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Attendees learn about cutting-edge inspection software, participate in hands-on demonstration during December "Let's Talk Bridges!" session

by Julie Berg-Raymond

At the second session of "Let's Talk Bridges," held at Meehan Memorial Lansing Public Library Thursday, December 14, Anden Lovig - a construction engineer on the bridge replacement project at Lansing, and a member of the monthly "bridge talks" team - ran the show by himself; his colleagues (Paul Lindsey, senior field inspector; Clayton Burke, project manager, Iowa Department of Transportation [DOT]; and Travis Konda, project manager, HNTB Corporation) were away at meetings.

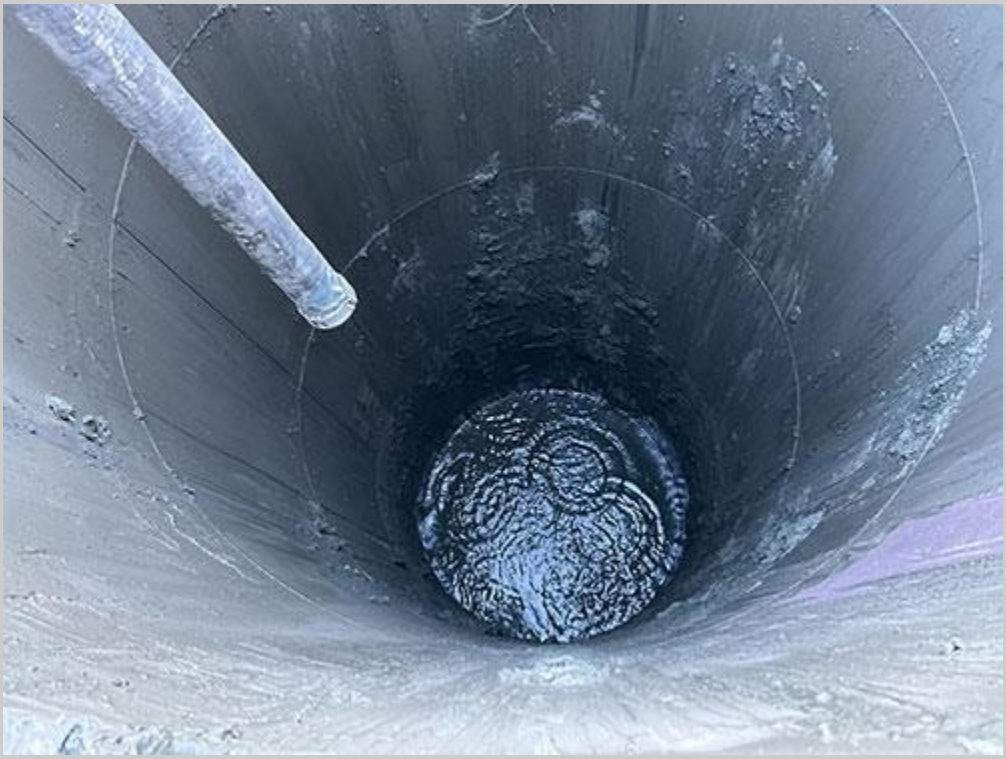
Lovig told attendees he was the "least knowledgeable" of the men who run the bridge talks at the library the second Thursday of each month; but the bar here is set pretty high, after all - and Lovig is obviously quite knowledgeable. He's also great with kids - which is a big part of what these monthly talks are all about. Derva Burke, the library's executive director, is working with Clayton Burke and the rest of the team to bring hands-on learning projects and demonstrations to the sessions.

For example, last Thursday's exercise with a rope and a stick demonstrated the various diameters of drilled shafts that will be filled with

concrete as part of the new bridge project. The markings on the stick represented the diameters in feet; the rope was used to demonstrate how big the concrete-drilled shafts will be. With assistance from a couple of young boys in attendance, Lovig showed attendees just how big that is (see photo on Page 32).

A sidenote: It's not hard to imagine these kids, the ones who attend the bridge talks every month, as they might be 50 years from now - telling their own grandchildren about how they talked to and learned from the actual engineers who worked on the big bridge that crosses over the Mississippi River into Wisconsin. Indeed, Clayton Burke especially enjoys that aspect of the "Let's Talk Bridges!" sessions at the library.

"I felt bad I had to miss the (bridge talk) that night," he said later. "Connecting with the community and future users and enjoyers of the bridge is something I am looking forward to each month."



INSPECTION TOOL

Lovig spent part of the session talking about tools the team uses for inspection during the construction process - in particular, a software system

called HeadLight. According to the company's website at headlight.com, the system works to "unify teams with data. Our solutions empower teams to easily capture and report complex data in real-time. Designed in partnership with infrastructure owners and their field teams, HeadLight solutions increase collaboration and accountability."

The software is being used on a few select projects across the state as a trial. This is Clayton Burke's first time using the program. "We use the Headlight system to collect, store, and report our project information we are required to collect," he said in an email interview following the session. "This helps us document that we are in compliance with all of our agreements, permits, plans, and the construction contract."

The system's value comes from the ability to efficiently collect and store project data - like photos. "It allows everything to be tagged, making it very easy to search thousands of photos and inspector observations," Burke said. "It also allows everyone to post information to the same location and print efficient reports with much less effort."

During the bridge talk session Thursday evening, Lovig showed attendees several of these pictures - showing, in this case, different aspects of the initial drilling for a drilled shaft, getting it ready for setting the permanent casing inside the temporary casing.

DRILLING THE SHAFT

With photographs as visual aids, Lovig discussed the process of preparing a drill shaft, noting that the contractor (Kraemer North America) first builds a "practice shaft, to prove they can do it." They will eventually build 12 such shafts, he said.

According to an email interview with Clayton Burke following the bridge talk session, the process works like this: "First, a temporary casing is 'vibrated' into the ground. This casing is only about one-third the length of the actual shaft being built. The casing will be filled with a thick polymer slurry to prevent the wet sand/soil from pushing up into the temporary casing from the bottom. Next, a drill/auger is used to remove dirt/sand to the bottom of the temporary casing.

“Then, a permanent casing is ‘vibrated’ into the ground in two or three sections. These sections will be welded together after the first section is driven to just above ground level. The permanent casing will be driven down to bedrock (sandstone in this case). Then, the casing will be rotated with a powerful piece of equipment attached to the top of the casing. The bottom of the permanent casing has metal teeth welded to it, and these metal teeth will help screw the casing about three feet into the bedrock. The permanent casing is also filled with the thick polymer slurry until it is filled with concrete.

“Rock coring equipment is then used to dig about 25 feet into the bedrock. The contractor then uses a piece of equipment called an air lift that is almost like a giant wet vacuum to suck the bits of rock and dirt off the bottom of the shaft. It is very important that the bottom of the shaft is clean before concrete is added. The air lift will be sucking up the polymer slurry, as the hole will have to remain filled with the slurry until the concrete is poured.

“After the hole is cleaned, a big rebar cage is lifted into the air and slowly, by two cranes, lowered into the shaft until it reaches the bottom. It is then lifted a little off the bottom and tied off to big metal beams, so it stays in place. The shaft is then filled with concrete. The concrete is added by pouring it into this long metal tube called a tremie. The tremie deposits the concrete starting at the very bottom of the shaft so the concrete doesn’t mix with the polymer slurry as it falls to the bottom of the shaft. The tremie is lifted with the level of concrete as the shaft is filled.”

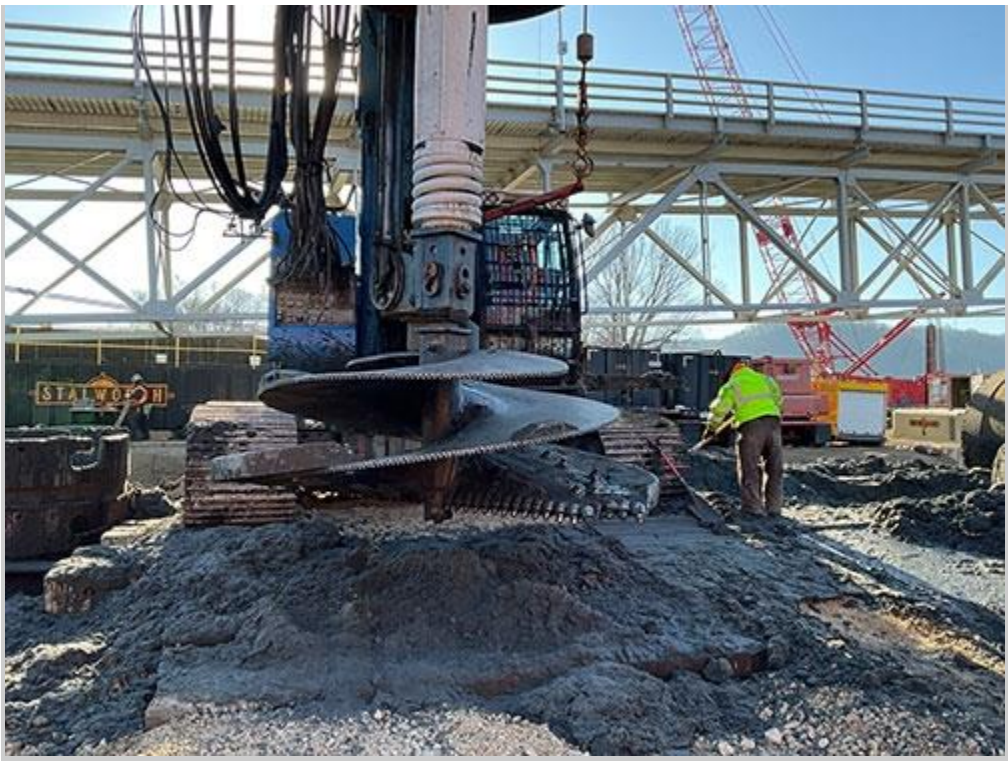
After the process is completed, Clayton Burke said, “many different technical tests are performed to prove that the shaft was poured correctly and will perform as expected.”

NEXT MONTH

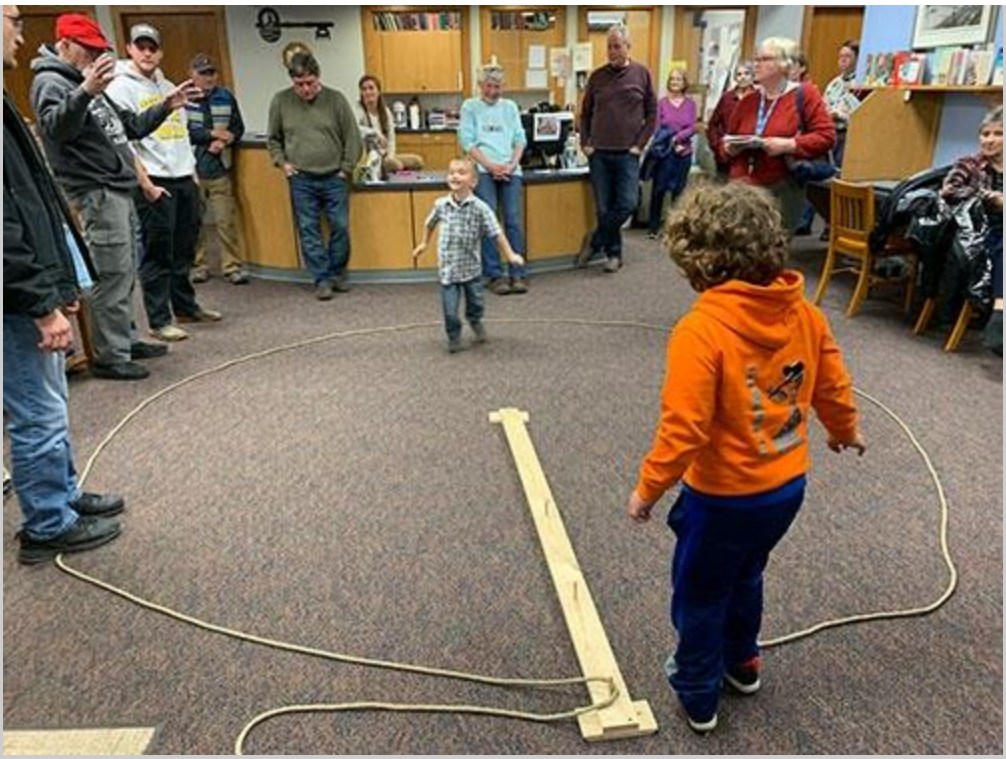
In the December 13 edition of The Standard, an update and photographs from the Iowa DOT were published which explained how “cofferdams” are built. Large, enclosed rectangles, they are built to provide a dry working area below the waterline to allow the construction of some deeper structures like piling and pier footings that will one day be under water. (This information is also available at https://iowadot.gov/lansingbridge/updates/).

For next month's "Let's Talk Bridges!" session, the team is putting together a demonstration of how the big metal rectangle cofferdams work - using a fish tank filled with sand and water and a small water pump.

For more information about the bridge project and to sign up to receive project updates via email, visit the website for the project at iowadot.gov/lansingbridge/Home. The project's Facebook page can be found at https://www.facebook.com/LansingBridge/.



Creating support for the new bridge ... The photo above shows the drill rig and auger used to dig the soil and sand out of a temporary casing by screwing the auger into the material and lifting it out of the hole near the existing Black Hawk Bridge. This process is used to create the shafts that will then be filled with concrete to create the supporting infrastructure of the new bridge at Lansing. Photo courtesy of the Iowa Department of Transportation.



Demonstrating the diameter ... The rope demonstration pictured above (photo by Julie Berg-Raymond) was presented at the Thursday, December 14 "Let's Talk Bridges!" session, hosted at Meehan Memorial Lansing Public Library, to show how big the concrete-drilled shafts will be as supporting structures for the new bridge being built at Lansing. The markings on the stick represented the diameters (or sizes) of drilled shafts that will be constructed as part of the new bridge project. The shaft that is being constructed now is a nine-foot diameter shaft, and other shafts will get as large as 12 feet in diameter. The photo below (provided by the Iowa Department of Transportation) shows one of those shaft holes dug down about 30 feet into its temporary casing.