

Introducing the PDA-8G

Pile Dynamics completely revamps its Pile Driving Analyzer® system

By Judy Penz Sheluk

Pile Dynamics recently announced the release of the PDA-8G, a complete redesign of its Pile Driving Analyzer® (PDA) system, the most widely employed system for dynamic load tests of any type of deep foundation. Like previous PDAs, of which some 2,000 have been sold around the world over 40 years, this eighth generation model performs the test normalized by the American Society of Testing and Materials standard ASTM D4945.

“The dynamic load test has been accepted for many decades as an alternative for static load tests in more than 100 countries around the world,” said Gina Beim, senior consulting engineer and marketing director for Pile Dynamics. “It takes place either during pile driving or when a substantial mass impacts a non-driven pile. At each impact, the PDA takes data obtained by sensors (accelerometers and strain transducers) attached to the pile and calculates bearing capacity and other quantities.”

PDA history

Attempts to determine pile capacity using dynamic analysis date back to the 19th century, when a dynamic formula that considered the energy of the pile driving hammer and the set of the pile was developed to find bearing capacity. In the

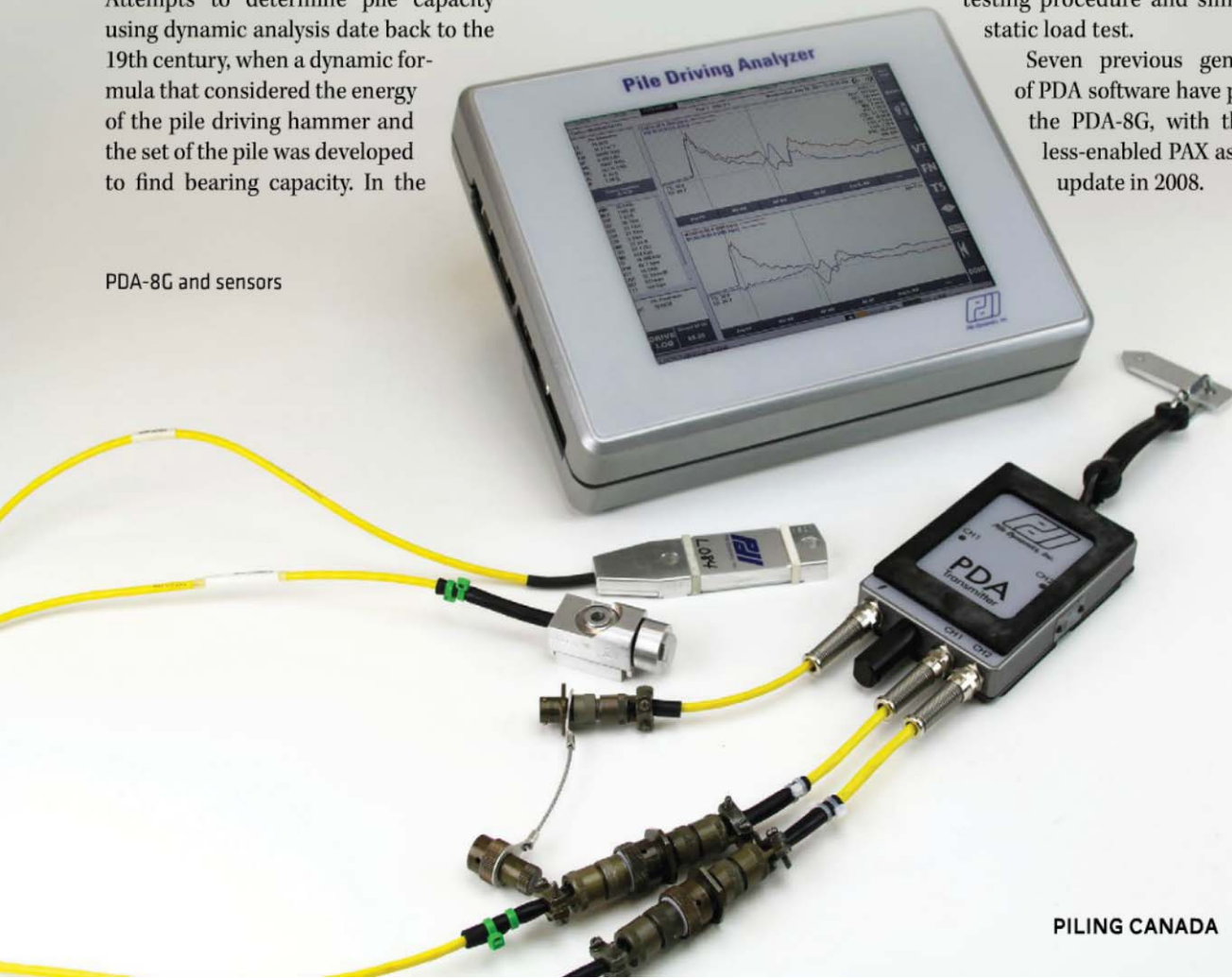
early 1940s, the results of a large study on dynamic formulas was published and discussed by prominent engineers. Those scholars concluded that none of the formulas were accurate and recommended instead the use of static loading tests to determine pile capacity.

In 1964, in an effort to develop an alternate technology to the traditional static load test, the Ohio Department of Transportation funded a research project at what is now Case Western Reserve University. The initial effort resulted in an electronic device that would display, for each hammer blow, the bearing capacity of a pile based on fundamental stress wave theory. The PDA system for dynamic foundation testing was born.

Pile Dynamics, Inc. was formed in 1972 to commercialize the PDA and its associated software, now known as CAPWAP® (CAsE Pile Wave Analysis Program), a program that estimates total bearing capacity of a pile or shaft, as well as resistance distribution along the shaft and at the toe. Essentially, CAPWAP completes the dynamic load testing procedure and simulates a static load test.

Seven previous generations of PDA software have predated the PDA-8G, with the wireless-enabled PAX as the last update in 2008.

PDA-8G and sensors



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New vs. Old

PDA-8G	PAX
High resolution colour XGA (1024 X 768) 10.4-inch LED LCD display enhanced for outdoor viewing	VGA (640 X 480) 8.4" LCD display
Touchscreen interface with multi-touch features, rugged, resistant to dirt, scratching and water	Single point touchscreen
Any sensor may be connected to any data acquisition channel; any combination of strain transducers and accelerometers is possible	Each data acquisition channel dedicated to either accelerometers or strain transducers, and separate wireless transmitters required for each type of accelerometer (piezoelectric or piezoresistive)
All data acquisition channels accept traditional (wired) or wireless smart sensors	Only accepted wireless smart sensors, traditional sensors did not operate in smart mode (smart sensors transmit their calibration to the PDA, eliminating need for manual input)
Acquires data from up to eight wireless sensors	Acquired data from four wireless sensors maximum (when operating with four sensors, at least four had to be traditional)
Data from wireless sensors collected at 120 blows per minute	Data from wireless sensors collected at 85 blows per minute
Built in VGA and HDMI external video connections	Built in VGA only
Four USB connections	Two USB connections



PDA-8G in use to monitor installation of driven piles on the Eastbound span of the George V. Voinovich Bridge (commonly known as Innerbelt Bridge), which spans the Cuyahoga River on Interstate 90 in Cleveland, Ohio

“Technology has advanced rapidly since that time, and the PDA-8G is reflective of those advancements,” said Beim. “For example, the PAX allowed for nine quantities to be displayed during the test; in the new PDA-8G these quantities number more than 230, providing a trove of information to the geotechnical engineer, who doesn’t even need to be at the job site.”

The new model also makes Pile Dynamic’s patented SiteLink® technology – a method to transmit test data in real-time from the field to an office computer at an alternate location – easier to use.

“The majority of engineers will probably still use the PDA-8G in the field,” said Beim. “For them, Pile Dynamics made a tablet-like PDA that is thinner than previous models,



PDA from the 1980s

light, ergonomic, and with a high visibility water-resistant touch screen display that is highly impervious to dirt and scratching, and responds to gesture controls like swiping and pinch-to-zoom.”

The PDA-8G is being offered with either four or eight universal channels of data acquisition, all compatible with both cabled and wireless sensors. This enhancement from previous models, which offered four channels with wireless sensors only, is of particular interest to those who test large diameter shafts.

“Data transfer from the sensors to the PDA-8G is extremely fast, suitable to test piles driven with high blow rate hydraulic hammers,” said Beim. “The PDA-S software includes extensive data input help and output customization, and two real time capacity calculation methods (CASE and iCAP®, which is similar to the CAPWAP data analysis software). A new version of CAPWAP is also being released. All PDA systems include licenses of CAPWAP, the GRLWEAP Wave Equation Analysis software and the complete PDA software suite.”

Pile Dynamics has a worldwide network of representatives and offers a host of other systems for quality assurance of deep foundations in addition to the PDA.

For more information, visit www.pile.com/PDA. ☺