Aiming for symbiosis between people and environment to contribute towards building a plentiful society with foundation construction technology
Since its foundation, our company has contributed to society in various fields of foundation construction works as a specialist providing technology for executions works through its own high-level and abundant technological know-how.

With the sudden changes in the economic climate that encompasses the construction industry, along with further refining our basic technological skills such as drilling and injection, we are also developing new technology that includes applications and alliances centering around environment, disaster prevention, maintenance and preservation. We are demonstrating our comprehensive strength for dealing with diversifying and more sophisticated needs through collaboration among the research, technical, sales and construction departments. We aim to be, all the more, a “company that can be trusted by the society and that can contribute to it”

President & CEO IWAO NAKAHARA
Construction consultant and survey technologies

Ground supports the large-scale structures on it. We believe that we can provide design services that are reliable at the construction site by strictly checking the consistency between ground information obtained through diverse methods and the actual ground. We are also striving day and night to develop and improve survey / instrumentation technologies such as developing an ‘automatic landslide monitoring system’ and ‘hydrostatic pressure permeability test equipment’.

Geological Surveys

Surface exploration
Before each survey, the geological features of the location are observed and the items related to ground and bedrock characteristics and design of structural foundations are clarified.

Physical exploration
This investigation method uses different physical properties of the sediment and bedrock making up the ground to estimate indirectly the soil characteristics and tectonics, etc. For example, seismic refraction method investigates the characteristics of bedrock from the propagation velocity of the impact of an explosion.

Hydrologic Surveys
The purpose of these surveys is the development of underground water. The pumping facility and abundance of groundwater of the site to be developed are estimated and their effectiveness as resources is evaluated using these surveys. In addition, in the drainage of underground water (for example, landslide or leakage surveys), the movement of underground water is analyzed and they are used as data in the design of landslide mitigation works.

Geological / soil features survey
In these surveys, the underground geological features are obtained using boring tests together with the observation through the naked eye. Permeability tests and physical logging, etc. are conducted and the related characteristics of the ground are clarified.

In-situ tests
By actually applying load to the bedrock of the site, strengths of the bedrock can be obtained from its resistance and reactions. With the increasing demand for construction of various types of structures, the need for in-situ tests is increasing these years especially in locations where the geological characteristics are not very favorable to constructions.
**Grouting test**

While improving the ground by injecting grout materials, a precise grouting method that is suitable for each site must be selected. For this reason, we confirm at the site whether or not the prescribed effects can be obtained with the specifications according to the design and plans, and seek a technically viable economic and optimum grouting plan.

**Hyrdostatic pressure permeability Tests**

In equipments generally used in the Lugeon test, it is inevitable to impose some restrictions on the water level and the static pressure, because it is impossible to conduct a Lugeon Test below certain water pressure. Furthermore, in ground with low resistance to pressure such as, natural soft rock, heavily weathered rock and fractured zones, when groundwater level is low, it is not possible to provide data that allows accurate evaluation of pressure limits or Lugeon values. The hydrostatic pressure permeability tests in boring holes made it possible to conduct the Lugeon Test even at very low levels of pressure in any kind of underground water conditions because it can create a static head equivalent to test pressure in an unspecified position of the injection pipe.

**Construction consultant**

**Automatic surveillance and analysis system for Slopes & Landslide**

From the aspects of disaster prevention or construction management, real-time remote monitoring / surveillance of the stability of landslides and slopes is increasingly gaining attention. We utilize our past experience and know-how to develop automatic surveillance and analysis systems and we are working towards offering these for practical use.

**Design & construction management**

Foundation works are designed based on the information about the ground obtained from the geological survey and the management of the construction works is done in combination with this during the operational stages. Using our independently developed computer systems, we conduct data processing and analysis simultaneously for items such as grouting, landslides and hydrology, along with the seepage analysis, ground deformation analysis and landslide stability analysis, etc., and thus provide accurate and speedy design and construction management.
Ground improvement works

Depending on the ground conditions and characteristics, there are cases when the ground is not suitable as foundation. Ground improvement works including dam grouting works improve ground with the prescribed strength and static water level.

In recent years, as the ground condition of dams / underground reserves, etc. becomes more and more severe, it can even be said that bedrock grouting technology determines the success or the failure of the construction concerned. Japan Foundation Engineering Co. Ltd has plentiful technological know-how and experiences accumulated through its outstanding domestic records in this field.

Bedrock grouting technology

General injection method

A borehole of about 5 cm in diameter and depth of tens to hundreds of metres is drilled in foundation bedrock using boring methods. Using this borehole, the strength of the bedrock is improved and the flow of underground water is controlled.

Hitokura Dam

Tenjin Dam

Yokokawa Dam

Regular mixture injection system

This is a method that successively kneads and injects mixed cement milk that complies with the permeability of the ground by continuously diluting the solution (1:0.75) with the cement milk concentration adjustment function. Compared with general injection methods, due to the concentration adjustment function, it is possible to inject meticulously complying with the injection status of each injection hole and it can be expected the volume of injection is increased in a short injection time. Furthermore, effective utilization of cement milk is achieved using the re-mixing function, and thus, waste milk is considerably reduced.
General injection method
Regular mixture injection system
Rodliner method (RL method)
Dynamic grouting method
Grouting management system

**Rodliner method (RL method)**

The rodliner method was developed by our company in order to execute the rationalization of grouting. This is a complex technology that incorporates the wireline system in the boring of injection holes and employs the hosepacker system in grouting.

**Dynamic grouting method**

The dynamic grouting method reduces the apparent degree of viscosity of grout and controls clogging by applying the injection pressure regularly at a frequency in the range of 5 - 30Hz, and thus, improving the liquidity and permeability of grout. The effectiveness of this method has been confirmed through laboratory injection tests using artificial fissures and also through in-situ injection tests. Through the dynamic grouting method, the liquidity and permeability of grout is improved. It can be expected that by using the dynamic grouting method, the domain of injection can be expanded, the improvement effects progresses and the performance of construction is improved (shortening of the injection time), etc.

**Grouting management system**

Dam grouting works require specialist know-how obtained over long years of experience. We speedily process all kinds of data that are generated during execution works. We strongly promote the collection, organization, analysis and statistical processing of data using computer in order to aid the construction management. Through this, it has become possible to meticulously respond to the requests of clients and we have been evaluated with high levels of rating by many concerned parties including the Ministry of Land, Infrastructure, Transport and Tourism and the Ministry of Agriculture, Forestry and Fisheries.
Ground improvement works

In urban areas, increasing progress in the developments and/or re-developments of large-scale structures in very deep and soft ground, works have to be performed under difficult circumstances such as earthquake-proofing, liquefaction mitigation and the presence of adjacent structures. We believe that for the success of construction under such difficult conditions, importance of ground improvement works will become even greater. Japan Foundation Engineering Co. Ltd., actively involves with the development as well as the introduction of new methods and has so far succeeded in overcoming diverse and difficult conditions in addition to applying the conventional ground improvement methods.

Ground improvement technology

- Double pipe strainer injection method (single phase injection method / multiple phase injection method)
- Double pipe double packer injection method (Soletanche injection method)

Super Multiple points injection method (mitigation for liquefaction)
One of the ideals in chemical grouting...a kind of permeation grouting in which the chemicals enter evenly between the soil particles. From the past experiences we know that, by injecting a little amount of grout at a slow rate, it is possible to obtain solid shapes close to an ideal sphere. With conventional methods, that consumes a considerable amount of time and labor, and that is not ideal from the view point of constructional efficiency. It was the “Super Multiple Points injection method” that solved this conflict with a completely new concept. The Super Multiple Points injection method spherically distributes a large amount of injection nozzles (from tens to hundreds) into the ground and injects grouts into these points with the optimum pressure / flow volume. The Super Multiple Points injection method is a new technology that materializes the ideal permeating grouting and high construction efficiency.

DCI Multiple Points injection method (displacement controlled-type)
The DCI Multiple Points injection method aims for restraining the upliftment of structures and railroad track. In conventional chemical injection method, as the injection rate is high (16 ltrs/min or 8 – 9 ltrs/min), uplifting of the structures and the tracks take place due to heaving of the ground. By determining the injection speed according to the ground concerned and conducting permeation injection between the soil particles at a slow rate of 0.5 – 4.0 ltrs/min, upheaving can be controlled. We have also made computerized construction possible by performing injection while controlling displacement through an automatic control injection.

Jet grouting methods (Superjet-Midi method, Superjet method)
Superjet-Midi method and Superjet method both employ powerful energy to propel an ultra high-pressure jet into the ground horizontally. Superjet-Midi (with a maximum diameter of 3.5m) and Superjet (with a maximum diameter of 5.0m) are both able to create improvement bodies in pillar form.
By constructing an improvement body of large-size piles rather than those constructed using the conventional JSG method or column jet grouting method, we aim for quality construction that is “cheaper”, “faster”, and “more environmentally friendly”.

Improved body obtained by Super Multiple Points injection method

Image of the Super Multiple Points injection

Centralized control of Super Multiple Points injection (photos are 32 frames × 2 sets)
Double pipe strainer injection method (single phase injection method / multiple phase injection method)
Double pipe double packer injection method (Soletanche injection method)
Super Multiple points injection method (mitigation for liquefaction)
DCI Multiple Points injection method (displacement controlled-type)
Jet grouting methods (Superjet-Midi method, Superjet method)
Dry Jet Mixing method (DJM)
Cement Deep Mixing method (CDM, CDM-LODIC)
Cast-in-situ diaphragm wall method

**Dry Jet Mixing method (DJM)**
It is a ground improvement method, in which the strength of the ground is improved by mixing the soil with powdered chemicals. The chemicals react with the soil water and gets hardened, thereby enhancing the soil strength.

**Cast-in-situ diaphragm wall method**
In conventional soil cement retaining wall method, as agitation is conducted while injecting the cement milk from the start of drilling, cement milk in volume equivalent to the amount of soil to be drilled is injected, and therefore, the drilled soil turns to waste mud (construction sludge) and is disposed of in large volumes. The ECW method was developed with the aim of solving all these problems. It greatly reduces the volume of waste sludge that is generated in conventional soil cement retaining wall methods. In addition, it becomes possible to reduce the hardening materials used. Because of the fact that no special system investment is necessary in executing this method, this new born soil cement retaining wall method can reduce costs through reduction of waste mud and reduction of hardening materials.

**Cement Deep Mixing method (CDM, CDM-LODIC)**
This is a method that uses processing machinery to agitate and mix the hardening cement slurry and soil at the site into the soft ground in order to harden the ground to the prescribed strength.
Ground reinforcing works

In Japan, the necessity of ground reinforcement work has increased recently, for effective utilization of the scarce land. Japan Foundation Engineering Co., Ltd, as a pioneer in anchoring methods, has developed and introduced various “permanent anchoring methods” and “temporary anchoring methods”. Furthermore, we have also made a lot of progress in the development and introduction of new reinforcing methods for slopes including the “high shot method” that makes it possible to spray from a high elevation. In Japan, we were the first to introduce the “BG method” with a self-propelled all-purpose drilling machine in 1983, and we have added improvements based on many operational experiences. Using the results of the operations as feedback, we continue to strive to make positive progress to develop, introduce and improve the methods in the future.

Anchor technology

<Outline of anchoring methods>

Anchoring is a method in which an anchor is fixed deep underground so that it exhibits powerful resistance through its tensile strength by fixing it to walls and structures. Our company, as a pioneer of anchoring technology, possesses many patent rights and operation licences. We are playing a leading role in the domestic anchor technology.

Permanent anchor method

The permanent anchoring method is widely adopted for preventing the overturn of high-rise building or electric power tower due to earthquake and wind pressure, and also as a preventive measure against slope failure. The development of anti-corrosion technology of tensioning steel contributes to the realization of this technique. We have abundant experiences of execution of highly reliable permanent anchors that have satisfactory anti-corrosion functions and can be widely used in the fields of Civil and Architectural Engineering. Construction is possible with a great variety of permanent anchoring methods such as VSL permanent anchor, VSL−J1 anchor, EHD permanent anchor, NM ground anchor, SEEE ground anchor, SHS permanent anchor, SuperMC anchor and Flotech anchor.

Temporary anchoring method

In some cases, the anchoring body installed in the ground must be removed after the completion of the work, so as not to be obstacles in future construction works or due to matters related to the property right. To remove tensile steel under restricted working conditions with large pullout force requires suitable technology and careful execution. We have several anchoring techniques at our disposal suitable for applying to various geological conditions to satisfy the customer’s need. The techniques include KJS removable anchor, VSL removable-type anchor, C turn removable-type anchor, CuPS anchor method, and expander body anchor.

Anchoring method in high artesian water

The high water pressure compliant ground anchoring method made construction of anchor possible in high artesian water. This was made possible by the development of a casing packer (mouth packer) and a bit with a backflow prevention function along with the usage of a static water box which can adjust the volume of water flow. Because of this, even in earth retaining anchors in high artesian water, it has become possible to ensure the required stress without loosening of the ground behind. Furthermore, buoyancy mitigation anchors can secure the underground space in almost the same original condition, since structurally the anchor is buried in an underground framework. Also, compared to other mitigation techniques, this method requires almost no future maintenance.
### Slope stabilization technology

#### Spraying methods

**High shot spraying method**

The high shot method is a new spraying method that compactly combines two techniques: (1) A technique which transports using pressure using a concrete pump and (2) a technique which transports and sprays using compressed air. This method uses a special concrete pump and has made it possible to spray high quality mortar / concrete in very high elevation or over long distances that were not possible using conventional methods.

*Ushinesakai, Kagoshima Prefecture*

#### Grating crib works

This method that has been in the spotlight in recent years as a method for earthquake resistance reinforcement of slope or landslide control. This method provides stability through combined use of rock bolts and ground anchors. Also, it produces a fine view and scenery and is a superiorly economic and effective method that can find a wide range of applications.

#### Spider web net method

This method reinforces and protects slopes, and allows vegetation in the entire construction area by fixing high-strength steel wire net to a slope with reinforcing materials without using any concrete structure.

*Spider web net illustration*

### Foundation pile technology

#### BG method

This is a drilling method that was introduced through technical cooperation with the Bauer Group in Germany. The machine uses a hydraulic, all-purpose large-diameter drilling machine called the BG machine, which is an all-round machine that makes drilling possible in cohesive as well as sandy soil and even in pebbles and bedrock by changing the attachment or accessories according to geological features and other conditions. Our company possesses machines with all types of capabilities (BG–7, BG–14, BG–18 and BG–28), and have been maintaining a system that can respond widely to the market needs.

*Construction under a structure (H=5m) with low-altitude head mast (Akita Station)*

*Removal of obstacles (Moriguchi City, Osaka Prefecture)*

#### Large diameter cast-in-situ pile methods

Large diameter cast-in-situ pile methods such as leader casing rotation excavation method (BG method), casing rotation excavation method (super top method), reverse method (BG reverse method, and the earth drill method (HND method) make low vibration / low noise construction possible in various work environments.

#### Removal method of underground obstacle

Using all-rotary all casing rotation excavation machines including BG machines, it is possible to remove obstacles such as existing piles, old structures and old underground pipes producing low noise and low vibration. Furthermore, the JC&R method makes streamlined construction possible in which large diameter piles existing in deep underground can be cut at the required depth and removed.
Ground reinforcing works

In order to effectively use the limited land of Japan, ground reinforcing works are increasing year by year. Japan Foundation Engineering Co., Ltd introduced the “Trevitube method”, a long distance pre-lining umbrella method in the 1990s and advanced into the field of tunnel supporting methods. Following this, we developed and introduced the “micropile method”, the “JUMBO de injection method” and the “BAF method” and have achieved good operation results from these. In the future, we would like to proactively enhance the accuracy of drilling technologies and continue to respond to our clients’ needs.

Landslide mitigation technology

Landslide prevention pile method

This method aims to prevent landslide mass using piles that pass right through the foundation soils. In such method, usually steel pipes are inserted into boreholes of 300 – 600mm in diameter that were drilled by boring, and then mortar is injected into the surrounding area. Recently, in order to respond to even larger landslides, it has become more frequent to employ methods that use dedicated thick steel pipes or shaft of 3 – 5m in diameter.

Drainage Drilling method

Lateral drainage drilling is necessary to remove ground (surface and sub-surface) water, which is the primary cause of landslides. In case, the length of lateral drilling is too long or the inclination of the drainage path is not steep, catchment well may be setup. The catchment well can collect water through its perforated wall as well as through the lateral drainage boreholes. The underground water collected at the bottom of the well is drained out through the drainage hole built by lateral drilling.

Tunnel supporting methods

Reinforced protective umbrella method – Trevi method

This is a method in which steel pipe core with injection holes at suitable intervals is set up like the spokes of an umbrella on the outer circumference of tunnel cross-section, and then grouting is done forming a reinforced arch in the form of an umbrella. This enhances the effectiveness of collapse prevention or slackness control during tunnel excavation. In recent years, many tunnels have been constructed in urban areas or areas surrounding them or in poor quality ground. It is thought that in future there will be an increasing demand for the Trevi method that makes streamlined construction possible, which is applicable to all types of geological features.

Pipe roof method

It is a supplementary industrial method for the build of the tunnel and the underground structure. The pipe (steel pipe) is first inserted before the tunnel excavation according to the digging section outer, and the roof put together on the shape of the tunnel is formed. It digs up this roof along with digging up the tunnel, and and, the transformation of loosening of the natural ground because of [uketamawa] and digging and ground levels is controlled directly by the timbering, and it is possible to dig up the tunnel safely.
JUMBO DE injection method

This is a construction method that has enabled easy execution of ground improvement works during tunnel excavation (double pipe chemical grouting method) by simply replacing the pneumatic drill tools. As this uses a double pipe rod, injection is implemented in 2 shots and it is possible to adjust gelling time depending on the material and to select the material appropriate for the ground concerned making it possible to obtain optimum results in any type of ground.

- Drilling (drilling to prescribed depth)
- Rotation impact
- Start primary injection (after drilling, change to quick-hardening chemicals and seal the surrounding area and then inject to fill up the weak spots)
- Start secondary injection (follow the same steps, conduct permeation grouting with mid- to soft-hardening chemicals)
- Completion of injection (Step up and inject 3 – 3 times, and then conduct injection in the prescribed injection areas)

BAF method

Lack of bedrock strength in the feet of tunnel supports becomes the primary factor in causing ground surface subsidence in tunnel excavation and subsidence of the tunnel itself. As a mitigation method against the subsidence of the feet of tunnel supports, the foot-pile reinforcement method that is typical in foot pile construction is employed. However, with such conventional mitigation techniques, there were problems such as prevention of initial subsidence due to construction in the rear of the face after excavation of the upper part or bedrock being disturbed and subsiding due to drilling water. The Bended Auger Foot-pile method (BAF method) can effectively improve the bedrock at the feet of tunnel supports before excavation regarding the problems mentioned above.

Dedicated machine for BAF method of construction (D500-L3.5)

Boring application technologies

Micro pile method

Micro pile is the general term for small diameter (around φ100 - 300mm) cast-in-situ / buried piles. In this method, bedrock is drilled and steel reinforcement materials such as rebars or steel pipes are inserted, and then piles are formed by injecting the grout. Applicable fields of such methods are: bearing capacity improvement, reinforcement of existing structures, landslide prevention and reinforcement of cut slopes.

Water hammer method

A water hammer has the special features of not damaging the environment of construction site due to the fact that in this case the operational medium is water. In addition to the high excavation rate this method has high shock absorbing performance because of the usage of high water pressure (15.0 MPa) as the driving force, as compared to the conventional air hammers that use high air pressure (1.7 MPa) as the driving force.
Environmental preservation methods

In order to leave behind a beautiful global environment to our children... Japan Foundation Engineering, Co., Ltd has been making dedicated effort towards the development, introduction and execution of technology that restores our nature and mitigates the pollution.

Technology for restoring the nature

Soft chip spray method (NETIS TH-050012-A)
Wood chips are steam blasted in high temperatures and high pressure, and broken down to fibers to make them soft chips. That improves the water absorption capacity of the chips. Furthermore it hinders the germination and growth of adversarial insects. Processed chips can be sprayed on slopes using the conventional spraying machine. Plants in locations that have been sprayed with chips using this method grow in the same manner as plants in locations in which conventional plant-based material spraying methods have been used.

Bamboo fibre slope vegetation method (NETIS TH-030015-A)
Bamboo fiber slope vegetation method is a slope afforestation method that does not require lath wire netting and makes use of the tenacity of the natural fibers of bamboo. Both the leaves and branches of bamboo are made into fibers using a dedicated fiber making equipment that can be transported on a 41 capacity truck. They are then mixed with plant-based materials, top soils and soils from the site and the mixture is sprayed on the slopes. In this method, it is possible to skip the process of fixing lath wire netting, thus making the execution time shorter. Also, a stable vegetation bed can be reclaimed. The plant roots that tightly bind the ground, decompose and return to nature in a number of years. Bamboo fiber is an environmental preservation method that reduces the burden on the natural ecosystem and it makes the recycling of bamboo resources possible, which is a major issue in bamboo forestation.

Step Vegetation method (NETIS QS-980183)
This method is employed in very steep slopes with concrete or mortar or rocky slopes, where normal vegetation is not possible. In this method using an anti-rust net called terraced unit on the slope a level ground is formed, where growth of vegetation is possible. In such slopes, fallen leaves and seeds come and settle in the level ground surface, and thus making the growth of vegetation easier. Using this method, a high grade vegetation can be expected in comparison to conventional level vegetation beds since the vegetation bed that fill up the units are formed naturally from the soils in the site.

Thick layer basic material spraying method
Seed dissemination method
Top soil spraying method
Pollution mitigation technologies

With the enforcement of the Soil Pollution Countermeasures Law, adequate understanding of the soil pollution at the right moment and prevention of health risks to humans by soil pollution are demanded. We conduct soil pollution surveys and related works such as entrapment, soil replacement and insolubilization or purification measures.

Surveys of the status of soil pollution

Our company was chosen by the Ministry for the Environment, Japan as a designated survey organization (20th January, 2003 Env. 2003-1-204), and we conduct soil pollution surveys using the latest boring technology.

Pollution mitigation works

Mitigation works that have received orders for measures against soil pollution are:

Entrapment measures:
- Diaphragm wall, steel sheet pile diaphragm wall for seepage control and grouting methods.

Soil replacement measures:
- Removal of excavated polluted soil by special excavation machines and BG machines.

In-situ insolubilization measures and in-situ purification measures:
- Super multiple points injection method and the double pipe double packer method.

Seepage control using steel sheet pile diaphragm wall

In this method, a pocket section (around 10mm in diameter) is made in conventional steel sheet pile. Using a new steel sheet pile that can be attached to the pocket section, seepage control materials are injected and filled in, thus constructing a diaphragm wall that possess even better seepage control capabilities.

This method can be applied to vertical seepage control works in control-type final waste disposal sites and entrapment works for preventing the spread of soil pollution. In addition, this method can also be applied as a temporary retaining wall when high seepage control results are demanded.

Outline of steel sheet pile diaphragm wall works

Soft chip spray method (NETIS TH-050012-A)
Bamboo fibre slope vegetation method (NETIS TH-030015-A)
Step Vegetation method (NETIS QS-980183)
Thick layer basic material spraying method
Seed dissemination method
Top soil spraying method
Surveys of the status of soil pollution
Pollution mitigation works
Outline of steel sheet pile diaphragm wall works
World of technology is progressing rapidly. We are required to exert our efforts positively towards improving and renovating technology with wide perspectives. To respond to such needs, we have been continuously exercising our steady efforts.

R&D / Introduction of technology
We are always in the forefront of developing unique method of construction and new techniques. We have been pouring our energies towards research and development with positive approach through technical collaboration with overseas companies.

Information management
Since our in-house personnel payroll, financial and accounting system had been launched in 1983, various systems are operating in full fledge. They include order management, asset management, cost management, management of purchasing or outsourcing machineries and materials, management of payment and collection, etc. Information gathered in these systems optimized the office work by proactively sharing electronic reports and data through internal network.

In addition to that, since 1995, using the program developed by our company, we started the computerization of technical calculations such as central operation of dam grout control system.

In recent years, the use of personal computers for the management of construction site is becoming indispensable. Therefore, along with placing network based stations at main plants nationwide, we are progressing well with maintaining an even better mobile computing environment.

Center for Machinery and Materials
Being the supply base for machinery and materials for job sites, control and management are conducted here so that machineries may be used conveniently at any time.
Safety management
Safety has always been our top priority. Safety patrols are conducted at regular intervals in the sites and the branch offices. We conduct educational session for safety whenever we have the opportunity, and we continue to put our maximum effort to avoid accidents.

Training for Employees
In an effort to improve the technology and to acquire new knowledge, we regularly conduct internal education and training for new employees as well as for the mid-career employees and management staff.

Quality Control
Quality control of construction materials as well as of the works is particularly important for us. We have a strict quality control system such as inspections at manufacturers’ site from time to time and conducting tests in advance for design and planning.
<table>
<thead>
<tr>
<th>Trade name</th>
<th>Established Japan Grout Corporation in Matsugae-cho, Kita Ward, Osaka with the aim of conducting boring and grouting works in reservoirs / land reclamation / dams / tunnels, etc. with capital stock of 1 million yen.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Representative</td>
<td>Iwao Nakahara, President &amp; CEO</td>
</tr>
<tr>
<td>Headquarters</td>
<td>Established Tokyo and Kyushu branches.</td>
</tr>
<tr>
<td>Tokyo Headquarters</td>
<td>Established Sapporo branch.</td>
</tr>
<tr>
<td>Company Establishment</td>
<td>March, 1972 Constructed the headquarters building in Matsugae-cho, Kita Ward, Osaka.</td>
</tr>
<tr>
<td>Capital stock</td>
<td>April, 1975 Established Tohoku branch.</td>
</tr>
<tr>
<td>More than 5,900,000,000 yen</td>
<td>July, 1975 Established Tokyo headquarters in Shibuya, Shibuya Ward, Tokyo.</td>
</tr>
<tr>
<td>Bankers</td>
<td>August, 1976 Established Osaka (currently Kansai branch) and Shikoku branches.</td>
</tr>
<tr>
<td>Stock</td>
<td>December, 1980 Established Nagoya branch (currently Chubu branch).</td>
</tr>
<tr>
<td>Listed on Osaka Securities Exchange market 1st section</td>
<td>October, 1981 Established Hiroshima branch.</td>
</tr>
<tr>
<td>Public works</td>
<td>April, 1985 With the aim of strengthening the company foundations, merged with New Technology Development Co., Ltd. Trade name changed to Japan Foundation Engineering Co., Ltd.</td>
</tr>
<tr>
<td>Water supply facility construction works Registration</td>
<td>November, 1988 Listed on Osaka Securities Exchange market 2nd section.</td>
</tr>
<tr>
<td>Construction consultant registration</td>
<td>October, 1989 Training centre established in Yamazaki-cho, Shisawa City, Hyogo Prefecture.</td>
</tr>
<tr>
<td>River erosion control and coastal / ocean department</td>
<td>October, 1990 Kanto branch established.</td>
</tr>
<tr>
<td>April, 2005 Compliance committee established as a management inquiry organization.</td>
<td>May, 2006 Business partnership with OK Soil Co., Ltd with the aim of expanding orders / construction in soil improvement works.</td>
</tr>
<tr>
<td>October, 2009 Established JAFEC USA Inc.</td>
<td>April, 2010 OK SOIL Inc. has been subsidiary company of JAFEC.</td>
</tr>
</tbody>
</table>