Fort Wayne ENGINEERS' Club

Engineers' News **April 2023** **Vol. 85 No. 7**

www.FortWayneEngineersClub.org

April Tour

HARRIS

When: Thursday, April 27th @ 6:00 PM
Address: 1111 N. Hadley Rd., Fort Wayne IN 46804
Website: https://www.harrisboats.com/
Info: Founded in 1956, Harris is a leader in the pontoon boat industry. They currently offer an impressive array of models. Their basic model still retains the classic good looks you'd expect, but the top of the line Crowne model is truly a work of art, and with available twin 400 HP Mercury outboards, it's sure to get you around the lake in style. This tour will include the making of the tubes themselves, as well as a walk down the line where you will see step by step how the boats are assembled and

outfitted.

* Please note this is a factory setting. Please come prepared with safety glasses and ear plugs if you can provide. Also, closed toe shoes or boots are necessary.

March Tour Summary

This was a stunning tour for most of us in one way or another, especially those who had not been on a farm for years. Kent Kiefer hosted us at his shop and equipment shed which currently supports 800 acres of primarily corn and soybeans northwest of Decatur, IN. Our attendance was strong despite a windy cold rain and somewhat longer than usual drive. Kent was born and raised farming in the area, earned an electrical engineering degree, and continued to farm a reduced area while managing projects which created a succession of weather satellites. Combining outside work and farming is normal in his region, figuring up to 200 acres is feasible part-time. (Ed.: A historical homestead family farm claim was 160 acres, including buildings, woodlot, and any public “roads”.)

An Eighth Grade education had been normal until the 1950’s, but high school and now college degrees have become almost essential. High levels of broad-based acumen across many disciplines is essential for survival. Yields of corn (for instance) were statistically flat at an average 26 bushels/acre (1.6 MT/ha) in the U.S. from 1886 to 1937, during which individual farms saved seed from their best performing plants for growing the next year. (Ed.: Meanwhile, improvements in equipment freed huge numbers of people for burgeoning nonfarm economies.) Then, yields increased an average 0.8 bu/a/year to about 45 bu/a in 1955 due to relatively simple breeding technologies, notably select multiple-crossed hybrids for different local conditions. After 1955, a steady 1.9 bu/a/yr average yield increase has prevailed to roughly 178 bu/a currently. Seeds and managements of inputs/resources have been radically improved every year, including increased compatibility with nature and neighbors. For instance, nutrients had been routinely tied up on soil particles or lost into the Maumee River drainage. Kent’s farmstead area and woods also used to be an automotive racetrack. (Ed.: During roughly

1950-1980, massive U.S. research funding targeted production, sustainability, and global adoption of programs which could support a projected 6 billion people around the year 2000, 12 billion by 2020, and 24 billion by 2034. We appear to be in Malthusian "topping out" phase around 8 billion, partly due to the programs.)

To read more, click here

Items of Note

FWEC member Rod Vargo is Chair of the 28 year-old and all-volunteer Utility Advisory Group, which formally advises Fort Wayne City Utilities and often City Council. Your comments are welcome at rodvargo@comcast.net

Volunteer Positions within the Club

Membership and Contact Chair: Open
Northeast Indiana DiscoverE Chair: Open

Vice President:

Club Vice President needed! It's time once again to ask club members to fill this vital spot in the club's leadership roster next year. The Vice President is generally in charge of arranging club tours, though this has traditionally been a team effort so it's not really all that much work. You would be expected to attend the monthly officers meeting (from the end of August until the end of May) and at the end of your one-year term, you would automatically become club president. The typical monthly time involved would be roughly 2 hours (including attending the officers meeting). If you enjoy the club and would like to see it continue to function, please consider volunteering for this spot.

Let us know if you're interested!

Volunteer

General Club 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 past newsletters.

Those participating in activities or hosting tours through FWEC do 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.

Interested in hosting a tour?

Contact us today!

Host a Tour

FWEC Roster for FY2022-2023

President: Nate Berndt
Vice President: Nathaniel Wisel
Secretary: Marna Renteria
Treasurer: John Magsam
First-year Board Members: Ryan Stark, Ed Woodward
Second-year Board Member: Mike Magsam, Rod Vargo
Third-year Board Member: Dave Gordon, Bert Spellman
Editor of Engineer News: Pending
Membership and Contact Chair: Open
Northeast Indiana DiscoverE Chair: Open

Vice President: Open for FY2023-2024

Job posting and resumes listed

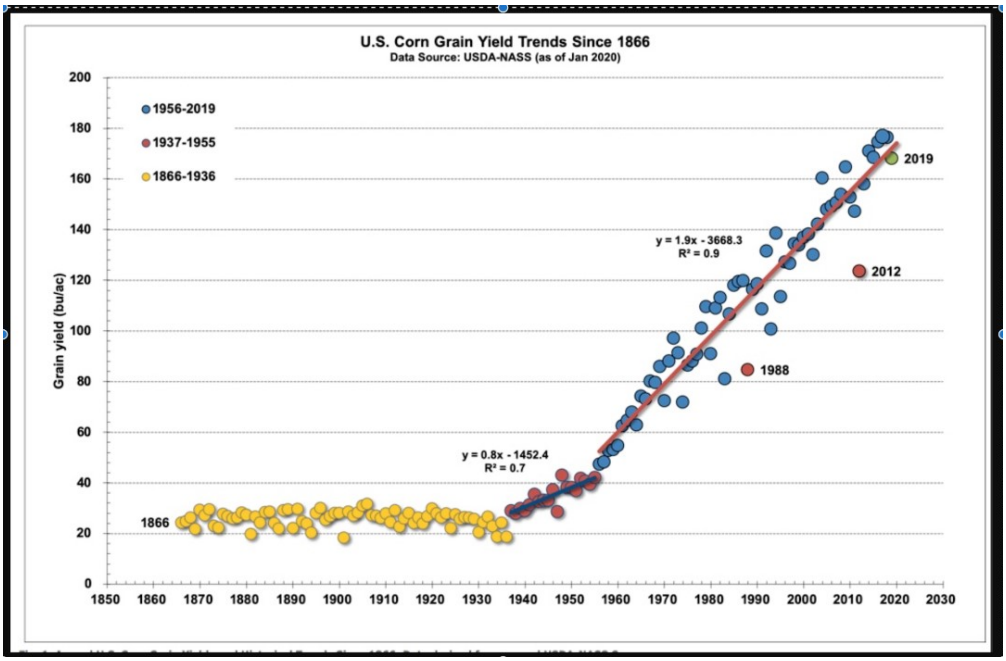
The club accepts both job openings from around the area, as well as resumes from those seeking employment. Please submit these to the following email address: Info@FortWayneEngineersClub.org

Advertise in the Engineers' News

The FWEC provides advertising space within the Engineers' News. Advertisements are only $10 per issue and limited to ½ page of content.

Advertise Your Business

March Tour Summary Continued



Our tour discussed that prices/acre of land suited for agriculture are approaching those for residential lots. Kent recalled passing on $2800/acre thirty years ago, adjoining his shop, versus $22,000/acre now. That is not unusual for much of the corn/soybean farmland in the central Midwest.

He outlined the progression over time of “smart” technologies in tractors and equipment. The initial step in 2023 might be choice of GPS system. The RTK type requires subscription(s) costing between $1,000-$10,000 for situations similar to his. It is accurate to <1 inch with similar reproducibility from year to year. The WAAS type is free, providing accuracy within 3 feet (1 meter) and reproducibility likely within 6 inches.

A subsequent step is building up overlying computer maps of a field or farm. Yield distribution in a field is the most common first step. Another would likely be soil sampling every so many feet in a grid across the field. Possible soil factors are many, and most are not static. Drainage could be another map (Ed.: such as soil reflectance at specific wavelengths using a drone).

Properly equipped equipment can then be computer controlled via wireless signals to steer clear of some areas, turn herbicide sprays on/off, stop planting seed, and much more. Self steering (“auto steer”) tractors radically reduce Kent’s fatigue and stress, freeing up energy to safely work hours longer and/or pay attention to details. Basic systems are also productive in avoiding errors, such as damage along field margins or drainage ways within fields during hectic peak work seasons. More complex systems can control individual spray nozzles or individual seed rows (on/off, or spray/seeding rates).

An older style of auto steer involves adding a gear under the steering wheel for a small electric motor to engage with. An iPad in the tractor can then wirelessly steer. Kent's system on an “older” (new by our standards) tractor was purchased used for $7,000. A new John Deere system (different quality) would have been five times more costly.

Modern systems of auto steer typically use designed-in hydraulics to control direction. The steering wheel itself might just control a highly sensitive hydraulic valve body or motor. Some newer equipment may have only a joy stick. Kent’s unit of this type was an awesome nearly two stories high and considered medium-range in power. A 2015 model, it eclipsed anything most of us were expecting. The enclosed cab reflected Kent’s words of overseeing operations, not unlike a central monitoring station in modern municipal and commercial facilities. The suspension seat had an integral control console that moved with the seat’s occupant. We were all impressed by the large, quiet, and clean DEF exhaust system. A common side conversation was that horsepower originally required evermore massive motors, but the past few decades evolved smaller engines that reliably produce generally 75% more power with far less fuel, pollution, and weight.

As outlined by Ken, stepwise progressions of “smart” technologies are being driven by economic gains that increasingly coincide with environmental gains. Reduced use of animal power, hay acreage, manure, and more resulted in reduced organic matter, soil health, and water quality. (Ed.: Breeding programs also radically reduced unneeded vegetative growth that competed with grain yield and quality.) Improved conservation of organic matter from crops and potential “cover crops" expanded since the 1980’s but introduced other economic and environmental problems. Overlaid computer maps and automated equipment can be enabled to provide explicit continuously-variable control of nutrient types, seeding conditions, herbicide uses, and rates along each seed row. Depending on local needs, a host of electric motors or control valves may be retrofitted to each planter box assembly or spray boom nozzle, and controlled wirelessly with basic electronics. It is now feasible and often beneficial to seed secondary cover plants into an existing crop. He was clear that use of Roundup is inherent in correctly timed conversion of cover plants to organic matter for tilth, moisture, and nutrient retention. Nutrients and soil are kept available, backed up by catch basins to monitor for and capture/reuse losses. The direct and indirect economic gains (savings and improved yields) typically free up money for further improvements, debt management, and adequate farm income. (Ed.: Purposes and types of cover crops are complex, may soon create overlapping crop cycles.)

There seem to be many barely tapped opportunities, further decades of learning and new technology ahead. An imminent project is adding certain electric motors for each seed row on the corn planter, adjusting almost continuously for seed rate, depth, and final tamping pressure. The planter already has now-standard separate nutrient feeds for in the seed furrow and each side of the furrow, but even those could be made “smarter". Production of food and fiber inherently removes nutrients from the soil system that need replenishment. Midwest farms now have to add sulfur since it no longer arrives as air pollution.

Kent indicated that non-GMO (genetically modified) crops no longer earn a premium price. GMO modified crops (not just corn) allow much better soil tilth through cover plants, and moisture management, among other benefits. Insecticide use is also reduced.

A nationwide low priority in the stepwise progression of technology tends to be plant diseases. That is because the impacts are mostly invisible, such as Kent’s corn is analyzed for vomitoxin. We discussed plant diseases as massively influential in yield, quality, crop value, and potential toxins. Uses of grain evolve every year and increasingly generate millions of gallons of fuels and fats, with the solid remains going to feed, pet food, and closely regulated human higher-protein food. Most farms involve millions of dollars of expenses and financing per year. It is an

intensely demanding way of life.

THANK YOU to Kent and three generations of his family for the tour, wide ranging discussions, cookies, and tractor rides!
