

PAL-R Remote Pile Driving Analyzer™

The PAL-R is a device that monitors pile installation from a remote location. It records and processes force and velocity signals obtained during pile driving, during a pile restrike or by impacting a non driven pile or shaft with a drop weight. Signals are obtained by attaching reusable strain transducers and accelerometers to the pile shaft.

The PAL-R changes the way pile driving instrumentation and dynamic pile testing are done. Before this innovation, an engineer had to travel to the job site to operate a Pile Driving Analyzer and obtain the necessary signals for these tests. With the PAL-R ("R" is for remote) only the equipment is sent to the site. Technicians or the pile crew can be trained to install the required sensors on the pile to be tested, connect the sensors to the PAL-R, and dial up the engineer's office. The engineer remains in the office and operates the PAL-R via a cell phone connection to the job site. Special software (PDA-W) in the engineer's office computer uses the force and velocity signals to estimate pile capacity by the Case Method, driving stresses, hammer efficiency and pile integrity, all in real time.

The advantages of this development are clear: no travel time or expenses for the engineer and the same real time results as if the engineer were on site. One engineer can even monitor several sites at once, provided that more than one PAL-R is available. Furthermore, the engineer can immediately start the post processing and analysis of the data obtained in the field. In the past, the post processing could only be performed upon the engineer's return to the office sometimes several days after the data was acquired.

For situations when a cell phone connection is unavailable or not desirable, two other modes of operation of the equipment are possible: data collection only (stored data is transmitted at a later time) and local mode (direct connection to a laptop running PDA-W software on site, with the testing engineer present).

Equipment specifications are:

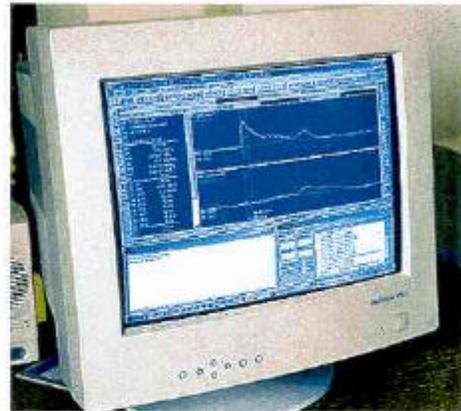
- size: 110mm by 175 mm by 200mm weight: 3.2 kg
- four channels of data acquisition (two for strain, two for acceleration) high contrast touch screen display doubles as keyboard
- 40 MB PCMCIA removable flash memory card
- Serial port for data output and transfer
- Powered from either internal batteries, car battery or 100-240 VAC

The PAL-R was developed by the engineers of Pile Dynamics, Inc., in Cleveland, Ohio, between 1996 and 1998. In 1999, it was made commercially available to consulting engineering firms specializing in foundation testing and analysis. To this date, it has been acquired by companies in Sweden, Australia, Honduras and Brazil.

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PAL-R, carrying case and cell phone



PAL-R screen as seen in the office . Lower left corner is reserved for sending and receiving short messages (e.g., "ready to drive").

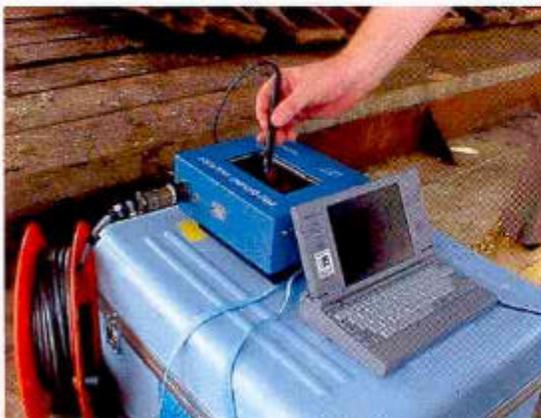
Proyecto Reftexsa in San Pedro Sula, Honduras



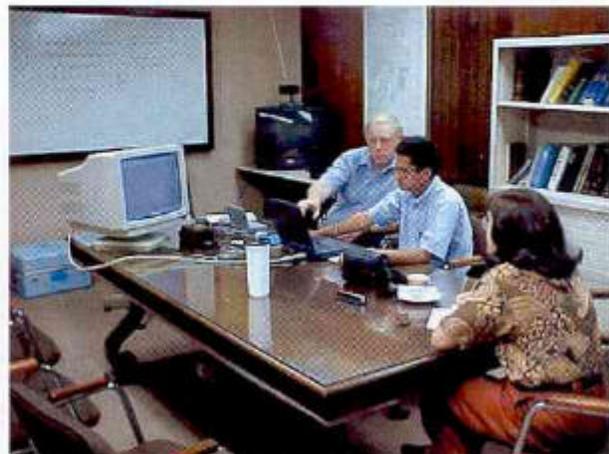
Attaching sensors to pile.



Driving pile: sensors are inside red square, connected by cable to PAL-R.



PAL-R receives signals from sensors. Field operation is minimal, and done by touching screen with special pen. Laptop is optional.



Engineers control PAL-R operation and follow driving from the office.