INTRODUCTION
Located in Hamilton, Ontario, Canada, Berminghammer Foundation Equipment is a manufacturer of advanced foundation equipment with over 50 years of experience. The company is represented in more than 40 countries worldwide, maintains an extensive Research and Development team, and has earned a reputation for finding the most practical solutions to the most challenging projects.

The Vertical Travel Lead, referred to as “VTL” system, was first developed and patented by C.W. Bermingham in the 1960’s. This lead system was developed in response to the fundamental limitations found in a fixed lead or swinging lead systems. The fixed lead system is well suited to level job sites with few obstructions and has the advantage of fast positioning of the lead. The hanging lead is very adaptable to different elevations and batter piles but takes much longer to position. Therefore the Vertical Travel Lead was developed to combine the advantages of fixed leads, fast and accurate positioning, with the ability to adjust the height of the lead base up or down. The VTL lead is connected to the boom by a sliding connection, which allows the lead to be elevated or lowered below grade. Many have recognized the advantages of the VTL system, and they have become the Industry standard in Canada, US Railway Construction, and many parts of the USA. The structural column of the VTL will resist bending in forward, aft, and side batter positions. The hydraulic spotter is very rugged and will transmit torque to the body of the crane rather than the boom.

Berminghammer Foundation Equipment manufactures many different models of Vertical Travel Leads and many of the first sets are still in service today.

Well-Proven
The Berminghammer Vertical Travel Lead system has been used for close to half a century, with installations on every type of crane ranging from 40 ton truck cranes to 300+ ton crawler cranes.

Rugged and Simple
The Berminghammer lead columns are ruggedly built to withstand the daily abuses of pile driving. Leads are available in a wide range of models for drilling and pile driving applications. The lightweight construction, combined with great strength, allow the leads to be used in any number of compound batters—up to 1:2 fore and aft and up to 1:3* side. The leads are simple to rig and un-rig—in some cases, piles are ready for driving in less than 3 hours from arrival onsite. When rigged, the lead can be used as a jib, allowing the crane to be used to set steel, unload trucks, etc., without un-ripping the crane or using a service crane. The slim design of the lead gives the crane operator a better view for faster driving and greater on-site safety. Berminghammer Vertical Travel Leads are made to last, requiring little maintenance.

*While Berminghammer lead systems are ‘geometrically’ capable of ‘side-battering’ it should only be performed when the lead and crane have been specifically designed to do so.
LEAD SPECIFICATIONS

<table>
<thead>
<tr>
<th>Weight / Unit Length *</th>
<th>L-18</th>
<th>L-23</th>
<th>H25</th>
<th>H28</th>
<th>H36</th>
<th>BL-42</th>
<th>BL-57</th>
</tr>
</thead>
<tbody>
<tr>
<td>180 lb/ft (268 kg/m)</td>
<td>230 lb/ft (342 kg/m)</td>
<td>225 lb/ft (335 kg/m)</td>
<td>260 lb/ft (387 kg/m)</td>
<td>360 lb/ft (536 kg/m)</td>
<td>275 lb/ft (409 kg/m)</td>
<td>290 lb/ft (432 kg/m)</td>
<td></td>
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<thead>
<tr>
<th>Width &quot;W&quot;</th>
<th>21.19&quot; (538mm)</th>
<th>21.19&quot; (538mm)</th>
<th>22.50&quot; (572 mm)</th>
<th>25.00&quot; (635 mm)</th>
<th>33.00&quot; (838mm)</th>
<th>42.50&quot; (1080 mm)</th>
<th>57.50&quot; (1461 mm)</th>
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<table>
<thead>
<tr>
<th>Depth &quot;D&quot;</th>
<th>18.75&quot; (476mm)</th>
<th>23.00&quot; (584mm)</th>
<th>25.00&quot; (635 mm)</th>
<th>28.00&quot; (711 mm)</th>
<th>36.00&quot; (914mm)</th>
<th>45.00&quot; (1143mm)</th>
<th>51.00&quot; (1295 mm)</th>
</tr>
</thead>
</table>

| Torque Capability **  | 45,000 ft/lbs (61 kN/m) | 65,000 ft/lbs (88 kN/m) | 200,000 ft/lbs (271 kN/m) | 250,000 ft/lbs (339 kN/m) | 350,000 ft/lbs (475 kN/m) | 80,000 ft/lbs (108 kN/m) | 150,000 ft/lbs (203 kN/m) |

* Typical configuration assumed, weight varies based on number of connection points.  
** System Torque Limits dependent on spotter attachments.

HYDRAULIC SPOTTERS

The spotter is an integral part of the Vertical Travel Leads. Berminghammer spotters are capable of up to 30 degrees side-to-side movement with equalization cylinders that automatically keep the front face of the lead parallel with the front face of the crane. This is very beneficial when driving a straight bent of piles.

Precise control of the hydraulic cylinders from within the crane cab gives precise placement of piles during driving. Both 2 and 3-stage spotters provide a wide range of sizes from 12 feet (3.66 m) retracted to 56 feet (17.07 m) extended. Custom spotters are also available to suit any job.

![Diagram of hydraulic spotters](image)

<table>
<thead>
<tr>
<th>2-STAGE</th>
<th>2-STAGE HIGH TORQUE</th>
<th>3-STAGE</th>
<th>3-STAGE HEAVY DUTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>HHH-12</td>
<td>HHH-14</td>
<td>HHH-16</td>
<td>HHH-18</td>
</tr>
<tr>
<td>Retracted Length &quot;A&quot;</td>
<td>16' 11&quot; (4.55m)</td>
<td>16' 11&quot; (5.16m)</td>
<td>18' 11&quot; (5.77m)</td>
</tr>
<tr>
<td>Extended Length &quot;B&quot;</td>
<td>26' 8&quot; (7.52m)</td>
<td>26' 8&quot; (8.74m)</td>
<td>32' 7&quot; (9.93m)</td>
</tr>
<tr>
<td>Heel Width &quot;C&quot;</td>
<td>58&quot; (1.47m)</td>
<td>58&quot; (1.47m)</td>
<td>58&quot; (1.47m)</td>
</tr>
<tr>
<td>Max. Slewing Angle &quot;D&quot;</td>
<td>30°</td>
<td>30°</td>
<td>30°</td>
</tr>
<tr>
<td>Max. Torque **</td>
<td>80,000 ft-lbs (108.5 kN/m)</td>
<td>80,000 ft-lbs (108.5 kN/m)</td>
<td>80,000 ft-lbs (108.5 kN/m)</td>
</tr>
<tr>
<td>Weight</td>
<td>5250lb (2380kg)</td>
<td>5650lb (2500kg)</td>
<td>6100lb (2790kg)</td>
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Notes
- Standard Spoter Light-to-Medium Drilling
- High Torque Drilling: Larger Range of In/Out Systems with a Large Range of In/Out Batteries
- Heavy Duty Frames for Drilling or On-Site with Side Loading

* No equalizing  ** To achieve maximum torque values, additional components are required.
LEAD STYLES

<table>
<thead>
<tr>
<th>Vertical Travel</th>
<th>Semi-Fixed</th>
<th>Fixed</th>
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<tbody>
<tr>
<td>Hanging Offshore</td>
<td>Flying</td>
<td></td>
</tr>
<tr>
<td>Bridled</td>
<td>Free Floating</td>
<td>Fixed Underhung</td>
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BENEFITS

**VTL VS HANGING LEADS**

Berminghammer Leads have been designed to increase the productivity of the pile driving operation. This is accomplished by minimizing the movement of the crane, and by decreasing the time spent placing the pile under the hammer and spotting of the pile.

On a typical project, the actual productive driving time may be increased from an average of 50% of the work day to 75% or more.

The daily cost of the Vertical Travel Leads is less than the daily cost of a four-man crew and swinging/hanging lead.

The VTL contractor will begin to save after nine months. An additional cost benefit will result from the increased production and reduction in false-work and templates that are no longer required.

**SINGLE STROKE PILING & ONE-PASS DRILLING**

Installing foundation elements in segments can be time consuming and expensive. Berminghammer Leads are often used in situations where traditional Piling and Drilling rigs cannot achieve the required pile length or drill depth without splicing. Splicing is a tedious task that is a production killer. It ties up the piling rig while it is used to support the pile and weld on another section.

If you can eliminate driving or drilling in two sections, you significantly reduce the entire installation process. Larger diameter piles can take days to splice together, when there are thousands of piles driving without a splice can save months on schedules.

Another type of single stroke is one-pass drilling.

For years piles have been installed to bedrock using vibratory hammers, then they would be cleaned using hammer grabs and then a rock drilling tool would be used to drill out the socket. With one-pass drilling all of the different tools (vibro/hammer grab) are eliminated in favour of a one entry system.

This advanced pile installation technique involves locking a pile onto the drill bit and evacuating spoils while inserting. When rock is reached, the drill bit is disengaged from the pile and proceeds to drill through the rock without having to ever re-enter the pile.
Berminghammer engineers also make use of field instrumentation and laboratory experiments to refine and optimize the design of our equipment. Measurements of strain, pressure, temperature, and load are made on a regular basis using in-house expertise and equipment. For larger instrumentation and research projects, Berminghammer frequently partners with other companies and universities.

In the field of foundation equipment, Berminghammer's engineering expertise is second-to-none.
ACCESSORIES AND INNOVATIONS

Power Pack Brackets
Allow a power pack to be mounted to the rear of the crane

Crane Hydraulic Retrofit for VTL
Utilizes existing crane hydraulics to run Berminghammer VTL functions

Stand Alone Valves (SAV)
Allows a customer to utilize an existing Vibro powerpack to run Berminghammer VTL functions

Vibro Slides
Allows for guided precise utilization of a vibratory hammer.

Wick Drain Dispensors
Controlled / tensioned release of the wick drain

Custom Gibs / Guides for Any Tool
Put any tool on Berminghammer Leads

Side Mounted Augers
For pre-drilling before driving concrete piles

Lead Rig-up Hinge
For very long lead set-ups the, the rig-up hinge design removes the need for a support

HOW TO CONTACT US

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