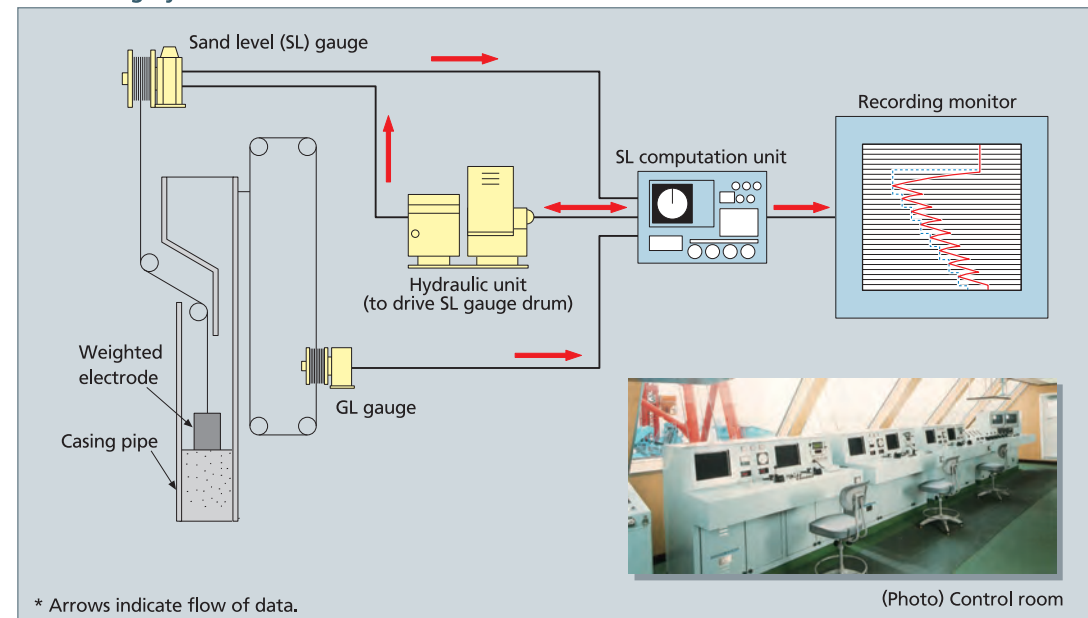


Compozer operations are carefully monitored using sophisticated instruments.

Monitoring system

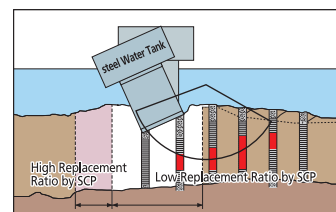
- A depth (GL) gauge, to indicate the depth of a casing pipe, and a sand level (SL) gauge, to indicate the sand level in the casing pipe, are used for monitoring and quality control.
- The GL gauge consists of a drum that rotates as the casing pipe moves up and down. Its rotation is converted into an electrical signal that records the pipe depth on the monitor. The SL gauge records the sand level in the casing pipe using a weighted electrode, and a computer calculates the volume of sand discharged at each point as the pipe is gradually raised.
- Use of Compozer Numerical Operation System (CONOS) has made possible more precise operations, simpler monitoring, and faster, more accurate data processing.

Monitoring System



The Japanese Society of Soil Mechanics and Foundation Engineering Technology Prize

FUDO Construction received the Technology Prize of the Japanese Society of Soil Mechanics and Foundation Engineering, for its demonstrative destruction test of the low replacement ratio SCP method. Due to the relatively high occurrence of clay soil, the low replacement ratio design raised various technical issues, such as its effectiveness in improving the strength of clay between sand piles, and the stress concentration ratio on the sand piles and clay. FUDO Construction was responsible for the running of site verification trials that were arranged to resolve these issues. FUDO Construction continues its research and pursuit of technical innovation for improvements in Compozer design, operation, and technical analysis.



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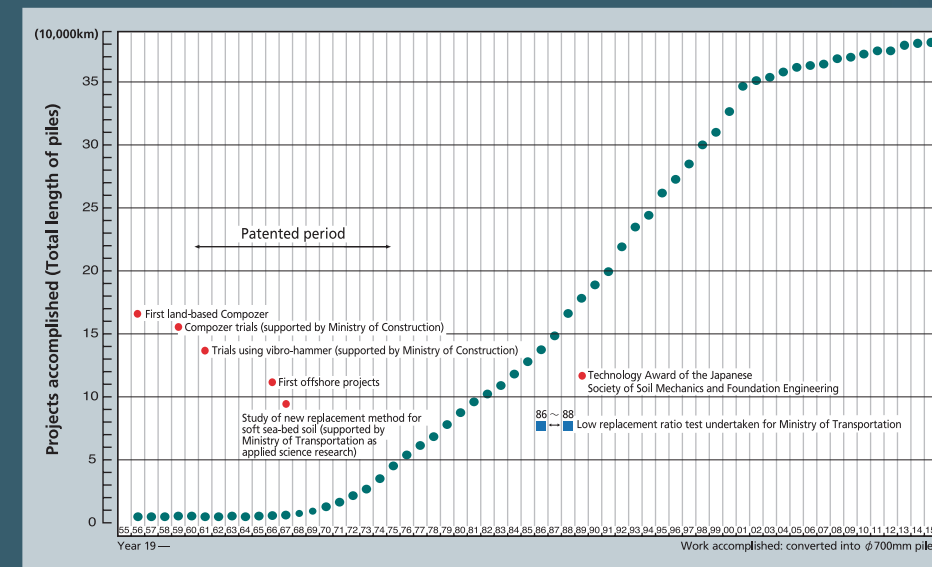
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Sand Compaction Pile Method

COMPOZER

The history of the offshore-use Compozer method parallels the entire modern development of contemporary offshore construction. Compozer was developed in tandem with large-scale projects including man-made islands, coastal roads and new towns, designed to promote economic growth and enhance modern lifestyles. The world's first construction method of this type, it was developed and adapted for site use by FUDO Construction Co., Ltd. since 1956, and by 1996 has been used to install sand piles totaling 390,000 km in length.



Applicable to variety of soils

This method is suited all types of soil, from clay to sandy soil.

Wide-ranging ground improvement objectives

For sandy soils, compaction of the ground aims to increase bearing capacity, prevent compression settlement, and improve horizontal resistance. For clayey soils, the formation of a compound ground of clay and pile sand aims to increase bearing capacity, prevent slippage, and reduce consolidation time and consolidation settlement.

Efficient procedure

Working by strengthening soft ground with large-diameter, compacted sand piles satisfying the required replacement ratio, this is a highly efficient procedure that involves minimal dumping of soil and environmental disturbance compared with the conventional dredging/replacement method.

Deep ground/deep sea bed improvement possible

This method can be used at sites for which the dredging/replacement method is not suited, such as sea bed under a considerable depth of water, and considerable depths of ground to be improved.

High performance in sand pile formation

A powerful vibro-hammer is used to drive a casing pipe to the required depth, and a well compacted sand pile is formed by repeatedly raising and driving down the casing pipe as the sand is properly discharged. By designing pile spacing to suit the particular site objectives, ground improvement that satisfies the required replacement ratio can be readily accomplished.

Reliable monitoring and quality control

Monitoring devices ensure the precision of Compozer operations and consistent quality of sand pile.

COMPOZER prepares the ground for offshore construction.



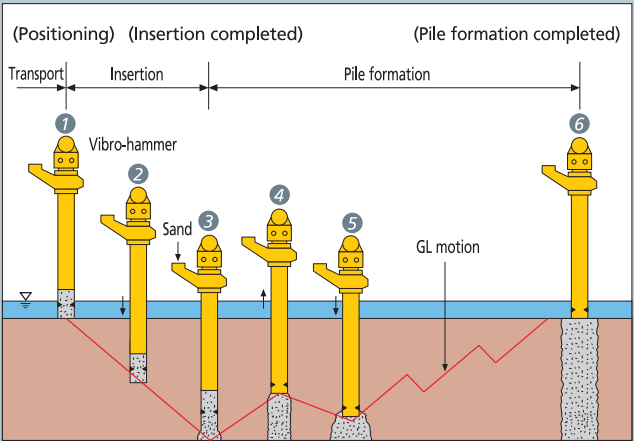
COMPOZER

Operating procedure

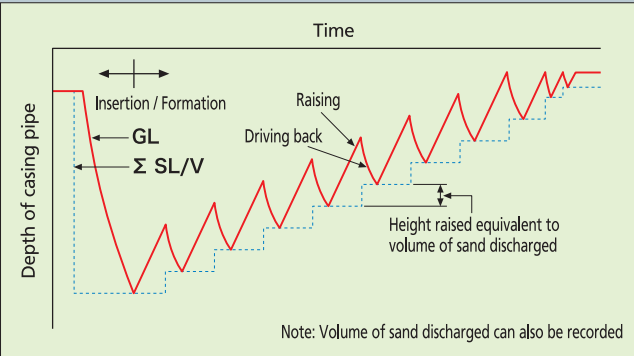
The Compozer method stabilizes soft ground by forming large-diameter, well compacted sand piles in the ground. This is done by driving a vibrating casing pipe down to the required depth and repeatedly raising and driving back the pipe as it discharges sand.

Operating procedure

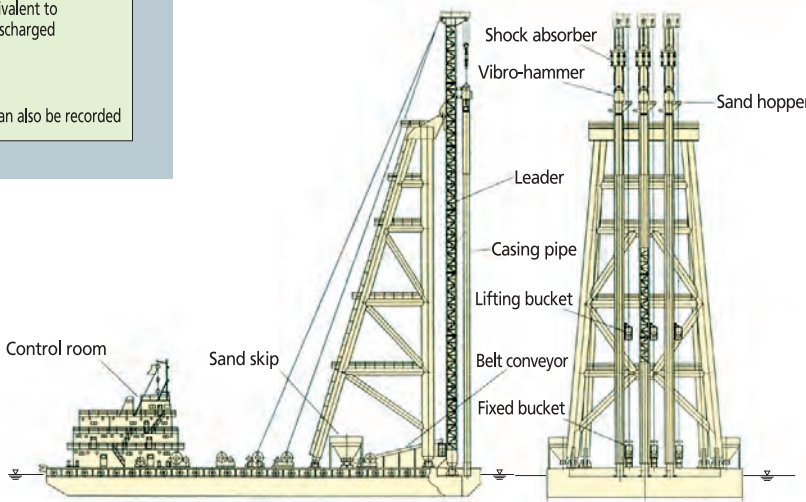
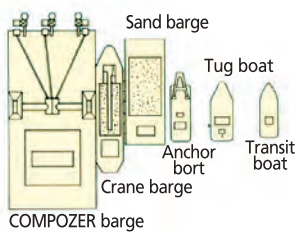
- 1 The casing pipe is correctly positioned.
- 2 The casing pipe is driven into the ground using a vibro-hammer.
- 3 When it reaches the required depth, the casing pipe is charged with a specified volume of sand.
- 4 As the casing pipe is raised by a specified margin, the sand is discharged into the ground using compressed air.
- 5 The sand pile is compacted and widened by driving the pipe back down into the sand.
- 6 The pipe-raising, sand discharge and re-driving procedure is repeated numerous times as the pipe is gradually removed, forming a complete compacted sand pile.



Monitoring

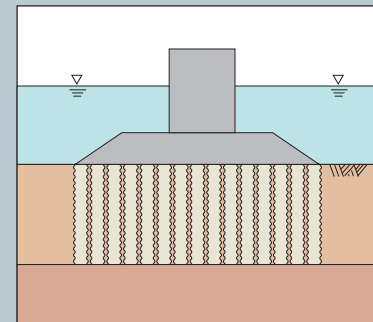


Vessel arrangement



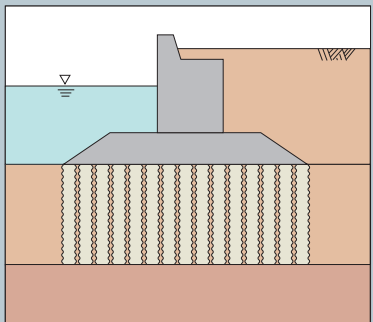
The pioneering Compozer method has a wide range of applications.

Concrete Caisson Breakwater



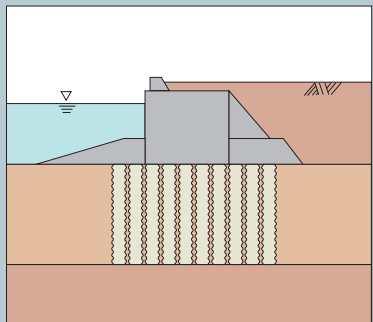
Objectives: stability, improving bearing capacity, reducing settlement

Concrete Block Bulkhead



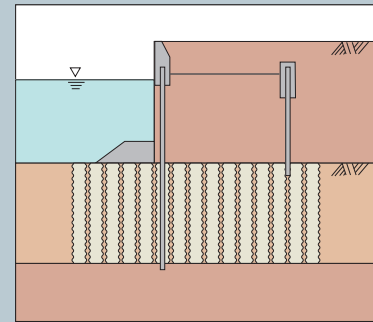
Objectives: stability, improving bearing capacity, reducing settlement

Cellular Block Pier



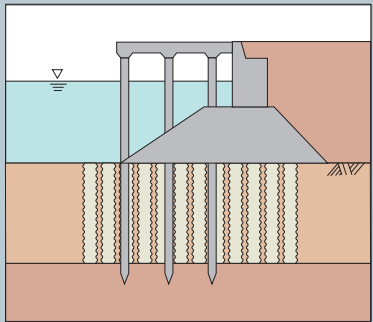
Objectives: stability, reducing settlement, improving bearing capacity

Steel Sheet Pile Bulkhead, Wharf



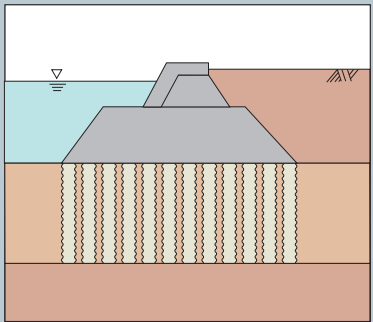
Objectives: stability, reducing settlement, increasing K-value, countering ground pressure

Piled Pier, Jacket Structure



Objectives: stability, reducing settlement, increasing K-value, improving bearing capacity

Sloping Revetment



Objectives: stability, improving bearing capacity, reducing settlement

Compozer barge positioning system using GPS

This system allows Compozer barge to be precisely positioned using GPS, a method of identifying location from satellites. It simplifies shifting the barge from one piling position to the next. All the site positioning coordinates are input at the start and a monitor shows the barge's current position and its next required position. A buzzer sounds when the barge comes within the permitted tolerance of the new position, and anchoring cables are tightened to hold the barge in place. The shift is complete after a final confirmation of the barge's position.

