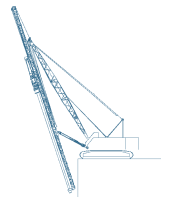
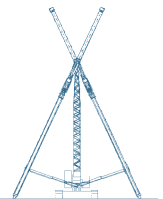


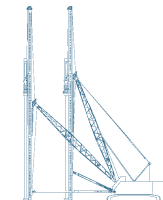
Vertical Configuration



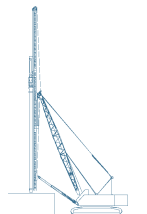
Aft Batter Below Grade



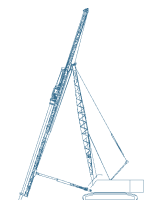
Side Batter



Forward Reach



Raised Leads Above Grade



Forward Batter

# LEAD SYSTEM

**Located in Hamilton, Ontario Canada, Berminghammer Foundation Equipment, is a manufacturer of advanced foundation equipment with 30 years of experience. The company is represented in more than 20 countries world wide, 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 1970's. This lead system was developed in response to the fundamental limitations of either a fixed lead or hanging lead system. The fixed lead system is well suited to level job sites with few obstructions and has the advantage of faster 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. 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.

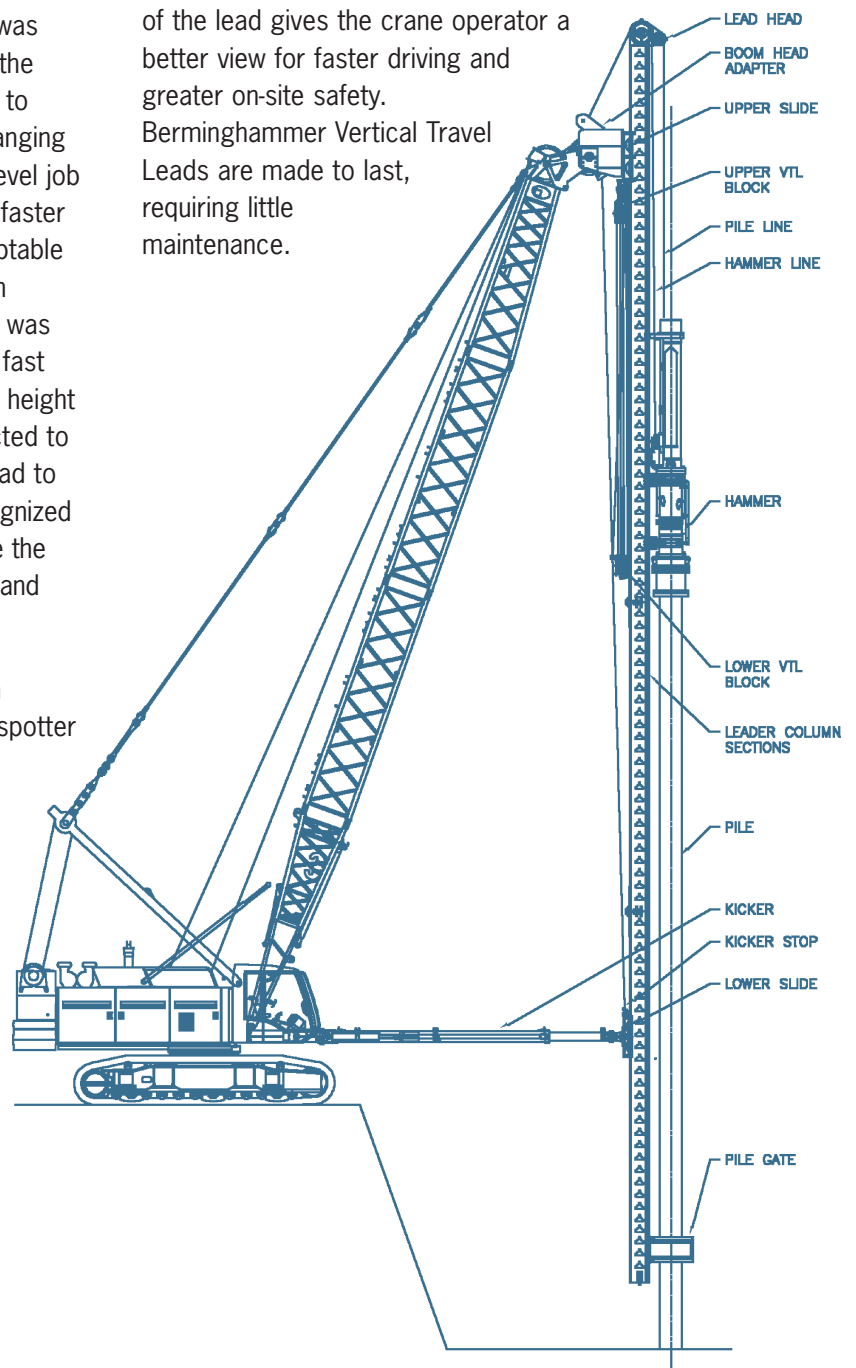
Berminghammer Foundation Equipment manufactures seven different models of Vertical Travel Leads and many of the first sets are still in service today.

## Well-Proven

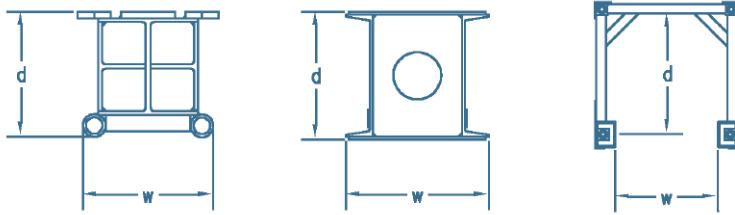
The Berminghammer Vertical Travel Lead system has been used for over thirty years, with installations on every type of crane.

## Rugged and Simple

The lead columns are ruggedly built to withstand the daily abuses of pile driving, even at the expense of extra weight. The spud-type lead weighs less than the conventional box-type lead, with a range of 95 to 400 pounds per foot. 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 on site. When rigged, the lead can be used as a jib, allowing the crane to be used to set steel, unload trucks, etc., without un-rigging 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.



# LEAD SPECIFICATIONS



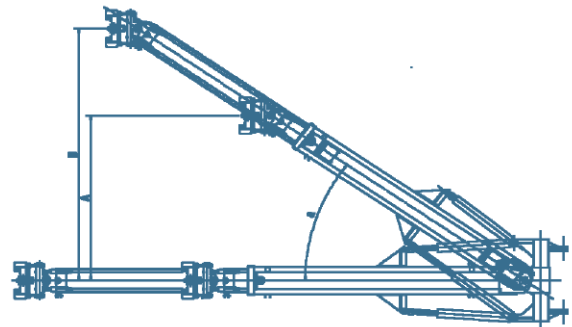
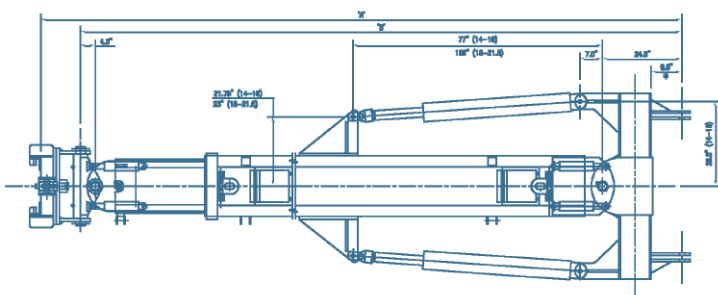
MODEL		'C-12'	L-15	L-18	L-23	L-27	L-36	Box 26	Box 32	Box 37
Weight/Unit Lenth	lb / ft	85	127	148	235	310	400	110	160	220
	kg / m	127	165	220	350	461	595	165	240	328
Width – w	in	17	20	21	21.2	25.25	30.4	26.5	32.5	37.5
	mm	432	508	533	538	641	772	673	826	953
Depth – d	in	12.63	15.63	18.75	23	27	36	27	38.5	53
	mm	321	397	476	584	686	914	686	978	1346
Recommended max. hammer weight	lb	10 000	18 000	34 000	46 000	58 000	70 000	20 000	34 000	50 000
	kg	4 500	8 200	15 400	20 800	26 300	31 800	9 100	15 400	22 700

## HYDRAULIC KICKERS

The kicker is an integral part of the Vertical Travel Leads, capable of up to 36 degrees side-to-side swing and can extend to over twice its pin-to-pin retracted length. Equalization cylinders 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. A wide range of sizes (from 13 feet (3.96 m) retracted to 25 feet (7.62 m) extended) and types of kickers (both manual and hydraulic) are available to suit any job.

Single Stage Kicker dimensions



Showing extended and retracted lengths Shown with 58" wide Heel Bracket, others available)

\*For kickers with drop type lugs, this dimension is 4 3/4"

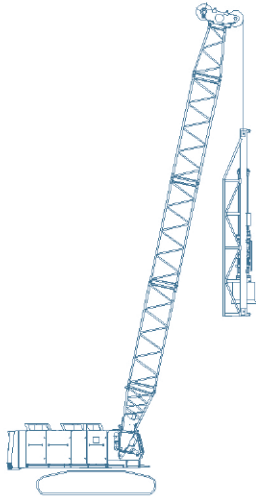
KICKER MODEL	MHH-14	M/HHH-16	HHH-18	HHH-20	HHH-21.5
Dimension 'A' Retracted	18'-8"	20'-8"	22'-9"	24'-9"	26'-3"
Dimension 'A' Extended	30'-1"	34'	38'-1"	42'-1"	45'-1"
Dimension 'B' Retracted	17'-7"	19'-7"	21'-8"	23'-8"	25'-3"
Dimension 'B' Extended	29'	32'-11"	37'	41'	44'
Max. Angle - Horizontal slewing	33.0 °	33.0 °	33.0 °	33.0 °	33.0 °
Maximum Slew - Retracted ("A")	8'-3"	9'-4"	10'-6"	11'-7"	12'-5"
Maximum Slew - Extended ("B")	14'-6"	16'-7"	18'-10"	21'	22'-8"

Note: The five most popular kicker models are listed above – many more models are available. Information on other kicker models is available upon request.

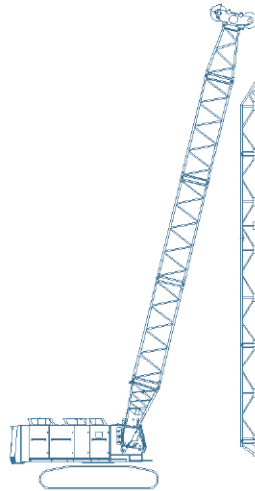


# LEAD STYLES

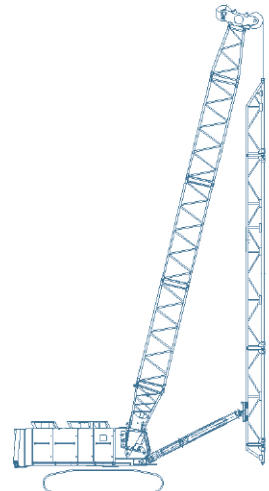
**Offshore Hanging Box Lead**



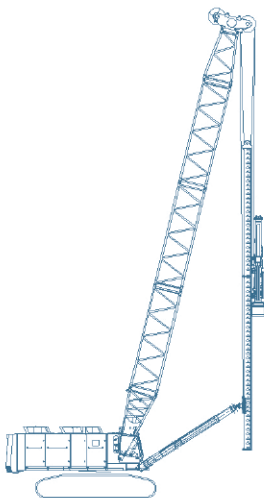
**Hanging Box Lead**



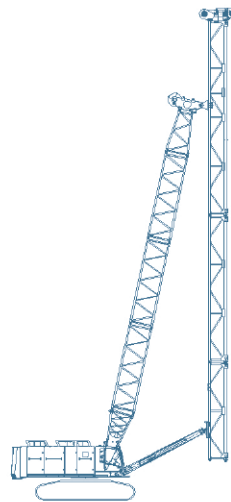
**Semi - Fixed Box Lead**



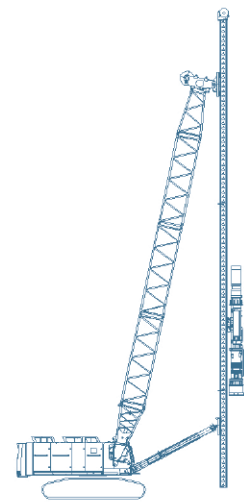
**Semi - Fixed Lead System**



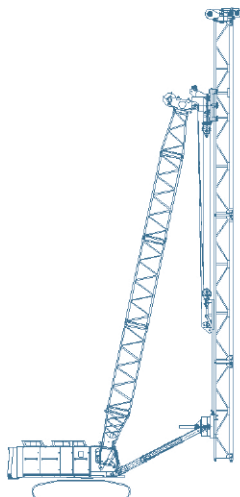
**Fixed Box Lead System**



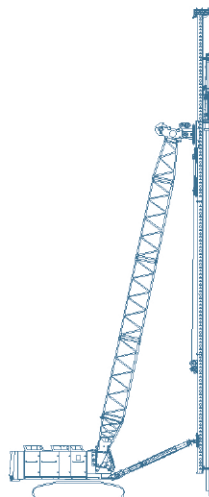
**Fixed Lead System**



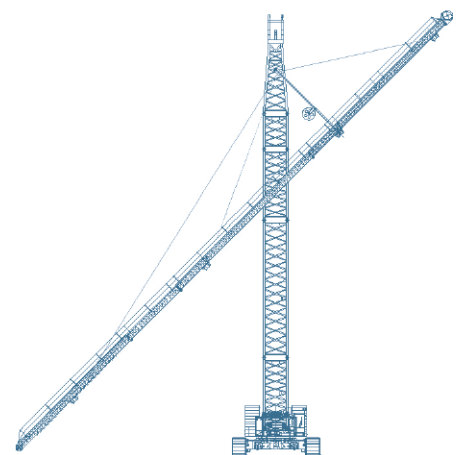
**Vertical Travel Box Lead**



**Vertical Travel Lead**



**Swinging Lead System**



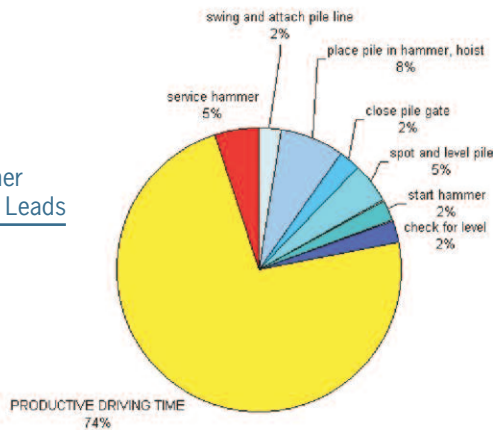
# BENEFIT

Birmingham Leads have been designed to increase the productivity of the pile driving crew. By minimizing the movement of the crane, the time spent placing the pile under the hammer and spotting of the pile.

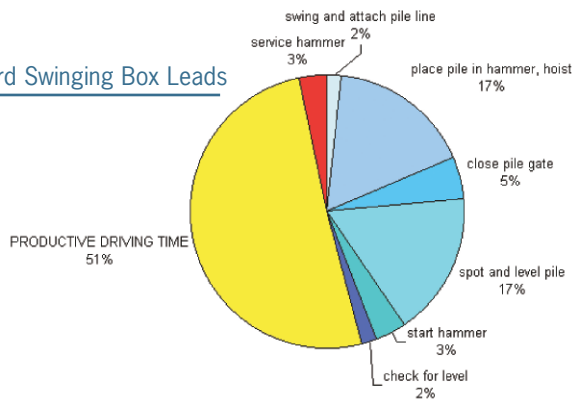
The actual productive driving time may be increased from an industry average of 50% of the workday to 75% or more.

At the "BIG DIG" Nicholson saw an increase from 5 insertions per day with a custom European piling rig to 12 insertions per day with a Birmingham Vertical Travel Lead on a Manitowoc M-250.

## Birmingham Vertical Travel Leads



## Standard Swinging Box Leads



# SAFETY

Birmingham Foundation Equipment (BFE) lead systems are engineered to meet the requirements of the project without exceeding the limits of the crane.

Safe operating limits can be established in advance and BFE's kickers contain safety stops, which prevent these limits from being exceeded.

The primary increase in safety results from the smaller work crew size required to carry out the work. The piles are placed with the aid of the hydraulic spotter and lead. The crane operator and front end man are all that are required. The spotter and not the men position the piles.

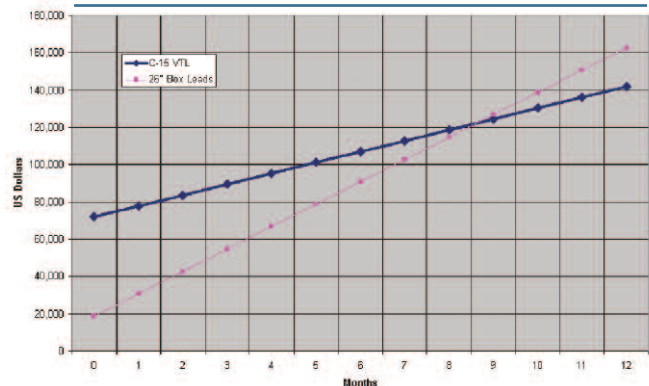
# COST BENEFIT

The daily cost of the Vertical Travel Leads is less than the daily cost of a four-man crew and manual lead. However the initial purchase price is higher.

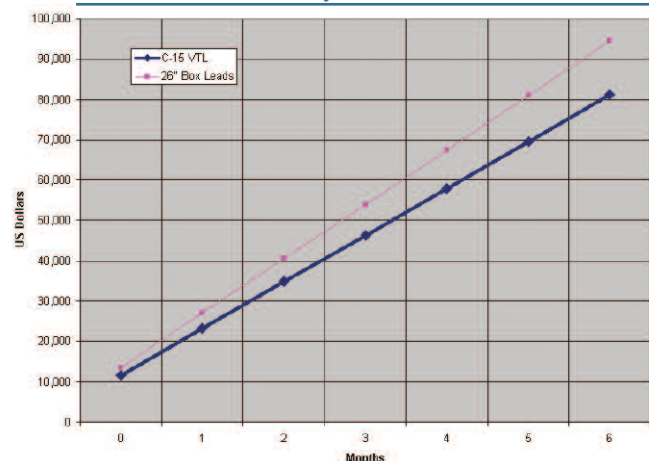
After a nine month period the cost of operating a hanging lead system will be greater than the cost of a complete Vertical Travel System.

An additional cost benefit will result from the increased production and reduction in false work and templates that are no longer required.

## Lead Comparison Based on Rental – Numbers based on Rental Rate + Work crew labour Costs



## Lead Comparison – Numbers based on Initial Purchase + Monthly Crew Labour costs



# ACCURACY

Hydraulic positioning of the lead and pile provides greater accuracy and consistency in driving piles.

Batter Piles can easily be driven to tight tolerances and the Vertical Travel Lead provides an improved alignment between hammer and pile.

The Vertical Travel Lead System allows for fast and accurate positioning and alignment during splicing and re-driving of piles increasing productivity

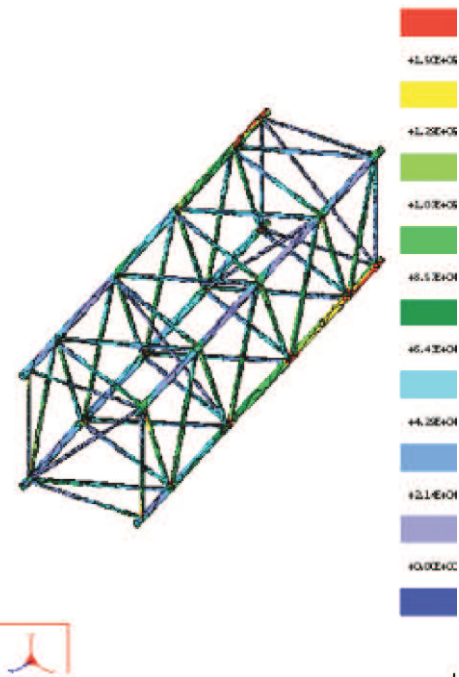
# ENGINEERING

Birmingham employs a staff of licensed civil, geotechnical, and mechanical engineers as well as draftsmen, designers and technicians. These professionals provide the highest level of technical expertise in the design and engineering of Birmingham leader systems.

To supplement our years of experience the Birmingham engineering staff use state-of-the-art design tools such as the latest versions of CAD software including 3-D modeling and finite-element analysis.

Birmingham 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, Birmingham frequently partners with other companies and universities.

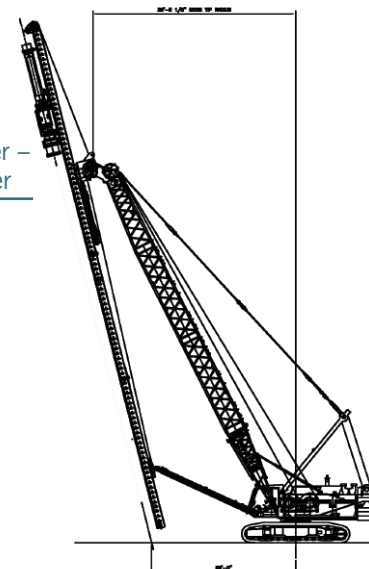
In the field of foundation equipment, Birmingham's engineering expertise is second-to-none.



1:4 Forward Batter –  
HHH 18 Kicker



1:4 AFT Batter –  
HHH 18 Kicker



Equivalent Weight Chart

## Example #1:

Hammer Model	4505
Pile CL Radius from Crane CL	46.00 feet
Resulting Boom Tip Radius	19.15 feet
Ratio	240%

Component	Actual Weight lbs	Equivalent Weight lbs	Ratio
Lead	17500	27872	1.59
Head Box	3000	3413	1.14
Hammer	17600	39174	2.23
Pile	0	0	
Kicker	7500	8922	1.19

## Example #2:

Hammer Model	3505
Pile CL Radius from Crane CL	28.00 feet
Resulting Boom Tip Radius	39.43 feet
Ratio	71%

Component	Actual Weight lbs	Equivalent Weight lbs	Ratio
Lead	17500	16983	0.97
Head Box	3000	3201	1.07
Hammer	12000	15034	1.25
Pile	5000	4876	0.98
Kicker	7500	3282	0.44





Drilling Rock Sockets Bermingham Construction

Leads may be used to resist torque and provide additional crowding force when drilling rock sockets with reverse circulation drills.



Driving 90 ft long H-piles PCL

Long leads can be used to drive piling in one piece eliminating splicing in the lead. It is possible to drive in excess of 4,000 feet per day.



Soil Mixing SMW Seiko

Berminghammer Foundation Equipment supplied 3 sets of 150 ft long leads for the "BIG DIG" central artery project.

Each lead system was designed to maintain verticality and resist pull out forces up to 100 tons.



Crawler Cranes  
Gulf Intracoastal

Berminghammer has supplied lead systems for almost every make of crawler crane from 30 ton to 300 ton capacity.



Railroad Cranes  
Burlington Northern Santa Fe

Almost every major US railway utilizes Vertical Travel Leads to build trestle bridges.

Locomotive cranes can travel while fully rigged and start driving as soon as they reach the bridge site.



Mobile Cranes  
Used for military applications

Accurate positioning of piles combined with high mobility and a simple rig up make this a great combination for small jobs



# ACCESSORIES

## Lead Extensions

- Various lead extensions are available for specific applications

## Pile Gates

- Bermingham manufactures a complete line of pile gates to be used with all types of lead systems and piles

## Head Boxes

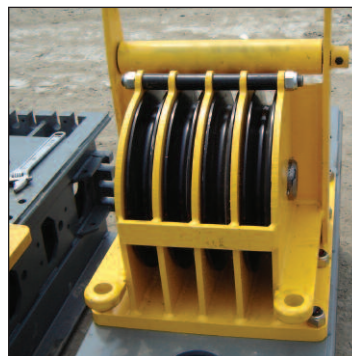
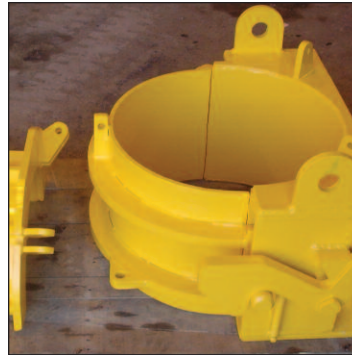
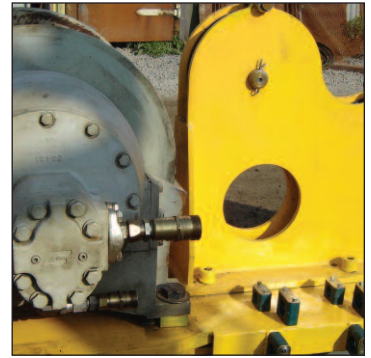
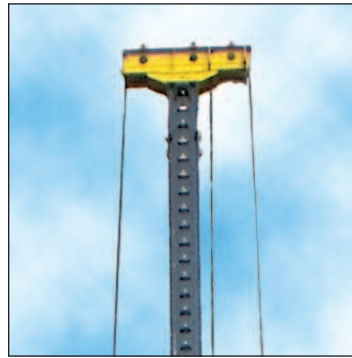
- A variety of standard head boxes to attach the lead system to the crane boom tip are available.
- Custom head box and lead attachments are available to suit virtually any railroad or crawler crane.

## Hydraulic Power Sources

- Bermingham may retrofit the clients' crane with hydraulic controls mounted in the operators cabin to control the lead systems.
- An independent hydraulic power pack may be supplied to operate the lead system.

## Winches

- A Vertical Travel Lead System requires 4 lines to make use of all the advantages of the systems design.
- Additional winches may be added to existing 2 and 3 drum cranes.



### **BERMINGHAM** FOUNDATION SOLUTIONS SINCE 1897

Wellington Street Marine  
Terminal, Hamilton Ontario,  
Canada L8L 4Z9

Tel: +1.905.528.0425

Fax: +1.905.528.6187

Toll-Free: +1.800.668.9432

(Canada & USA)

E-Mail: [bfssales@bermingham.com](mailto:bfssales@bermingham.com)

Web: [www.bermingham.com](http://www.bermingham.com)

*Bermingham Foundation Equipment  
and Bermingham Foundation Solutions  
are divisions of  
Bermingham Construction Limited.*

*Copyright ©2008  
Bermingham Construction Limited.*

*Revised 2010*