Jack-in Pile / Push Pile

Differences in design and construction of bored piles and driven piles are largely understood. While driven piles provide excellent performance, they carry vibration and noise hazard. For bored pile constructions, the performance and quality control are key issues. The deep foundation construction industry is now interfacing with a piling method which brings all the advantages of these piling methods and providing us less polluting and less noisy environment with excellent quality and high performance. Let's know more about it [Page 8].

Volume 6 Book 3, July 2020

DFI of INDIA News

DEEP FOUNDATIONS INSTITUTE DFI FINDING COMMON GROUND®

Quarterly Newsletter from Deep Foundations Institute of India

www.dfi-india.org

DFI India Board

Dr. K S Rama Krishna, Director, Chairman, DFI India
Mr. Anirudhan I V, Director, Vice Chair, DFI India
Mr. G Venkata Prasad, Director - Operations

DFI India Executive Committee (2020-2021)

Mr. Arvind Srivastava, NPCIL, Mumbai
Mr. B S Srinivas, CMRL, Chennai
Mr. K Bairagi, L&T Ltd., Chennai
Dr. Sunil S Basarkar, Afcons Infrastructure Ltd., Mumbai
Mr. Harikrishna Yandamuri, Keller Ground Eng. P. Ltd, Chennai
Mr. V K Panwar, EIL, New Delhi
Dr. N Kumar Pitchumani, AECOM, Chennai
Mr. Mohan Ramanathan, Advance Construction Technologies, Chennai
Mr. Ravikiran Vaidya, Geo Dynamics, Vadodara
Mr. Sanjoy Chakrabarty, Soilmec, Mumbai
Prof. Amit Prashant, IIT Gandhinagar
Prof. A Boominathan, IIT Madras, Chennai
Mr. K Bikshapati, NAC, Hyderabad
Prof. Shailesh R Gandhi, SVNIT Surat
Prof. G L Sivakumar Babu, President, IGS, New Delhi

DFI India Office Team

Mr. T S Mahendran , Manager - Accounts & Administration
Mr. Mohamed Athif M, Manager - Operations
Mr. Pranav Jha, Assistant Manager - Operations

DFI USA

Executive Director
Theresa Engler

Director Technical Activities
Mary Ellen Large

Treasurer
Gianfranco Di Cicco

Trustee Emeritus & International Director
William F. Loftus

President
Matthew Janes

Vice President
Michael H Wysockey

Past President
Dan Brown

DFI India Support Committee

Mr. Satyajit Vaidya, P.E., Langan Engineering
Mrs. Srilakshmi Nagarajan, Giken America
Dr. Conrad Felice P.E., P.Eng., D.GE, C W Felice LLC
Dr. Sastry Putcha, Smart Structures
Mr. Gianfranco DiCicco, Bauer Foundations
Mr. Jim Morrison, P.E., COWI

DEEP FOUNDATIONS INSTITUTE OF INDIA

Non-profit company registered under Ministry of Company Affairs,
Government of India (Regn. No:U91900TN2013NPL091176)
44/17 'BHASKARA', 19 Usha Street,
Dr. Seethapathy Nagar, Velachery, Chennai, Tamil Nadu, India.

www.dfi-india.org Email: dfiindiaoffice@gmail.com

My journey with DFI Family

-Mr. Ravikiran Vaidya

It is a moment of pride that DFI of India has asked me to contribute this article on my journey with the DFI family as my association with DFI has been right through its inception and formation in 2010. The first DFI conference was held in Mumbai in 1996 which I was fortunate to attend. This conference had several stalwarts present and left a deep impression in my mind at that time as a young engineer just getting started, such conferences are required for learning, interacting, networking and connecting with industry and academia worldwide.

I had known Dr. K.S. Ramakrishna since my working days in Singapore and also when he came back to India and worked for L&T. Thus when he mentioned that he is trying to get DFI into India, to me it was a new dawn for the professionals and industry as henceforth conferences will be focused, theme-oriented, and with a specific agenda to bring new technologies into the country, encourage Indian geotechnical engineers to think differently and offer them a forum to present and participate with the who's who of the deep foundation industry of India. That Mr. I.V. Anirudhan, one of the most independent and well known geotechnical professional will also be a part of DFI of India was great news.

The DFI India journey systematically started with its first full-fledged conference in Chennai in the year 2013 wherein I had a privilege to host a stall and now interact with the industry as a premium testing company. It was a personal achievement too that I had progressed from a young engineer who was simply awestruck attending DFI Mumbai to being an active member participating in different activities. It was only natural to eventually being included in the DFII Executive Committee in an advisory role.

Mr. Ravikiran Vaidya

-Principal Engineer, Geo Dynamics, Vadodara

Starting from the Chennai conference, DFII has conducted nine national conferences till date which have been hugely successful and acknowledged by all as the most premium event of the geotechnical industry. The conferences ensure a focused audience interested in knowing very specific areas of the deep foundation industry. The lectures are of very high quality and delivered by real experts worldwide in their domain. It is increasingly apparent from the feedback received that those who have attended DFI conferences tend to mark those days in their annual calendar to ensure that they do not miss this important event. Technologies that have been discussed during the conferences include design of large diameter piles, pile foundations for transmission line towers, helical piles, deep excavations, slope stability problems to name a few. Personally, I learnt a lot not only about various aspects of deep foundations, but it was also a pleasure to interact with testing industry stalwarts worldwide and especially interacting with experts from PDI

Contd.

who regularly travel to attend and present at DFII conferences. It culminated in the introduction of Thermal Integrity Profiling in India.

The DFII 2019 in Hyderabad showcased stalls from Junttan, ITD Cementation, L&T Geo Structures, AFT, YJack, and several other contractors, equipment manufacturers, and test equipment suppliers and services companies. It was also an honour to be at our own Geo Dynamics stall at this prestigious conference. It showed the interest and importance international companies attached to the growing infrastructure market in India. It also showed DFII has been able to motivate and sell the Indian infrastructure market dream not only to Indian companies but also to all the stakeholders worldwide.

In addition to organizing several events and conferences in India, DFI India in 2017 decided on an ambitious program to demonstrate and introduce Continuous Flight Auger (CFA) pile technology into the country. Since the acceptance of new methods and technologies is low in India, DFI of India took a bold and giant step to demonstrate the actual execution of these piles to the country. This required not only huge funds but also participation of several stakeholders like designers, rig suppliers, concrete and testing experts, support at local ground level from resourceful contractors, etc. It was fantastic to see the team effort from DFI core management and supported by NPCIL, ITD Cementation, L&T, Keller, Afcons, Geo Dynamics, Smart Structures Tata Projects, etc who ensured that the technology was successfully demonstrated to the Indian deep foundation industry. The CFA manual that was made subsequently is now available and provides direct information on all aspects of the method. It is expected that there will be a specific CFA piling code in the future.

Over the years, I notice that DFI India has made significant efforts in widening its horizons into “Women Chapters”, Student Chapters”, has tried to promote training for specialized equipment like piling rigs, training for soil investigations, working on manuals, documents, educate the government and industry on the various initiatives and efforts required to make India technologically savvy so that we are on par with the deep foundation industry worldwide. The support of the parent body ensures that everybody has huge access to the DFI library (onemine.org) which I strongly recommend for everyone to avail. Participation in DFI India conferences also ensures direct interaction and learning. The e-copy of the DFI magazine that each member receives is a treasure with case studies and information on various companies as well as DFI activities worldwide.

Contd.

The DFI membership has thus opened new vistas and significantly helped in "Connecting Technology and People". The organization is all about "Finding Common Ground" between various stakeholders of the deep foundation industry. Geo Dynamics has greatly benefitted participating in DFI activities through the years which contributed directly or indirectly to its growth in India.

I strongly recommend and encourage all the stakeholders of the geotechnical industry to join DFI, learn and benefit through interactions, participation, and contribution as the industry and country cannot grow unless we all join hands together and make a strong foundation.

Congratulations!!!

Dr. K S Rama Krishna

DFI Distinguished Service Award 2020

DR. KSR, chair of DFI of India and a member of the DFI Board of Trustees, is the recipient of DFI's highest award to an individual, the Distinguished Service Award (DSA). This award recognizes individuals who have made exceptionally valuable contributions to the advancement of the deep foundations industry.

As chair of DFI of India, Dr. KSR's primary focus has been to bridge the wide gap between geotechnical and foundation engineering knowledge and practice in India by creating a vibrant platform for the interaction of all the stakeholders of foundations industry in India and abroad. According to Rama Krishna, the current role of DFI of India is to continuously help the deep foundations industry by implementing new technology initiatives and organizing training programs to enhance the skill levels of operators, engineers and others within the geotechnical industries.

Congratulations to Dr. KSR for this wonderful achievement and best wishes for his future.

DFII Director of Operations - Message

-Mr. G. Venkata Prasad

Mr. G Venkata Prasad

Rejuvenating the Indian Foundation Industry Along the Higher Productivity Route

The increasing spread of COVID 19 had radically disrupted traditional patterns & networks of economic interaction & behavior and post this crisis a new normal has to emerge. This is not another turn of the business cycle, but a shake-up of the world economic order. While countries and companies attempt to come to terms with the scale of the pandemic, it is evident that we are staring at more permanent structural changes in the way we live, work & plan.

For the first time work from home, virtual meetings/conferences, webinars have become most common and hopefully, this will become a new norm because of several advantages, i.e. possible savings in office lease rentals and maintenance cost, commuting time and cost, travel cost, energy consumption, pollution emission and carbon footprint, have a reach to more delegates in the virtual conference and webinar programs at a more affordable cost.

During DFI's 2019 Winter Planning Meeting held in February, DFI leadership discussed how DFI structure should evolve further to ensure continued service to its expanding global community? How can activities remain impactful and continue to create a space where members find common ground? Apart from continuing in-person conference/workshop programs, opportunities to have webinars and podcasts programs, videos, apps, text messages, and social media discussions were explored. This is to cater to diversified membership base which is multigenerational, multidisciplinary, and consisting increasing participation from women, engaging varied levels of expertise and areas of interest. Each group will prefer a different delivery method.

The DFI goals include expanding their global audience, enhanced educational offerings, increased research by technical committees, and effective student engagement through more online and in-person training and opportunities for mentoring and networking.

COVID 19 pandemic compelled the DFI team to fast forward necessary efforts in this direction, and it completed the first virtual SUPER PILE 2020 program very successfully and gearing up to launch many other programs. Following the suite, DFII is ready to offer 3 webinar programs during Aug, Sept, Oct 2020, and DFII 2020 Annual Conference event during November 2020 that consist of interesting presentations by global experts on different interesting topics. Many webinars programs also on the anvil catering to the student community on interesting topics.

Making use of current lockdown condition DFII team made an on-line presentation to 200 plus professionals of 10 different companies about a) the scope available in India geo foundation industry on multiple

Contd.

fronts to reach the global standards, b) success of its current efforts with the support of multiple organizations in India and abroad in few niche areas and c) future plans. We showcased how collective efforts can enhance the performance of the industry phenomenally and we got overwhelming applause for this progress.

Most of the participants did acknowledge the multiple challenges they are experiencing in executing the geotechnical and foundation scope of major projects. They emphasized the need of taking up more initiatives by DFII like an independent body in the related subject for the benefit of the Indian construction industry.

All of them wholeheartedly confirmed their involvement in our future programs to serve mutual interests.
The link *www.dfi-india.org* may be followed to know more about the progress of our current activities of following DFII committees and learn about opportunities to replicate this success story in other fields of construction as well.

- CFA Pile Technology Implementation Committee
- Geotechnical Characterization for Foundations Committee
- DFI CMRL International Geotechnical Engineering. Contractual & Construction Working Group
- Student Outreach Programs

We thank all patrons, well-wishers, and geotechnical professionals for their support to us during these trying times and wish all a safe and speedy passage through the Corona pandemic.

Congratulations!!!

Akhila Manne
Senior Geotechnical Engineer,
Keller Ground Engineering (India)

WiDF 2020 Professional Development Grants

The DFI Educational Trust awards **Akhila Manne** along with four other women professionals the *"Women in Deep Foundations (WiDF) 2020 Professional Development Grants"* of $1,750 each, to attend DFI's 45th Annual Conference in Maryland, USA. The grant includes complimentary conference registration and covers related expenses for attending the conference.

Ms. Akhila's core interests are in heavy foundations, seismic site characterization and numerical modeling of granular materials. Prior to working in industry, she worked on the seismic microzonation of an Indian city during her masters which was published in Geotechnique Letters. She authored about 20 technical papers and a book chapter. Apart from technical interests, she likes adventure activities and was an organizer for hiking and rock-climbing trips.

Congratulations to Ms. Akhila for this achievement and best wishes for her future.

Cover Story

High-Performance Jack-in Pile Installation – Case Studies

Introduction

Pile foundations have been used in construction industry for past many years and is one of key aspect of foundation engineering. It is one of the obvious and preferred choice to transmit the loads from superstructures to the underlying soil or rock strata. However, in India, due to many reasons, the piling construction is not considered to be professional and many project experience significant delay due to many reasons i.e. lack of deployment of appropriate piling rigs, deficient geotechnical investigation programs and old age construction methods. Because of these reasons the Customer/ Clients (mainly in India) always try to avoid pile foundation and see as one of the key contributor of cost overrun and schedule delay.

Jack-In Pile – New Piling Method

Jack-in pile is a pile foundation construction system in which the precast pile section is pressed into the ground using a hydraulic jack that is loaded with sufficient counterweight so as not to cause vibration. Since the jacking or pressing of pile is carried out against the counterweight, it practically eliminate requirement of any impact on the top of pile. The pressing or jacking force can be monitored and piles can be pushed in to ground at specified depth. This way the installation system carry many advantages over the conventional driven and bored cast in situ piles. The method uses static pressing method and there is no potential driving stresses (due to hammering to the pile head), which practically limit the requirement of high reinforcements which is mandatory in reinforced concrete driven piles. Additionally, it minimizes the breaking of pile head. Jack-in piles offers very high stiffness as residual stresses are locked-in at the base and these residual stresses are more than driven piles. In other words, due to high residual pressure at the base, the shaft stiffness is very high and high end bearing resistance is available at small displacement levels. Typical Jack-in pile rig is illustrated in the Fig. 1. The system/ rig is equipped with inbuilt crane (approximately 50 Ton) which can be used to pick and lift the precast pile elements from surrounding and pitch them in the rig. This eliminate the requirement of additional machinery around. However, for transporting the precast pile elements within the project site one may need additional cranes to facilitate the stacking of these elements around pile rig to leverage the faster installation. In addition to the advantages

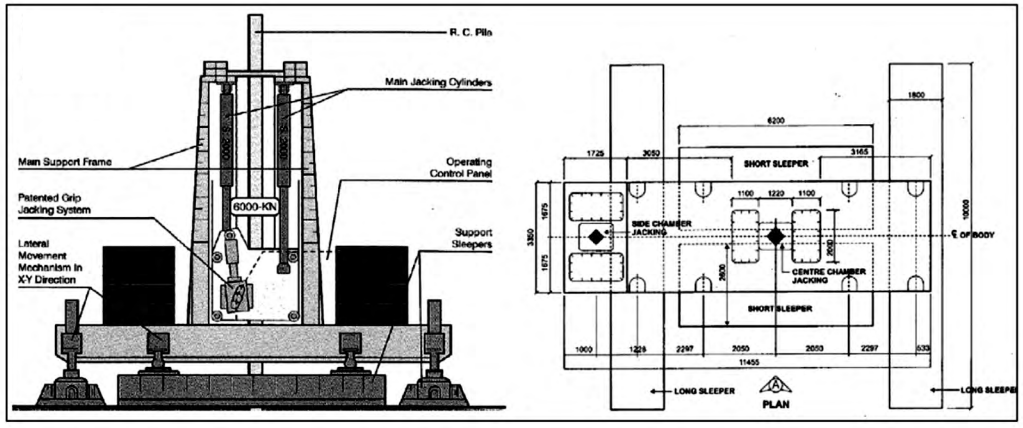

Fig. 1. The Jack-in pile installation system

Contd.

mentioned above, the rig is capable of driving pile with various sizes ranging from 200 200 mm up to 600 600 mm or also for spun pile with diameter 300 to 600 mm. However, the ultimate pile capacity or jack-in force requirement governs the system as equivalent counter weigh need to be maintained at the top. These piles were successfully used in two of the projects in Bangladesh. Some of the construction details and performance data are presented here.

Case Study 1

The site is located on the south bank of the Kushiyara River and is about 2 km North West of the village of Sherpur, Bangladesh. Site consists of thick compacted sand layer of 6 m at the top followed by soft clay layer up to 5 to 6 m. The prior contractor has excavated soil the natural ground approximately 2 m and replaced with compacted dredged sand layers. Original ground was then raised to another 4 m to match the desired site elevation to make the site sufficiently high compared to high flood level of adjacent river. During inception state it was decided to go with 800 dia. bored cast in situ piles and few test piles were also constructed including few piles for the one of the building structure. However, during construction operations of the bored piles, it was observed that at many places boreholes were collapsed and piles need to be abounded. Contractor tried to push the temporary liner but liners due to top backfilled sand layers liner pushing was not successful. To overcome this issue, contractor then started to predrill the borehole to higher dia for facilitating the liner installation. This in turn created the situation as shown in the Fig.2 where the bentonite slurry find the place between liner and pre-bored soil surface thereby creating non uniform shaft. It was also observed that thick bentonite filter cake accumulated between this spaces thereby imperiling shaft resistance. All these instances during test pile construction raised serious concerns regarding the successful bored pile construction in given schedule time.

Fig. 2. The condition of the bore round liner (liners where installed with pre-bored holes of higher dia.)

After many discussions among the stake holders, it was decided to go for Jack-in piles and to start with a trial construction and testing program was initiated. The piles were installed using rig. Comparison of the few test piles, which were bored cast in place piles are highlighted in the Fig. 3. It is important to note that 500 x 500 mm square precast piles of 12 m long (working capacity as 120 Ton) replaced 800 mm dia. bored cast in-situ pile of 15 m long with better site control and ease of construction. For small structures, another set of 350 x 350 mm square precast piles (with 80 ton capacity) were used. All the jack-in piles were of 12 m long single section piles with flat bottom (i.e. without any pile shoe). With 30 min of average installation time per pile, the installation of piles were carried out in record time thereby saving significant cost and time for the project.

Contd.

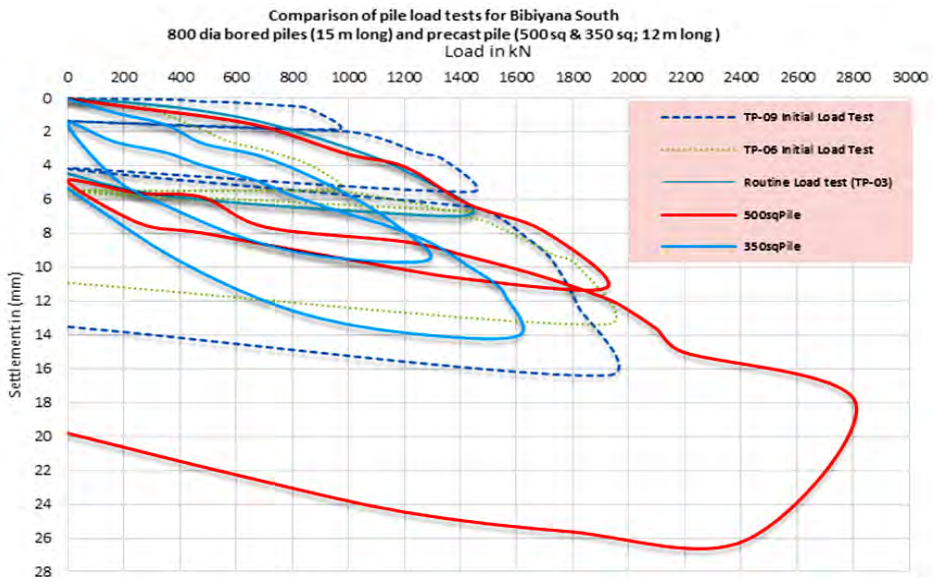

Fig. 3. Comparison of pile load tests conducted on 800 mm dia bored piles and Jack-in Piles (500 x 500 mm section and 350 x 350 mm sections)

Case Study 2:

Plant is located close to Dehular Khal (approximately abutting 560 m with the bank of Dehular Khal) in Bangladesh. The land along the Dehular Khal is observed to have RL.1.8 to RL 0.8 M (Mean Sea Level) and towards the existing plant the ground is observed to be higher having RL. 3.1 m (main plant) to 0.9 m(fuel oil area). The Highest Flood Level is observed to be RL. 3.7 m. The average natural ground level is in the range from RL 2.1 to RL 1.6 m and finished grade levels to be achieved as RL 4.1 m in order to develop the site reasonably above the flood level. However, in order to achieve it, the plant is required to have approx 2 to 2.5 m filling with compacted earth

Based on data collected, origin of strata, the results of SPT and other laboratory test results, the sub soils conditions can be divided in to four main layers. Layer 1 is top weak soil layer. The thickness of this layer ranges from 5 m to 8 m. The SPT N-value is from 1 to 5 blows, average in 3 to 4 blows. The layer primarily consist of fine silt to clay. Layer 2 is also weak soil layer consist of sandy silt to clayey silt. The thickness of this layer ranges from 4.5 m to 8.0m. The SPT N-value is from 4 to 10 blows of 30cm penetration, average in 8. The bottom layer is dense sand to silty sand stratum having average SPT Blow Count 18 to 25 (up to 30 m depth from natural ground level). Ground water table is generally shallow in the plant and seasonal variation is generally observed due to monsoon and proximity of Dehular Khal.

Initially, bored cast in situ piles were considered for the project. However, few initial load tests demonstrated that thick layer of soft clay layer extending up to almost 18m from the natural ground level is creating issue with borehole stability and construction quality. Installation of permanent liner was explored but was not implemented due to economic constraints. Few initial test piles of bored cast in situ piles were found to be defective through integrity test data. Finally it was decided to go with precast Jack-in piles of 400x400 mm section of 31 m length. The 31 m long piles was installed in three segment and each segment was welded together. Since, the static jacking do not involve considerable driving stresses, the welded joints were observed to remain intact and performed satisfactorily. With design load as 70 Ton, each pile was driven up to specified depth and jack-in force was monitored. It was observed that for few piles the jack-in force was not meeting the criteria. However, routine load testing in form of static and high strain dynamic load testing were

Contd.

performed on few of such piles under critical structures. It was observed that even for the piles jack-in force could not meet the requirement (i.e. 200% of the working load), performed better as demonstrated through load testing. One of the such load testing is presented in the Fig.4 which highlight that the stiffness of the 31 m long 400x400 mm square pile is equivalent to 750 mm dia bored cast in situ pile of 35 m long. However, there is considerable difference in the installation of time for one bored pile (750 mm dia.) and jack-in pile employed. The installation time of one Jack-in pile is around 1 hour whereas bored pile will require more than one day that too with lots of uncertainties associated with quality of piles and its post installation behavior. Additionally, each jack-in pile is tested pile and static force required to install up to specified depth is direct indication of the pile capacity. It is interesting to note that in the clay stratum of the project site, for all the load testing conducted (static and high strain dynamic load testing), the piles performed better and even demonstrated the capacity more than that derived from the static force used during driving.

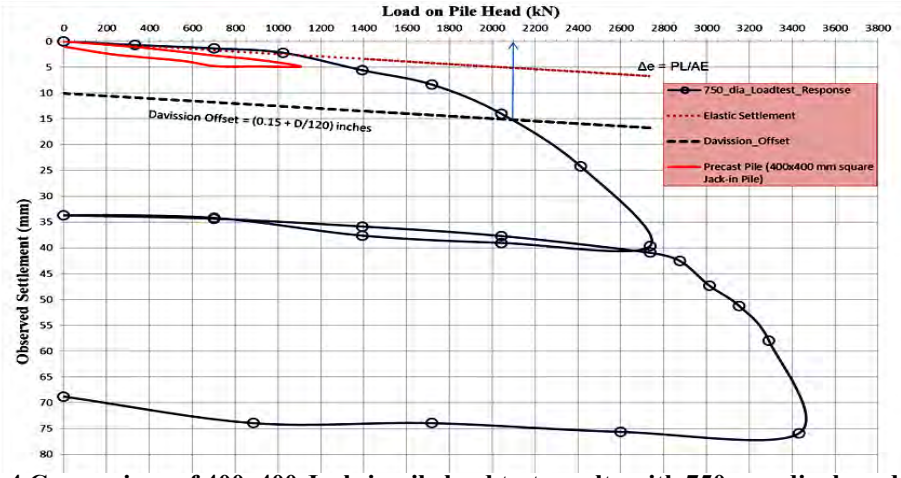

Fig. 4 Comparison of 400x400 Jack-in pile load test results with 750 mm dia. bored cast in place pile.

Summary

Due to the nature of pile installation using the jack-in system where less cycling loading is induced during installation, mobilized shaft friction in jack-in piles is expected to be higher compared with conventional driven piles. When a displacement pile is jacked into the soil, it displaces a soil volume equal to the volume of the pile. Thus, very large normal and shear forces are applied on the surrounding soil layer considering a dense pile group, causing increases of pore water pressure and changes in the stress state. This is also true as the installation of Jack-in pile comparatively quick. It has also been observed that the pile capacity of driven piles increases with time in other soils, including loose to dense silt, sandy silt, silty sand and fine sand. For clay, which has very low hydraulic conductivity, excess pore pressures appear in the soil layer surrounding the pile after pile driving. With time, this excess pore pressure dissipates, and effective soil stresses increase. The main cause of pile setup in clay is dissipation of excess pore water pressure. It causes increase in effective stress in the clay layer, and thus increased strength and stiffness of the clay around the pile, leading in turn to increase in the shaft and base resistances of the pile (*Basu et al., 2014; Cooke et al., 1979).*

One of the major technical benefits of the jacked pile is that it shows higher stiffness response compare to driven or bored pile when loaded especially at working loads. Many researchers i.e. Tan et al. (2014), White and Deeks (2007), Yetginer et al. (2006) and many others, have

Contd.

shown through the field test that adjacent pile jacking activity give rise to notable lateral stress along an already installed pile. Higher stiffness of the jacked pile is achieved due to preloading which is given during the final installation strokes. An important mechanism due to which the pile stiffness can be enhanced is the residual base loads which is locked during the pile installation. When the pile installation is completed and the head load is removed, the shaft resistance on the upper part of the pile is reversed as the top of the pile rebounds upwards. As the shaft friction response is stiffer compare to base response, the base does not become fully unloaded during this rebound. Owing to the fact, base load acts at the pile bottom to conserve the equilibrium of the pile, even though the load at the pile head is completely removed. In the presence of residual load, ultimate capacity of the pile is achieved at a relatively smaller settlement (as a smaller displacement of the pile bottom/base is required to fully mobilize the base resistance).

Though termination criteria of each installation is not uniformly established and many countries follow country specific and site specific chosen criteria for final termination or preloading criteria before termination or unload. However, based on load test results where the piles are tested up to at least two times their working load including the two sites case study presented here, maintaining the jack -in pressure corresponding to 2 times working load for a minimum of 30 seconds with settlement not exceeding 2mm or less may result satisfactory results. However, post installation load test results demonstrated that actual static resistance is increased along with time due to adjacent installations and pile set up.

It is imperative to note that there are no established theoretical basis to calculate the pile resistance based on the soil data. However, review of static load test results and published research data indicates that jack-in pile capacity calculated using equations derived primarily for driven piles will tend to be underestimate the actual pile resistance. Till the definite theory supported by field investigations and acceptable experiments, calculation considering driven pile will be conservative and produce satisfactory results for similar subsoil conditions.

Authors:

- *Dr. Jaykumar Shukla, Geo Dynamics*
- *Piyush Bhattacharjee, Shapoorji Paloonji Infrastructure*
- *Soumen Sengupta, L&T Sargent & Lundy*

India has to equip herself to face the increasingly challenging geotechnical and structural demands for the infrastructure developments embracing advanced cutting edge technologies and risk management tools. Join us for the two-day precursor conference to the 10th Anniversary Conference on Deep Foundation Technologies for Infrastructure Development in India, to be held virtually during November 19-20, 2020. The Conference will provide a forum for a wide range of geo professionals to present, discuss and debate many aspects of the latest deep foundation technologies appropriate for the faster development, expansion and improvement of India's critical infrastructure.

For detail program, speaker information, sponsorship options and registration, visit www.dfi-india.org/DFII2020/

Conference Registration Fee

2-day Conference (3 Webinars free)	INR
DFI Member*	3,200
IGS and IGSCC Member *	3,700
Non-Member *	4,200
Student (PG & Research)**	800

(*includes DFI membership through Dec. 31, 2021

** Students shall register using the institute email ID for availing the concession)

Download the conference brochure here:
www.dfi.org/update/dfii2020-brochure%20Final.pdf

Upcoming DFI Events

DFI-India Webinar Series on Steel Retaining Structures and Foundations

Webinar Series

DFI India is happy to announce the launch of its new webinar series on steel retaining structures and foundations. We are bringing together industry leaders worldwide to present educational sessions on the latest solutions, technologies and applications of steel pile foundations. Topics will include types of steel piles, design, installation, case studies, innovations, and much more. This technical webinar series is completely free for all the delegates.

The first two dates are:
Wednesday, July 29, 2020
Wednesday, August 12, 2020

For detail program, speaker information, and registration, visit www.dfi-india.org/DFIISteel/

Sponsorship opportunities available for upcoming webinars, contact Mr. Athif (+91 - 8870130850) for details.

Event	Date	Venue
DFI-India Webinar Series on Steel Retaining Structures and Foundations	July 29 Aug 12, 2020	Virtual Event
S3: Slopes, Slides and Stabilization: A Software Discussion	Aug 5, 2020	Virtual Event
DFI-India 2020: Pre-conference Webinar Series	Aug 20 17 Sept 22 Oct, 2020	Virtual Event
45th Annual Conference on Deep Foundations	Oct 13-16, 2020	National Harbor, Maryland
DFI India 2020 - Annual Conference	Nov 19-20, 2020	Virtual Event
DFI 2021 Middle East Conference	Feb 16-18, 2021	Virtual Event
SuperPile 2021	June 23-25, 2021	Philadelphia, Pennsylvania
46th Annual Conference on Deep Foundations	Oct 12-15, 2021	Austin, Texas
DFI-India 2021: 10thAnniversary Conference	Nov 18-20, 2021	Chennai, India

DFI of India News

DFI of India is very happy to announce the following progress updates:

1. DFII CFA Pile Technology Implementation Committee:

   The committee is ready with following three documents corresponding to its CFA Pile Trial project in Haryana (click on the link to download)

   a) Document for Pile Design and Construction by Continuous Flight Auger (CFA)
   b) Continuous Flight Auger (CFA) Trial Pile Installation Report
   c) Compendium of Load Test Reports on Continuous Flight Auger (CFA) Piles

   The committee is also developed "Guidelines manual for design & construction of CFA Piles" which is currently under expert review and will be available soon for the industry.

   For more details visit www.dfi.org/commhome.asp?ICFA

2. DFII Committee for Geotechnical Characterisation for Foundations (DCGCF):

   The committee has widened its scope after formation of two sub-committees, first for Geotechnical Investigation Field Supervisor Certification program, second for implementing good work practices and enhancing current tender practices for geotechnical investigation.

   For more details visit www.dfi.org/commhome.asp?IGCF

3. During the Coronavirus lockdown period DFI India made presentation to more than 250 engineers representing more than 15 companies in multiple sessions. The presentation compared the best global geotechnical practices to Indian practices and provided an overview of different DFI India initiatives and activities, and explained how DFI is bridging the gap and finding common ground for different stakeholders in foundation industry. The session got very positive response which made sure DFI India continues the program and reach more organisations.

DFI India Long Term Membership Plan

On popular demand DFI India has come up with long term membership plans of 3 years and 6 years. It will not only save you from renewing your membership every year, but you can also save up to 23.5 % on your membership fee. Kindly refer the new term plan and revised DFI membership rates applicable from 2021.

Category	Year of entry	2021	2022	2023	2024	2025	2026	Saving
Individual Membership-General	Yearly	7000	7000	7400	7400	8000	8000	
3 Year Term fee	Block of 3 years	18900	18900	20200	20200	21900	21900	11.7%
6 Year Term fee	Block of 6 years	34200	34200	36900	36900	40000	40000	23.7%
Individual -corresponding	Yearly	3000	3000	3200	3200	3400	3400	
3 Year Term fee	Block of 3 years	8100	8100	8700	8700	9300	9300	12.0%
6 Year Term fee	Block of 6 years	14700	14700	15800	15800	17000	17000	23.4%
Individual -corporate	Yearly	2500	2500	2700	2700	2900	2900	
3 Year Term fee	Block of 3 years	6800	6800	7400	7400	7900	7900	11.7%
6 Year Term fee	Block of 6 years	12400	12400	13300	13300	14400	14400	23.5%
Government Employee	Yearly	1500	1500	1600	1600	1700	1700	
2 Year Term fee	Block of 2 years	2700	2700	2900	2900	3200	3200	10.0%
Student	Yearly	1500	1500	1600	1600	1700	1700	

Student membership is FREE for students pursuing 2 year geotechnical specialiasation course

Please join us in welcoming our first batch of Long Term Members:

Dr. K S Rama Krishna - Deep Foundations Institute Of India - 6 Yr plan	Mr. Ravikiran Vaidya - Geo Dynamics - 6 Yrs plan
Mr. Anirudhan I V - Geotechnical Solutions - 6 Yrs plan	Mr. Joseph Anil - M/S. Cecons Pvt Ltd - 6 Yrs plan
Prof. Boominathan A - IIT Madras - 6 Yrs plan	Prof. Amit Prashant - IIT Gandhinagar - 3 Yrs plan
Mr. Kondapalli Bairagi - L&T Wet - 6 Yrs plan	Mr. Dicky Sinha - Tethys Business and Projects - 3 Yrs Plan
Dr. Jayaprakash K N - Geo-Engineering Company Private Limited - 6 Yrs	

For more details about DFI Membership and benifits, please contact Mr. TS Mahendran at *dfiindiaoffice@gmail.com*
To become a member visit, *https://dfi2.org/iappl.asp*

WHAT CAN DFI DO FOR YOU?

Overview

DFI is an international association of contractors, engineers, suppliers, academics and owners in the deep foundations industry. For more than 30 years, we have brought together professionals for networking, education, communication and collaboration. As a member, you help create a consensus voice and a common vision for continual advancement in the planning, design and construction of deep foundations and excavations.

Find Common Ground. Become a Member of DFI

- Network with thousands of members and industry professionals worldwide
- Get involved locally through DFI's active presence in Europe, India and the Middle East
- Strengthen your knowledge base and obtain practical information at seminars, short courses, workshops and conferences
- Collaborate with colleagues by joining one of 15 active Technical Committees, Regional Chapters or a DFI group
- Gain visibility with a corporate member listing on the DFI website, which has 20,000 views each month
- Connect and communicate with industry peers through social media such as DFI's LinkedIn Groups
- Access OneMine.org and download up to 130,000 articles, technical papers & books from DFI & organizations all over the world - at no cost

DFI India 10th Anniversary Conference on Deep Foundation Technologies for Infrastructure Development in India

November 18 - 20, 2021

IIT Madras,
Chennai, Tamil Nadu, India

DFI-India 2021, 10th Anniversary Conference on Deep Foundation Technologies for Infrastructure Development in India, is taking place in Chennai, Tamil Nadu, India. This event is being organized by DFI of India in collaboration with IIT Madras, and Indian Geotechnical Society - Chennai Chapter. It will present the successes and failures of geo-technical foundation work in major projects and current research in the advanced foundation design and implementation that are currently being pursued in premier technology institutions.

For more information, visit www.dfi.org/dfieventlp.asp?13430

This e-newsletter of DFI of India is available at http://dfi.org/enews.asp?india

Editorial team: Mr. Pranav Jha, Mr. Mohamed Athif & Mr. G V Prasad