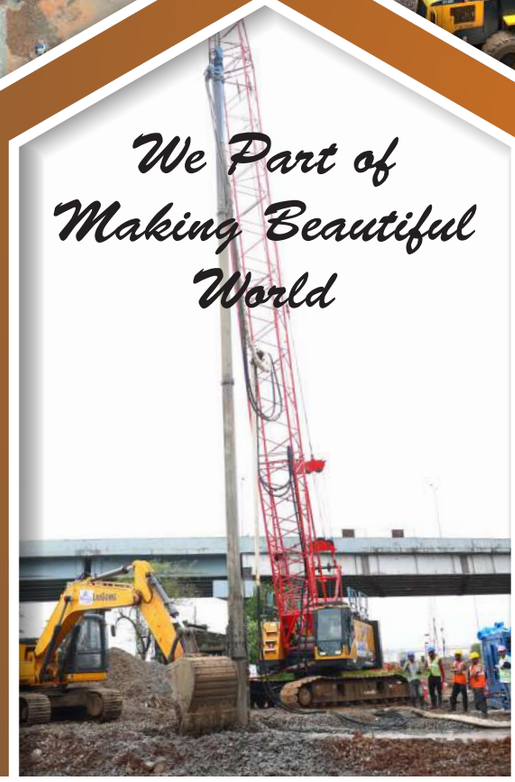
A Leading &
Fastest Growing Firm...

KAMAR
Infrastructure Pvt. Ltd.

World's One Stop Foundation Shop

We Part of Making Beautiful World



MAKE IN INDIA

www.groundimprovement.in

Kamar Infrastructure Pvt. Ltd.

has grown to establish itself as a highly professional Civil Engineering Contractor in the last few years. We are in the fields of Diaphragm Wall, Piling, & Ground Improvement.

Client satisfaction has always been the ethos of our firm. This is achieved by a combination of prompt and efficient service, adherence to health and safety restrictions and site rules, good people, site conduct and presentation, good client relationships and professional yet personal approach.

As such, we have successfully built up long term relationships and regular business with a host of leading organizations across the commercial, industrial sectors and local authority throughout India.

We operate from a modern and well-presented head office and workshop premises in Taloja- Navi Mumbai & corporate office situated in Mazgaon, Mumbai.

Our Approach

To take on and respond to our clients problems as our own; earn trust through service, and commercial fairness; thereby generating business in the long run.

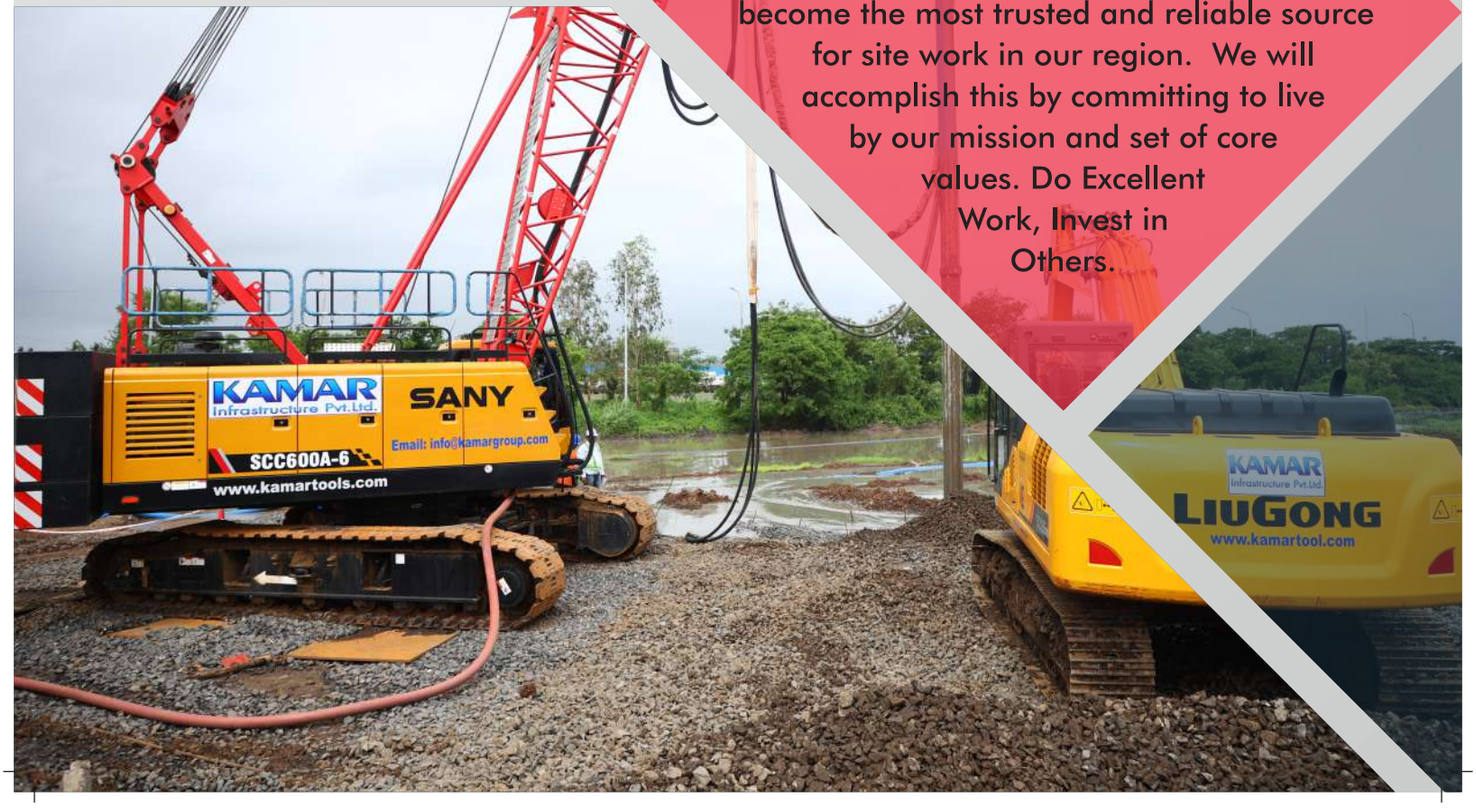
Kamar Infrastructure is one of the fastest growing companies in the fields of Diaphragm Wall, Piling, & Ground Improvement.

Strength

We are administered by a group of experienced professionals leading the team of skilled staff in foundation works. Backed by the well maintained fleet of equipment required for the execution of the projects within budget and on time.

Vision & Mission

Our vision is to serve our customers better than they expect, in an ultimate safe environment, in which we become the most trusted and reliable source for site work in our region. We will accomplish this by committing to live by our mission and set of core values. Do Excellent Work, Invest in Others.



Excellence

Even though we live in a competitive bid market where lowest price wins the race, we are committed in making quality one of our highest values. This will apply to every aspect of our work. Each of us will strive to "do it right the first time" and when that doesn't work; we will spend our time and money to make it right. We hate excuses. Our services will be best in class, performed by a well-trained, professional team of people who are committed to not taking short cuts. We will be diligent in our daily preparation and planning. We strive for results that will not just meet, but exceed our customer's expectations.

Value Our company has committed to live by the following values. These traits are the essence of what we are about. It is very important for our future success with and of this company, as a whole, for us to commit to live out each of these values in our workplace.

Safety We value each of our employees and their families above all. We practice that value most evidently by investing in the safety of our people and others around us. Nothing that we accomplish in this business compares to protecting the lives and health of our people.

Vision & Goal

To become known as a leading and preferred strategic partner providing complete support & services expanding to emerging markets by bringing forth our expertise of providing high quality solutions to our customer and a dynamic environment for our employees where the consistent delivery of value is testament to the resilience and scope of our business model. To not be a business associate but a value creating strategic partner.

Strengths

Kamar Infrastructure Pvt Ltd has no doubt served the Construction Business community with the utmost standards of quality. It is this standard that allows us to be so highly recognized by our achievements. As in everything we do, we have set standards that make sure nothing less than perfect is achieved. Nothing more shows our commitment to excellence other than the final product. Our commitment to the client allows for such great projects to be referred to us each time. We take pride in our quality of service and strive to find the most cost effective solution for all of our client's projects.

Quality Policy

Developing our existing expertise and range of support services in those sectors and countries that have real prospects for growth, as well as providing the global capability necessary to support our growing international client base. Delivering the highest quality and service performance, whilst at the same time relentlessly driving to be the lowest cost, most efficient provider. Setting the highest standards for corporate governance and responsible business practice, including all aspects of business conduct, health, safety and environmental practices.

Areas of Operations

Metro

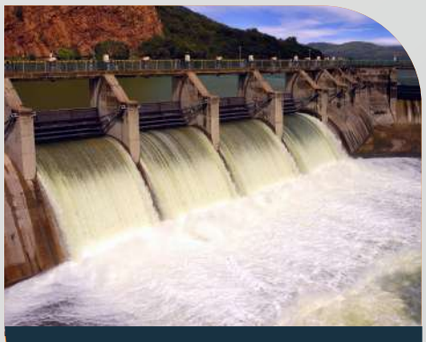
Railways

Airports

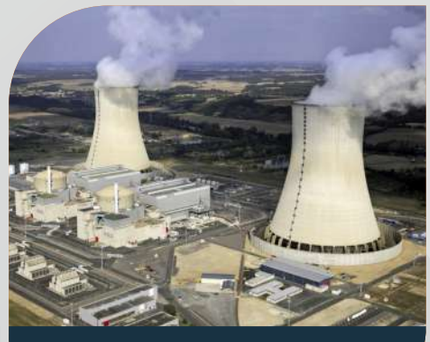
Ports & Harbor

Highways, Bridges & Flyovers

Wind Energy



Dams, Rivers



Industrial Structures

Solar Plants

Residential Buildings

Commercial Buildings

Transmission Towers

Verticals of the Company

www.groundimprovement.in

- GROUND IMPROVEMENT
- DIAPHRAGM WALL
- PILE FOUNDATION
- MARINE CONSTRUCTION
- SHEET PILE
- FORMWORK
- HEAVY FABRICATIONS
- REBAR COUPLER MANUFACTURING & SUPPLY
- EQUIPMENT HIRING
- FOUNDATION TOOLS MANUFACTURING & SUPPLY
- PILING WINCH MACHINE SUPPLY


LiuGong

Vast areas of India, particularly in the marine and alluvial environment, consist of weak and problematic soils. These have low shear strength and high compressibility, often accompanied with swelling properties. Important/settlement sensitive structures cannot be placed on them without pile foundations or appropriate ground treatment measures.

Although piles are an easy solution, the cost often becomes prohibitive. Also, for large area loading like material stockpiles, storage tanks etc., that can tolerate more displacements, providing piles do hurt the pocket of the client and the credibility of the designer.

Thus, there is ample scope and need to utilize alternative solutions that are technically and economically viable. An appropriate improvement technique not only serves the purpose, but, often works out economical too. The earliest known improvement adopted by man was to excavate a portion of the existing loose/soft soil and refill it with compaction. With time, he learnt to reject undesirable soil and replace it with competent borrowed earth from nearby sources. Over the ages, man learnt to reinforce the ground beneath his dwelling house by driving relatively stiffer members into the ground. From tree trunks/logs to holes filled with stones, and later, inserting metal pipes/rods into the ground, man has used them all! He even learnt to apply different techniques to suit different sub-soil conditions etc. Today, man has at his disposal state-of-the-art methods for shallow and deep soil improvement along with natural or synthetic fibers to reinforce the ground.

Why ground improvement?

During the planning stage of a construction project a soil investigation is usually carried out on the proposed site by a specialist soils engineer who assesses the bearing capacity of the subsoil and recommends possible types of foundations. Normally, the subsoil provides adequate bearing capacity without special foundation measures being required (see Example 1 in Figure 1 below).

If, however, the specialist soils engineer comes to the conclusion that the subsoil does not have sufficient bearing capacity, then various solutions are available, such as ground improvement or deep foundations (see Examples 2 and 3 in Figure 1 below).

In many cases, ground improvement offers an economical and fast method for improving the engineering characteristics of the prevailing subsoil.

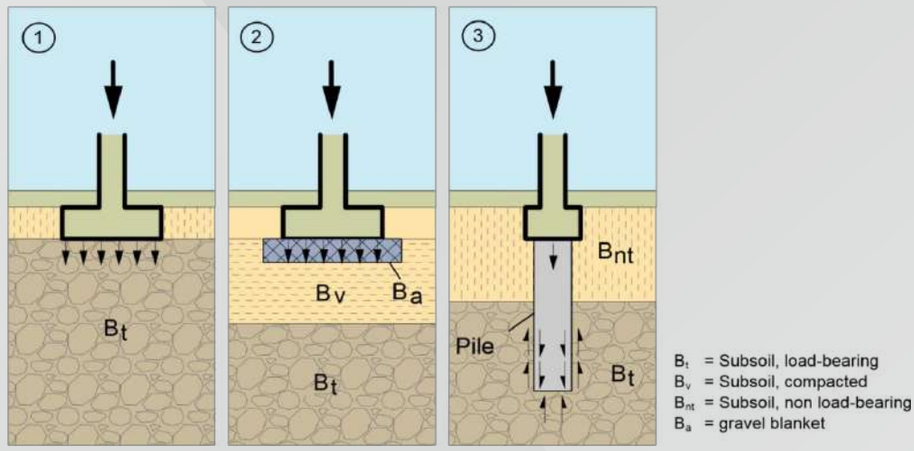


Fig. 1: Different subsoil conditions and possible foundation methodsqualifications.

Advantages of ground improvement:

No excavation, therefore no environmental impact resulting from costly transportation and specialist disposal of contaminated soils.

No groundwater lowering, therefore no requirement for permits, no discharge problems and no risk to adjacent buildings.

Simple foundation conditions, similar to natural subsoils with an adequate bearing capacity. The technique is highly adaptable.

Environmentally compatible by using only natural materials (VF and VD processes) VCC columns require a shorter penetration depth into load-bearing soil compared to bored piles.

By providing good technical supervision and workmanship throughout the works and understanding the interaction between subsoil and structure, it is possible to attain the required bearing capacity in nearly all natural and artificial soils subject to certain qualifications.

Stone Column
(Top / Bottom Feed)

Pre - Fabricated Drains

Pre - Compression

Grouting

Vibrofloatation VF (Top Feed)

Applicable in non-cohesive and slightly cohesive granular soils such as sands and gravels, as well as slag deposits. Suitable for carrying high loads on the improved subsoil, including dynamic loads without significant settlements. Particularly economical application in fully saturated soils below the groundwater table.

Vibrofloatation VF (Top Feed)

Applicable in mixed grained or cohesive soils, such as sandy silts, to fine-grained soils with undrained shear strength values ranging from 20 to 100 kN/m² by the introduction of coarse grained backfill material. Suitable for light to medium structural loads.

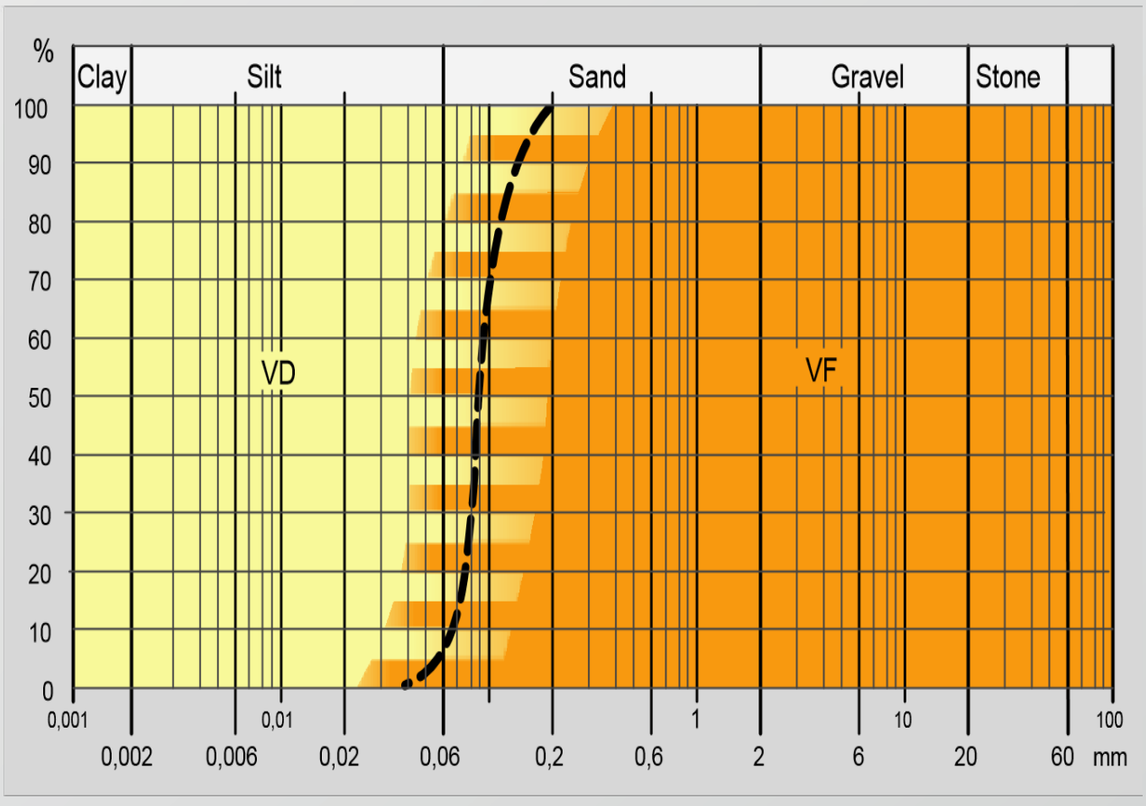


Fig. 5: Zones of application for the VF and VD techniques.

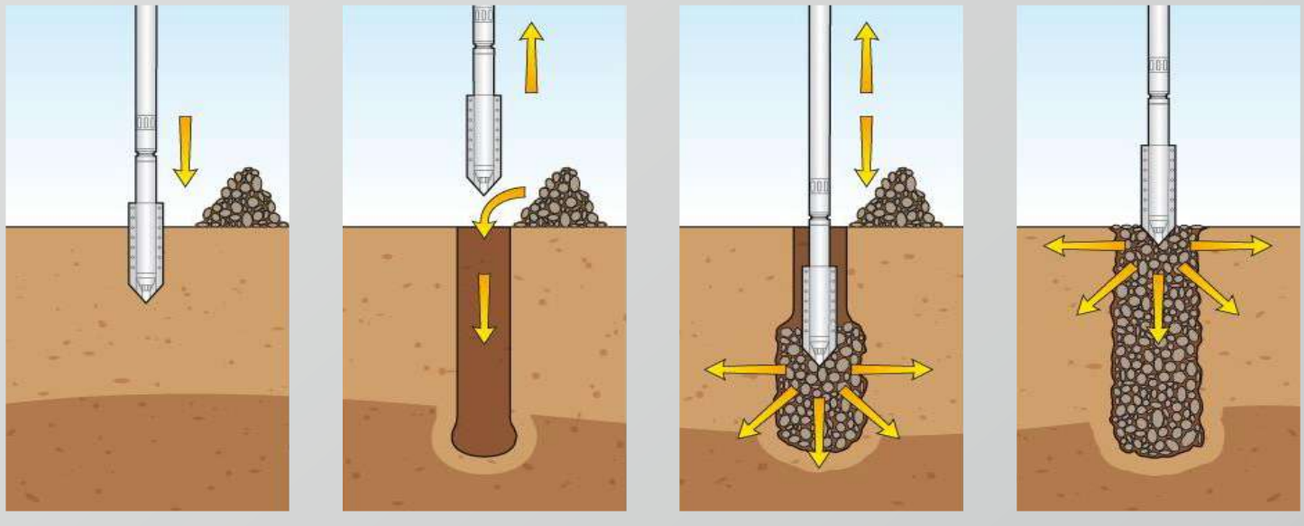
Vibrofloatation Process

Granular or slightly cohesive sediments, such as gravels and sands, are generally considered to be ideal foundation soils for carrying high loads. It is, however, frequently overlooked that in their natural state these types of soil are characterised by an extremely non-uniform state of compaction. Surcharging these soils with structural loads can lead to large differential settlements, which result in structural damage. By application of the VF technique it is possible to transform such soil layers quickly and economically into soils with optimal load-bearing characteristics. The treated areas are homogenised and at the same time compacted to a relative density of around 80 %, attaining a modulus of compressibility ranging from 80 to 150 MN/m^2, under particularly favourable soil conditions even 150 to 200 MN/m^2. The upper one to two metres of soil cannot be compacted effectively by the Vibrofloatation technique. These areas must be compacted by vibratory surface compaction rollers or alternatively be removed.

What occurs inside the soil?

During the Vibrofloatation process, the vibrations introduced into the soil by the depth vibrator together with water or air flushing temporarily destroy the intergranular friction, allowing the soil particles to rearrange themselves under gravitational forces into the densest possible state. This increases the relative density of the body of soil being treated and results in an overall volume reduction of around 8 to 15 %. This causes the formation of a crater around the compaction point, which is backfilled with imported material, generally crushed stone, gravel or sand. As a result of the denser packing of the soil particles, settlements have been eliminated in advance.

The Foundation Concept The effectiveness of the densification around a compaction point is largely influenced by the prevailing soils and ranges generally between around 2 and 4 m. The spacings between individual compaction points depend on various factors, such as specified relative density, grain size distribution, silt content, power output of the depth vibrator, etc. Fine sands require smaller spacings than coarse sands or gravels. When determining the size of the area to be compacted, it is essential to be aware that the soils at the periphery of the proposed building influence its settlement behaviour and stability. Under uniformly distributed loads the compaction points are usually arranged in the form of equilateral triangles, whilst under point and line loads the compaction points are generally arranged more densely. The extent of our experience enables us to produce tailored designs for every construction project. For medium to large-sized projects it is recommended to carry out on-site trials using different grid spacings in order to optimise the grid arrangement of the compaction points. Good compaction results will allow high structural loads with foundation pressures up to 800 kN/m^2 to be carried.



Vibrofloatation process

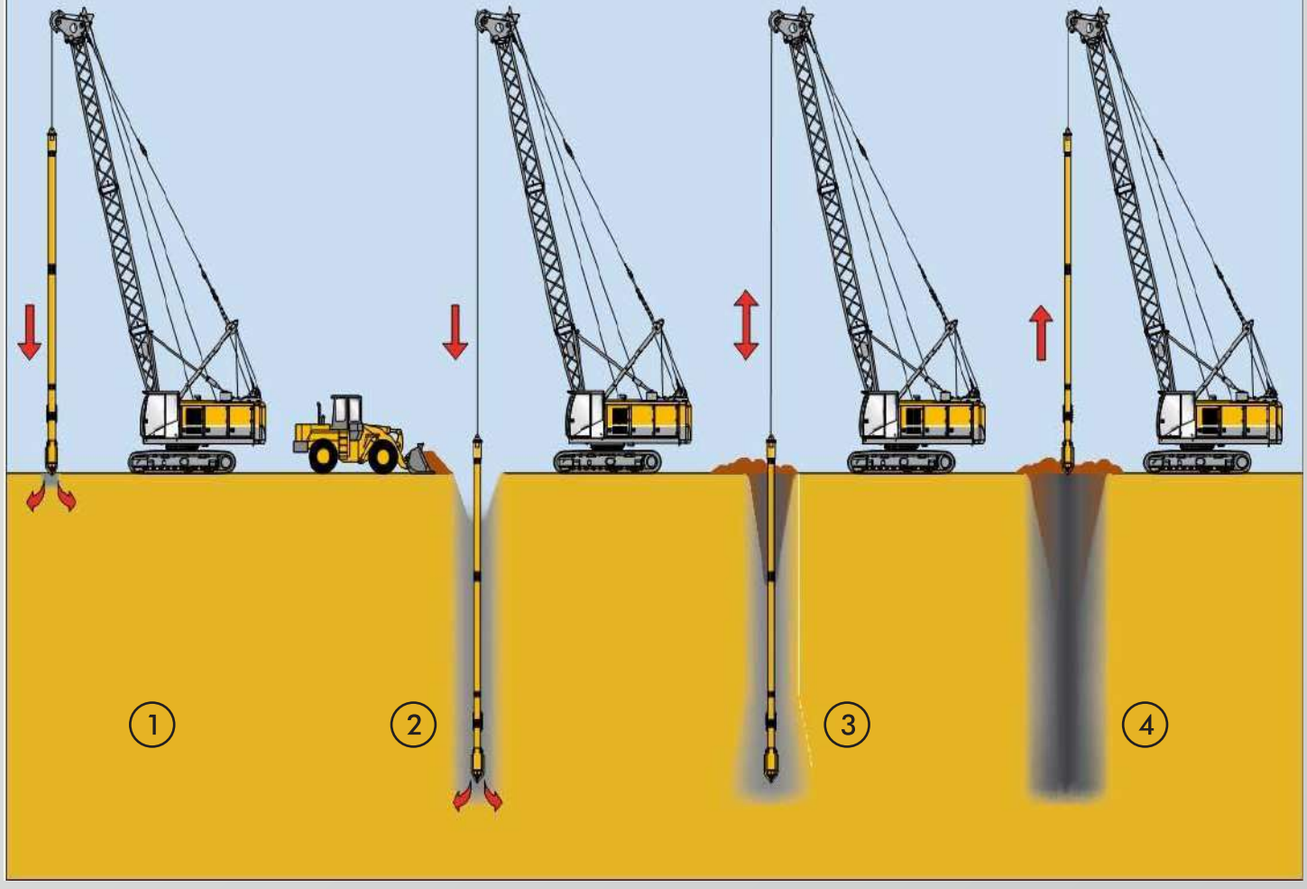
Step 1: The depth vibrator is positioned over the compaction point. Flushing, using water or air, is commenced and exits through jets in the nose cone of the vibrator.

Step 2: As a result of the induced vibrations and jetting, the soil is temporarily liquefied enabling the depth vibrator to penetrate the soil under its own weight.

Step 3: The vibrator has reached the specified depth. Flushing is reduced or stopped. The soil is densified by the vibrator induced vibrations. Soil densification causes the formation of a crater around the vibrator, which is backfilled with imported granular material.

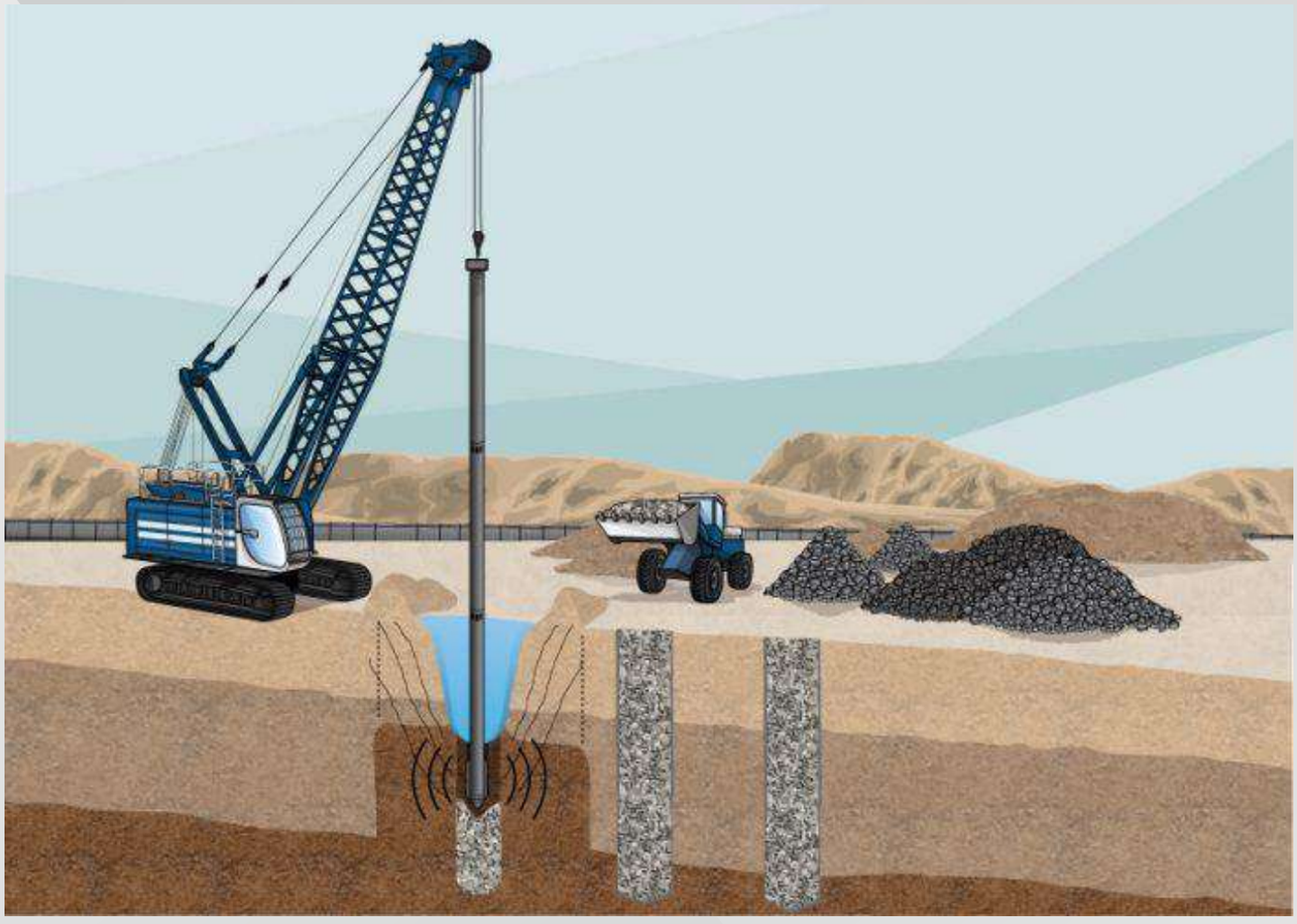
Step 4: As the depth vibrator in slowly withdrawn, usually in stages of around 0.3 m, a cylindrical compaction zone with a diameter of 2.0 to 4.0 m is formed around the vibrator. The achieved degree of compaction is indicated by an increase in oil pressure. The annulus around the vibrator is continuously backfilled with granular material.

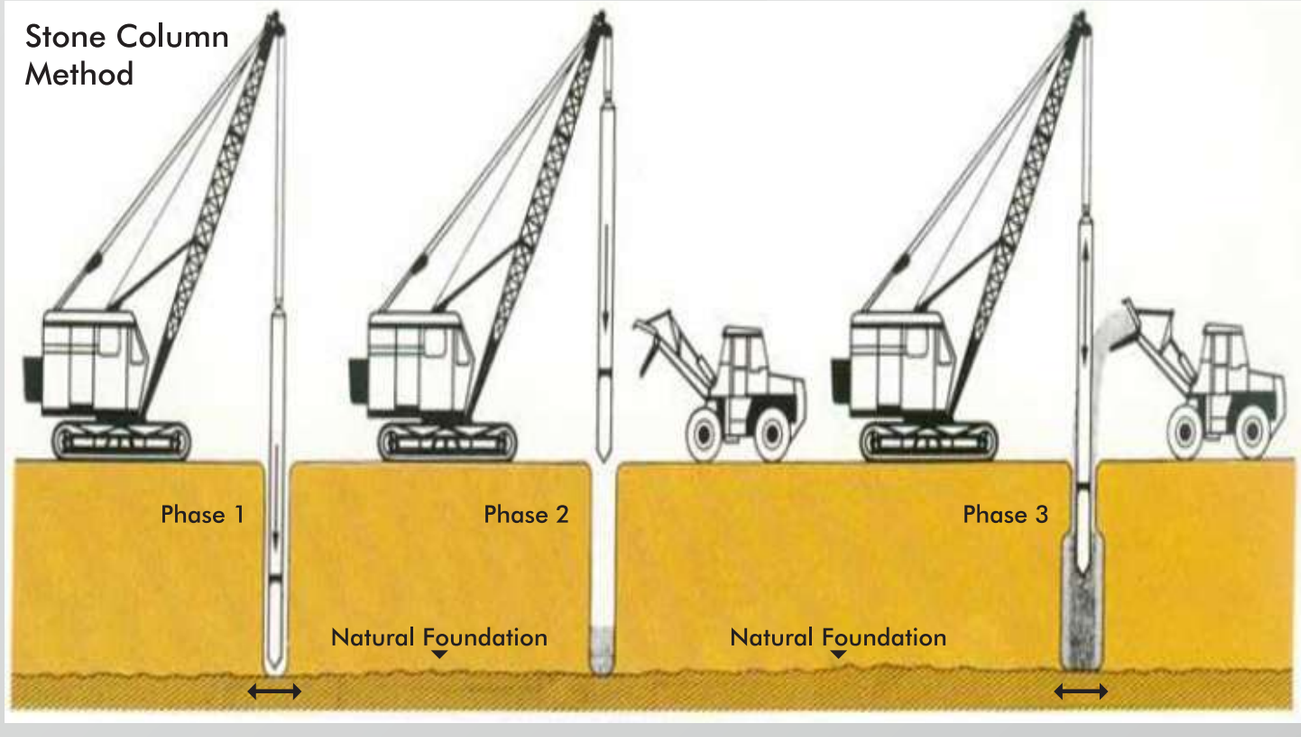
Fig. 10: Work sequence for the construction of vibro-flotation columns (VF)



Suitable backfill materials are:

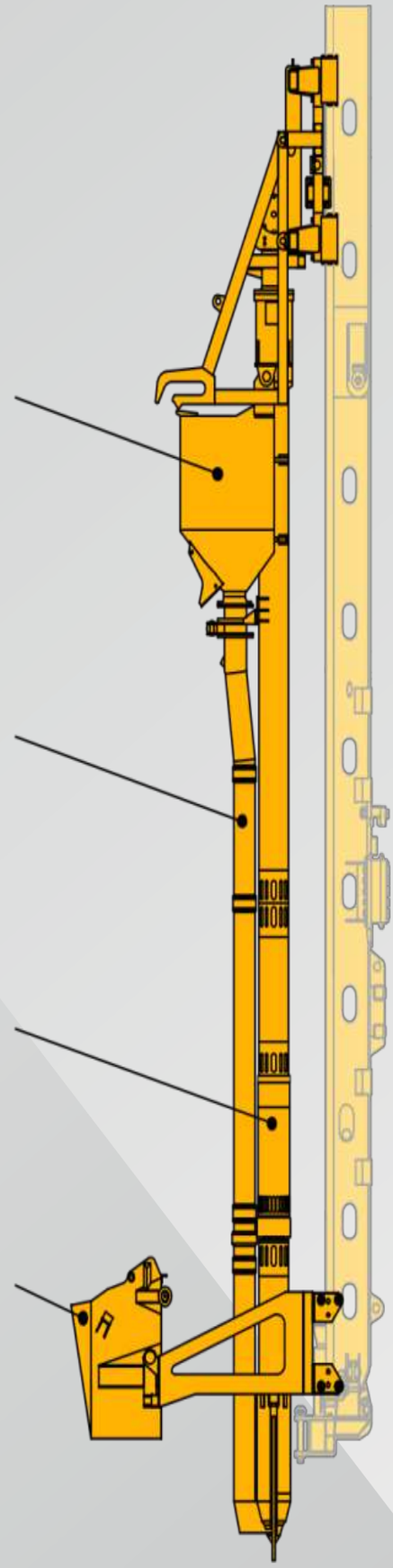
A. Silt-free quarry or river gravel, silt-free sand-gravel mixture
B. Gravel or crushed stone, with grading between 2 and 250 mm
C. Existing soil taken from the site, with max. silt content of 6 %
D. Normal consumption of backfill material can generally be expected to be around 0.4 to 0.8 tonnes per linear metre.
E. The overall length of the depth vibrator can be adjusted to the specified compaction depths by the addition of extension tubes. Compaction depths in excess of 50 m have already been achieved by the VF process and completed successfully.
F. The flushing medium can either be water taken from rivers or existing groundwater. Both fresh and salt water are suitable.
G. In certain ground conditions a combination of water and air flushing has also been Successful.




Stone Column
Method
Phase 1
Phase 2
Phase 3
Natural Foundation
Natural Foundation

Vibrodisplacement

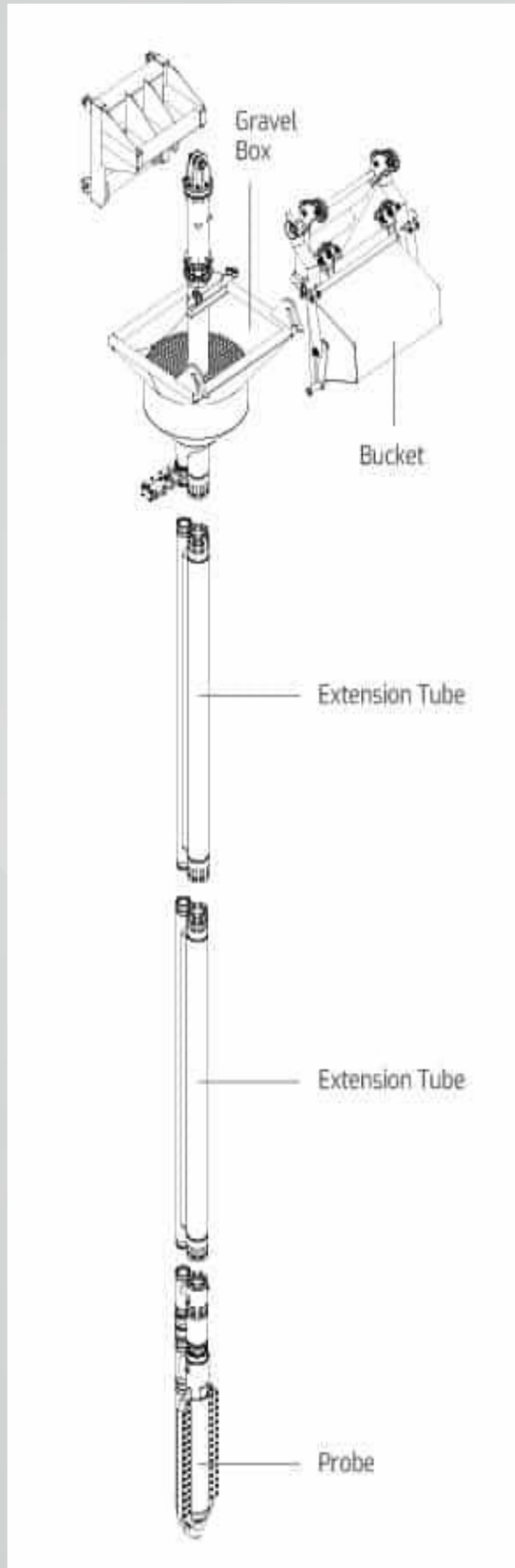
In cohesive soils the soil particles cannot be rearranged by vibrational impulses as for Vibrofloatation. A considerable increase in bearing capacity can, however, be achieved in these soils by the Vibrodisplacement process. With the Vibrodisplacement technique stone columns are constructed by a depth vibrator specially adapted and equipped for this process. Assisted by air flushing, the vibrator penetrates the soil to the required depth. The surrounding soil is displaced as a result. Coarse granular backfill material is delivered directly to the tip of the vibrator through the material transfer pipe attached to the front of the vibrator. During withdrawal of the vibrator, the Material storage container annulus formed below the tip of the vibrator is immediately backfilled with the gravel or crushed stone supplied through the material transfer pipe. By repeated raising and lowering of the vibrator in steps of around 0.3 to 0.5 m the backfill material is compacted and displaced laterally and forced into the surrounding soil. With this technique it is possible to increase Material transfer pipe the average stiffness modulus of the soil by a factor of 2 to 3. Vibrodisplacement stone columns can also facilitate drainage of layered soil formations. Excess pore water pressures can be rapidly dissipated through the open grain structure of the stone columns. This feature offers considerable advantages Vibrator particularly in earthquake zones by preventing liquefaction of the soil during earthquakes. In addition, horizontal vibrations can be dampened by the relative flexibility of the foundation.



Vibro replacement stone column is a system where vertical columns that made out of compacted gravels are placed into the soil. This technique builds load-bearing columns and these columns are made out of gravels or crushed stones in cohesive soil and granular soil with high fines content.

Vibro replacement columns are beneficial for enhancing wide range of soil types. They can improve very soft clays and peat to materials suitable for the vibro compaction method. The equipment of the vibro replacement method is identical to the one in the vibro compaction method.

As for the operation of stone/gravel columns, there are two methods: the top feed and the bottom feed. The latter operation will be issued in this part. "The bottom feed" process feeds gravels from the end of the probe with pressurized air. In order to achieve an optimum performance, KIPL has developed the vibrofloatation probe and gravel hooper with the pressure chamber. Additionally, these KIPL vibroflotation probes can mount on an existing rig or leader, crane or an excavator.



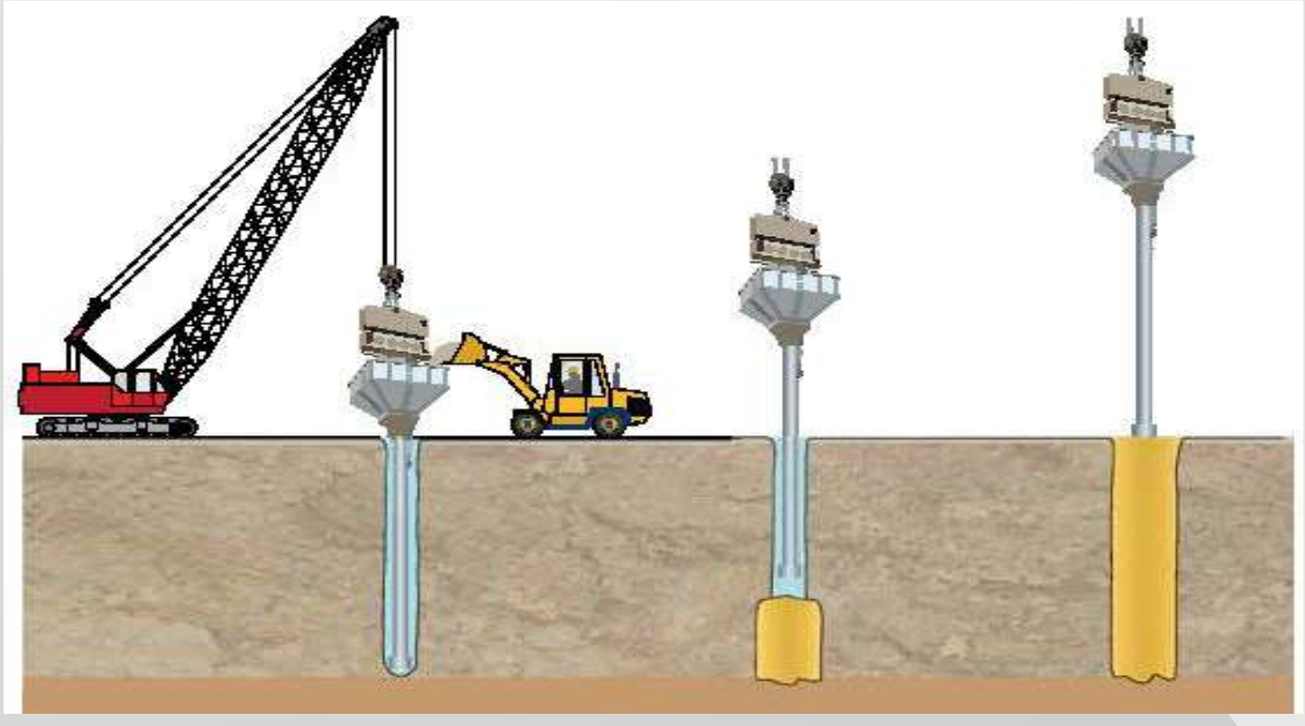
Vibrodisplacement

What occurs inside the soil?

If the silt or clay content in the soil increases to more than around 8 to 10 %, ground improvement by rearrangement of the soil particles is no longer possible as the cohesion of the fines content in the soil binds the soil particles together. In this case the vibrator has to create an annulus space that can be backfilled with gravel or crushed stone.The stone columns have a significantly higher shear strength and stiffness than the surrounding soil. At the same time, the surrounding soil provides lateral support to the stone columns and thus creates a composite load-bearing effect.

The foundation concept

It is recommended to place a clean and properly compacted load distribution blanket comprising well-graded gravels or a well-graded sand-gravel mixture between the exposed tops of the stone columns and the underside of the structural foundations.As with Vibrofloatation, the compaction points under uniformly distributed loads are generally arranged in the form of equilateral triangles, whilst under point and line loads compaction points are arranged more densely. Vibrodisplacement stone columns are designed according to probe or others. The allowable bearing pressure applicable for foundation designs after ground improvement by vibrodisplacement ranges generally between 150 and 300 kN/m^2.



Step 1: The bottom-feed vibrator is positioned over the compaction point on the working platform. Material transfer pipe and material storage container are filled with granular backfill material. Air flushing is activated.

Step 2: Bottom-feed vibrator is lowered to the specified design depth. After reaching the design depth the vibrator is retracted in steps of around 0.5 m allowing the granular backfill to discharge into the granular space formed by the vibrator. Repeated penetration and retraction of the vibrator causes the backfill material to be compacted and displaced laterally and forced into the surrounding soil. This process is repeated until either the hydraulic pressure of the vibrator has increased to around 270 to 290 bar or the volume of backfill material required for the column diameter specified for structural design purposes has been placed.

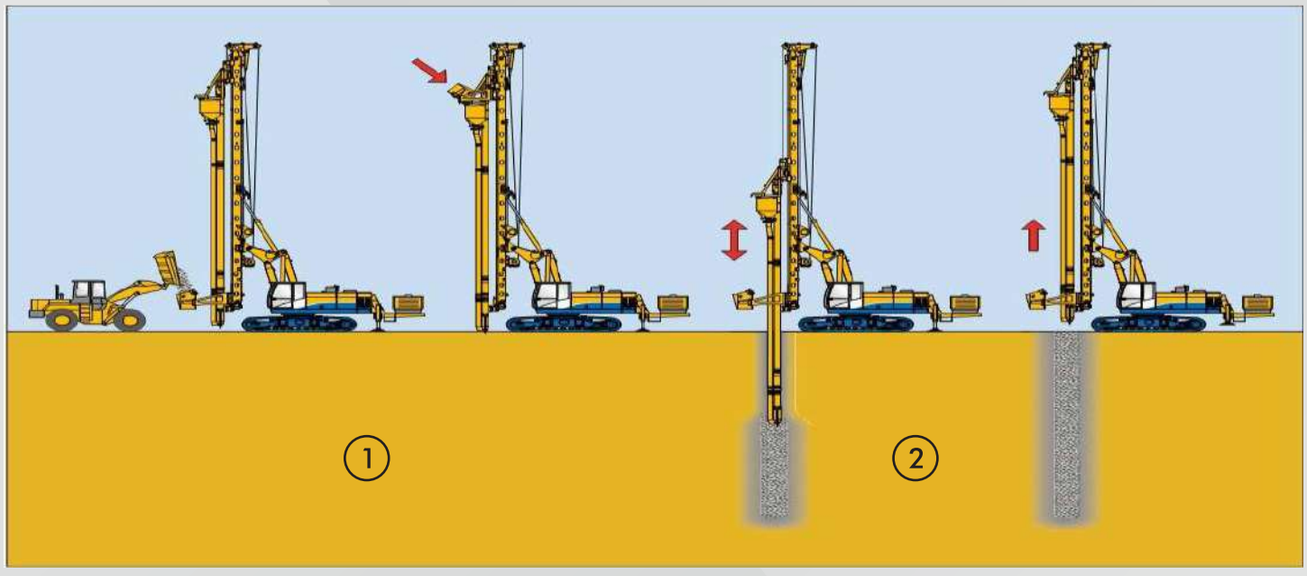
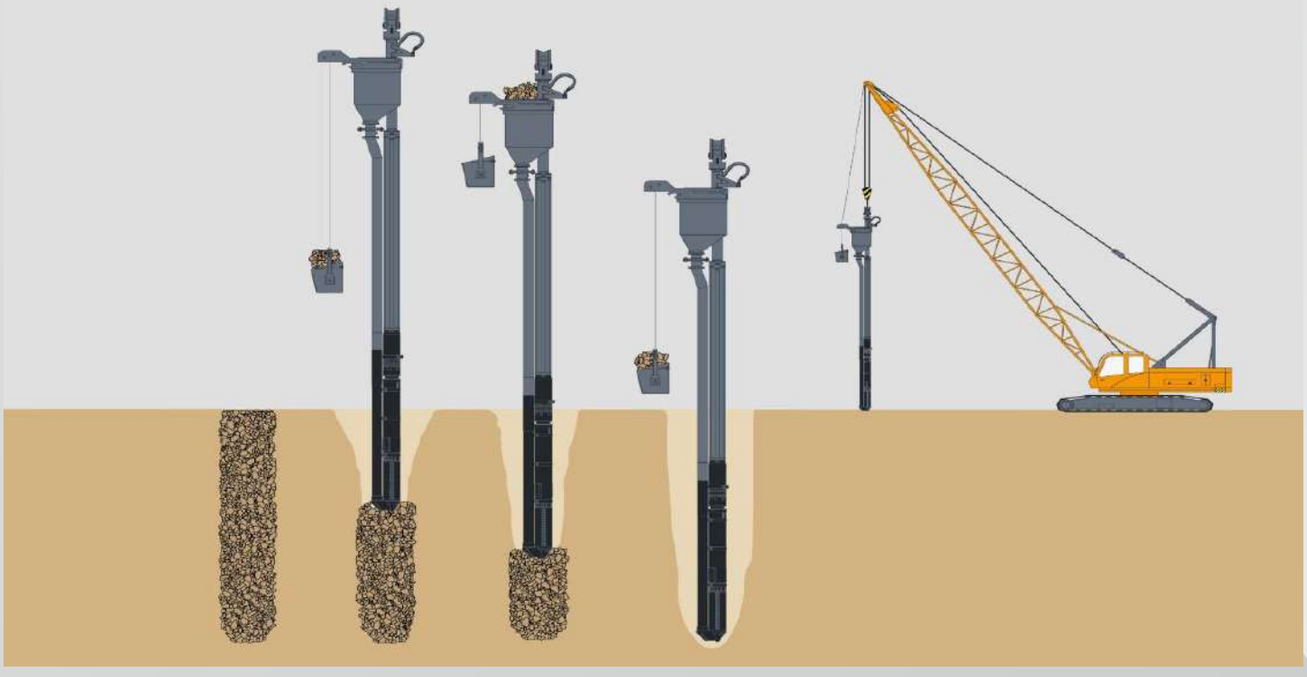


Fig. 13: Work sequence for the construction of vibrodisplacement (VD) stone columns

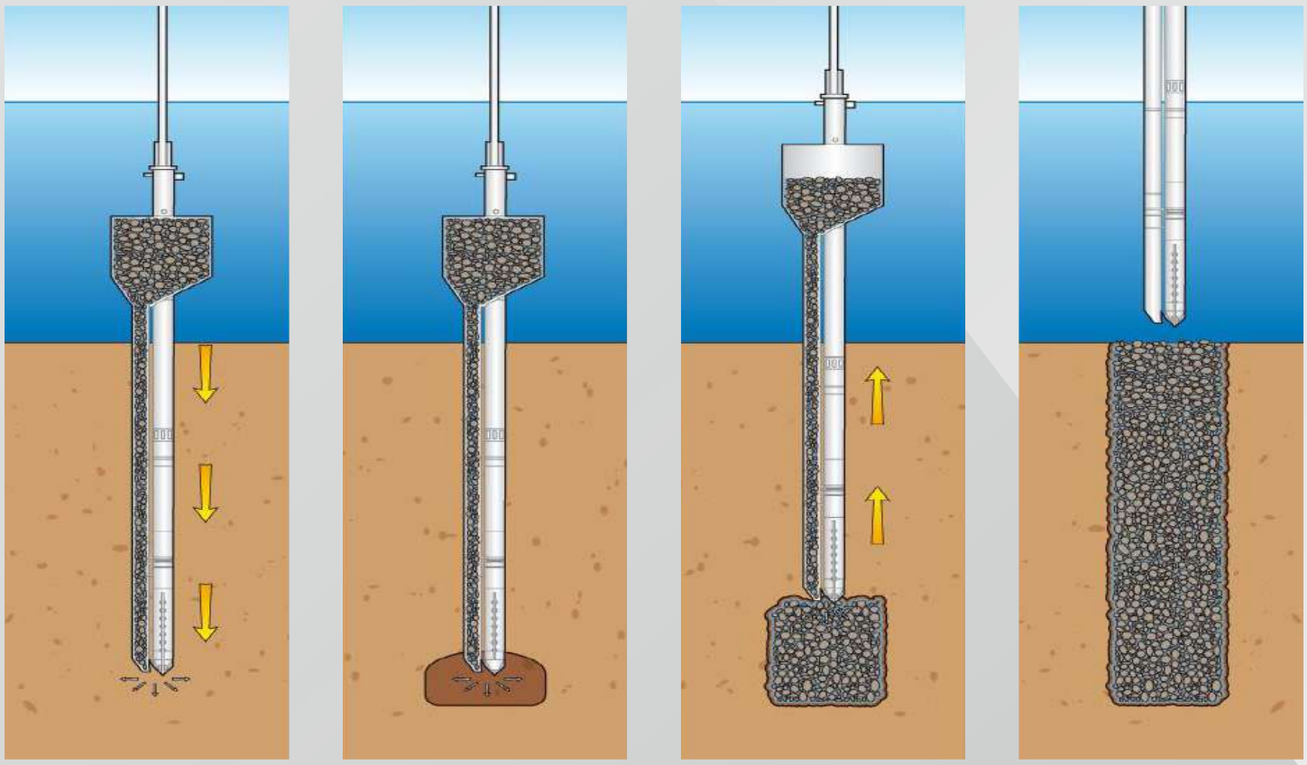


"Head" of a vibrodisplacement stone column

Suitable backfill materials are gravels or crushed stone with gradings of 8-32 and 16-32 mm, conditionally also 4-32 mm. Crushed stone can on the whole be compacted much better than rounded gravels. Normal consumption of backfill material can generally be expected to be around 0.6 to 1.0 tonnes per linear metre of column with a diameter of 0.6 to 0.9 m.

Hard desiccated surface layers or highly compacted layers of fill may not readily be penetrated by the bottom-feed vibrator. In this case it is recommended to loosen the upper stratum carefully with an excavator or If necessary, an auger has to be used to pre-bore through the hard surface layer.

Fig. 14: "Head" of a vibrodisplacement stone column



प्रारूप 1
पंजीकरण प्रमाण-पत्र

2011 - 2012

Form 1
Certificate of Incorporation

Corporate Identity Number : U45400MH2012PTC237018 2011 - 2012
I hereby certify that Kamar Infrastructure Private Limited is this day incorporated under Part IX of the Companies Act, 1956 (No. 1 of 1956) and that the company is private limited.

Given at Mumbai this Sixteenth day of February Two Thousand Twelve.

Certificate of Registration

This is to Certify that
Quality Management System of

KAMAR INFRASTRUCTURE PVT. LTD.

KAMAR ESTATE, DEVICHA PADA, BEHIND DEEPAK NITRITE LTD., TALOJA MIDC, TALUKA PANVEL, DIST. RAIGAD, NAVI MUMBAI - 410208, MAHARASHTRA, INDIA

has been assessed and found to conform of the requirement of

ISO 9001:2015

for the following scope:

MANUFACTURING OF DRILLING TOOLS & EQUIPMENTS, OIL SEALS, TRADING OF SPARES OF CRANE MACHINERY AND HIRING CONTRACTORS FOR CRAWLER CRANES (20 TONS TO 250 TONS), VIBRO HAMMERS & PILING RIGS

ISO 9001 : 2015

Certificate No.

Expiry Date : Issuance Date :
1st Surveillance Date :
Next Surveillance Date :

Government of India
Form GST REG-06
[See Rule 10(1)]

Registration Certificate

Registration Number :27AAECK6416D1ZQ

1.	**Legal Name**	KAMAR INFRASTRUCTURE PRIVATE LIMITED			
2.	**Trade Name, if any**	KAMAR INFRASTRUCTURE PRIVATE LIMITED			
3.	**Constitution of Business**	Private Limited Company			
4.	**Address of Principal Place of Business**	Kamar Estate, Devika Pada MIDC, Behind Deepak Nitrite Ltd, Panvel, Raigad, Maharashtra, 410206			
5.	**Date of Liability**	01/07/2017			
6.	**Period of Validity**	From	01/07/2017	To	NA
7.	**Type of Registration**	Regular			
8.	**Particulars of Approving Authority**				

Signature

Name	
Designation	
Jurisdictional Office	
9. Date of issue of Certificate	22/09/2017

Note: The registration certificate is required to be prominently displayed at all places of business in the State.

This is a system generated digitally signed Registration Certificate issued based on the deemed approval of the application for registration

We, have been falicitead with Best Qualiry Conscious Subcontractor at Construction of Mumbai Trans Harbour Link Road Project.

Ground Improvement Equipments

Sr. No.	Equipment	Quantity
1	ICE- Hydraulic Vibro Float	08
2	Pennine Hydraulic Vibro Float	03
3	BG-20	01
4	CASAGRANDE B-170	01
5	KIPL-Power Pack	20
6	SANY SCC-100A Crawler Crane	04
7	P&H 5170 Crawler Crane	02
8	JCB-BACKHOE	10
9	Luigong- EXCAVATOR 922 EH	02
10	Kobelco-380 EXCAVATOR 40T	02

Ground Improvement Equipments

Sr. No.	Equipment	Quantity
11	Luigong-Loader 836 N	04
12	Liugong-Loader 818 N	04
13	200 KVA DG set	04
14	160 KVA DG set	02
15	125 KVA DG set	06
16	PICK & CARRY	05
17	50 HP Pump	06
18	20 HP Pump	02

Our Prestigious Clients

GAMMON INDIA LIMITED	Larsen & Toubro Ltd.	AFCONS Afcons Infrastructure Ltd.
TATA TATA PROJECTS LIMITED	Shapoorji Pallonji	HCC HINDUSTAN CONSTRUCTION CO.
Chennai Metro Rail	LODHA BUILDING A BETTER LIFE Lodha Group Ltd.	NEW MANGALORE PORT TRUST
Sabarmati Riverfront Development Corporation Limited	advant	दिल्ली मेट्रो रेल कॉरपोरेशन लिमिटेड Delhi Metro Rail Corporation Limited
ITD Cem ITD CEMENTATION INDIA LIMITED	MEGA AHMEDABAD MEGA METRO	SEW S E W Infrastructure Ltd.
SIMPLEX INFRASTRUCTURES LTD. Simplex Infrastructures Ltd.	ESSAR Essar Construction Ltd.	TM Pratibha Industries

"Our experienced project delivery teams work closely with our clients throughout the project life cycle ensuring the development runs to time and budget"

info@kamargroup.com
www.groundimprovement.in

HEAD OFFICE :
Kamar Estate, Devicha Pada, Taloja MIDC,
Behind Deepak Nitrite Ltd., Taluka : Panvel,
Dist.: Raigad, Maharashtra - 410 208. (INDIA)
Direct No : +91 22 - 2740 1462
Tel.: +91 22 - 2741 0766 / 2741 0768
Fax : +91 22 - 2740 1460 / 2740 1458.
E-mail : dwall@kamargroup.com

CORPORATE OFFICE :
20, Husain Patel Marg, Mazgaon,
Mumbai - 10. (INDIA)
Tel.: +91 22 - 2377 6024 / 2371 1811
Fax : +91 22 - 2371 3708

REGIONAL OFFICES :
DELHI , CHENNAI , KOLKATTA ,
HYDERABAD , AHMEDABAD

Mohammed Mateen Sharif
+ 91 982 113 2057
mateen@kamargroup.com

Arvind Chitkul
+ 91 7045176691
arvind@kamargroup.com