

## **JULY 31, 2002 - Design and Construction of Augered Cast-in-Place Concrete Piles**

Speaker: [Dr. Mike O'Neill, P.E.](#), Cullen Distinguished Professor, Department of Civil and Environmental Engineering, University of Houston

[Dr. Mike O'Neill, P.E.](#), Professor of Civil Engineering at the University of Houston, Main Campus, gave a PowerPoint presentation entitled "Augered Cast in Place (ACIP) Piles for Bridge Foundations" to a room of about 25. In 2000, Mike presented a paper the lateral design of ACIP piles. In this presentation, he presented the axial design of ACIP piles. He believes local foundation engineers can use them for buildings under 20 stories (he said mat foundations make more sense over 20 stories here) and that they could be adapted to residential work if the construction equipment were to be downsized.

Dr. O'Neill described research he is doing for TxDot as they are now considering the use of ACIP piles for their bridges. He reported that although ACIP piles had been used for 35 years successfully, they are just now being considered for the public sector because of their economy and other advantages over driven or drilled cast in place (DCIP) piles. Based on the results to date, he believes both TxDot and FHWA will qualify ACIP piles for use on their future projects.

Mike showed data from monitoring test ACIP piles at four Texas sites with different stratifications, one being at UH Main Campus and the fourth being an implementation site with 69 - 18" dia. ACIP piles now being installed for a bridge in Crossley TX. Some of the latter are battered at 4:1 and some are as long as 67 ft.

His findings as far as axial capacity were that the load transfer in clays were the same as for driven or DCIP concrete piles. But for sands, the skin friction had to be reduced from traditional equations, with up to a 66 percent reduction in loose sands. He also found that in loose sands he used 90 percent more grout that the diameter dictated whereas 40 percent was lost elsewhere.

Dr. O'Neill described the construction sequence for ACIP piles as follows:

1. Auger the hole with a single flight auger, keeping the auger in the hole.
2. Pump grout down the auger's center hole, blowing out the expendable hole plug at the auger bottom.
3. Reverse/withdraw the auger (and soil cuttings) as grout is pumped in from the bottom, traveling about half the speed during withdrawal as during the original insertion.
4. Monitor the grout volumes and pressures during withdrawal. The overpressure should be maintained at about 30 psi.
5. If grout volumes or pressures are low during withdrawal (these are checked in real-time by the rig operator), simply reverse the rig and re-drill and re-grout in the deficient zone.
6. When the auger is out of the hole, drop in the reinforcing steel cage within the 10 minute set-time window allowed by the grout. In the case of battered piles, use a centralizer tied to the steel cage (they used pvc pipe skids in the Crossley piles).

Mike thanks for giving this presentation to our group.

To download a copy of Dr. O'Neill's actual ASCE presentation in Adobe Acrobat format, [click here](#).

To read summaries of Dr. O'Neill's previous FPA presentations, click [July 2001 - Geostatistics](#), and [December 2000 - The results of using isolation tubes around pier shafts](#)

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