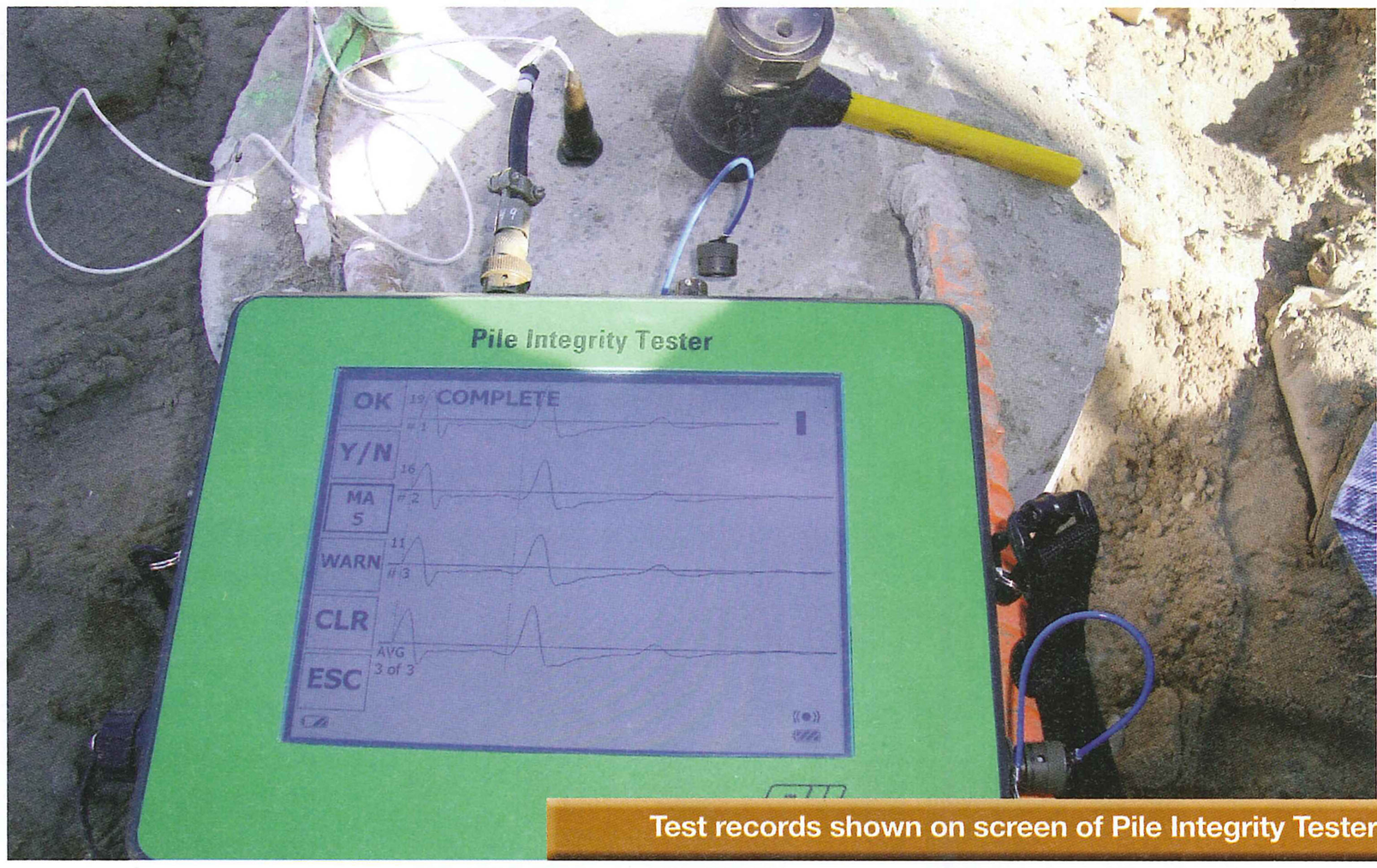
School with Tsunami-Safe Floor Undergoes Testing

The new **Ocosta Elementary School** in Westport in the state of Washington in the Northwest coast of the USA, will have an upper floor dedicated to providing a safe haven in the event of a tsunami. The geographic location of the school makes it vulnerable to a tsunami in the event of a large earthquake. The evacuation floor is located above the gymnasium. This will be North America's first vertical evacuation site. **TCF Architecture PLLC** from Tacoma, WA was the architectural designer of the new building, which is founded on augered cast-in-place piles. The Washington office of **GRL Engineers, Inc.** provided the quality assurance / quality control for the foundations in January of 2015. Thirteen of the piles were selected for evaluation by Thermal Integrity Profiling, while 53 were subject to low-strain dynamic testing. Thermal Integrity Profiling was conducted soon after pile installation, during the initial phases of curing of the cement. This test consisted of attaching two diametrically opposed Thermal Wire® cables to the pile reinforcing cage prior to grouting. The cables, manufactured by **Pile Dynamics, Inc.**, contain digital temperature sensors at every 30 cm. The end of the cables was connected to a data acquisition port that registered temperatures measured along the entire length of the piles, and later processed with the aid of a Thermal Integrity Profiler instrument. An examination of the heat generated during pile curing revealed no abnormally cool temperatures, which would have flagged a potential flaw. This testing method also allowed the evaluation of the verticality and centering of the reinforcement cage – both were deemed adequate. The testing objectives of low strain dynamic testing included the evaluation of the general structural integrity of the piles, within the capability and limitations of the pulse echo test method. Tests were performed by attaching a small accelerometer to the top of each of the eight foundation elements, and striking each with hand held hammers weighting approximately 1 and 3 kg. A Pile Integrity Tester, manufactured by Pile Dynamics Inc., recorded the signals registered by the accelerometer. The engineering interpretations of the test records were indicative of sound shafts in all eight piles. The building was scheduled to be operational for the start of the school year in the fall of 2015.



Test records shown on screen of Pile Integrity Tester

Evacuation floor, located above the gymnasium

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