Presenters and Presentation Summaries

The PDCA, in corporation with the PDCA education committee, has gone to great lengths to put together general session presentations that contain valuable information on pile driving efficiency, technological advances, natural disaster response efforts and their effect on the pile driving industry, as well as research projects and case studies.

You don't want to miss this opportunity!

The Top Ten Reasons for Choosing Driven Piles

Gerry McShane, Service Steel Warehouse

The purpose of this presentation is to review the merits of the driven pile and see how it compares to cast in place alternatives. Particularly to look at where it fits competitively into today's highly competitive construction environment with volatile material prices. The large variety of piling options available can be daunting for the designer or developer. However, in many cases selecting the most appropriate pile to meet the structural loading yet remain with budget can be achieved by understanding the strengths and weaknesses of each and being aware of project priorities. Having the right knowledge and expertise when selecting a particular piling type is the only way to ensure safe, efficient and cost effective construction. This presentation will examine the top ten reasons for choosing a displacement or non-displacement driven pile solution compared to a cast in place alternative.

H-Piles Selected for Power Plant Project

Scott Newhouse, Bechtel

Detailed site investigation for a large power plant project in the mid-west US showed that heavy plant structures would require deep foundations extending to rock. Preliminary estimates indicated a count of 5,000 to 6,000 piles. A pre-award load testing program was developed to find the optimal pile design. The main goals of the program were to determine variation in driving lengths across the site and pile capacity that could be obtained by driving various size H-piles to rock. All piles driven for the testing phase (test and reaction piles) were tested using dynamic testing PDA); static load testing followed on the designated test piles. The tested H-piles were compared to drilled piles and piers, and other driven pile types. Based on evaluation of cost and schedule, and specifically tons/$ for the foundation, the project selected driven H-piles. The use of H-piles and load testing allowed customizing the pile design, matching capacity with demand. This approach creates an efficient foundation; pile capacity is customized to meet demand without expending cost on surplus capacity.

How Converting an ACIP to Driven Piles Saved the Client's Schedule and Pocketbook

Brent Guthrie, Cajun Deep Foundations, LLC

This presentation is meant to share information in regards to how a contractor assisted both the client and itself by converting originally designed Augered Cast-in-Place Piling to Driven Piling (PCCP and Pipe) on a project in Houston, TX. Brent will detail the efforts that went into estimating, negotiating the conversion from ACIP to driven pile and successfully completing the project within the client's budget and timeframe.

Development of a Total Station with a Concentric Circle Reticle and Navigation System for Pile Driving

Koji Mitani, KUMONOS Corporation

A new measurement method was developed using total stations (TSs) utilizing a concentric circular reticle called "Baum". The Baum replaces a crosshair which can't measure cylindrical structures such as piles, chimneys or corners of pointed structures well. The new "Baum Station" captures objects with circular reticle as it's able to obtain accurate measurements of the above structures using offset calculations. Also, by measuring two different points on the center line, operators can measure the position and tilt of the axes of the cylinder. A new pile navigation system was developed by applying the Baum Station and combining a special software and a portable digital assistant (PDA). This new system allows pile driving contractors to reduce a significant amount of deviation in pile positioning resulting in a decrease in costs compared with when they use conventional pile measuring methods. In this system, the information of the pile position is measured using a TS, transferred to a PDA, and displayed on a screen for the pile driver operator. This system is especially valuable when driving tilted piles, which are very difficult to measure utilizing conventional pile driving methodology.

The Internet of Things: Where is the Industry? And Where are we Going?

Keith Plemmons, The Citadel

Are you looking to apply connective technology to expand your market, create value, reduce costs, automate compliance data, improve safety, while keeping your customers happy? Does your company have a strategy associated with the next technology trend - the internet of things (IoT)? Do you foresee owners/clients requiring contractors, subcontractors, vendors, or other service providers to provide materials, equipment, and/or services in a connected environment?

This session will begin with an introduction to the IoT, then introduce examples of how advanced technologies are being applied, and close with a discussion on how the IoT can benefit your company and construction projects. The purpose is to develop an understanding of the critical technologies which allow decision makers to recognize the capabilities and opportunities associated with the IoT.

Don't blink twice, because the expansion of connected devices is coming to a project near you. Driven by incentives, competitive advantage and contractual requirements, connective technology is making its way into how we communicate, manage, and perform our work. In today's connected environment, the impact of connected devices continues to emerge. This session is for those who want to be proactive and remain competitive.

Presentation Summaries Continued

Efficiency in Piling
Roland Noestler, Liebherr

This presentation will show contractors the benefits and revolutionary design and efficiency concept of our new vibrators, hydraulic impact hammers and lead- systems. Based on case studies or/and test results from our test area we will prove how contractors can be more efficient and thereby more profitable by using new technologies for the pilling industry. For piling work at jobsites with different conditions, a high level of flexibility, efficiency and reliability is required. This not only means a strong carrier machine with good crowd, but also adequate piling attachments of the newest generation. The newly developed cooling system of the new vibrator allows a preheating of the gearbox and a more efficient cooling and lubrication. The symmetrical suspension and new linear guide increases efficiency and at the same time reduces maintenance requirements. At the same time several measures to reduce noise on the jobsite have been taken. A new hydraulic concept of the hammer reduces the required engine power of the carrier machine and makes the job more cost efficient. The pre-setting of both energy (kNm) and frequency output (bpm) is a further innovation. Thanks to a new design of the lead system assembly time is significantly reduced. With the new possibilities on data logging and reporting- systems we can easily verify and proof the accuracy of a pile installation.

Wilmington Bypass Pile Driving
W. Jay Boyd, Balfour Beatty Infrastructure, Inc.

The Wilmington Bypass Project is a four-year, $124 million bridge and roadway project that extends the I-140 loop around Wilmington from Highway 421 to Cedar Hill Road. This section, in conjunction with the concurrently running A-section, will complete the bypass around Wilmington. The project is approximately 3 miles long, with 1.5 miles of new bridges and 1.5 miles of roadway. Balfour Beatty Infrastructure, Inc. (BBII) is the general contractor responsible for the delivery of the Wilmington Bypass project, which is on schedule for completion in November 2017.The signature structures on the project are twin bridges each 7200 long crossing the Cape Fear River and adjoining wetlands. These bridges were originally envisioned as supported by drilled shafts, but were changed to driven pile during the design process. The 2 main areas of the bridge are an elevated section across the Cape Fear River utilizing post-tensioned concrete girders supported on 36 voided square pile and a lower level portion crossing the adjacent swamps with conventional pre-stressed girders supported on 24 solid and 30 voided square pile. These 2 areas of the bridge presented distinctly different challenges and opportunities, but the use of driven pile instead of drilled shafts gave the taxpayers and driving public of North Carolina significant economic and environmental benefits.

Emergency Sinkhole Repairs by Driven Piles
Takefumi Takuma, Giken America Corp.

Certain areas in the U.S. are highly prone to sudden and catastrophic sinkhole formations where the rock below the ground surface is limestone, carbonate rock, or rock of other types susceptible to dissolution by ground water. Depending on when and where they form, sinkholes can cause major damage to properties and threaten people's lives in extreme cases. Driven piles can provide prompt and high quality slope protection for emergency repairs. This presentation will review two sinkhole emergency projects that used driven piles with the Press-in Piling Method. The first project was tubular pile retaining wall construction to prevent 3-story apartment buildings from collapsing into a 150-foot-diameter and 60-foot-deep sinkhole in Orlando, Florida. The second project was sheet pile retaining wall installation to stabilize a 370-foot -long and 36-foot-wide trench-shaped ground cave-in due to an underground drainage structure collapse in a parking lot next to a restaurant building in Meridian, Mississippi.

SCDOT SC171 over Folly Creek & Folly River: Value-Engineered Approaches using Driven Pile
Sonny DuPre, Cape Romain Contractors, Inc.

SCDOT awarded a bridge-replacement contract to Cape Romain Contractors in 2012 for the replacement of two bridges on SC171 in Charleston County - SC171 across Folly Creek and SC171 across Folly River. Project specifications for the $32 million dollar project were stringent in regards to the design of the bridge approaches, specifically the new seismic design guidelines. The original design called for Deep Soil Mixing. Deep Soil mixing would have required a specialty contractor from out of state, and concerned Cape Romain in several ways: environmentally, project schedule, cost, and overall feasibility. A Value-Engineered Proposal was made utilizing driven pile. Although complex and highly technical, the proposal ultimately saved SCDOT $1.5 million dollars, reduced environmental exposure, eliminated risk to the project schedule, and reduced the quality control aspect of the work. The driven-pile ground improvement allowed Cape Romain to perform the work with its own forces, saved the taxpayer considerable monies and once again proved that driven piles are cost efficient and reliable.

Presentation Summaries Continued

Shoring of Deep Excavations in Historical Areas

Michael Carter, Blue Iron Foundations & Shoring LLC

Conventional sheeting and shoring in historical areas or in historical towns has often lead to damaging structures of historical significance due to vibrations and settlement. Using the Press-In method to install sheeting in historical areas or near vibration sensitive structures allows for further progress on projects where he shoring was often overlooked or always burdened on the Contractor to assume liability. We will explore using sheeting for shoring in Historical areas such as New Orleans, Baltimore, Napa and Hoboken and how the methodology has allowed for construction to progress without any damages to adjacent structures.

Innovative Solution for Heavy Marine Fender and Seawalls Structures

Kevin E. Lathan, P.E. and V. "Larry" Tsimmerman, P.E., Omega Trestle, LLC

The Omega Beam is a newly developed structural section that is wide, compact, torsion resistant and economical. It was first introduced in horizontal applications as part of high capacity bridge structures. Recently it was recognized that this section can be effectively driven in vertical applications and function effectively as a singular structural element in a fortified foundation, marine fender applications or in earth retention and deep seawall structures. When it is used for such vertical applications, this structural section is called Flanged Pipe Pile (FPP). Flanged Pipe Pile is an economical, patented, scalable, built up section that can be customized to suit any soil retention, or deep seawall requirements. It is a readily drivable section in a variety of soil conditions. Its hollow tubular core allows for the easy installation of soil anchors and rock sockets. Due to the positioning of flange plates on the FPP, equal wall strength of a comparable pipe combi wall can be achieved with a footprint that is 1/3 to 1/2 the size. This is a distinct advantage as we look to minimize environmental impacts along our working and recreational waterfronts.

Soil Fatigue Analysis for Pile Driving Simulations Using an Impact Hammer

Gerald Verbeek, Allnamics USA

For pile driving simulation the model used must be accurate for the entire process, i.e. from the start of pile driving until the pile has reached its target depth. Of the various model components (hammer, pile and soil), the soil is the most difficult to characterize accurately. This is well known, but the aspect that is not as well understood (and therefore commonly misapplied) is the fact that the soil properties and thus the soil parameters do not remain constant during the pile driving process. Furthermore, this phenomenon of soil fatigue, mainly for skin friction, as a continual change of soil resistance during pile installation, is not implemented into all commonly applied pile driving simulation software and could therefore not be taken into consideration. In this presentation the effect of soil fatigue will be described by numerous research results, showing that this effect will occur regardless. Different methods to consider the change of soil resistance during pile installation will be presented, some applying soil fatigue while others merely reduce soil resistances. Using currently available wave equation software that can take soil fatigue into consideration, the importance of doing so will be shown on the basis of the back calculation of a monopile installed offshore.

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