

Attention

Do not miss the opportunity to be a part of DFII first technology initiative during March 2019.

Block your time to witness the installation of six CFA test piles each of 600mm dia. and 18mm length at Nuclear Power Corporation of India Limited site at Gorakhpur, Hissar District., Haryana during March, 2019. Tentative date of commencement is 26th March, 2019.

DFII is happy to inform that its first technology initiative is being executed with the support of major industry leaders like NPCIL, L&T, Keller, ITD Cem, Afcons, Soilmec, AECOM & IRB Infra.

Other major organizations like NTPC, BHEL, PGCIL, Reliance, Bauer, Casa Grande, Liebherr, Tata Projects, Navayuga Const, NCC, Simplex, IITs and BIS have been requested to financially support the project and also to witness the project during installation and testing. Readers of this newsletter are requested to excuse us if we have missed their organization names. We offer our invitation to one and all to come and participate in the first initiative of DFII. Successful pile installation and testing will be followed by compilation of design documents, method statements for pile installation and testing. These will serve as guidelines for implementing CFA piles in all infrastructure projects in India.

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Partner with DFII to introduce the Continuous Flight Auger (CFA) Pile Technology in India



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Quarterly e-Newsletter from
Deep Foundations Institute of India
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Single Stroke CFA Pile Installation with Full Length Reinforcing Cage

Continuous Flight Auger (CFA) piling, also known as auger cast piling and auger cast-in-place (ACIP) piling, is an installation method that requires no sleeves or casing. This allows for the economical installation of drilled, cast-in-place piles in areas of poor soil conditions like sand or silt, or in areas with a high-water table and limestone/rock bearing strata. Ideal conditions range from loose to dense cohesionless soils (sands), soft to very stiff cohesive soils (clays and silts), weakly cemented sands, residual soils, partially weathered rock (PWR), and/or limestone.

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Mile of pile

HJ Foundation Company (HJ), a Keller company headquartered in Miami, Florida with operations in the Northeast and Southeast US, is providing just the right amount of encouragement for applying this technology in India, having successfully completed the world record installation of a single stroke CFA pile with a full-length reinforcing cage to a depth of 182.3ft (55.6m). HJ specializes in undertaking challenging deep foundation projects requiring CFA piling, excavation shoring, and underwater construction (soil mix and tremie seals). With offices in Miami, Tampa, Atlanta, Baltimore, New York, the subcontractor is the fastest in the industry, having installed up to 1 mi (1609m) of piles per rig in a single day. HJ President Frank Fonseca has reported HJ setting records in pile diameters, lengths, capacity, and load tests. In 2015, HJ set the depth record at the time for installing 30-in (0.76m)-diameter CFA piles to depths of 177 ft (54m) in a single stroke at One Thousand Museum in Miami. In 2017, HJ set the diameter record for installing 48-in (1.22m)-diameter CFA piles to a depth of 100ft (30m). HJ Vice President Andres Baquerizo says it has become typical in Florida to install CFA piles to depths of 150 ft (46 m) each with full reinforcements.

The project

The Estates at Acqualina in Sunny Isles Beach, Florida is comprised of two of the tallest twin skyscrapers on the beach, each with 50 stories planned for construction. The Estates are being developed by The Trump Group, famous for the Williams Island Development in Aventura, Florida and will serve as luxury condominiums with over 260 residences. Tower production piles will sustain design loads up to 1290 T (1170 MT) in compression and 600 T (544 MT) in tension. The garages, villas, and podiums will be supported by 14 and 16-in (355 and 406mm)-diameter piles up to 50ft (15m) deep. The up to three-level basement depth excavations will have a soil mix bottom plug and secant soil mix perimeter walls, minimizing water intrusion during the construction phase. All soil mixing and excavation will be provided by the joint venture between Keller companies HJ Foundation and Hayward Baker (HJ-HBI JV).

The final lobby and valet access ramps will be supported by vibro replacement stone columns installed by Hayward Baker. Now in phase three of this vast development, HJ continues work on the towers and set the world record this past spring for installing a CFA test pile to depth of 182.3ft (55.6m)—resulting in a value engineering (VE) CFA pile solution to a reduced depth of 170ft (51.8m) for production piles. The test piles use two Osterberg Cells® (O-cells) located at different depths and strain gauges throughout the pile length to analyze friction capacities at varying depths. A lump sum contract with a tight schedule, HJ Vice President Andres Baquerizo says this project “emphasizes HJ Foundation and Keller devotion in going one step further to help improve and change the face of cities by providing schedule-driven, cost-effective solutions. We’ve been developing all our equipment, people, and procedures to the point where all previous records have been held by us.”

Design and installation

The HJ-HBI JV first mobilized equipment and personnel to excavate the site to the working elevation and build a working platform for the equipment, including access roads. The subsoil was assessed and preconditioned prior to soil mix operations and soil samples were retrieved from the site to perform bench scale testing to determine the mix design and soil conditions.

The HJ-HBI JV installed a soil mix bottom seal and soil mix walls to restrict groundwater flow into the excavation. Soil mix walls were reinforced by placing I-beams into the wet soil mix columns (located on the outside perimeter of the structural walls).

Next, HJ installed CFA piles by rotating a continuously flighted hollow stem/shaft auger into the soil to a specified or required depth. A high strength, high slump cement grout mix is pressure pumped through the hollow shaft as the auger is slowly withdrawn and a reinforcing cage can be installed while the cement grout is still fluid. The resulting cement grout column hardens and forms a CFA pile. Positive concrete pressure is maintained to ensure the integrity of the shaft.

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QA/QC

To maintain quality control during all phases, in addition to the pile load test program and concrete/grout sample testing, a full-time inspector is aided by AME (Automatic Monitoring Equipment) to measure the auger rotation speed, advancing speed, auger torque required to shear the soil the concrete injection pressure, volume of concrete/grout placed, and auger extraction speed. This information is always available to operators and for real time verification by additional offsite personnel. Once a pile is complete, a report

may be generated, confirming the pile profile and specified parameters as proof of proper quality control. Once the auger is removed and cleaned, the carefully assembled cage is inserted into the concrete. Cage centralizers are used to guarantee concrete cover. A comprehensive soil mix test program is performed to verify installation and design criteria including in-situ testing methods like collecting wet grab samples in conjunction with onboard telemetry of the soil mixing equipment by the Keller data acquisition system.

Conclusion

Advantages of this technology include: high installation speed (CFA piling installation speed often outperforms cased holes by a ratio of 3:1), low vibration, low noise, and non-impact, providing the required capacities for axial (compression and tension) and lateral loads. Low vibration and no impact noise mean the technology can be used in urban and redeveloping areas. CFA piles have a low risk of ground displacement, reducing possible damage to any neighboring foundations or utilities. HJ Foundation, a Keller company continues to set the record for the fastest, deepest, and most efficient CFA pile installations with more than 2,500 successful projects. The technology is reliable and strong, showing much potential on Indian soil. HJ is proud to offer a guaranteed price, guaranteed schedule, and guaranteed results to all clients.





Cutter Soil Mixing Technique (CSMT)

- Franz-Werner Gerressen, BAUER Maschinen GmbH, Schrobenhausen, Germany

One of the latest developments in the field of wet mixing was the Cutter Soil Mixing (CSM) method, developed in a joint venture of BAUER Maschinen GmbH and Bachy Soletanche in 2003/2004. CSM is used mainly for stabilizing soft or loose soils (non-cohesive and cohesive). However, the machinery used, derived from the cutter technology, extends the applicability of the method to much harder strata when compared to other methods of soil mixing.

Introduction

Soil mixing is a methodology where the soil is improved by mixing it with cement, lime or other binders in-situ by using a mixing tool. This methodology can be used either as wet mixing or as dry mixing.

In the more frequently used wet mixing process, usually a mixture of binder and water, maybe with additives, is injected and mixed with the soil. Depending on the type of soil and binder, by the end of the mixing process, a mortar like mixture is created which hardens during the hydration process. In the dry mixing process, the binder is directly mixed with the soil and reacts directly with the existing soil and water. Mixing tools show several versions, so that they are mixing around either a vertical or horizontal axis, mixing in a trench and maybe are jet assisted. Figure 1 shows a classification done by Bruce, 2010. Depending on the technique, improvement depth of up to 80m can be achieved.

While the history of these techniques starts predominantly in Japan (wet mixing) and Scandinavia (dry mixing) in the 1970's, nowadays soil mixing is getting more and more important all around the world.

Soil mixing can be carried out in almost all soil formations. Granular soils are more favorable than cohesive soils, but with the considerations of potential limits also the use in cohesive soils is applicable.

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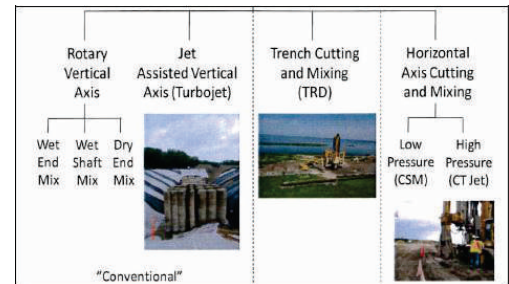


Figure 1: Updated Deep Mixing Method classification (Bruce, 2010)

Cutter Soil Mixing (CSM)



Figure 2: Mixing head for CSM with symmetric mixing wheels

Construction principle

One of the main differences, in comparison with other soil mixing methods, is the mixing wheels which rotate about the horizontal axis. The design of the mixing head (Figure 2) with so-called reamer plates provides a very good intermixing of soil and injected slurry, comparable with the principal of compulsory mixers.

Depending on the required properties of the soil mix elements and local conditions, different amounts of cement, if necessary, bentonite, have to be injected by the CSM mixing head into the soil. If elements with relatively high strength are required, the cement content has to be increased and the water-cement ratio decreased. Typically, in case there is a need for the use of bentonite for liquefaction, sandy soils will require a larger amount of bentonite in the slurry than clays. At some clayey sites, where enhanced resistance to permeability is not required, acceptable liquefaction of the soil can be achieved without the use of bentonite.

A typical construction sequence is as follows:

- a) Construction of an open guide trench for retaining excess slurry.
- b) Liquefaction of the soil mass during penetration to the final depth as an appropriate slurry is simultaneously introduced. Depending on the prevailing conditions, either bentonite slurry is added to the mixing/liquefaction process or cement slurry is introduced into the soil during penetration. The volume of slurry injected is determined by the rate of cutter penetration.
- c) During upstroke, the precise volume of slurry required for producing the final wall construction material is injected.
- d) A continuous wall is formed by the construction of individual panels in an alternating sequence of overlapping primary and secondary panels. Secondary panels can be constructed immediately after completion of primary panels, i.e., "wet-into-wet". The cutter technology does, however, also enable cutting into panels that have already hardened, i.e., "hard-into-hard".
- e) To utilize the wall as a structural retaining wall, steel beams (UB/IPB sections) are inserted into the freshly mixed wall panels.

The CSM method can be adapted to local conditions in different ways. In mixing applications with production times less than approx. 2 hours per element, a one phase mixing procedure may be used. In the one phase procedure, the final slurry product consists of cement and water or a cement, bentonite and water mixture, which is injected on both the down stroke and the upstroke of the machine. Advantages of this procedure include the additional mixing of the cement/soil and the simplicity of only having one slurry mix.

When mixing time per element is longer than the initial setting time of the injected cement slurry, a two-phase system should be implemented. During the two-phase method, non-hardening slurry is used until the final mixing depth is achieved. During the upstroke, the cement slurry will be injected and mixed into the element. This method prevents the mixing tool from being 'trapped' in the panel if the panel construction time exceeds the initial setting time for the cement slurry.

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The size of individual panels is determined by the type and size of equipment being deployed. Panels can be constructed in lengths ranging from 2.4m to 2.8m and wall thicknesses of 0.55m to 1.525m. Mixing depth up to 80m are achievable. Some equipment configurations are shown in Figure 3.

Comparison with other techniques

The CSM process has significant advantages over conventional techniques like secant pile walls or sheet piling walls. These include:

- The existing soil is utilized as construction material.
- Very little spoil material is generated. Therefore, the technique is particularly suited for work on contaminated sites.
- CSM is an ideal alternative to the traditional "Berlin wall" system, which is better known as soldier beam wall with timber lagging, for use in high groundwater conditions, or to sheet pile walls in soil formations unsuitable for pile driving or near vibration sensitive buildings.
- CSM is a vibration free method.
- By using Kelly guided CSM units, one can avoid guide wall or drilling templates.

Compared to traditional deep mixing methods, CSM has the following advantages:

- A high degree of verticality of wall panels is achieved by the counter-rotating cutter wheels.
- The cutter principal ensures construction of clean and trouble-free joints even between wall panels of different construction age e.g., after weekend breaks or prolonged stoppages on site.
- Harder soil formations can be easily penetrated, broken down and mixed by using the cutter wheels.
- Homogenize the cohesive soils and self-hardened slurry through horizontal mixing.

Single Column Mixing – Double Head (SCM-DH)

Another new approach is the so-called Single Column Mixing – Double Rotary Head (SCM-DH) method. It has been in operation now for a couple of years. Since it is not new to install single mix columns, the benefit of this new tool needs to be explained.

As the name indicates, the system works with a double rotary head. This ensures that two counter-rotating mixing tool components achieve exceptionally intensive levels of mixing between soil and slurry. Therefore, the newly developed SCM-DH Single Column Mixing Tool for Double Rotary Drives (Figure 4) represents a significant improvement over the single column mixing tool, as it enables to move the borderline of suitable soils for soil mixing applications.

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Cutter Soil Mixing (CSM)



Figure 3: Wire rope-suspended CSM unit, China.

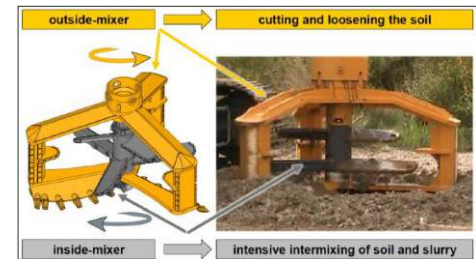


Figure 4: SCM-DH mixing tool

Since the counter-rotating mixing tools act like a compulsory mixer, the grade of achievable homogeneity allows intensive levels of mixing between soil and slurry and the construction of soil mix columns not only in granular soils but also in cohesive soils where soil mixing usually gets to its limits.

Construction principle

The normal sequence of manufacturing a SCM column as showed in Figure 5 starts with the preparation of the pre-excitation. Aim of the pre-excitation is to accommodate overflow, which will be created during the soil mixing process. For weak surface conditions it is recommended to use steel plates or similar material as support for the base machine. After positioning the SCM-DH machine, the mixing tool is drilled into the ground at a continuous rate by the rotary drive of the drill rig. During the penetration, the soil will be cut by the outer mixing



Figure 5: Standard working procedure

References

- Wilson, B.W., Scholte, J., and Atkinson, M., 2008. Vancouver Island Conference Centre, Cutter Soil Mixer Transforms Site. *Deep Foundations Institute Magazine, Summer Edition*.
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tool. At the same time a fluid (e.g., cement slurry) is pumped by a slurry pump through a flexible hose to a flushing head on top of the rotary drive and the inner mixing tool. The fluid nozzles are located at the lower mixing blade layer of the inner mixing tool. The injection rate depends on the soil conditions and the required properties of the mixed column. Due to the counter rotating parts of the mixing tool, high shear forces can be applied to the soil. After reaching the final mixing depth, the mixing tool is pulled out of the ground while it continuously rotates and mixes the soil with the fluid. If necessary, reinforcement (e.g. steel beams) could be installed into the fresh mixed column.

Conclusion

The normal sequence of manufacturing a SCM column as showed in figure 5 starts with the preparation of the pre-excitation. Aim of the pre-excitation is to accommodate overflow, which will be created during the soil mixing process. For weak surface conditions it is recommended to use steel plates or similar material as support for the base machine. After positioning the SCM-DH machine, the mixing tool is drilled into the ground at a continuous rate by the rotary drive of the drill rig. During the penetration, the soil will be cut by the outer mixing tool. At the same time a fluid (e.g., cement slurry) is pumped by a slurry pump through a flexible hose to a flushing head on top of the rotary drive and the inner mixing tool. The fluid nozzles are located at the lower mixing blade layer of the inner mixing tool. The injection rate depends on the soil conditions and the required properties of the mixed column. Due to the counter rotating parts of the mixing tool, high shear forces can be applied to the soil. After reaching the final mixing depth, the mixing tool is pulled out of the ground while it continuously rotates and mixes the soil with the fluid. If necessary, reinforcement (e.g. steel beams) could be installed into the fresh mixed column.

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F.W. Gerressen, B. Wilson, *The development and state of practice of Cutter Soil Mixing in North America – The first 10 years*, Deep Mixing 2015, San Francisco/CA/USA.

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Soil Investigation Training Program -18 & 20. Aug. 2018



Session



SPT Demonstration

CMRL, a Joint Venture of Government of India and Government of Tamil Nadu with equal equity holding is implementing the Chennai Metro Rail Project. Following design-build approach the Phase-1 project comprising two metro line corridors totaling about 44.0 km with 20 underground stations and 16 elevated stations is almost completed. According to the discussions we had with CMRL officials they faced several technical and contractual challenges in Phase-1 execution which no doubt also led to certain innovative approaches. CMRL has now embarked on Phase-2 of the project in design-bid-build mode and it comprises three corridors totaling 104 km with 104 stations. More than 80% of Phase-2 is expected to be underground. Geotechnical investigation is underway and design consultants have been appointed. DFI and DFI of India suggested that they could explore the possibility of forming an international expert working group (GCCWG) for this purpose. Further interactions between the parties have culminated in signing an MOU between CMRL and DFI of India in November 2018 during the DFI-India 2018 conference at IIT Gandhinagar. CMRL is also looking forward to DFI to facilitate training program for the foundation equipment operators and field personnel of contractors after award of contracts in Phase-2.

DFI of India has conducted the Soil Investigation Training Program for the CMRL Engineers during 18 and 20 August 2018 at CMRL Admin. Office, Koyambedu on "Training towards good quality Geotechnical Investigation".

DFI Next Event



SuperPile '19
May 1, 2019 -
May 3, 2019,
Sheraton Grand Seattle,
Seattle, WA.

DFI Events

March 2019

- 13 Augered Cast-in-Place and Drilled Displacement Piles Seminar**
Pantagis Renaissance, Scotch Plains, N.H.J.
- 18 DFI-COPRI New York City Ports and Marine Engineering Seminar**
NYJ Tandon School of Engineering, Brooklyn, N.Y.

May 2019

- 1-3 SupperPile '19**
Sheraton Seattle Hotel, Seattle, Wash.

June 2019

- 4-5 HPW-DFI Helical Piles-Tiebacks-Anchors Tradeshow and Educational Seminar**
Hamilton County Fairgrounds, Cincinnati, Ohio

August 2019

- 6-8 S3: Slope - Support - Stabilization**
Renaissance - The Depot Hotel Minneapolis, Minn.

October 2019

- 14-18 44th Annual Conference on Deep Foundations**
Hilton Chicago, Chicago, Ill.

For a 12th year, several DFI technical committees will combine their industry expertise with ADSC to focus on the latest developments in augered cast-in-place/drilled displacement piles, drilled shafts, driven piles, ground improvement, helical piles and tiebacks, marine foundations, micropiles, testing and evaluation of foundation systems, and seismic and lateral loads. More than 40 presentations will highlight best practices for project safety from design through construction as well as topics relevant to the

Pacific Northwest. Equipment, material and instrumentation suppliers, contractors, engineers, and other vendors will present their products and services in the Exhibit Hall. The Women in Deep Foundations Committee will also host its annual networking reception.

Al Khawaneej Second Sewerage & Drainage System – A Case Study

Temporary Circular shoring Shafts for Deep NDM Pits

Introduction

Dubai Municipality in the year 2017 allocated AED 7 billion in its annual budget for executing necessary infrastructure in the field of health and environment in the newly developed or developing regions of Dubai. Under this scheme, AED 300 million were allocated to develop deep underground sewerage network in Al Khawaneej area of Dubai (Refer Pic. 1). The project was anticipated to be completed in the year 2018.

Horizontal directional drilling (HDD) was proposed for the construction of deep underground sewerage network. As part of the sewerage network, several Manholes were planned along the network. The manhole construction required excavations from 13m to 22m. To facilitate the deep excavations, ESC proposed Circular Shoring System. A typical circular shoring shaft is presented in Pic. 2. ESC carried out the design, supply, installation, and extraction of circular shoring system for this project.

Site Stratigraphy

The overburden soils at this project consisted of medium dense to dense silty sands to about 6m depth from the existing ground level. This is followed by extremely weak to weak, poorly cemented light brown Sandstone up to the final explored depth. Ground water table was not found during the geotechnical exploration. The natural water level in the region is expected to be well below 30m depth. The stratigraphy at site, i.e., presence of hard ground and no water table, is ideal for kingpost shoring system.

Design Concept - Circular Shoring System

The Circular shoring system consisted of a series of kingposts installed in a circular pattern. The pit diameter is designed to be 9m to provide enough space for manhole construction. 356x358x129kg/m Beams of Grade 275 are used as kingposts. Since the excavation depths ranged between 13m and 24m, these beams are fabricated to required additional lengths. Length of the kingposts ranged between 18m and 26m depending on the excavation depth.

The nature of excavations required multiple level walings. These walings are pre-fabricated at ESC yard to suit the pit diameters, i.e., 9m. Each waling unit is divided into 3 arc segments connected with 3 connectors. Pic. 3 illustrates a typical circular waling beam with three segments and 3 connectors. To optimize the design requirements, 305x305x97kg/m beams are used for first level and 356x358x129kg/m beams are used for second level walings.

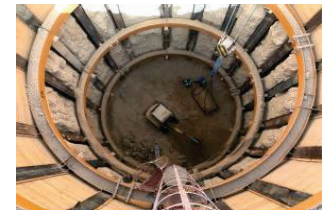
Installation - Circular Shoring System

Due to the nature of ground conditions, pre- drilling is carried out to facilitate the installation of kingposts. Prior to commencing the drilling process, each kingpost locations are surveyed and marked on ground. Kingposts of desired length (fabricated on site, Pic. 4) are then installed at the pre-drilled locations. Prior to carrying out the excavation works, ESC's QA/QC team ensured the alignment of kingposts, spacing between the kingposts and the clear spacing required for manhole construction inside a 9m diameter pit.

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 ESC
PILE


Pic 1: View of the Deep Sewerage Network in Al Khawaneej, Dubai



Pic 2: View of a Typical Circular Shoring Shaft with multi-level circular walings



Pic 3: View of a typical circular waling with three segments and three connectors

Al Khawaneej Second Sewerage & Drainage System – A Case Study

Timber infill panels are installed between the kingposts simultaneously during the excavation in stages. These timber infill panels are installed up to the end of loose to medium dense overburden sand or to the top of the underlying Sandstone (bedrock).

Pre-fabricated circular waling beams are then assembled on site next to the pit location and lowered using a mobile crane to the desired level as per the approved shoring design drawings. Pic. 5 illustrates lowering of first level waling using a mobile crane in one of the deep manhole shafts.

Advantages - Circular Shoring System

There are several advantages of circular shoring system over conventional square or a rectangular shoring pattern. Some of the main advantages are listed below:

- Due to the nature of stress development in circular shoring system (hoop stresses), the structural elements like kingposts and waling beams can be optimized to lighter sections which otherwise might require very heavy steel sections – particularly for deeper walings at 18m depth or below.
- Circular walings can be easily fabricated at ESC yard (Pic. 6) to suit the different pit diameters. These circular walings can be modified to suit different shaft diameters which can be used at many other project sites.
- Since the shoring system comprises steel elements (Beams), excavation can be commenced immediately without any waiting period for curing.
- Several re-uses can be extracted within the same project or any potential future projects.
- Depending on the number of re-uses, there can be considerable financial savings for the project and for potential future projects too.



Pic. 6: Ariel view of ESC Yard where circular walings are being fabricated for Al Khawaneej Project Site



Pic. 4: View of a set-up for kingpost fabrication at Al Khawaneej Project Site



Pic. 5: View of a circular waling being installed in Manhole No. 73 at Al Khawaneej Project Site

Update: DFI of India November 2018 Conference



DFII Conference Venue

DFI of India, 8th Annual Conference, 2018 with the common theme “Deep Foundation Technologies for Infrastructure Development in India” was conducted successfully at the Indian Institute of Technology (IIT) Gandhinagar, Gujarat between November 15 and November 17, 2018. IIT Gandhinagar and Indian Geotechnical Society-Ahmedabad Chapter were the collaborators. Prof. Amit Prashant, Professor of Geotechnical Engineering at IIT Gandhinagar was the chairman, and Prof. Ajanta Sachan of IIT Gandhinagar and Mr. Ravikiran Vaidya, Principal – Geo Dynamics were the organizing secretaries of the conference. The conference was designed to have three main events: A one-day workshop on “Ground Improvement

Techniques - Column Supported Embankments and Soil Mixing”, a two-day conference to highlight four important aspects of quality foundation construction, viz., “Deep Foundations in Infrastructure Projects – Owners Perspective”, Geotechnical Investigation - Testing, Contractual and Reporting Requirements”, “Best Design Practices and New Technology Initiatives”, and “Ground Improvement, Piling, and Deep Excavation & Support Technologies”. The third event which ran parallel with the conference was the exhibition to showcase the latest technologies, equipment, testing and monitoring techniques, and special materials.

The inaugural function of the conference was held on November 16, 2018. Dignitaries on the dais included Chief Guest, Dr. I P Gautam, IAS (Retd.), Managing Director, Metro-Link Express for Gandhinagar and Ahmedabad (MEGA) Company Ltd, Prof. Sudhir K Jain, Director of IIT Gandhinagar as President, Dr. Conrad W Felice, Managing Director, CW Felice LLC and DFI Trustee, Dr. K S Rama Krishna, Chairman DFI of India and DFI Trustee, Mr. Y Harikrishna, Managing Director, Keller Ground Engineering India Pvt. Ltd., Prof. Amit Prashant, IIT Gandhinagar and Chairman of the conference, and Mr. Ravikiran Vaidya, Principal, Geo Dynamics and Organising Secretary of the Conference. Narayan V. Nayak, Principal Advisor, Gammon India Ltd., received DFI India Lifetime Contribution Award for the year 2018 from Dr. Conrad W Felice.

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Felicitation to Dr. N V Nayak



Souvenir launch by Dignitaries (2018)

DFI of India November 2018 Conference

Eight Keynote lectures from overseas and Indian experts and forty-four paper presentations from practitioners and researchers were the highlights of this conference. A souvenir was also brought out and it contained messages from dignitaries, abstracts of technical papers, and details of sponsors and exhibitors. We had 75 attendees for the workshop and 162 attendees for the conference. Other highlights of the conference were the Student Outreach Program, Inauguration of Women in Deep Foundations, Panel Discussion by senior management officials from various stakeholders, and Evening Cultural Program followed by al-fresco dinner.

The introductory program on Women in Deep Foundations in India was successfully launched on the first day of the conference by Ms. Mary Ellen, Technical Director, DFI. Mrs. Anjana Kadakia, P.E., LEED AP BD+C, Senior Principal & Mumbai Office Director, Thornton Tomasetti, spoke eloquently about her technical and professional journey and her experiences as a woman in the construction industry.



Cultural Program on 16 November, 2018



Organizers and supporters after the concluding session

The purpose of Student Outreach initiative by DFI of India is to generate interest among the young students in geotechnical engineering so that they take up this field as their chosen career and become future leaders. Undergraduate and postgraduate students totaling around 50 from various colleges in the region attended the program. This was followed by an open session where students' doubts were clarified by the speakers. The necessity to form a committee to develop and implement all future student outreach programs was discussed.

The Panel Discussion Program on the topic, "Possible Solutions for Handling Issues in Geotechnical/Foundation Scope of Major Infrastructure/Building Projects" was successfully conducted and well received by all. The panelists included Mr. R N Dwivedi of CMRL (Owner), Mr. K Bikshapati, Director General, National Academy of Construction (NAC-A Government of Telangana Institution), Mr. A M Khan, Project Director, L&T (General Contractor), Mr. Manish Kumar, Executive Vice President, ITD Cementation (Specialist Contractor), Mr. Manfred Schoepf, Marketing Director, Bauer Maschinen, Germany (Equipment Manufacturer), Dr. K S Rama Krishna and Mr. G V Prasad of DFI of India chaired the session. Everyone expressed in one voice, the urgent need to improve the quality of geotechnical investigation, to develop skills and to embrace new technologies as the possible solutions that will accelerate construction projects with required quality and safety. Following the first day's program, the second day was completely utilized for the remaining presentations by the respective authors.

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