to showcase their knowledge while solving real-world problems through global collaboration with their peers from around the world.

At the final event at MIT, the Fermi-Astroid-Craig team first battled two other teams in a round-robin contest. Each team had representatives that spoke to the audience and astronauts to explain their strategy during the competition. The world could watch the robots compete via live feed.

Craig lost the first match to Keppler-Hubble by 0.64 of a point which rounded to 17-16. Craig won the second match 13-10. At the end of their 3 team round-robin, Craig placed second to the Flying Falcons alliance. The three teams in the Craig pool scored: 32, 29.1 and 20.8 points respectively. Flying Falcons went on to take second place in the entire competition. Although the team didn't quite make the final two – Craig's efforts, dedication and collaborations should be exemplified as a model for excellence to be imitated across all areas of education. The exposure to experts at MIT, NASA, ESA, and CASIS will help them as they pursue their interests and dreams long into the future.

**www.janesville.k12.wi.us**

# Solo Success!

**Continued from Page 6**

surprised there was no one else taking advantage of the weather. Josh and N904EN had the entire airport to themselves. Josh came around the pattern and after slipping the plane on final to lose some altitude, he made what looked to be a great landing.

After completing 2 more circuits he met me back at the club hangar, we took pictures and, of course, cut his blue "Student Builder" shirt tail.

Josh Engberg is the fourth student from the CHS Aviation Club that has completed their First Solo Flight in the RV-12 they helped build. He is also the fourth student from the program to complete his First Solo Flight in the last year. I'm thankful to have worked with each of them, and am looking forward to continuing to Josh and others attain their private pilot license!

### *From Jim Senft, Director Eagle's Nest Wisconsin:*

The Eagle's Nest program is truly I life changing experience and valuable resource for the Westosha Central High School. The Eagle's Nest program provide us the resources to develop STEM program based around the fundamentals of aviation. As a result, we have been able to raise the level of knowledge and skills in the area of science, technology, engineering and math. Our program not only builds these necessary skill but also exposes students, teachers, students, and community members to the aerospace field. Since the completion of our first aircraft "Falcon 1" has been flying for just over one year, this aircraft has been available to students for flight instruction and other educational proposes. Students have put nearly 300 hours on the aircraft in that first year. Our program also stresses critical 21st-century skills, such as communication and teamwork. Our curriculum involves both student-directed and teacher-led curricula to create a powerful and effective STEM experience. The support we get from the Eagle's Nest is helping to ensure that we can become self-sustainable and to continue to provide this is a life-changing program to our students.

**www.westosha.k12.wi.us**

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* ATRI, Cost of Congestion to the Trucking Industry, 2014 • † TRIP, Bumpy Roads Ahead, 2012 • ‡ TTI, Urban Mobility Report, 2012

APA ASPHALT PAVEMENT ALLIANCE

The Asphalt Pavement Alliance is a partnership of the Asphalt Institute, National Asphalt Pavement Association and the State Asphalt Pavement Associations.

The Wisconsin Asphalt Pavement Association is a statewide, non-profit organization representing the interests of the asphalt industry.

WAPA
WISCONSIN ASPHALT PAVEMENT ASSOCIATION

# Careers in Trucking

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.

# Alternative Fuels

## Biodiesel

Biodiesel is a domestically produced, renewable fuel that can be manufactured from vegetable oils, animal fats, or recycled restaurant grease for use in diesel vehicles. Biodiesel's physical properties are similar to those of petroleum diesel, but it is a cleaner burning alternative. Using biodiesel in place of petroleum diesel, especially in older vehicles, can reduce emissions.

## Ethanol

Ethanol is a renewable fuel made from corn and other plant materials. The use of ethanol is widespread—almost all gasoline in the U.S. contains some ethanol. Ethanol is available as E85—a high-level ethanol blend containing 51%-83% ethanol depending on season and geography—for use in flexible fuel vehicles.

## Electricity

Electricity can be used to power all electric vehicles and plug-in hybrid electric vehicles. These vehicles can draw electricity directly from the grid and other off-board electrical power sources and store it in batteries. Hybrid electric vehicles use electricity to boost fuel efficiency. Using electricity to power vehicles can have significant energy security and emissions benefits.

## Natural Gas

Natural gas is a domestically produced gaseous fuel, readily available through the utility infrastructure. This clean-burning alternative fuel can be used in vehicles as either compressed natural gas (CNG), liquefied natural gas (LNG), renewable natural gas (RNG), or biogas.

# Plymouth Auto Program

## *A project-based transportation program*

*Plymouth School District*

Thanks to the support of a local auto dealer, the project-based transportation program at Plymouth High School offers an opportunity for students to work on various types of vehicles in an expanded automotive lab.

The auto lab is part of the LTC-Plymouth Science & Technology Center at the school, which also features Haas CNC mills and simulators, a high-tech lathe, high-speed packaging equipment, a metal fabrication training facility, a 3-D printer, and a laser engraver. The facility is used by high school students during the day and by college students in the evening.

The lab was expanded in 2012 and two state-of-the-art hydraulic vehicle hoists were installed. The asymmetric hoists – of the same quality found in professional auto shops – allow for simultaneous student projects.

The hoists were made possible by the first installment of a three-year, $45,000 pledge from an automotive group to upgrade the lab. Subsequent installments provided new tools and diagnostic equipment.

In addition to the funds, the dealer has offered to share its own shop, equipment, vehicles and personnel to enhance the education of auto tech students. They also have provided professional-looking uniforms for PHS auto students for many years.

As the community has given to the PHS auto program, the students have in turn given back to the community.

Each fall for the past 20 years, students have provided free vehicle winterization inspections, checking fluid levels, wipers, belts, hoses, batteries, tires and lighting system. The program is sponsored by the Plymouth Police Department as way to provide peace of mind for senior citizens and disabled people as winter approaches. In October 2016, students inspected the vehicles of 41 community members.

PHS students also have organized a community Auto Show each May since 2012. The public is invited to enter vehicles as well as to view them during the show. Winners are recognized in 10 categories, from vintage to lawn tractor.

This year's show will take place on May 19th.

"Our car show is an opportunity for the students and community members to showcase their interest and knowledge about vehicles," student organizer Alex Schilsky said last spring.

The acquisition of knowledge doesn't end with the school day for PHS auto students. They also can join in PHS Technology Education and Engineering Club, which participates in a variety of activities, including Formula High School and High Mileage Vehicle competitions.

PHS participated in the Wisconsin Formula High School project for the first time in May, placing third of 12 in the stock class. Participants designed and built the car from scratch and gained experience with engineering, marketing, public relations, team work, interpersonal skills, tolerances, deadlines and design constraints. They had to develop a budget and seek sponsors to cover $5,385 in materials.

"Our goal with the automotive program is to provide students with the skills and tools and experiences of professional auto technicians," said instructor Beau Biller. "Not all of these students will choose automotive careers, but all will benefit from the applied technical skills."

**www.plymouth.k12.wi.us/Schools/PHS**



# Concrete Pavement Curing

**Continued from Page 7**

several different types of curing compounds available based on the following criteria; water retention, pigments, drying time, type and amount of solids, Volatile Organic Compounds (VOC), and Compatibility with coatings. Membrane forming curing compounds for fresh concrete are covered by ASTM C 309 and ASTM C 1315.

ASTM C 309 covers liquid membrane-forming compounds suitable for application to concrete surfaces to reduce the loss of moisture. Materials that meet ASTM C 309 are typically more economical than materials that meet ASTM C 1315 and have been the industry standard for many years. WisDOT requires a poly-alpha-methylstyrene (PAM) liquid curing compound conforming to ASTM C309, type 2, class B for all concrete pavements.

Membrane-forming compounds with special properties including, minimum solids content (25%), resistance to ultraviolet radiation, acid and alkali resistance and non-interference with adhesives are described in ASTM C 1315. Many municipalities in Wisconsin require the use of a curing compound meeting this requirement. These products will act as curing compounds when used on freshly placed concrete and as membrane forming sealers when a second coat is applied on hardened concrete. These are the recommended products used on decorative and integral colored concrete when aesthetics is the primary goal such as a glossy/wet looking finish and color intensity since they can be applied as a curing compound and then reapplied to form a membrane forming sealer.

Just imagine what a concrete paving operation would look like today without the advancements in concrete curing technology.

# 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

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

- Fleet Manager
- 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

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

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

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

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

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

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

**Explore Transportation Careers at**

**www.transportationtodaywi.com**

# Transportation and Logistics Management

The Transportation and Logistics Management bachelors' degree program was designed with the aid of business educators and industry leaders. The program is the only one its kind in Wisconsin and has been continuously growing since its inception in 1998. Students majoring in this program enjoy the benefits of UW-Superior's personal attention to students and its quality business programs. Students go on tours of five modes of transportation that serve the Twin Ports of Duluth-Superior which is as a Midwest transportation hub. Students with faculty also travel frequently to the Twin Cities for tours of distribution centers, warehouses and transportation facilities.

At UW-Superior, you'll learn the business of efficiently moving people, information and money. You will also lean business techniques, management skills and leadership. Through a major in transportation and logistics at UW-Superior, you will: Gain a sound background in business while specializing in your desired form of transportation or logistics

- Earn real-world experience
- Learn to plan, organize, and control procurement, manufacturing, logistics and supply chain management
- Gain an understanding of conducting business in different cultures
- Enhance your decision-making skills

Students start with a critical foundation of the liberal arts. They also take core business courses such as accounting, finance, marketing and business law. The T&L program build on these keystones with courses in; International Logistics, Transportation Economics, Environmental Law, Supply Chain Management, Economic Geography and three electives from our pool of six electives in the field. All T&L majors must also complete a two credit internship giving them with hands-on experience making them more valuable to companies upon graduation. This is a comprehensive major that does not require a minor but many students double major or take the Geographic Information Systems (GIS) minor along with the T&L degree.

T&L Student John Bergstrom says: "I'm really impressed with the program. There are so many opportunities. The instructors are great too, and I'm glad I joined the Transportation and Logistics Management program." To get even more out of his second major and make new connections, John recently joined the Transportation and Logistics Club. "It's a great group of people. There's a different mentality here," he said. "Everyone wants to be successful, and no one is ashamed of going after their dreams. They're not shy at all, and it's motivated me to do the same." The Transportation and Logistics (T&L) Student Club is very active and travels across the nation attending EXPOS, tour facilities and winning intercollegiate case study competitions.

UW-Superior offers a very high quality T&L Degree at an affordable price. In 2016-2017, nearly 30% of all Transportation & Logistics Students were awarded some type of scholarship.

Graduates have tremendous job opportunities and upward mobility. Read more about the program, the students, the student club and scholarship opportunities by going to the UW-Superior Website www.uwsuper.edu and search the word transportation. You can hear from students, see a video about the program and get more details about a very special opportunity. What can you do that does not incorporate transportation?

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