

MAY 10, 2006 - Instrumentation for Auger Cast Piles and Pile Driving

Speaker: [Gina Beim, P.E.](#), Senior Consulting Engineer with [Pile Dynamics Inc./GRL Engineers](#)

PRESENTATION SUMMARY

To a room of about 45, Gina Beim, P.E. (Licensed in the State of Ohio), who holds a BS in Civil Engineering from the Pontifical Catholic University of Rio de Janeiro, in Brazil, an MS in Engineering from Case Western Reserve University, in Cleveland, and an MBA, also from Case, gave a presentation entitled, "Instrumentation for Driven and Auger Cast in Place Piles."

Ms. Beim began with a discussion of the analysis of driven piles, introducing the "Case Method", developed at the Case Institute of Technology during the late 1960s, and used for analyzing piles in real-time during driving. The Case Method employs the fundamentals of the one-dimensional wave propagation for impact driven piles. In this method, the pile is monitored on a per blow basis using a computer attached to strain transducer and accelerometer sensors bolted two to three diameters below the pile head. Output data includes pile stresses, pile integrity (i.e., crack existence), hammer performance and soil resistance. The soil resistance can be broken down to static and dynamic components by assuming a damping factor. Given the soil profile from the geotechnical report, typical damping factors used vary from 0.3 - 0.4 for gravel to 0.8 - 0.9 for clay.



Ms. Beim then discussed analysis of Auger Cast In Place (AGIP) piles. During AGIP construction, typical monitoring gives output on torque, penetration, and grout volume. After the grout sets, a special drop-weight apparatus can be used to test the AGIP integrity where the weight of drop weight is as little as one percent of the pile resistance. She said this type of monitoring was relatively new and she referred to research in this area by the late Dr. Mike O'Neill of University of Houston (See Dr. O'Neill's [FPA Presentation summary](#) on this subject July 2002)

Ms. Beim said it was also possible to test ACIP pile integrity using a low-strain method consisting of installing an accelerometer at the pilehead and then hitting the pilehead with a hand-held hammer. This inexpensive method allows testing for an early reflection that is due to a discontinuity in the placed grout. She said more data could be attained on larger ACIP piles using cross hole sonic testing. This is done by installing open vertical tubes at say 90 degree spacing in the wet grout and then using sonic techniques at various penetrations to check for grout discontinuities along the pile.

[PAST PRESENTATIONS \(click here\)](#)