contents

4 Introduction
4 History
5 Organizational Structure
6 Services: Bored Piling
8 Services: Barrettes
10 Services: Diaphragm Walling
12 Services: Substructure Works
14 Services: Civil Construction
16 Services: Ground Improvement
18 Services: Ancillary Services
20 Resources: Work Force
21 Resources: Equipment
22 Research & Development
23 Publications
24 Projects
With 30 years of experience in deep foundation works, and vast human and machine resources, SEAFCO PLC is a leading provider of deep foundation works, comprising large bored piling, diaphragm walling, cement column, ground improvement and substructure construction in Thailand. SEAFCO also offers conceptual design for deep foundations and basement construction with diaphragm walls to the clients for project appraisal and budgeting. SEAFCO is traded publicly under the ticker symbol "SEAFCO" on the Stock Exchange of Thailand (SET).

1974
It was incorporated on December 19, 1972, with a registered capital of 3 million baht (paid up capital of Baht 1.5 million). The company focused on construction of small diameter bored piles.

1980
Joined with Stent Foundation Company Limited, from England and set up a joint venture company called "Stent Seafco", specialized in construction of large diameter bored piles, with a registered capital of 3 million Baht. Stent Seafco later changed its name to Balfour Beatty Thai.

1987
Seafco sold its investment in Balfour Beatty Thai to Stent Foundations, but purchased the remaining equipment and transferred employees from the joint venture company to Seafco.

1989
Seafco made an agreement with Soletanche Bachy Group to construct diaphragm walls.

1994
Seafco increased its capital to 120 million Baht, and changed a par value from Baht 1,000 to Baht 100.

2004
Seafco changed the par value from Baht 100 to Baht 1 and increasing the paid up capital to Baht 210 million. Seafco became a public company listed in the Stock Exchange of Thailand (SET) on 3rd September, 2004.
**Services**

**Bored Piling**
SEAFCO has been a leading deep foundation specialist in Thailand since 1974.

SEAFCO constructs both small bored piles with diameters of between 350 and 600mm and large bored piles with diameter up to 2000mm. Small diameter piles have the capacity to carry the load up to 150tons. Large diameter piles can carry the load up to 2000tons.

Support of boreholes during piling process includes temporary steel casing, bentonite slurry or polymer based slurry.

SEAFCO's bored piles constructed under polymer based slurry provide higher skin friction than those constructed under bentonite slurry. SEAFCO also provides pile toe grouting as per design requirements.

SEAFCO has a wide range of equipment for construction of bored piles ranging from small rig for limited headroom to hydraulic drilling machine capable of drilling down to 70.0m. Drilling can be done in soil and rock.
Typical pile sizes and working load capacities in Bangkok Subsoils.

<table>
<thead>
<tr>
<th>Diameter (m)</th>
<th>Perimeter (m)</th>
<th>Section Area (m²)</th>
<th>Working Load Capacity* (ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.60</td>
<td>1.88</td>
<td>0.283</td>
<td>80-150</td>
</tr>
<tr>
<td>0.80</td>
<td>2.51</td>
<td>0.503</td>
<td>250-400</td>
</tr>
<tr>
<td>1.00</td>
<td>3.14</td>
<td>0.785</td>
<td>450-600</td>
</tr>
<tr>
<td>1.10</td>
<td>3.46</td>
<td>0.960</td>
<td>500-700</td>
</tr>
<tr>
<td>1.20</td>
<td>3.77</td>
<td>1.131</td>
<td>650-800</td>
</tr>
<tr>
<td>1.35</td>
<td>4.24</td>
<td>1.431</td>
<td>800-1000</td>
</tr>
<tr>
<td>1.50</td>
<td>4.71</td>
<td>1.767</td>
<td>1050-1200</td>
</tr>
<tr>
<td>1.65</td>
<td>5.16</td>
<td>2.138</td>
<td>1200-1500</td>
</tr>
<tr>
<td>1.80</td>
<td>5.66</td>
<td>2.545</td>
<td>1400-1600</td>
</tr>
<tr>
<td>2.00</td>
<td>6.28</td>
<td>3.142</td>
<td>1600-2000</td>
</tr>
</tbody>
</table>

*Note: Working load capacities depend on pile length, subsoil conditions, concrete strength, factor of safety adopted, type of supporting fluid used, etc.

SEAFCO’s large bored piles with pre-founded steel stanchions can accommodate top-down construction for basement construction using diaphragm walls.
BARRETTES

Barrettes or strip piles are the best alternative where a single pile safe working load in excess of 2000 tons is required or conventional boured piling is impractical. Various dimensions, cross-sections and orientation can be formed and arranged to suit design requirements. SEAFCO's barrettes are used in foundation for expressways, transmission towers, MRTA subway stations and high rise buildings. Barrettes can be constructed to a depth of 60m or deeper.

Available Grab Sizes (m)
0.4x2.5
0.6x2.7
0.8x2.7, 0.8x3.0
1.0x2.0
1.0x2.7, 1.0x3.0
1.2x2.7
1.2x3.0
1.5x3.0

Barrettes Cross-sectional Form
Rectangular
L-shape
T-shape
H-shape
Cruciform

Barrettes piling in the close vicinity of a khlong for foundation of elevated expressway.
SEAFCO's cruciform barrettes are utilized in foundations of monopole transmission towers which require large moment resisting capacities.
SEAFCO is one of the pioneer contractors who introduces diaphragm walls in Thailand.

Having accumulated competence in diaphragm wall technique since 1987, SEAFCO has diversified its services covering from conceptual design, cost estimation, design and build of deep excavation to sub-structure works utilizing conventional and advanced top-down construction methods. SEAFCO diaphragm walls with top-down construction method allow deep excavations to a depth of 24m or more in soft Bangkok clay. SEAFCO diaphragm walls are used for:

- Deep Basements
- Underpass Tunnels
- Deep Shafts
- MRTA Subway Stations
- Cut and Cover Tunnels

Underground subway station constructed with diaphragm walls.
WALLING

Reinforcement section with soft-eye for TBM breakthrough being installed into the diaphragm wall trench.

Concrete pouring with a double tremie set.

Diaphragm wall thickness ranges between 600mm and 1200mm and individual panel width varies from 2.0m to 5.0m depending on subsoil conditions.

Panel layout can be arranged to suit the outline of the perimeter wall. L-shaped panels are usually formed for the corners of perimeter walls. Cantilever retaining wall can be constructed with T-shaped panels. Diaphragm wall can be designed as deep load bearing elements.

Top-down construction with diaphragm walls for deep basements.

Deep circular shaft constructed with diaphragm walls for launching TBM for water pipeline.

Cut and cover tunnel constructed with diaphragm walls.
SEAFCO utilizes its vast experience in ground engineering and deep foundation in construction of substructures. SEAFCO has undertaken substructure works comprising foundation pile and diaphragm wall construction, temporary bracing installation, excavation and construction of foundation mat and basement slabs. With advanced geotechnical instrumentation and monitoring, deep excavations were successfully executed in environmentally sensitive and heritage locations.

SEAFCO also offers design and installation of temporary works comprising temporary bracing system, temporary working platform, preloading of struts, and instrumentation and monitoring.
SEAFCO constructs deep basements, underground car parks, cut and cover tunnels and traffic underpasses. Construction technique such as top-down or bottom up construction methods with observational approach is usually adopted by SEAFCO to benefit the project owners.
CIVIL CONSTRUCTION

SEACFO also provides turnkey construction. SEACFO has completed turnkey projects such as underpass tunnels, a fish marketplace and sports stadium which comprised foundation piling, retaining walls and road works as a package. SEACFO is a "one stop shop" for Client in the construction industry.

SEACFO always offers advice on appropriate foundation method which is very advantageous to the project owners.

SEACFO performs its construction services dedicating its efforts and experience to satisfying the requirements of the Clients.

"one stop shop"
72nd Anniversary
H.M. Queen Stadium

Interior of the stadium.

Pipe jacking for
Prayasuren Road Project.

Pattanalain U-turn Underpass.
GROUND IMPROVEMENT

With experience in soft soil, foundation machinery and techniques, SEAFCO establishes in the field of soil improvement, enabling Deep Mixing, Jet Grouting for embankment foundations of highways, canals, river banks, tunnel openings, etc. SEAFCO also provides vertical drain installation service.

Deep Mixing Method

In Deep Mixing method, cement slurry is introduced into the ground through rotary blending injection auger. In-situ mixing of soft soil with cementitious material reduces permeability and increase soil shear strength up to 350kPa.

Individual soil cement columns or continuous wall can be formed with selection of equipment and construction sequence.

Improved stabilized soil allows excavation work for designers facing problems in difficult and soft soil conditions.
Vertical Drains

In construction of various structures on compressible, saturated soft soils, excessive settlement is a common problem to deal with. The ground improvement technique using prefabricated vertical drains (PVD) is one of the most suitable methods to overcome this problem. The vertical drains shorten the drainage path of the pore water from a low permeable layer to free water surface or to pre-install drainage layer, accelerating the primary consolidation or the process of settlement. PVD installed in predetermined patterns suitable for ground conditions, being coupled with surcharge or preloading can significantly shorten the period of primary settlement.

PVD installation equipment can be developed to suit the soil conditions, installation depth, specified scope of the work and required production rate.
ANCILLARY SERVICES

SEAFCO with highly trained and experienced staff provides valued services to the Client.

Sonic Integrity Test
In addition to pile length estimation, sonic integrity test can detect different kinds of flaws, such as discontinuities, poor concrete quality, pile sectional changes, etc.

Drilling Monitoring
Drilling monitoring enables specialists to confirm the vertical accuracy, dimensions and the state of the wall face of drill shaft or excavated trench on easy-to-read recording paper.
Pile Load Test

Pile load test is crucial for confirming the calculated safe load capacities. The test can be conducted in advance to the contract piling, but it is usually carried out on working piles to confirm the design and construction adequacy. With compiled records of the best results analyzed and logged over the years, SEAFCO has vast knowledge in pile performance in various types of soil.

Inclinometer monitoring

Inclinometer monitoring enables specialists to confirm the design parameters, construction sequence and performance of retaining walls for deep excavation and of soil slopes.
Human resources
More than 500 employees comprising of more than 20 engineers with an average of 12 years of work experience and skilled workforce for administration and project management.

Machinery
16 units of drilling rigs for large bored pile works and 6 units of equipment for diaphragm wall works. A workshop for equipment for repair and maintenance.

Softwares
SEAFCO invested in geotechnical and civil engineering softwares for design and analysis of foundations, excavations, retaining structures and also qualified, trained design engineers.
Deep foundation industry demands technology and experience. SEAFCO is a company that constantly pursues innovation and new technologies through ongoing research and development efforts. SEAFCO employs trained and highly qualified persons dedicated to increasing our productivity, quality and standard.

The company broadens its technical knowledge through involvement with local and international organizations in geotechnical and foundation engineering fields. All our research and development activities focus on technological advancement in design and construction, and deliver superior quality products to our clients.

The company also facilitates continuous improvement and promotes safety and environmental awareness, by safety training and using environmental friendly product such as polymer based drilling fluid in piling work and investing in wheel cleaning machines for construction vehicles in every construction site to ensure cleanliness of public road.

A wealth of SEAFCO’s research & development efforts bring about its capacities in timely operations, quality improvement and cost-effectiveness. The effort starts with proper instrumentation and regular monitoring of on-going projects, gathering actual operations data, systematically analyzing figures and statistics and methodically incorporating information for future studies.
SEAFCO's R&D team continuously conducts researches on piles grouting techniques and performance of diaphragm wall and development of construction methods. R&D activities do not merely entertain business demand, but also stretch out for the encouragement of study as well as disseminate new discoveries for the industry.

Supports are extended for seminars, workshops, and discussions to improve the currently used methods and design procedure. The new findings are present in various international conferences.

SEAFCO also offers on-job training courses to civil engineering students to fulfil the requirements of a graduate degree.

Some of the proceedings in which SEAFCO published papers.
SEAFCO's endeavours have underlined the success, and ensures the firm ground, of a number of large-scale buildings, superstructures and infrastructures in big cities of Thailand since 1974.
Thammasat University Library Building Project.

Column Tower Project.

Phuket Fantasea Project.

Bang Pae-in-Pak Kret Expressway Project.

Thammasat University Administration Building Project.

Thailand Cultural Center Station (MRTA) Project.
PROJECT HIGHLIGHTS

- Rajavej Hospital
  (Diaphragm Wall Work)
  Project.

- MRTA Cut and
  Cover Tunnel
  (Diaphragm Wall Work)
  Project.

- Sathorn Complex
  (Diaphragm Wall Work)
  Project.

- Din Daeng Underpass
  (Diaphragm Wall Work)
  Project.

- Siam Paragon
  Project.

- Yannawa Wastewater
  (Circular Diaphragm
  Wall Work) Project.

- Aquatic Products
  Center, Maha-choi
  Project.
Bangkhen Shaft
(Circular Diaphragm Wall Work) Project.

BMA Underground
Car Park Project.

Sofitel Hotel
(Bored Piling and Substructure Works) Project.

Underpass U-turn
Pattanakarn Project.

Athenee Residence Project.

Bobae Center
(Diaphragm Wall Work) Project.

Second Bangkok International Airport,
North Extension
(Diaphragm Wall Work) Project.

Southern Outer
Bangkok Ring Road Project.
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