Fort Wayne ENGINEERS' Club

Engineers' News **February 2017** **Vol. LXXIV No. 5**

www.FortWayneEngineersClub.org

Find us on

MS & HS Bridge Competition Volunteers Needed

FWEC and Northeast Indiana DiscoverE Committee member Rick Slayback is looking for volunteers to assist with the Middle School and High School bridge competitions.
The Middle School Bridge Competition will be held at Concordia Lutheran High School on Saturday February 18th, 2017.
The High School Bridge Competition will be held in the IPFW Engineering, Technology and Computer Science Lobby on Saturday February 25th, 2017.
Please contact Rick Slayback at raslayback@aol.com if you can assist.

February Tour

Jensen Cabinet Inc
205 Murray St, Fort Wayne, IN 46803
Tuesday February 21st at 7:00 PM

February's tour takes us to Jensen Cabinet Inc at 205 Murray Street near Calhoun. Join us on Tuesday February 21st at 7:00 PM during National Engineer's Week to find out how Jensen designs and manufactures airport ticketing terminals, gate desks and more. There is a great chance you have seen their work around the country and had no idea it was made here in your backyard. They are masters at wood, stainless steel, granite, charging stations and more. Being on this tour will give you so much more to admire next time your flight is cancelled! Check in by 7 PM so you don't miss this flight up 3 stories in downtown.

Northeast Indiana DiscoverE

Engineers Week Banquet

The Northeast Indiana DiscoverE Engineers Week banquet will be held on Saturday February 25th, 2017 at Parkview Field's Lincoln Financial Event Center.
6:00 PM – Doors open

6:45 PM – Dinner served

The Northeast Indiana DiscoverE banquet features:

- Master of Ceremonies – Sandy Thompson
- Featured speaker – Kelly Bajic, PE from the City of Fort Wayne regarding the Tunnel Works Program
- Academic Award presentations to engineering students
- IPFW Bridge Building Contest highlights
- Future City program highlights
- Student/Engineer visitation program highlights

Dinner Entree Selections:
Entrees include a choice of a cup of soup or a salad, vegetable, starch, rolls and butter.

- SLICED ROAST BEEF
  - All beef served medium-rare to medium
- TUSCAN CHICKEN BREAST
  - Broiled chicken breast marinated in a red pepper, garlic and herb vinaigrette; served in a light chicken broth reduction
- GRILLED PEPPER WITH MEDITERRANEAN QUINOA
  - Onions and peppers sautéed then slow simmered with quinoa and tomatoes. Served in a broiled red pepper bell on a nest of lemon-basil buckwheat noodles
- BUTTERNUT SQUASH LASAGNA
  - Butternut squash with bechamel sauce

Purchase Tickets:
Banquet tickets are $30 per person. **RSVP deadline is Friday February 17th.**

Reservations are made to Nancy Burkey (nancy@rlguimont.com or (260) 422-7081)

Please include:

- Name and organization or company
- Meal entree selection
- Payment checks (payable to Northeast Indiana DiscoverE) can be mailed:
  - R.L. Guimont Co., Inc.
  - Attention: Nancy Burkey
  - 923 Spring St.
  - Fort Wayne IN 46808

March Tour

Peridot Inc
14508 Bruick Drive, Hoagland, IN 46745
Thursday March 30th at 7:00 PM

If 3D printing is going to take over the world, the transformation is already in full swing in Hoagland! Our March tour will be of Peridot Inc at 14508 Bruick Drive in downtown Hoagland starting at 7 PM on Thursday March 30th. These engineers and craftsmen can not only create models in several different 3D printing technologies, they can help you turn them into castings, molds and so much more. Watching a part print may be fascinating, but seeing what Peridot can create for actual working parts is nothing short of amazing. They are looking forward to showing off their recently expanded facilities. If your company is looking for prototyping support and expertise, don't miss this tour.

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Please visit us at WWW.WILCOXENV.COM or contact Derek Faulk in Fort Wayne at (260) 422-0775

FY17 Membership Year FWEC Board

President

- Dave Schaller (260) 486-7610

Vice President

- Bharat Rajghatta (260) 615-1869

Treasurer & Resident Agent

- Ryan Stark (260) 456-0809

Secretary

- Elizabeth Garr (260) 486-0158

1st Year Board Members

- Rod Vargo (260) 416-0986
- Craig Welch (260) 241-5138

2nd Year Board Members

- Marna Renteria (260) 744-3407
- Ellsworth Smith (260) 637-6070

3rd Year Board Members

- John Magsam (260) 482-2843
- Jack Phlipot (260) 438-0258

Northeast Indiana DiscoverE Committee Chair

- Devin Snowberger (260) 450-1098

Board positions are crucial to the planning of tours and events for the FWEC. Please consult the FWEC constitution or contact us at info@fortwayneengineersclub.org for information on specific duties on board positions.

New FWEC Members

Welcome Associate Member Steven Martz.

FWEC Board Meetings

Fort Wayne Engineers' Club board meetings are open to all FWEC members. The next FWEC board meeting will be Tuesday March 7th at 7:00 PM. Board meetings are held on the Indiana Tech campus in the Academic Center in room ACC-201.

FWEC Membership

The FWEC exists through funding of its membership. Please forward your copy of the Engineers' News to prospective members and encourage their attendance at tours. Remember, the FWEC is the best deal in town, annual membership is $10. We offer free monthly tours September through May. Please be sure to recommend FWEC membership to your colleagues and friends.

Advertise in the Engineers' News

The FWEC provides advertising space within the Engineers' News. Advertisements are $10 per issue and limited to ½ page of content. For submissions please contact info@fortwayneengineersclub.org.

FWEC LinkedIn Group

LinkedIn

FWEC's LinkedIn site is gaining critical mass. Soon we will have 200 members in it, with most being engineers, but also a few HR leaders and recruiters. There are now some jobs posted there, and with your help more engineering related jobs can be posted there. Please let your HR team know it is ready to use. Engineers tend to know other engineers that are seeking new challenges so this could become a great tool for our area. And to celebrate National Engineer's Week, please invite all of our engineering team to connect with us on LinkedIn as well. We do NOT charge membership fees just to be part of our

LinkedIn group, but welcome you to join it and always know what FWEC is doing.

January Presentation History

North American Council for Freight Efficiency Presentation

FWEC Board Member Rod Vargo provides commentary on Dave Schaller's North American Council for Freight Efficiency Presentation.

On January 26, FWEC President Dave Schaller presented a summary of his association with the North American Council for Freight Efficiency (NACFE). Much information is available on their website TruckingEfficiency.org.

The national fleet average for diesel semi-trucks is approximately 5.8 mpg (2015 data). Fleet averages for progressive fleets are now cresting 7 MPG while the latest rucks off the production line can sometime beat 8 MPG. Engineering concept trucks are generating 11-13 mpg but include features not yet vetted in the real world and/or in conflict with regulations, such as exterior mirrors which may be outmoded. Mainline fleets represent over half the miles driven and tend to sell off equipment that is three years old. A 0.1 mpg difference can represent $1,000,000/year.

Tires and wheels are currently among the easiest remaining factors for improved efficiency of heavy duty trucks (Ed.: not cars and light trucks) at "reasonable" cost. Many of these items have already been adopted and proven on trucks which chronically operate at maximum gross weight, such as tankers and dry bulk haulers. These include aluminum rims, aluminum wheel (often called "brake") drums, lower resistance tires, swapping dual tires for various types of singles, and axles that can be raised or lowered as needed.

Automatic tire pressurization on trailers promises substantial mpg improvements. This can tap into existing air brake systems. But, the jumbled array of cost-conscious trailer purchasing and ownership arrangements make it difficult to implement, except through more Federal regulations.

Reduced regulations in Washington may be offset by compensating regulations from California's Air Resources Board, which strongly impacts choices made in nine other states. (Not mentioned by Dave, domestic and Mexican drivers swap features such as upgraded tires and rims to their equipment from generic trailer fleets. This grand larceny is exacerbated by any regulatory requirements which can somehow be swapped out.)

Another "easy" efficiency would be eliminating the second axle on the rear of many semi-tractors. It is never needed in many applications. But the resale value on these so-called "6 by 2's" is atrocious, so fleets typically continue to order 6 x 4 configurations. Many aftermarket owner-operators feel the extra road contact is needed. Many versions of a second axle are in use and evolving, including ones that automatically retract as needed. These can reduce tire expenses.

The easy and obvious gains in aerodynamics have been made. Mostly gone are flat grills, "coffin" hoods, and exterior air cleaners. A huge number of variables now matter including weather, snow and mud loading (particularly underside and fairings), speed, road surfaces, trailer type, and loading (including lack thereof). Twin exhaust stacks are evolving out of the air stream and into horizontal assemblies along the frame rail(s).

Apparent logic may not match results. Items such as "cattle" or "moose" guards bolted to the front of modern aerodynamic vehicles can sometimes increase mileage slightly (probably by displacing a somewhat static high pressure area in front of the vehicle). Roof fairings on the tractor need to be matched to the type of trailer.

Skirts under trailers are now routine and relatively foolproof. Trailer "tails" work well if the driver bothers with or remembers them (including before backing up), so automatic systems are being developed. If properly matched, skirting between cab and trailer provides better stability and less noise, in addition to fuel efficiency. There are efforts to close this cab-trailer gap further, including automatic folding screens. But, technologies are converging to eliminate the driver and cab sooner than most people realize.

Skilled drivers are increasingly hard to find. Expensive consequences due to inexperienced and/or inattentive drivers figured prominently in Dave's presentation. Automatic manual transmissions ("AMTs") had to rapidly displace classic double clutch shifting and manual transmissions. Fully automatic units will soon be the norm. Electronically controlled clutches and shifting are faster, more effective, more efficient, less maintenance, less fatiguing, and less distracting.

Fully autonomous (effectively driver-less) trucks have already operated (since mid 2015, per this writer's contacts at the time) and are legal in Nevada. More states are gradually

modernizing regulations and permissible research as technology evolves. Dave reported a recent on-road commercial delivery test in Colorado (at night on an interstate essentially emptied by many police escorts) during which the driver, for potential publicity effect, rode in the sleeper. Existing technology has already proven much safer than human drivers.

For worker safety reasons, driver-less "crash" trucks are now available. "Crash" trucks follow behind road crews to protect them from oncoming motorists. They can now automatically follow electronic "breadcrumbs" transmitted from crewed vehicle(s). Dave and the audience could think of at least two fully automated special-purpose passenger shuttle systems. Driver-less quarry vehicles and farm tractors are in use. (Not mentioned, the only discontinued system seems to be ore trains across 300 miles of uninhabited Australian outback due to difficulty processing whether distant objects and reflections could be disregarded.)

Development of driver-less trucks is being "driven" in part by "platooning", which is two or three trucks separated by 20-30 feet. Using two trucks, the lead vehicle experiences a 4% fuel improvement (see hull velocity or bicycle drafting for explanations) and the trailing rig a 10% gain. On road experiments are currently done with human(s) steering (at least in the rear truck) but otherwise automated with both trucks communicating electronically.

Current limits to platooning include regulations, a need for identical tractors and electronic protocols, lack of a system for trucks to meet along similar route segments, and the rigs must have various high performance brake features. Addressing these limitations should be workable given the safety, environmental, and cost advantages.

Eliminating the cab would increase load capacities. Most full load deliveries already do not require a delivery driver, so could probably be handled much like military drones are flown worldwide. Eliminating conventional drivers will probably allow 24/7 scheduling, allow virtually nonstop travel, double the potential productivity of a truck unit, and increase use of existing roads at night.

Without drivers, it would be far easier to schedule heavy trucks to avoid commuter traffic. Average fleet miles per truck each year have fallen from about 120,000 to 100,000 over the last ten years. The most significant factors are traffic congestion and road conditions. Semi-tractors are typically designed for 1.2 million miles, but there are huge variations in use patterns. Modern communications and "the cloud" are reducing the number of miles without loads, such as the Walmart fleet returning from stores.

Decades of trial and error have not eliminated a need to idle engines during mandatory driver rest periods. Drivers often cannot sleep without the engine drowning out constant

activity around them, or simply cannot sleep without the reassuring vibration and purr. Various schemes have shown that idling the engine often remains the best way to provide heat, air conditioning, and/or electricity. Alternative ideas come and go, including thermostats that start and stop the engine, small auxiliary motors, banks of batteries, and more. Going driver-less will resolve this, and reduce the vast, expensive, and environmentally problematic shortage of semi-truck rest areas.

Choosing a very white tractor color (particularly the roof) can reduce heat loading in the southwest by 20%. Choice of color provides little or no heat value in cold weather.

Between 100-200 programmable engine parameters are commonly accessible in on-board computers or through "the cloud" on newer semi-tractors. Relatively few are used, but the potential is 3-8% fuel savings and so a learning process is underway. These systems make a vast amount of data available for research and engineering.

Improved versions of low viscosity motor oils became available over the last three years with no engine failures or net cost issues so far. Viscositities as low as 30 weight suggest 1.5% increases in fuel efficiency.

Modern ideas such as regenerative braking and exhaust heat recovery can result in downsides such as loss of available payload, loss of payload space, excessive maintenance, environmental costs, purchase/financing expense, and reduced resale value.

Adoption of fuel efficient technology has become insensitive to fuel prices. Fuel and maintenance savings allow better compensation and/or training to help offset the shortage of experienced and reliable drivers. Also, fleet operators find fuel prices are sufficiently high and unpredictable enough to justify constant incremental attempts at improvement, purchasing roughly five similar new trucks at a time for data purposes. Since most fleets sell vehicles after three years, this process often moves the overall industry ahead.

There is another potential phenomenon where operators buy many units prior to regulatory deadlines, causing boom-bust cycles. The industry and regulators discuss and try to minimize these swings.

One of Dave's recurring insights is that state transportation system managers are chronically being asked to plan ten to thirty years ahead, which is largely impossible. For instance, the iPhone revolutionized just about everything, but was introduced slightly less than ten years ago.

Fort Wayne Astronomical Society

Fort Wayne Astronomical Society, Inc.
P.O. BOX 11093 • FORT WAYNE, IN 46855 • USA
1959
FortWayneAstronomicalSociety.com

The Fort Wayne Astronomical Society will have their next general meeting Tuesday February 21st, 7:30 PM at Aboite Township Community Room, 11321 Aboite Center Rd. Fort Wayne, IN 46814.

Hi-Seas Team Completes 8-Month "Mars" Isolation Mission

Mission Complete! Ron's' will report on the Hi-Seas Mars Simulated Isolation Mission. His individual research interest, while on the HI-SEAS mission was focus on exploring the cognitive, personality and psychological characteristics of the crew and their relationship to adjustment, group dynamics and mission success.

Ron will also introduce us the the Tuson Amateur Astronomy Association ,(TAAA) and their plans for a 40 inch telescope.

Dr. Ron Williams was born and raised in Bloomington Indiana. He received his BA degrees in Psychology and Chemistry at Indiana University Bloomington in 1976. He received his MA degree in Experimental Psychology with a concentration in gerontological psychology from the University of Notre Dame and his PhD in Neuropsychology from Ball State University in Muncie, Indiana.

Northeast Indiana Chapter Project Management Institute

NEIC PMI® NORTHEAST INDIANA CHAPTER

The Northeast Indiana Chapter of the Project Management Institute will have its next meeting on February 22nd.

'Agile at Swiss Re'

On February 22, NEIC PMI presents "Agile at Swiss Re", featuring Peggy Willman, who will use telepresence from Swiss Re's Kansas City office to show how SharePoint and Agile are used together to support project management. Dale Vollenweider will share how Atlassian's JIRA tool was used to introduce agile to in a multi-team, global environment.

Dinner includes pizza (including veggie), salad, soft drinks and beer. If you have special dietary requirements, please describe them in the reservation and NEIC PMI will try to accommodate. You are also welcome to bring your own meal to the event. Please note the special time for the event 5-7 pm and event location, Swiss Re, 1670 Magnavox Way. First time visitors are welcome as our guest to this event.

- NEIC chapter members: dinner and speaker-$20, speaker only-free
- PMI Hardship Provision or PMI Student Membership-$10
- Non-members: Dinner and speaker-$30, Speaker only-$10
- Register Now; Pay now with credit card only; pay at door option is no longer available

Biography: Peggy Willman PMP:
Peggy began at Swiss Re in 2003 and her current role is a Consultant. She received her PMP in 2012, is a Toastmasters Competent Communicator and has a Prosci Change Management certification. Her experience includes Process Consulting, Business Analysis, as well as Project Management. She takes a keen interest in software solutions. Peggy developed a SharePoint based project support structure and is located in Swiss Re's Kansas City office.

Biography: Dale Vollenweider, FSA, MAAA, PMP
During his 35-year career, Dale worked as an actuary, profit center manager, PMO manager, and now Head of Service Management & Processes for Swiss Re's Global IT. His bachelor's degree is in finance and his masters certificate is in project management. He implemented a hybrid agile methodology for the Document Management and Collaboration department, which is responsible for Swiss Re's Global SharePoint platform design and support. Dale has been a PMI and chapter member since 2001. He has held various chapter roles including Director of Programs, VP Finance and is currently chapter President.

City of Fort Wayne Internship Opportunities

Fort Wayne City Utilities has several engineering internships advertised for college Sophomores, Juniors, or Seniors at www.cityoffortwayne.org/jobs-with-the-city.html (find them more easily by selecting "intern" in the drop-down box labeled "Category"). Open until filled.

Engineering Technician Intern
Intern shall work under the direct supervision of an engineer technician within the City of Fort Wayne City Utilities Engineering Departments. The technical areas for which the candidate will provide assistance will include civil engineering...

Electrical Engineering/Computer Sciences Intern
Intern shall work under the direct supervision of an engineer within the City of Fort Wayne City Utilities Engineering Departments. The technical areas for which student will provide assistance will include electrical engineering...

Civil Engineering Intern
Intern will have the opportunity to work under the direct supervision of an engineer within the City of Fort Wayne City Utilities Engineering Departments. This position will work closely with a diverse office group of professional engineers...

Mechanical Engineering Intern
Intern will have the opportunity to work under the direct supervision of an engineer within the City of Fort Wayne City Utilities Engineering Departments. This position will work closely with a diverse office group of professional engineers....

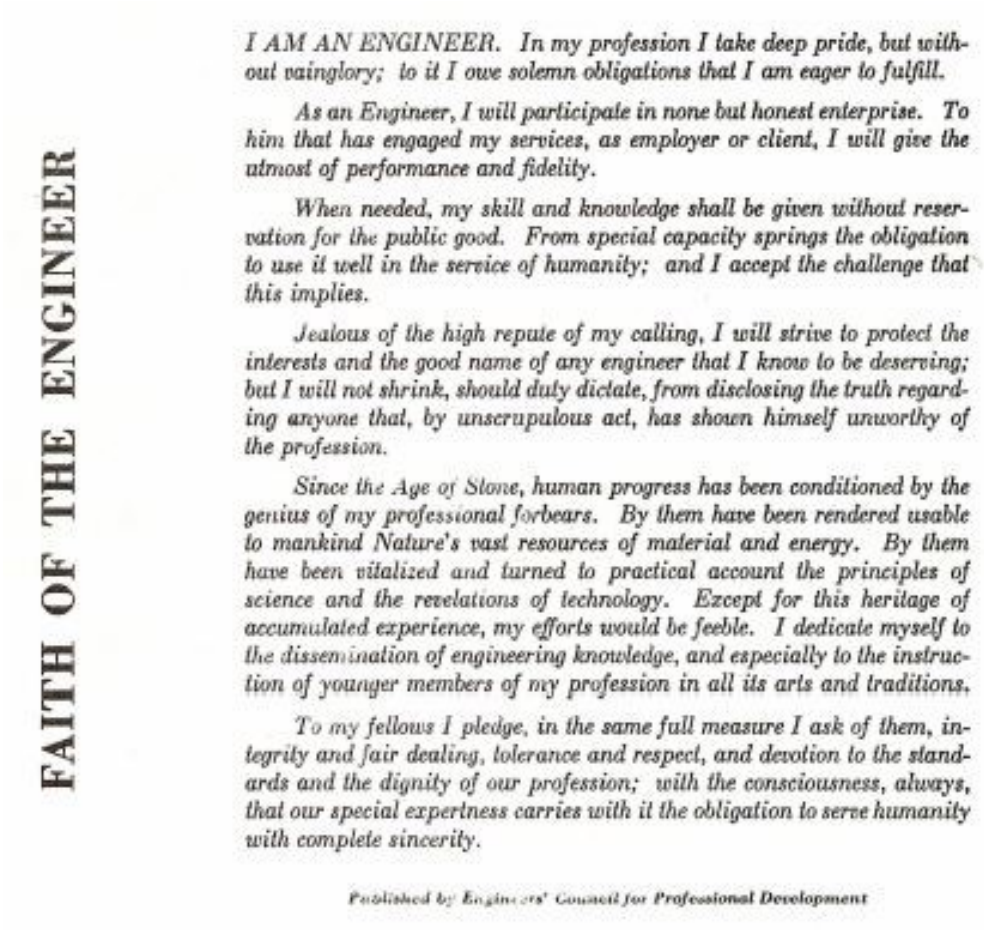
Allen County Soil & Water Conservation District Annual Meeting

Annual meeting topic expected to be related to local geology associated with engineering in our area associated with the City of Fort Wayne Tunnel Works Program.

Engineers' News Past

The FWEC has a significant history; Treasurer Ryan Stark and his wife were able to find past Engineers News documents dating back to 1938! Here is an excerpt of the past newsletter (a scanned copy of the entire newsletter is available through the FWEC website):

February 1964



FAITH OF THE ENGINEER

I AM AN ENGINEER. In my profession I take deep pride, but without vainglory; to it I owe solemn obligations that I am eager to fulfill.

As an Engineer, I will participate in none but honest enterprise. To him that has engaged my services, as employer or client, I will give the utmost of performance and fidelity.

When needed, my skill and knowledge shall be given without reservation for the public good. From special capacity springs the obligation to use it well in the service of humanity; and I accept the challenge that this implies.

Jealous of the high repute of my calling, I will strive to protect the interests and the good name of any engineer that I know to be deserving; but I will not shrink, should duty dictate, from disclosing the truth regarding anyone that, by unscrupulous act, has shown himself unworthy of the profession.

Since the Age of Stone, human progress has been conditioned by the genius of my professional forbears. By them have been rendered usable to mankind Nature's vast resources of material and energy. By them have been vitalized and turned to practical account the principles of science and the revelations of technology. Except for this heritage of accumulated experience, my efforts would be feeble. I dedicate myself to the dissemination of engineering knowledge, and especially to the instruction of younger members of my profession in all its arts and traditions.

To my fellows I pledge, in the same full measure I ask of them, integrity and fair dealing, tolerance and respect, and devotion to the standards and the dignity of our profession; with the consciousness, always, that our special expertness carries with it the obligation to serve humanity with complete sincerity.

Published by Engineers' Council for Professional Development
