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**Arkansas
Professional**

ENGINEER

Official Magazine of the American Council of Engineering Companies of Arkansas & the Arkansas Society of Professional Engineers



Emerging Leaders

Lowering a hoop together so that it remains parallel to the ground does not sound difficult. It is. But the exercise is one of many ways participants in the Emerging Leaders program learn communication and creative thinking skills. And, as Garver's Mary Kennedy, E.I., and Crafton Tull's Ben Kuddes, P.E., might attest, it's kind of fun.



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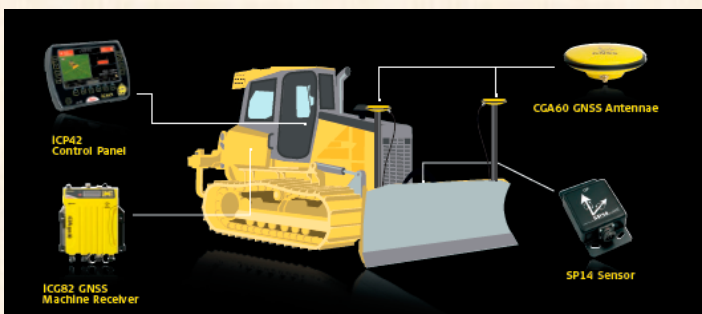


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Dee Brown
ACEC President

Much is happening at ACEC/Arkansas. Our focus this year continues to be on:

- Government Affairs
- Public Relations
- Membership

The most fascinating news that I have seen lately came directly from ACEC President Dave Raymond. Here is the statement sent out from him to the membership, and I highly encourage you to watch the video from C-SPAN that he included at the end of his statement.

"Passage of the new 5-year transportation bill was a big victory and testament to the strength of ACEC engagement. However, I want to share with you some critical behind-the-scenes wrangling over QBS and contracting out. ACEC killed amendments in committee that would have mandated both government insourcing and the repeal of QBS. Then on the floor of the House, the public employee unions again attempted unsuccessfully to defeat ACEC's provision encouraging DOTs to make greater use of the private sector. Our amendment also withstood separate challenges in the final conference committee with the Senate. I cannot exaggerate the importance of member contributions to ACEC/PAC and participation in the current ACEC contracting out studies offered in all our states. For evidence of what we're up against, check out this video of House debate prior to passage of our contracting out amendment:

<http://www.c-span.org/video/?c4558727/grace-napolitano>"

The video illustrates exactly why ACEC exists, which is to look out for the business of engineering, which impacts each one of us. When new people are elected all the time, many of whom do not understand the technical details of what we do or how our private practices properly interface as team members on government projects, then it us up to us to speak up. Qualifications-based selection is a prime example where many don't understand why it is needed. We have even seen this happen at a local level with several new engineering RFQs where fees and labor rates are requested. ACEC/Arkansas continues to be an advocate for QBS selection and maintaining state law.

For these reasons, we need to increase awareness, and we need to get more local engineering firms engaged in supporting ACEC/Arkansas. "WE NEED YOU," as the old Uncle Sam slogan goes.

In addition to the ACEC/A's government advocacy, its website and social media sites are better than ever so you can stay connected to all the latest news. Those include:

- ArkansasEngineers.org, whose content is better than ever.
- Our Facebook page, <https://www.facebook.com/American-Council-of-Engineering-Companies-of-Arkansas>
- Our Twitter handle, [@ACEC/Arkansas](https://twitter.com/ACEC/Arkansas), which is seeing in-

creased traffic for those who want to stay in touch.

Engineering Excellence Awards are coming up March 17 and showcase some of our best examples of engineering work. Please participate by submitting your project.

Finally, we are actively recruiting new members by explaining the benefits of ACEC/Arkansas through our significant government relations and political action. But as I said earlier, we cannot do this without you. So please join us in the effort.



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Defining engineering

In my first message as ASPE president, I addressed the need to implement the NSPE's newly adopted strategic plan, which includes three basic tenets: DEFINE. PROMOTE. PROTECT. Just as the NSPE uses its national platform to raise awareness, I plan to use this space to highlight each of these principles. The first step to successful implementation is to DEFINE what it means to be a P.E.



Brad Peterson
ASPE President

DEFINE Comprehensive Education. In an effort to increase college graduation rates, many states have lowered the minimum credits needed to obtain a bachelor's degree to 120 hours. While this is a positive step for many areas of study, it may limit the experience of applying technical engineering knowledge prior to graduation. In certain states, such as Arkansas, minimum credit requirements may be raised to the national average, which is currently 128 hours for a Bachelor's of Science in Engineering. However, this still leaves a large gap between the 150-credit-hour engineering degrees of the past.

The National Council of Examiners for Engineering and Surveying recently released an updated position statement, and NSPE is amending professional policy language addressing the education requirements as they pertain to engineering licensure. One of the primary initiatives is commonly referred to as "B.S.+30." If adopted, candidates seeking licensure would be required to obtain an accredited bachelor's degree in engineering as well as a minimum of 30 additional engineering-focused credit hours. Proponents believe this initiative would go a long way in defining the public's understanding of what it takes to become a licensed engineer, much like the almost universal understanding that doctors attend medical school and lawyers attend law school before being licensed to practice. A more primary goal of the B.S.+30 initiative is to ensure those sitting for P.E. exams are equipped with technical experience needed for practice. Regardless of which side of the B.S.+30 debate you sit on, the engineering community needs to recognize the difference between the technical knowledge necessary for graduation and the experience necessary to perform as a professional engineer.

DEFINE Code of Ethics/Order of the Engineer. Engineers have a significant impact on the public's safety and quality of life. Because of this, we are held to high ethical standards. The number one obligation listed under the Fundamental Canons in the official NSPE Code of Ethics is: Hold

paramount the safety, health, and welfare of the public. Professional licensure ensures all P.E.s are sworn to uphold a single code of ethics. Much like a comprehensive curriculum helps define the steps required to become licensed, a comprehensive code of ethics helps define the commitment engineers make to the public.

The Order of the Engineer follows the same premise as the Code of Ethics in that the goal of the Order is to "foster a spirit of pride and responsibility in the engineering profession, to bridge the gap between training and experience, and to present to the public a visible symbol identifying the engineer." And in the same way the Hippocratic Oath instills confidence in doctor-patient relationships, the Order of the Engineer instills confidence in the relationships between engineers and those we serve. Unlike the Code of Ethics, The Order of the Engineer Obligation is not limited to licensed individuals but is offered to engineering graduates at commencement and those working towards registration. We who have taken the Obligation of the Engineer share the common experience of wearing a stainless steel ring on the pinky finger of our working hand.

DEFINE Professional Development. Another tool in establishing a single, unified definition of what it means to be a P.E. is setting comprehensive requirements when it comes to professional development and continuing education. Once the public is aware of the education needed to pursue licensure, as well as the Code of Ethics to be honored upon receiving licensure, the topic becomes more about what is required to maintain the integrity that comes with the licensure. It is not enough to take the exams and honor the oaths if we are not also dedicated to keeping abreast of new technologies and advancements within our field. The more P.E.s that participate in speaking engagements and technical presentations, the greater the opportunity to establish the expertise so crucial to our industry. Through civic involvement, community outreach, and the requirement of continuing education units, we are able to more clearly define the importance of professional licensure as it pertains to the safety of the projects we undertake.

Clear, comprehensive requirements will go a long way in defining our profession to the public. By focusing on increased compulsory education and professional development, members of NSPE can ensure engineering retains its position among the most trusted professions.

In the News



FTN'S Linda Johnson, P.E., CFM, accepted the award from Conrad Battreal, the executive director of the Arkansas Floodplain Management Association.

FTN awarded for service to flood manager group

The Arkansas Floodplain Management Association recently honored FTN Associates, Ltd. for the firm's dedication and service to the organization. FTN has been an active member and supporter of AFMA for more than 15 years.

FTN's Linda Johnson, P.E., CFM, accepted the award from Conrad Battreal, the executive director of AFMA. Johnson is a senior project manager and principal water resources engineer.

AFMA was formed in 1996 to promote a common interest in flood damage abatement. It facilitates cooperation and the exchange of information among individuals, organizations, businesses, and government offices engaged in managing floodplains in Arkansas.

Crafton Tull's Hennelly named vice president

Crafton Tull has promoted Thomas Hennelly, P.E., to vice president.

Hennelly, who joined the Crafton Tull team as a project manager in January, will supervise the production of all private land development projects handled through the firm's Rogers location. He is a member of the United States Marine



Corps and remains actively involved in the American Society of Civil Engineers as well as the Society of American Military Engineers.



Hennelly

Founded in 1963, Crafton Tull has six offices, four of which are located in Arkansas and two in Oklahoma.

McAbee to lead environmental team at Garver

Garver's Bill McAbee has been promoted from environmental project manager to Environmental Team leader, where he will work to expand Garver's environmental capabilities.



McAbee

McAbee has experience in many areas of engineering. He has worked 13 years in transportation-related projects ranging from categorical exclusions to environmental impact statements and most recently a large planning and environmental linkage study. He has 17 years of experience completing wetlands delineations, permitting, and mitigation. He has more than 20 years of experience completing endangered species and biological surveys, including birds, fish, and mammals. He has managed many environmental projects and has been involved in almost all aspects involved in National Environmental Policy Act studies such as public involvement, noise, air, environmental justice, cultural resources, and hazardous materials. His experience also includes managing environmental laboratory testing.

AASHTO honors Garver for use of innovation

The American Association of State Highway and Transportation Officials (AASHTO) recently awarded the Arkansas State Highway and Transportation Department's \$13.23 million Don Tyson Parkway Interchange, designed by Garver, with an America's Transportation Award in the Best Use of Innovation category.

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Garver designed the project around a buried landfill under the interchange to ensure a stable roadway without excavation. It completed the project more than six months ahead of schedule and \$2.6 million under budget.

"Ultimately it's the American people who are the big winners," said John Cox, president of the American Association of State Highway and Transportation Officials, in a Garver press release. "These (winning) projects are a small example of how state DOTs are saving taxpayer dollars while building innovative projects to meet community needs."

In the release, Garver Project Manager Jeff Webb said, "This project is another example of how Garver utilizes its strong relationships with regulatory agencies to meet requirements and deliver a complex transportation project of this size ahead of schedule on a routine basis."

AASHTO represents state departments of transportation in 50 states, the District of Columbia, and Puerto Rico.



Garver opens office in Conway

Garver recently hosted citizens and city leaders at the grand opening of its new downtown office in Conway.

According to a Garver press release, Conway Mayor Tab Townsell noted the partnership the city and Garver have developed through recent projects.

Those projects include Cantrell Field, a new regional airport in Conway; Tupelo Bayou Wastewater Treatment Plant, which replaces the existing Stone Dam Treatment Plant and will serve the cen-

tral Arkansas metropolitan area for many years; and Baker-Wills Parkway.

"I commend Conway for adding value to the city through well-planned infrastructure," Garver President and CEO Dan Williams said. "The city made an investment in us when they trusted us with major infrastructure projects, and through our new presence in the downtown business community we are excited to be invested in the future of Conway."

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How the FAST Act was passed so fast

Early bipartisan support, continued bipartisan spirit helped highway bill travel

You're driving. It's 5:30 p.m.

Traffic is flowing through West Memphis so smoothly that you wonder if you're dreaming. And in fact, you are, because as everyone and their brother knows, West Memphis has been choked by construction since the dawn of time.

You can't blame all construction woes and transportation headaches on inconsistent funding and outdated legislation, either in West Memphis or in other parts of Arkansas. However, a modern, long-term federal highway bill does allow cities and states to begin needed projects and complete them much faster.

In 2005, Congress passed the \$286.4 billion "S.A.F.E.T.E.A.-L.U." act (the "LU" part of the title, officially an acronym for "a Legacy for Users," was actually made in homage to Lu Young, the wife of the then-Transportation Committee Chairman, Rep. Don Young). But SAFETEA-LU expired in 2009, and since that time Congress has passed 36 "patches" that continued to fund transportation programs but did not completely update policy to reflect modern needs.

MAP-21, the most substantive highway patch, passed in 2012 and was the first foray into the type of modern policy our infrastructure needed. After MAP-21, from concept to completion a highway project might take 10 years instead of 15, for example. However, MAP-21 was still relatively short-term: Funding lasted only 18 months.

All of us on the Transportation and Infrastructure Committee knew that, to truly address our nation's outdated infrastructure, we needed some serious policy updates. In order to give assurances to our general contractors and their employees, suppliers, and the jobs directly and indirectly supported by these projects, we also knew that the highway bill needed to be long term, preferably authorized for six years.

On November 5, the House passed its version of the highway bill, the STRR Act. On December 3, the House passed



By Rep. Rick Crawford
U.S. Congress

by a vote of 359-65 the FAST Act, the reconciled version of the STRR Act and the Senate bill.

As a member of the conference committee, I worked with 64 other conferees to resolve differences between the House and Senate versions of the bill. And then, on December 4, the president signed the FAST Act into law.

At this point, you should be asking yourself, how could Congress create and pass a five-year, fully funded highway bill (the sort of which we haven't produced since 2005) in a single month? These conferencing processes to resolve differences usually take months.

A few factors made quick passage possible.

Number one: During the creation of the House bill, the House Transportation Committee essentially, and thankfully, forced members to garner bipartisan support for any of their priorities.

For example, during the markup of the House bill, the committee did not seriously consider any amendments unless there were at least one Republican and one Democrat as cosponsors. If the amendment was partisan and offered during the markup, the chairman (Rep. Bill Shuster, R-Pennsylvania) and ranking member (Rep. Peter Defazio, D-Oregon) opposed it. Ensuring bipartisan support on the front end enabled quick passage during the conferencing process.

In addition, approximately two-thirds of the highway bill was already agreed to before the conferencing process with the Senate began. And for that, we must thank the staff of both Senate and House committees and the staff of individual members for their near round-the-clock work.

By the time the conferencing process started, we were already working with a bipartisan bill text, two-thirds of which had already been agreed to.

Certain personalities were also more willing to compromise and lent decades of experience to the process. Sen. Barbara Boxer, D-California, for instance, the Democratic ranking member of the Senate Committee on Environment and Public Works, is retiring at the end of her term and was more willing to work with the Republican majority to get another highway bill under her belt. Senator James Inhofe, R-Oklahoma, also an old hand and well versed in this process, used his expertise to guide the process.

All of these factors taken together created the unique situation where Congress was able to act with lightning speed (relatively speaking, of course) to create a landmark bill that will provide for the large majority of our nation's infrastructure needs until 2020. But the FAST Act's passage does not signal the end of our committee's work. For the next several months and even years, our committee will track the progress and implementation of the FAST act, and before we know it, it will once again be time to pass another highway bill.

Editor's note. Rep. Rick Crawford, R-Ark., has represented Arkansas' First District since his election in November 2010. He serves on the House Transportation & Infrastructure Committee and is a member of the subcommittees on Highway and Transit, Water Resources and Environment, and Economic Development. He also serves on the House Agriculture Committee and is chairman of the General Farm Commodities and Risk Management Subcommittee and is a member of the Nutrition Subcommittee.

Help us share engineering's story

Save these two dates, because they're really important to our engineering community: Jan. 22 and Feb. 21.

Jan. 22 is the state deadline for submitting an entry in the Engineering Excellence Awards. Feb. 21 is the start of the NSPE's Engineers Week.

What does one have to do with the other? The EEAs give you a chance to brag on your firm. Engineers Week helps all of us brag on the engineering profession. The display boards that we use during the EEAs are also displayed that week at the Capitol, where important people – legislators, agency leaders, and, most important, schoolchildren, see what our profession does.

One of the differences between engineering and architecture is that when an architect does something well, everyone notices, and, usually, when an engineer does something well, no one does. Engineers create the infrastructure and



Angie W. Cooper
Executive Director

mechanical processes that allow other people to shine.

That's admirable. The only problem is that things that are out of sight are often out of mind and are forgotten when others are sharing their stories. Legislators visit with teachers and students, and that's a good thing because it reminds them of

the importance of education. When a major crime occurs in their community, they feel it personally, reminding them of the importance of law enforcement and prisons. Health care is always on everyone's minds. But if policymakers drive across a bridge and it doesn't fall down, or if they flush and it goes away, they may be tempted to focus on other important state priorities that are more visible.

Engineers should be the champions of infrastructure, of research and development, of innovation and invention. Those things require dollars – sometimes, state dollars. Unlike other state priorities, we can't show off cute kids, or scary prison mug shots, or doctors in lab coats. What we can show off are the cool things we do – cool things that, by the way, make schools, prisons and hospitals possible.

So save those dates. Enter your firm's projects in the EEAs, and let's share engineering's story.

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EMERGING LEADERS. Members of this year's Emerging Leaders class engage in an exercise where they advance to a point about 25 feet away, the rule being that each person's feet must remain welded to the participants' standing beside them. Pictured are, from left, Aaron Smith, P.E., CEI; Matthew Vinyard, P.E., MCE; Corey Lucas, Pack Engineering; Mary Kennedy, E.I., Garver; Daniel George, P.E., B&F Engineering; Ben Kuddes, P.E. Crafton Tull; and Scott McReynolds, P.E., Garver.

Young pros build skills, relationships

Emerging Leaders program focuses on 'right-brain' communication, leadership traits

By **Steve Brawner**
Editor

Seven young engineers participating in the Emerging Leaders program are engaged in an activity that looks a lot easier than it is: Working together to slowly lower a plastic hoop perched on their fingertips so that it remains parallel to the ground at all times.

The exercise is called "helium hoop" for a reason: The hoop is so light that participants tend to want to lift it, not lower it. In fact, last year's Emerging Leaders kept lifting until their arms were outstretched before later getting the hang of it. It's one of several activities at a Challenge Quest course at Northwest Arkansas Community College in Bentonville

that helps the group develop teamwork and communication skills and build relationships.

Emerging Leaders is an annual class sponsored by ACEC/A and ASPE whose purpose is to train engineers and other design professionals in leadership, communication, and other so-called "right brain" skills. Other classes include risk reduction, public speaking, a senior leadership roundtable, Business 101, conflict resolution, and state government. Class members earn professional development hours and will graduate at the ASPE State Conference in April 2016.

This year's participants are Scott McReynolds, P.E., Garver; Mary Kennedy, E.I., Garver; Ben Kuddes, P.E., Crafton Tull; Matthew Vinyard, P.E., MCE; Aaron Smith, P.E., CEI; Corey Lucas, Pack Engineering; and Daniel George, P.E., B&F Engineering.

Trying to master the helium hoop challenge, the group members patiently communicated with each other as they tried creative ways of lowering the hoop together, including holding it against their bodies and grasping hands so that there were fewer points of contact. They never became frustrated with each other as they checked with each other continuously. Eventually, one team member slowly counted as the participants lowered the hoop a few inches at a time.

After that exercise, Matt Hardwick, a technician with the challenge, had high praise for the participants. "They don't seem to be limiting themselves as much," he said. "They seem pretty competitive. Most of the solutions that they've come up with, other groups could come up with, but it seems like they might be more willing to vocalize new ideas and put them into practice pretty quickly. This



HELIUM HOOP. In this exercise, the Emerging Leaders try to lower a plastic hoop making sure it remains parallel to the ground. The many points of contact and the hoop's light weight make this a difficult exercise requiring lots of communication.

group here is a pretty high-functioning group."

That exercise took about 37-38 minutes, which is about average. The next exercise went much quicker. The participants stood in a line shoulder to shoulder

and were instructed to advance to a point about 25 feet away, the rule being that each person's feet must remain welded to the participants' standing beside them. It took only two tries. The first time, a couple of participants' feet came apart after

they had advanced a short distance. On their second try, the participants locked their arms, took their time, pointed to the exact spot where they would step, counted to three and then stepped. Lead

Continued on next page

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LAUGHING IT OFF. Smith, Vinyard, Lucas, Kennedy and George share a laugh at the challenge course, top. At right, Kuddes, left, and McReynolds communicate before taking a step so their feet don't separate. Bottom, the Emerging Leaders try to stay in step.



facilitator Hannah Shelburne said few groups so specifically identify each step they are going to take. The engineers had their plan, and they executed it.

"I see them visually checking in, like making eye contact," she said. "And in that eye contact, there's kind of like a physical representation of them paying attention to what you're saying, and 'I want to be an active member in the process of how you're formulating ideas as well as how I'm formulating ideas.' I see that really aiding in their success here, and I don't always see that with other groups or even other engineering groups."





RISK REDUCTION. Ken Estes with BancorpSouth Insurance Services describes risk reduction concepts while Rick Geraci, P.E., with Brown Engineers looks on.

Shelburne said engineering groups are “usually more high-functioning than others. They tend to be more thinkers rather than just doers. ... They often think through the process and then do it based off of that plan. Then they think about how they can continue improving it, rather than just doing and then thinking about it and then doing an improved (version).”

Kennedy, 25, went to work at Garver after graduating from the University of Arkansas in 2012. She now is a project engineer in Garver’s aviation depart-

ment, where her projects have included a taxiway pavement rehabilitation effort at the Bill and Hillary Clinton National Airport in Little Rock. Some of her co-workers had graduated from the program and spoke highly of it, piquing her curiosity.

“A few of the guys in my group have done it, and they all have great things to say about it, and so my boss asked me if I was interested in it, and I thought it sounded like an interesting program that I could learn a lot from,” she said.

During the contracts and risk reduction class Nov. 17, Ken Estes with Ban-

corpSouth Insurance Services explained various strategies for dealing with risk. He warned them that the cost of a claim is “like an iceberg” in that you only see how much you have to write the check for, not the “soft costs” like the time leaders spend gathering information. Estes said that client selection is an important part of avoiding claims; those who offer trouble in the contract phase will probably be troubling throughout. In fact, client selection-related claims tend to increase when an economy is down because firms become less selective.

Estes said that 95 percent of claims are not due to design problems or technical errors but instead are caused by client management, communication and documentation.

“Managing client expectations, basically, is what it boils down to,” he said.

Kennedy said the program lets her work with engineers from different firms and disciplines, teaching her teamwork skills. The contracts and risk reduction course would increase her skills in an area where she didn’t have much experience. The challenge course included some off-the-ground activities that “kind of pushed my limits a little bit.” But having courage and trusting your co-workers is part of being an engineer.

“You have to trust your instincts and also what you know and learned in school and then through your experience when you put out designs,” she said.



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A hand is holding a bright green paper cutout of a stylized mountain range. The cutout features a jagged mountain peak on the right and a wavy line representing a river or stream flowing from the mountains down towards the left. The background is a photograph of a rocky stream with water flowing over stones.

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STEVE HALL, ACEC's vice president of government affairs, speaks at the annual Agency Forum.



ACEC: Congress agrees highways vital

Chief lobbyist says votes show infrastructure an easier sell than other issues

By **Steve Brawner**
Editor

The passage of the \$305 billion Fixing America's Surface Transportation Act, or FAST, shows the kind of support members of Congress tend to have for highways and infrastructure, Steve Hall, ACEC's vice president of government affairs, said at the annual ACEC/A Agency Forum Dec. 5.

The annual Forum brings private engineering firms together with state and federal agency leaders to discuss how the legislative and regulatory environment will affect the profession.

Hall spoke the day after senators had voted 83-16 for the first long-term surface transportation bill passed by Congress since 2005. The House had voted for the bill, 359-65, so it was on its way to President Obama's desk.

Bipartisan support

In an era when Congress is marked by dysfunction, recent vote totals show both Republicans and Democrats support infrastructure funding.

MAP-21 for surface transportation: House, 373-52; Senate, 74-19

Water Resources Reform and Development Act: House, 412-4; Senate, 91-7

MAP-21 extension, 2014: House, 367-55; Senate, 79-18

MAP-21 extension, 2015: House, 387-35; Senate, unanimous voice vote

FAST Act: House, 369-65; Senate, 83-16

"As much as they're going to fight over Planned Parenthood, Syrian refugees, clean power, they still like to vote for infrastructure," Hall said.

Hall told the Agency Forum that the bill includes an increase in funding and adds a program to address freight congestion. It also includes a pilot program to consider alternative financing mechanisms other than the motor fuels tax, which traditionally has funded highways but which is a declining revenue source as vehicles become more fuel efficient. It reduces funding for the Transportation Infrastructure Finance and Innovation Act, or TIFIA, which provides federal

loan assistance for significant transportation projects.

Arkansas' congressional delegation members all voted yes except Sen. Tom Cotton, who said it lacked a sustainable funding solution.

Hall said ACEC kept busy as the votes neared. During the House committee debate, ACEC opposed several amendments, including one that would have prohibited the private sector from performing inspections and another that would have mandated a cost-benefit analysis prior to private sector contracts. Instead, the act includes language pushed by ACEC that urges state transportation

departments to contract with the private sector. One congressman considered filing an amendment that would have abolished qualifications-based selections.

"I threw studies at his staff, probably sounded like I was in panic mode, but just said, 'Look, you're undoing 40 years of federal procurement law in this amendment,'" he said. "And they took a look at some of the information, and they were familiar with our organization. I think here's where our political profile comes into play. He was persuaded not to even offer the amendment."

Hall thanked the engineers for meeting Arkansas' fundraising goal for ACEC's political action committee. Nationally, ACEC's PAC is nearing \$900,000 for 2015, with a goal of raising \$1 million.

In addition to transportation, the FAST Act reauthorizes the Export-Import Bank, the government agency that guarantees loans for foreign buyers of U.S. products. ACEC supported the reauthorization because many member firms have foreign clients.

Next up is the reauthorization bill for the Federal Aviation Administration, whose previous authorization expired in September. FAA-related issues include what regulations are needed for unmanned aircraft, a tool used by many design firms. Hall said a brewing controversy is whether or not to move the air traffic control system out of the FAA and under the supervision of a private corporation. Such a move would happen because some in Congress are frustrated

at the FAA's slow pace of modernization.

Also, Hall said there is some interest in Congress in passing another Water Resources Reform and Development Act, the main legislation authorizing Corps of Engineers projects. The last was passed in 2014, and ACEC would like the act to return to a two-year cycle.

If legislation is to be passed, it must happen early next year during a window of time that will close as the elections grow nearer, Hall said. The good news is that ACEC issues, such as highways, tend to have broad support in Congress.

In addition to working with Congress, ACEC also is keeping a close eye on federal agencies. The Department of Labor is considering changes to the Fair Labor Standards Act regarding which employees must receive overtime pay when they work more than 40 hours a week. A proposed rule would raise the salary threshold below which employees must be paid time-and-a-half for overtime work from \$23,660 to more than \$50,000. The Department of Labor also has proposed a "blacklisting" rule that would require allegations of federal or possibly state labor laws to be reported to the contracting officer and the Department of Labor. Such a rule could shut out engineering firms from government contracts based on a mere accusation of rule-breaking.

"Needless to say, the contracting community's not really excited about this – very concerned about the notion of the guilty-until-proven-innocent aspect of the reporting requirement," Hall said.

30 Crossing to be AHTD's first design-build job

Project to move motorists within, not through LR, NLR

By **Steve Brawner**
Editor

The Arkansas Highway and Transportation's Department's first design-build project will widen the I-30 bridge corridor across the Arkansas River and is focused on routing traffic within the cities of Little Rock and North Little Rock, not through them.

That's according to Ben Browning, P.E., the AHTD's design-build project director. Browning made the comments at this year's ACEC/A Agency Forum. The annual Forum brings private engineering firms together with state and federal agency leaders to discuss how the legislative and regulatory environment will affect the profession.

Branded as the 30 Crossing, the 6.7-mile corridor will relieve congestion on

Continued on next page



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AGENCY FORUM SPEAKERS. Pictured are, top from left, Scott Kelly, regulatory project manager for the U.S. Army Corps of Engineers' Little Rock district; and Ben Browning, P.E., the Arkansas Highway and Transportation Department's design-build project director. Bottom row is, from left, Lance Jones, P.E., Department of Health chief engineer; Ryan Benefield, P.E., Arkansas Natural Resources Commission deputy director; and Becky Keough, Arkansas Department of Environmental Quality director.

Interstate 30 between its intersection with I-40 in North Little Rock and its connection to I-530, which leads to Pine

Bluff. The plan rehabilitates six interstate lanes and adds four connector-distributor lanes separated from the interstate by

a concrete barrier. The I-30 bridge across the Arkansas River will be replaced, interchanges will be improved, and ramps

“There’s a possibility, a good possibility, that this project is actually bigger than our budget. ... Innovation is where you start to attack that issue.”

- Ben Browning, P.E., AHTD

will be modified to improve roadway safety and update a corridor that hasn’t been redone since it was built in the 1960s, Browning said. Also, the current bridge is the only one across the Arkansas River with a pier in the navigation channel, resulting in occasional barge accidents. The new bridge will clear a path.

Largest project ever

The project is five times larger than any project AHTD has ever let and affects six interstates or interstate-quality roadways. That size and complexity has led the AHTD for the first time in its history to incorporate a design-build process rather than a design-bid-build process, Browning said. While AHTD will oversee the project, a design-builder will handle the day-to-day work. One goal is to finish as quickly as possible because of the impact construction will have on the two growing downtown areas. Design-builders can become more involved early, use their expertise, and can begin construction in one area while other areas are still being designed.

“There’s a possibility, a good possibility, that this project is actually bigger than our budget. ... Innovation is where you start to attack that issue,” he said.

First PEL project

The project is the first in which the AHTD has incorporated a planning and environmental linkages study with the Federal Highway Administration, allowing it to bring forward to the planning phase activities that normally happen as part of the National Environmental Policy Act process. AHTD has hosted more than 100 meetings about the project and enjoys widespread support from North Little Rock. But some leaders and residents of Little Rock have questioned the plan’s necessity, calling for an approach that doesn’t increase the flow through Little Rock. Metroplan has asked the AHTD and design firm Garver to reconsider a shelved proposal that would add a lane to both sides to create an eight-lane system. It is now being considered as part of the NEPA process, along with a no-build alternative. Meanwhile, AHTD is working through the process of releasing a request for qualification for a design builder, with probably three firms short-listed and given six months to respond. Browning said the department will enter into a contract with a design-builder in late 2016 or early 2017, with the next phase starting in early 2018.

Most of the traffic in that corridor is staying in the Little Rock-North Little Rock area. Browning said the 10-lane proposal will relieve that congestion while supporting traffic flow east and west as well as north and south.

“So you can see that we’re not increasing the throughput,” he said. “Instead what we’re doing is really making it easier for those people that are trying to make those local maneuvers to do it safer and to be separated from that through traffic, which is really what the downtown areas need.”

Connecting Arkansas

The 30 Crossing is the last Connecting Arkansas Program project to begin the design phase. Passed by voters in 2012, a 10-year, half-cent sales tax is funding 35 projects in 19 corridors worth \$1.8 billion. Because the program is temporary, AHTD hired Garver as a program manager led by Jerry Holder, P.E., Garver’s director of transportation.

The CAP was passed by 57 percent of the voters in 2012 and won majorities in all but seven counties, but its passage wasn’t always assured, said Kelly Wiley, P.E., Arkansas Highway and Transportation Department’s CAP administrator. She said AHTD spent several years laying the political groundwork before the voters were approached. The Blue Ribbon Committee on Highway Finance was formed in the 2009 legislative session and issued a report with funding options. A stakeholder group, Move Arkansas Forward, was formed by the Arkansas State Chamber of Commerce to build support. A poll conducted before the campaign found that 43 percent of respondents supported a half-cent sales tax for highways while 53 percent were opposed – numbers that led the pollsters to predict the effort

Continued on next page

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would fail. However, Arkansans were open to various selling points. Sixty-four percent found persuasive the fact that the CAP would support 40,000 jobs, while 62 percent were encouraged that food and medicine would not be taxed. Also polling above 50 percent were arguments that the tax would be dedicated to four-lane road construction, would make roads safer, and would make Arkansas more desirable to employers.

ADEQ: More purpose-driven

Also speaking was Becky Keough, director of the Arkansas Department of Environmental Quality. Keough said she and Governor Asa Hutchinson have set a goal of making ADEQ more purpose- and outcome-driven while working in a business-friendly way. The department, which is accountable for 21,000 permits and registrations, is trying to offer more regulatory certainty, policy stability and transparency.

ADEQ is being streamlined and restructured. It has moved to electronic permitting to make the application process easier. Historically organized with a director and two deputy directors with as many as 20 divisions, ADEQ now is divided into three program areas: an Office of Air Quality, an Office of Water Quality, and an Office of Land Resources. The change is being accomplished on a cost-neutral basis. She said her agency is not planning layoffs but is looking closely at rehires.

Keough said the department is working in a challenging federal environment. While the current Clean Air Act's structure means most environmental policy is led by the states, the Environmental Protection Agency is issuing many rules.

"In some cases, honestly, the regulations are coming so fast that a plan made last year becomes non-effective for the regulation proposed this year, and that's a true challenge," she said.

Those EPA actions include the controversial Waters of the U.S. rule, which is currently under a court-ordered stay in Arkansas. Keough said the rule was intended to clarify the definition of a protected body of water, but she and Attorney General Leslie Rutledge see too much federal overreach.



MORE AGENCY FORUM SPEAKERS. Pictured are, from left, Melissa Lombardi with the U.S. Fish and Wildlife Service and Mitchell Simpson, Arkansas Energy Office director.

Another issue is regional haze, where a federal plan proposed by the EPA will force more than 50 regulated entities to spend billions of dollars on controls in the next 2-5 years. A final federal plan is expected in August 2016, while Arkansas is working on a state plan.

Keough said Arkansas officially complies with EPA ozone standards except in the Crittenden County area, though that county actually reached compliance more than two years ago and the state is submitting documentation that would help lift the nonattainment designation. The models show that the transportation sector's efforts have helped Crittenden County reach the same level of air quality as central Arkansas.

Another issue is the EPA's Clean Power Plan, expected to be finalized this year, which will require Arkansas to reduce greenhouse gas emissions by 2030. Arkansas must develop a final plan by next September or request an extension, which it will do to give it more time to conduct an analysis before its final state plan is due in September 2018.

Entergy's plan to close a coal-fired power plant in Pine Bluff as part of a strategy to meet regional haze regulations could achieve about 90 percent of the target, Keough said.

State Water Plan

Ryan Benefield, P.E., deputy director of the Arkansas Natural Resources Commission, described the newly updated State Water Plan, which helps Arkansas plan for its future water needs. CDM Smith and FTN Associates teamed with ANRC to develop the plan. Eighty percent of the state's water use goes for crop irrigation, resulting in a well-publicized depletion of groundwater aquifers, with surface water diversion a likely fix for the problem. The plan recommends that the commission have the authority to merge water and sewer systems when necessary to make them economically viable; one plant is treating only 28 homes. Benefield said Arkansas is one of the few states that doesn't have a drought plan, and over the next year it will begin forming one.

Lance Jones, P.E., Department of Health chief engineer, told participants his agency has seen an uptick in disinfection byproducts violations as a result of the EPA's Stage 2 Disinfectants and Disinfection Byproducts Rule. DBPs are created when a disinfectant such as chlorine acts on organic matter such as decayed leaves, producing a compound posing a cancer risk. Under the old rules, systems were considered acceptable if an average of sample sites was in compliance. Under

the new rules, if a single site is not in compliance, the entire system is cited. The rule has forced water systems to maintain water quality throughout the process. Jones said some plants aren't well-equipped to remove the organic material and manage the disinfectant levels.

Jones said that, as a result of legislation passed in 2011 by the General Assembly requiring all community water systems serving 5,000 customers to fluoridate, 34 of the 35 systems not previously fluoridating have applied for grants from the Delta Dental Foundation, and 27 systems are now installed and operational.

Scott Kelly, regulatory project manager for the U.S. Army Corps of Engineers' Little Rock district, told attendees that their firms can make their dealings with the Corps more efficient if they will practice avoidance/minimization techniques and communicate with the Corps early in the process. He said the Corps' districts and divisions are decentralized and distinct from each other. "We try to be fair, balanced, flexible, and we basically, we're neither for or against the project," he said.

Joe David Rice with the Arkansas Department of Parks and Tourism said that tourism is a \$6.7 billion industry and that tourists pay \$345 million in state taxes – in effect reducing the taxes paid by individual Arkansans by \$115. Rice described Arkansas as a 58,000-square-mile theme park, and like other theme parks it can increase its business in three ways: by keeping clean, which the state is trying to accomplish with its

Keep Arkansas Beautiful anti-littering message; by promotion, which the state is doing by spending \$14 million to reach potential tourists from Chicago to New Orleans and from Jackson, Tenn., to Oklahoma City; and by adding a new "ride" every year. Those new rides have included the Clinton Presidential Center, the Crystal Bridges Museum, the Razorback Greenway Trail in Northwest Arkansas, and Johnny Cash's boyhood home in Dyess.

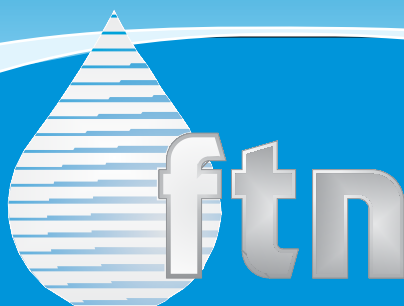
The state also is working to attract motorcyclists, mountain bikers, and the 10,000 baby boomers turning 65 every day and looking for a place to retire.

Mitchell Simpson, Arkansas Energy Office director, described the state's efforts at promoting energy efficiency, including helping every state-owned building achieve 30 percent energy use reduction by 2017 over 2009. The program has awarded five cash rebates for fuel station developers who want to establish compressed natural gas or propane pumps and has provided rebates for Arkansans purchasing alternatively fueled vehicles. Kum & Go chose Springdale as the location for the company's first CNG station nationwide in part through the office's efforts, he said.

Melissa Lombardi with the U.S. Fish and Wildlife Service described efforts to protect four endangered bat species and explained the actions developers must take when removing trees in bat habitats.

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ACEC/A Member Spotlight

MWY's concepts have been grand

Firm has won ACEC/A's top award four times

Since the beginning of 2006, there have been nine ACEC/A Grand Conceptor awards presented, and McGoodwin, Williams and Yates has won four of them.

The Fayetteville-based company, which specializes in water and wastewater treatment and other infrastructure projects for municipalities, won in 2006 along with MWH for the Beaver Water District Administration's Raw Water Intake Structure; in 2009 for Fayetteville's 10 million-gallon-per-day Westside Wastewater Treatment Plant; in 2010 for the Beaver Water District Administration Center; and in 2011 for the water master plan for Bentonville.

The firm was founded in 1946 by L.M. McGoodwin, P.E. Later, Terry Williams, P.E., and Carl Yates, P.E., joined the firm and became principals. Yates is a member of the ACEC's prestigious College of Fellows.

In 2004, the firm began preparing for Yates' retirement, with Brad Hammond, P.E., becoming president and the firm's other principals becoming vice presidents. One of those, Lane Crider, P.E., was Hammond's schoolmate. The two met in seventh grade. The firm has a staff of 32, including 12 professional engineers, four of which are LEED-accredited, architects, surveyors, site observers and others.

Among MWY's signature projects was the \$61 million construction of Fayetteville's Westside Wastewater Treatment Plant, which serves about two-thirds of the city's land area and was designed to treat 10 million gallons a day for about 40,000 customers.

The firm worked with Environmental Consulting Operations of Benton to construct a 46-acre compensatory mitigation site, the Woolsey Wet Prairie Sanctuary. The area was populated with the remnants of mounds that were part of a vast prairie that had stretched across Northwest Arkansas and into Oklahoma and Kansas. Designers have spent years clearing out invasive species so native plant species could return there.



GRAND CONCEPTOR WINNERS. Since 2006, MWY has won the ACEC/A Grand Conceptor award four times. Top, Fayetteville's 10 million-gallon-per-day Westside Wastewater Treatment Plant, the 2009 winner, was designed to meet some of Arkansas' most stringent effluent limits ever. Left, since the Beaver Water District's inception in 1959, MWY has provided planning, architectural, engineering design and construction management services. Above left shows the Raw Water Intake Structure, the ACEC/A Grand Conceptor winner in 2006 and an ACEC National Award for Excellence in Engineering winner. Bottom left, the Administration Center, which won in 2010 and achieved LEED Gold status.

The firm has provided planning, architectural, engineering design and construction management services for the Beaver Water District since the district's inception in 1959. The Raw Water Intake Structure won the ACEC National Award for Excellence in Engineering, while the Administration Center achieved LEED Gold status.

Other projects have included a wastewater treatment plant upgrade in Batesville, which will be the only moving bed

bio-film reactor basin municipal facility in Arkansas. The firm also designed the Clarksville Water Treatment Plant, the first in Arkansas to use ozone as the primary disinfectant and granular activated carbon as a filter media. An upgrade will make it the first in Arkansas to use ozone for disinfection of *Cryptosporidium*. Fayetteville's Westside Wastewater Treatment Plant, completed in 2008, was built to meet some of the most stringent effluent limits ever set in Arkansas.

Highway group offers funding ideas

Of task force's four proposals, one meets governor's demands of revenue neutrality

By **Steve Brawner**
Editor

A highway funding task force presented four proposals to the governor by its Dec. 15 deadline, but only one might meet his requirement that it result in no new state revenues or taxes.

The Governor's Working Group on Highway Funding, appointed through an executive order by Gov. Asa Hutchinson, decided to focus on short-term needs and provide the Arkansas Highway and Transportation Department with \$110 million in annual revenue over the next one to three years, based on a needs assessment provided by the department.

Raising that amount requires a total of about \$160 million in new road dollars because of the traditional 70-15-15 split between the state, cities and counties and because 3.2 percent off the top is dedicated to the Constitutional Officers and State Central Services funds.

A \$110 million influx would provide the Highway Department the \$50 million it needs to match federal dollars provided through the recently enacted Fixing America's Surface Transportation Act, while providing \$60 million for other projects.

Hutchinson: Decision in January

Hutchinson's office said the governor will review the group's recommendations and announce his decision by mid-January. In November as the proposals were taking shape, he said in a statement, "I will review the recommendations as well as listen to legislators' comments on the report, but, as I've said previously, any new revenue or tax increase must be offset with tax cuts in order to remain revenue neutral. It is important to fund our highways, but we want to keep the hard-working Arkansan in mind when they are at the gas pump filling up their truck as they commute to work."

Highways primarily are funded by motor fuels taxes, which have not been increased since 2001 in Arkansas and since 1993 at the federal level and were not in-

dexed to inflation. Meanwhile, vehicles have become more fuel efficient, meaning drivers are paying less in fuel taxes, and construction costs have increased.

The proposals

Proposal #1 in the 14-page report would index motor fuels taxes to inflation, with increases limited to 2 cents per gallon per year. Of that \$41.1 million in additional revenue, \$27.9 million would go to the Highway Department. The proposal also would increase the diesel fuel tax by 5 cents per gallon, raising \$31.5 million total and \$21.4 million for the Highway Department. That idea has the support of the Arkansas Trucking Association.

The proposal would phase in a transfer of revenue from new and used vehicle sales taxes from general revenues to roadways. By 2024, that idea would raise \$363 million total and \$242.4 million for the Highway Department. Finally, the proposal would reduce the 10-year, half-cent sales tax for roads approved by voters in 2012 to 3/8ths of a cent starting in 2023 and make it permanent.

Proposal #2 is the only one of the four proposals that might be considered revenue neutral. It includes a user fee increase that would be offset by a sales tax reduction planned for 2017. That reduction will coincide with the end of the desegregation case that has required the state to make payments to the Little Rock, North Little Rock and Pulaski County school districts. The planned tax cut is estimated to be between \$60 and \$70 million.

Meanwhile, the proposal would raise an estimated \$20 million by providing the Highway Department a rebate of sales taxes collected on highway materials. It also would raise \$2.7 million for the Highway Department by redirecting the part of the diesel tax currently going to general revenues, and it would raise \$5.4 million by rebating to highways the portion of the half-cent sales tax passed by voters in 2012 that is currently going to the Constitutional Officers and State Central Services funds.

Proposal #3 would raise \$1.1 billion over three years. It would increase motor fuels taxes by 8 cents per gallon, raising

a total of \$160 million, with \$112 million going to highways.

Motor fuels taxes then would be increased 5 cents a year for three years, raising \$308.4 million total by year three, or \$209 million for the Highway Department. Motor fuels taxes would be indexed to inflation moving forward. The proposal also would consider a study of implementing a reportable miles traveled funding model where drivers would report their annual mileage when they renew their car tags and pay a fee.

Proposal #4 would eliminate the sales tax exemption for motor fuels and collect a per-gallon tax at the wholesale level. At the weekly price of gasoline on Oct. 26, the tax would gross \$200 million, with \$140 million going to the Highway Department. If fuel prices change, so would the amount of taxes raised, making this the most volatile of the funding proposals.

Future needs

The working group set aside the Highway Department's longer-term needs and said in the report that it will study those if directed by Hutchinson.

The Highway Department said it needs \$250 million in new dollars annually over the next three to five years, counting the \$110 million provided for short-term needs. That amount would enable the department to implement an enhanced maintenance program for existing highways and fund a \$125 million resurfacing program. The Highway Department would be able to overlay and rehabilitate half of the highway system every 15-20 years.

The department said it needs \$400 million in new revenues in six to nine years, counting the \$250 million. That amount would, among other efforts, enable the department to undertake an economic development improvement program.

Ten years in the future, the Highway Department would like \$1.68 billion in new revenues annually for 10 years, which would enable the completion of I-49 along the state's western border and I-69 through south Arkansas. With that influx of money, the state would have no major capacity or congestion issues.



DRONING ON AND ON IN CLASS. Current and former Robotics, Engineering and Technology students watch as Kansas State University students fly a drone in the Waldron Middle School gym.

Engineering class a 'game changer'

Waldron Middle School's classes let students fly drones, apply engineering to fashion design

By Steve Brawner
Editor

When Lauren Hart was a Waldron Middle School student, she was interested in fashion design, not engineering. Now, because of the school's Robotics, Engineering and Technology classes, she's interested in both.

Teacher Tracie Adams has built the program these past seven years into one that serves a variety of interests and attracts many of the school's top students, regardless of their interests. Hart enrolled in the class her seventh grade year because it was an honors course despite having little interest in engineering or robotics. The next year, in an effort to attract more girls, Adams based one of the

school day's six classes on fashion and design. Students combined their fashion sense with engineering principles to design clothing, including firefighter equipment. ("It's all about the look," Hart said with a laugh.) They learned how fabrics are made and then made their own outfits. They used the lessons they had learned to design a Christmas show and engineer a stage.

Now a sophomore, Hart is still interested in fashion design. Because of that class, she also has a technical side to her that makes her more effectively creative and innovative.

"It's all about changing things up and being different and creating new things, and that's what the engineering does, like huge," she said. "It's new and it's different, and you change the way things already are. ... It's like you see things in a different light."

Teacher Adams' background isn't in technology. She was a college women's basketball coach who came home to Waldron to raise a daughter and take care of her dad, who had Alzheimer's disease. She was teaching math and health with her education degree when administrators wanted her to take charge of a technology class. Using a grant, she started with LEGO MINDSTORMS equipment and a few iMacs. There were seven students in the class.

The breakthrough came four years ago when her middle school team of seventh and eighth graders was ranked 11th in the country by BEST, a nationwide robotics competition. Each year, the class got bigger and bigger, and so did the offerings.

"This is a game changer," Adams said. "When you put something in a kid's hand, when you engage them with hands-on activities, they're going to remember

that because it's something that they have taught themselves. It's not somebody going up there giving them rhetoric. This is actually something that the kids have learned. And if you'll notice, these kids are in groups together, and they're visiting and they're talking, and they're always bouncing ideas off of each other. That's how you learn."

Now, six classes with about 10 students each are offered throughout the day. It's an honors class and students have to be recommended, so students want to be a part of it even if they aren't drawn to engineering. A variety of classes are offered, with students plugged in according to their interests and schedule. Student Clayvin Lunsford has been researching a phone app that would let chicken house owners remote-monitor their operations by video as well as control the climate. The class has learned computer coding basics and built fully functioning robots. Lunsford and fellow student Garron Deramus demonstrated for Arkansas Professional Engineer one such robot that can be controlled via a smartphone.

"If a kid really, really is into computers, then I'm really going to push them that way," Adams said. "You want to try an app? Go for it. You're really into planes, then we're going to work with this. So they kind of have some options."

The school district has been supportive both in terms of finances and scheduling. The class recently bought a \$600 3-D printer, which it used to print a model of a hand. Meanwhile, the students have been supportive of the school, too. The class flew unmanned aircraft, otherwise known as drones, over the bus pickup zone to try to determine the most efficient loading process – resulting in minor changes.

"We want them to be thinkers," Adams said. "We need them to be able to tear something apart, think about it, what's their ideas on it. Like I said, I just want to open every opportunity for them to learn, be engaged, something that can come back to our community and help."

Community partnerships have been another key to the program's success. The class has worked with the local Farm Bureau chapter and has flown drones over farm fields taking pictures. Students practiced a hostage situation with the



LAUNCHING IT. Madison Arrington tosses a glider across the gym.

local police department where they used a drone to find the hostage and to identify the hostage-taker's license plate in the parking lot. WeighTech, a global scale

manufacturer, is always ready to lend engineers' time and technical support to students working with engineering software

Continued on next page

An advertisement for McGoodwin Williams & Yates. The background is a blue-tinted image of water flowing over rocks. In the center, there is a logo consisting of a stylized 'M' and 'W' with a globe in the middle. To the right of the logo, the text reads 'McGoodwin Williams & Yates' in a bold, sans-serif font, with 'Engineering Confidence' in a smaller font below it. To the right of the company name, there is a block of text: 'Providing award-winning engineering services to municipalities for more than six decades.' Below this, there are two columns of bulleted services. On the left side of the advertisement, there is contact information: '302 E. Millsap Fayetteville, Arkansas 479-443-3404' and the website 'www.mwusa.com'.

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such as AutoCAD. Parents are interested and involved. This fall, the school had a Friday after-school robotics engineering camp that attracted 230 students in grades 3-7. Others in the community support the program financially. If an opportunity arises, Adams said, "We've got people here that it'll take me 10 minutes to get the money to go."

K-State partnership

Adams hasn't limited her partnerships to the local community. When unmanned aircraft – otherwise known as drones – became more common, some of her students expressed an interest, so she started researching the best programs across the country.

Her research led her to Kansas State University, where she has made three trips to work with students and professors. The relationship – Kansas State's only one with a public school – led to a recent session in November where K-State students spent two days in Waldron working with current and former students whom Adams pulled out of their regular classes. Students worked on building a drone and practiced throwing foam aircraft in the gym to learn about flight mechanics. In that exercise, two groups of boys and one group of girls filled their aircraft cargo holds with Play-Doh to try to balance the weight distribution. Student Hayden Chronister had the best toss when he sailed one across the gym that hit mid-wall on the other side, prompting a celebration from him and the other boys with him. The girls? Let's just say they did not appear impressed. "If the guys are doing something, then we want to do that, too," said Hart, the student interested in fashion design who has a pretty good throwing arm herself.

Asked what lessons she has learned building the class, Adams said students need access to the latest technology and need adult support, but the adults don't have to be experts in the activity.



WE BUILT THIS OURSELVES. Middle school students Clayvin Lunsford and Garron Deramus display a robot constructed by the class that can be controlled by a smartphone.

"I think a big mistake that I made was thinking that this is too hard for them to do. ... I gave those kids the very first kits that we got, and they had robots built in two days with me having no idea how this is built or what it is," Adams said. "I just gave it to them, kids put it together,

and loved it. Programmed it and everything."

For Adams, the ex-basketball coach, the class is a new kind of game – one that is training her students to be designers, innovators and engineers.

"I have the best job that could ever be," she said. "I'm like, I have the best job. You know, they say you find a job you love, you'll never work a day in your life. I come to work every day, and I'm excited. I mean, what's going to happen? It's like we get new toys in every day, and these toys, they're going to make a living for these kids some day."



"It's all about changing things up and being different and creating new things, and that's what the engineering does, like huge. It's new and it's different, and you change the way things already are. ... It's like you see things in a different light."

- Lauren Hart

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