



Engineers' News

April 2021

Vol. 83 No. 7

www.FortWayneEngineersClub.org



Find us on 

April Presentation

**Northeastern Indiana Regional Coordinating Council (NIRCC)
Presentation
by Dan Avery**

Where: The Omni-Room in Citizens Square

Date: April 29, 2021

Time: 6:30 pm

Location: 200 East Berry St Fort Wayne, IN 46804

This is an opportunity to literally participate in the region's planning of roads, highways, and trails. Join FWEC for interaction with the infrastructure that plans the region's infrastructure. Parking is free in the parking lot on the north side of the building. For more info about NIRCC, check out their website - <https://www.nircc.com/> Masks may be required to enter Citizens Square.

March Presentation Summary

by Rod Vargo

Current Semi-Truck Engineering and Design

Dave Schaller, North American Council on Freight Efficiency (www.nacfe.org) and former FWEC President.

A tsunami of technology change is converging on transportation. At least 30 relatively new businesses, in addition to traditional manufacturers, are working on alternative versions of semi-truck tractors. Many other entrants are developing or already marketing concepts such as improved battery charging, alternative power sources including various "colors" of hydrogen generation, and a host of other disruptive trends. Using an analogy to cell phone development, Dave characterizes transportation's current moment in time as the "bag-phone" phase, when most start-up businesses will fail and technologies will rapidly leap through total replacement cycles.

NACFE is a nonprofit organized ten years ago to promote the adoption of aerodynamic, power train, automation, and other features already in existence (FWEC newsletter, February 2017). Those are still important, but NACFE changed focus to help people inside and outside the logistics industry understand and plan through a quick series of waves already upon us. A remarkable number of corporate sponsors support and/or cooperate with the organization's research and outreach, so most services are free.

For more, click [here](#) to read the full summary

Welcome New Members

Mark William Nelson - Electrical Engineer at Raytheon
and
Annie Nelson - Structural Engineer at Needham DBS

We look forward to seeing you at future tours and presentations.

A plea to club members for help running the club

The Engineers' Club has been in continual operation since 1935. Very few clubs like ours have been around for this long, though we are currently in need of help. The club has openings for the officer positions of Vice President and Treasurer (in training), as well as First-Year Board Member, and newsletter editor. These positions do not require much time, but they are necessary to keeping the club up and running. If you have enjoyed attending our tours in the past and would like to see the club continue to operate, please consider volunteering your time. Also, please feel free to pass on our

newsletters to anyone who might be interested in joining the club. Friends and co-workers are generally always welcome at our tours and presentations, and being an engineer isn't even a requirement.

General Info

Fort Wayne Engineers Club dues are \$0. Donations are welcome but strictly voluntary. In recent years, club funds have helped support Discover-E, the Regional Science and Engineering Fair, annual bridge building contests in schools, academic awards, networking events, mentoring, our website, and facilitating free tours. Please see FortWayneEngineersClub.org, LinkedIn, or Facebook for updates on current Club activities, other news, and/or prior newsletters.

Those participating in activities through FWEC and our hosts does so strictly at their own risk, including disease exposures. Participation in club events is voluntary, free, nonprofit, and solely for the benefit of participants and the community at large. Anyone with an interest may participate unless restrictions are specified for specific events, such as minimum age or minimum safety attire.

Local Opportunities

Experimental Aircraft Association Chapter 2

The Experimental Aircraft Association's Chapter 2 is still active. Check the [EAA-2 website](#) for current information!

Upcomming events:

- May 8, EAA Young Eagles - [free airplane flights](#) for 8-17 year-olds from Smith Field's historic hangar, 9 am to 1 pm.
- June 12, EAA Young Eagles - [free airplane flights](#) for 8-17 year-olds from Smith Field's historic hangar, 9 am to 1 pm.
- July 26-August 1, a conventional AirVenture Oshkosh 2021 - This is the largest air show in the world and should be on your bucket list.
- Tentative additional dates for EAA Young Eagles free airplane flights from Smith Field are August 14 and September 11.

TekVenture

See TekVenture.org, a 501(c)3.

Interested in hosting a tour?

Contact us at info@fortwayneengineersclub.org

FWEC Board Meetings

The FWEC board meets eight times a year to plan and organize tours for our members. These meetings are open for anyone to attend. We are always looking for new members to join our team! If you are interested in being a board member please attend our next board meeting or contact us at info@fortwayneengineersclub.org.

Next Meeting

Date: Tuesday, May 4th, 2021

Time: 7:00 pm

Location: Blackstone Laboratories 502 E Pettit Ave, Fort Wayne, IN 46806

FWEC roster for FY2020-2021

President: Nate Berndt

Vice President: TBD

Immediate Past President: John Magsam

Secretary: Marna Renteria

Treasurer: Ryan Stark

Treasurer-Trainee: TBD

First-year Board Members: Dave Gordon, TBD

Second-year Board Member: John Renie, Craig Welch

Third-year Board Member: Rob Cisz, Bert Spellman

Editor of Engineer News: TBD

Membership and Contact Chair: Dave Schaller

Northeast Indiana DiscoverE Chair: TBD

March Tour Summary Continued

The NACFE [website](#), notably the "Run On Less" sections, provides a wealth of details. In cooperation with real-world corporate operations, NACFE's research concludes that medium-range trucking (less than 1,000 miles per day) will lead the way in experimentation and fleet evolution. Medium range is a very large portion of trucking

and typically involves a vehicle leaving and returning to a facility each day. The number of miles driven per day far exceeds operations such as school buses and public transportation in the same locations as the trucking. Battery-based electric vehicles (BEVs) will probably work well in urban regions and largely displace conventional Class 3-6 trucks during 2025-2030. As an example of the complexity, many municipalities still prohibit overnight deliveries because traditional diesel vehicles used to be noisy and smelly, but even diesels have changed.

Regenerative braking uses an electric motor in a vehicle that also acts as a generator, which helps recharge batteries and assist braking. This is inherently part of BEV and hybrid systems. (Ed.: The motor may be merely an auxiliary mounted somewhere along a fossil fuel drive train.)

Dave feels the light vehicle industry (pickups, SUVs, passenger cars, vans) is converting to BEVs and hybrids without the public being fully aware of it. Electrical conduits in garages will likely be required in new construction within four years, ready for whatever charging station matches a particular vehicle.)

A repeating theme was the sheer amount of power generation that will be needed to replace current fossil fuels or, said another way, the sheer amount of power available from modern fossil fuels. Most utilities could not fully supply their own needs if converting their light vehicle fleets to BEVs. Government administrators seem equally unaware and continue to reduce overall generation capacity. Many seem unaware these fleets must also operate in disaster areas for weeks.

An entire manufacturing or food processing facility often uses less electricity than its trucking fleet would need. Therefore, the existing supply grid usually could not support the demand, even if the generating capacity were in place. As FWEC learned from tours with AEP, the sheer amount of metals and transformers required in grid expansions is shocking, even if generating capacity is nearby. (Ed.: Expenditures for AEP's 2013-2015 upgrade cycle in Allen County alone were a billion dollars each year, and a recent conversation indicates at least a half-billion/year since in our immediate area.)

NACFE identified 75 corporate fleet locations around the nation willing to lead the way with BEV conversions. The utilities could approve only 5 for implementation.

Conversions to alternative power will happen rapidly over this decade. It will be expensive and many installations will rapidly become obsolete, much like the cell phone technologies alluded to earlier.

Since trucking facilities tend to be in clusters, it is likely that only the first facility to electrify could get sufficient power. Or, it might be more cost-effective to abandon

existing locations.

Refrigerated semi-trailers may convert to liquid nitrogen. It is also possible to power truck engines using the expansion force from nitrogen liquid to gas.

Trailers are now routinely tracked by GPS, powered from small solar panels on their roofs. This has greatly improved logistics and reduced the number of trailers needed. One tractor is typically in operation for every three trailers.

NACFE projects conversion of long-haul fleets from diesel mostly during 2030-2040 as technologies evolve from medium range hauling. Hydrogen will probably play a long-haul role where priorities must include cargo payload, mountainous terrain, relatively rapid refueling, and/or long distance range.

Hydrogen can be produced from various processes. It is typically used in hybrid electric vehicles where hydrogen fuel cells generate electricity and are matched to battery capacity, depending on application. It may be more important to promote use of hydrogen now and decide later on the best means of generating hydrogen as those technologies evolve.

Self-driving vehicles have been successful for repetitive operations on restricted roadways. Examples include shuttle buses at airports, carting ore or coal inside mines, and moving cargo containers around ports and rail depots. Other uses of self-driving include "crash" trucks which follow highway crews for protection against oncoming traffic and garbage trucks in Europe which follow workers emptying trash cans in neighborhoods. Over-the-open-road uses have proven problematic, such as incidents when an automated truck unexpectedly needed to back up. It may be possible to "drive" long-haul trucks from remote locations using drones immediately over the truck. Ever fewer people are willing to endure existing long-haul working conditions and expensive trucks/cargo are parked much of each day while drivers take required rest breaks.

Dan Avery of NIRCC asked what INDOT might be doing to better facilitate the oncoming changes. Dave responded that the long-term record is government has trouble enough just maintaining pavement and bridges. Perhaps the primary additional challenge should be maintaining obvious and coherent paint markings, because even the adaptive cruise control in his current passenger vehicle depends on it. Successful trucking advances are increasingly using adaptive cruise controls.

Editorial comments may provide the best summary. Ralph Nader appeared on Johnny Carson's Tonight Show, among other venues, in 1976 stating unequivocally that the United States could convert entirely to wind generators by 1986 if only utility companies would allow it. The show is still rebroadcast to this day. He seems to have had no clue

of the complexities of DC versus AC electricity. I myself was upset that Utilities promptly showed up to remove the primitive wind-driven units friends had wired into their fuse boxes. Personal computers were only five years away, but off our "radar" even in graduate school. My point is we are in for deep Future Shocks over the next decade. A particularly concern is policy decisions have made mass evacuations increasingly impossible over the last twenty years, while the necessity to flee in some cases has progressively increased. Speaking professionally, virtually all of these incidents were due to policy decisions. Change must happen, but research and information such as Dave's exceptional presentation and NACFE itself are badly needed.

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.

Copyright © 2021 Fort Wayne Engineers Club, All rights reserved.

[unsubscribe from this list](#) [update subscription preferences](#)

