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PILEBUCK

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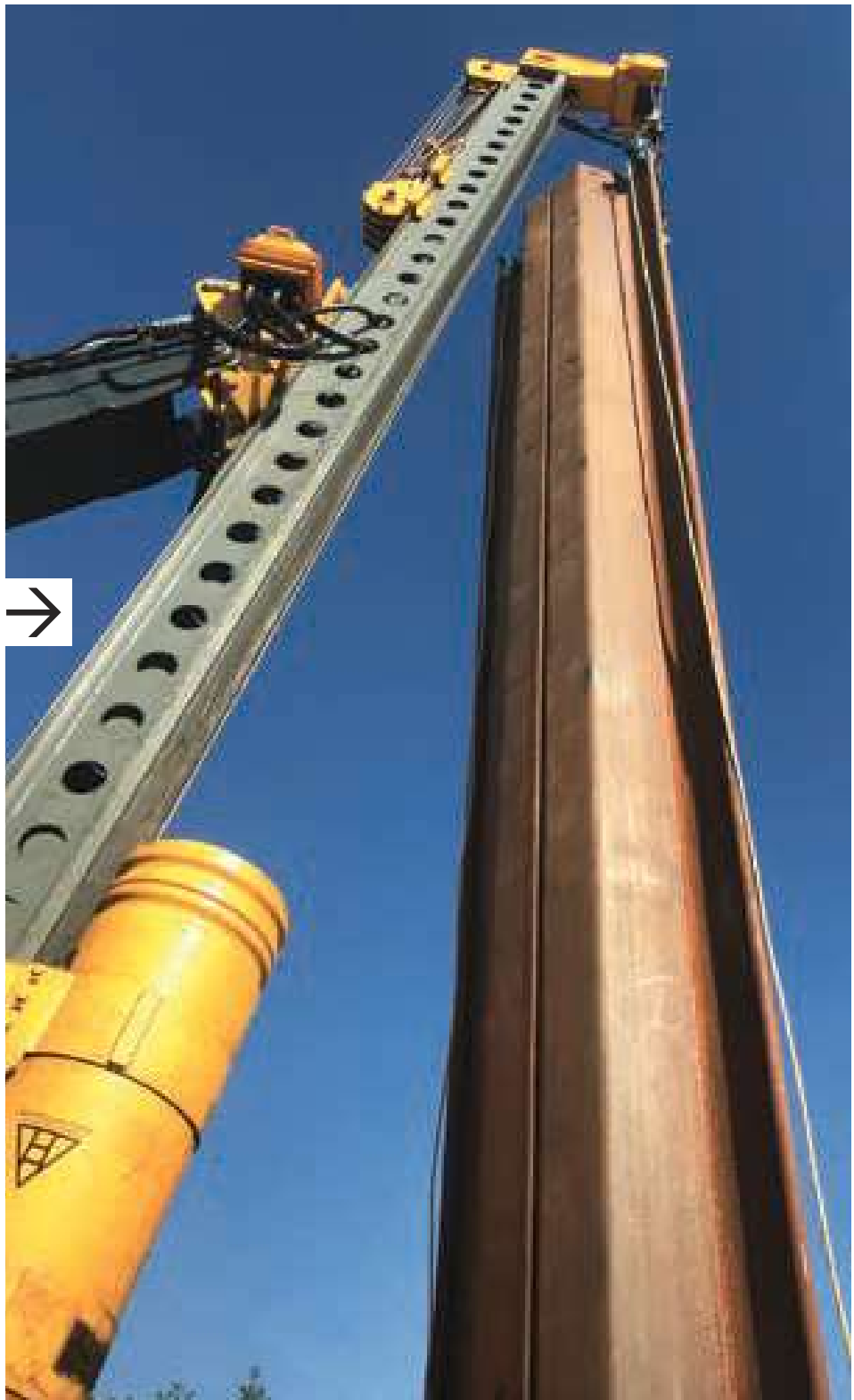
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Cover: The largest of the LB series: The drilling rig LB 44 at foundation work in Switzerland. Photo courtesy of Liebherr.

EXCAVATOR MOUNTED LEAD SYSTEMS (EML) DEVELOPED BY BERMINGHAMMER¹

Interview with Tyler Hilsden

Tyler Hilsden is a mechanical engineer with over 15 years of experience in the design of agricultural and construction equipment. He holds a diploma in engineering technology from Niagara College (Canada) and Bachelor's in Mechanical Engineering from Lakehead University (Canada) where he graduated with first-class honours. He has worked for three companies — John Deere, Alo and Bermingham. During these years, he worked both in design and product support roles.

PB: What is your current role with Berminghammer?

Tyler Hilsden: I have been working at Berminghammer for 3.5 years as a design engineer. I work alongside a team of engineers and technologists to design both crane and excavator mounted lead systems. These systems are used to install deep foundations by driving or drilling piles into the ground. We work on everything from short, low headroom systems, where systems need to fit under existing infrastructure, to large systems more than 180 feet tall capable of drilling with torque values of up to 350,000 foot-pounds.

PB: Tell me more about your background. How did you become an engineer? What made you interested in foundation equipment?

TH: Growing up I was always interested in fixing and taking things apart. Learning how appliances, toys and cars worked always kept my attention. My



¹ Bermingham was founded in 1897 by William Bermingham, who was succeeded by three further generations of Berminghams at the helm. The company started building the foundation of Canada's infrastructure and has continued that role. Bermingham brought the first diesel impact hammer to North America in the early 1950's and started developing their own line of foundation specialty equipment in the late 1960's. The Berminghammer trade name has become synonymous with leading edge technology around the world.





father is a civil engineer and had a big impact on me becoming an engineer. From a young age, he included me in repairs to cars and household items.

PB: How did the EML come to fruition? Who is the EML designed for?

TH: The EML came to fruition from our sales department noticing a group of contractors that work primarily on small bridges and road protection systems. They noticed that these contractors were forced to sub-contract pile installation to companies with pile driving equipment and cranes to install

a small number of piles. Often the cost of mobilizing the equipment was higher than the installation cost of the piles themselves. Having a pile driving solution that eliminates the need for a crane and uses an excavator instead, which these contractors all have on site, was identified as a huge advantage.

It was with these smaller foundation jobs in mind that our engineering and sales group formed the operational specifications of the EML product line.

PB: I understand the line consists of three different lead systems. Can you elaborate on each?

TH: The three EML models are named after the class of excavators on which it is intended to be installed. The number in the model name indicates in tons, the minimum excavator size that is required.

The EML30 is primarily designed to be used with an 8,000 pound drop hammer and install piles up to 30 feet in length. It has three functions: hammer drop function, pile loading and lead tilting side-to-side +/- 3 degrees.

The EML45 is primarily designed to be used with a 10,000 pound drop hammer and install piles up to 40 feet in length.

In addition to the functions of the EML30, the EML45 has the added

PILE BUCK SPOTLIGHT

function of vertical travel to allow the lead to be lifted up and down without losing verticality of the lead. Also, the EML45 can be used with the Birmingham B21 diesel hammer to increase productivity on projects with increased number of piles.

The EML60 is designed to be used for installing piles up to 50 feet in length. A customized version of the EML60 was the first EML made that had all the functions of the EML45 plus an added function to rotate the lead horizontally to allow a vibro to install H piles with precise orientation.

PB: What types of jobs would require the EML? I understand it is effective to areas sensitive to vibration.

TH: The EML is best suited for applications with relatively short piles or areas where it is difficult or expensive to set up a crane. One type of job that the EML30 has been very useful for is roadway protection where space is very limited.

PB: Tell me more about the design criteria.

TH: Hammer drop acceleration was of

upmost importance in designing the EML product line.

Drop hammer systems have been around for as long as piles have been used in foundations and it was important for the EML to have the best possible acceleration to provide equal or higher levels of energy than conventional crane mounted drop hammers controlled by a winch with free fall.

Every source of inefficiency was looked at: friction in sliding parts, inertia of moving parts and losses in hydraulic resistance in the control systems, and

HAVING A PILE DRIVING SOLUTION THAT ELIMINATES THE NEED FOR A CRANE AND USES AN EXCAVATOR INSTEAD, WHICH THESE CONTRACTORS ALL HAVE ON SITE, WAS IDENTIFIED AS A HUGE ADVANTAGE. IT WAS WITH THESE SMALLER FOUNDATION JOBS IN MIND THAT OUR ENGINEERING AND SALES GROUP FORMED THE OPERATIONAL SPECIFICATIONS OF THE EML PRODUCT LINE.

Cajun Industries, LLC introduces the SILENT PILER to our fleet of specialty deep foundations equipment.

Steel sheet piles are typically impacted or vibrated into the ground during installation. These methods generate excessive noise and can cause damage to adjacent structures due to ground vibration. Cajun has added to its fleet the Giken Silent Piler, a reaction-based press-in machine, which installs piles without excessive noise or vibrations. Piles are hydraulically pressed into the ground using static energy thus almost eliminating noise and vibration.

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plumbing to the hydraulic cylinder that raises and lowers the hammer.

Design Criteria

- **Quick mobilization.**

The EML30 can be shipped completely installed on the excavator with drop hammer installed on the lead. Once the unit is driven off the float, the shipping stops are removed, the anvil is lifted into place and the system is ready to work.

The EML45 can also be shipped completely installed (with required permits) depending on the destination.

- **Ability to switch between excavator work and pile driving within a reasonably short period.**

Because this equipment is installed on an excavator that is often the only equipment on site, changing from excavator to pile driving system must be quick.

Once mechanics are familiar with the equipment, switching from one

to the other requires as little as four hours.

- **Must be able to perform small drilling jobs.**

The EML products are designed to handle a maximum of 20,000 foot pounds of torque.

- **Provide an intuitive control system.**

With a short amount of training, excavator operators can learn to safely drive piles. The EML system provides a simple but clear LED panel to show the operator what function is active at any given time.

To achieve the above criteria, we realized right away that simply using previously-designed lead structures designed for crane systems that are much longer and require higher bending strength would exceed the capacity of the excavators that we wanted to use.

So, all components of the EML line were designed to provide the right

amount of strength with the least amount of material.

PB: What do buyers need to know about the cost of the EML versus traditional systems?

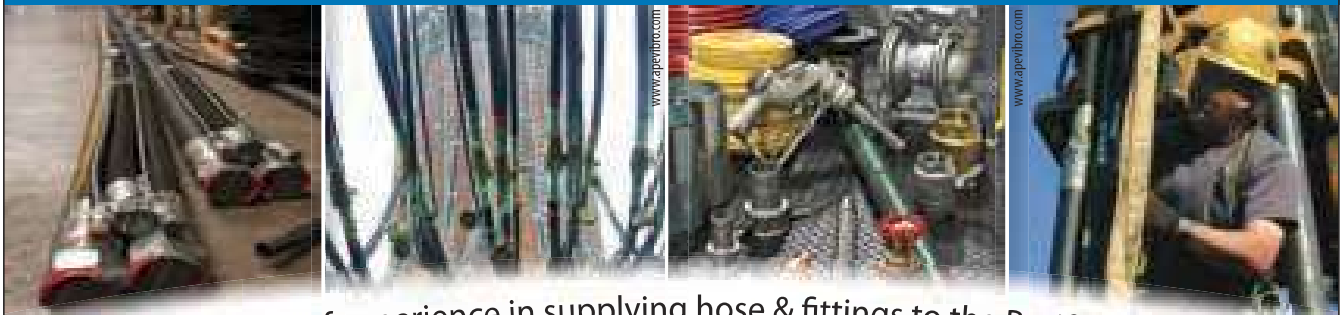
TH: When customers evaluate whether the EML product makes sense for their fleet of equipment, the three most important criteria that should be looked at are:

- Typical projects they do that use pile lengths of 30 feet to 50 feet.
- The ultimate limit state load of the pile (ULS) 1,600 kN to 2,000 kN ULS which is based on 3,200 4,000 kN mobilized geotechnical resistance.
- Cost of mobilizing the excavator system verses a crane system.

It is possible that a single remote job can more than pay for the rent or purchase cost of the EML system when compared to a crane mounted pile driving system. ■

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