



## Application Case

# Diba Bay New Container Port Project in Timor Leste





### Project Profile

This biggest port project in Timor Leste is located 10KM west of Dili, the capital of Timor Leste. Includes a 630 container piled wharf, 3.5 million cubic meters of dredging, 27 hectares of land reclamation and **18.5 hectares of foundation treatment.**

Owner: **Timor government, French Bollere group**

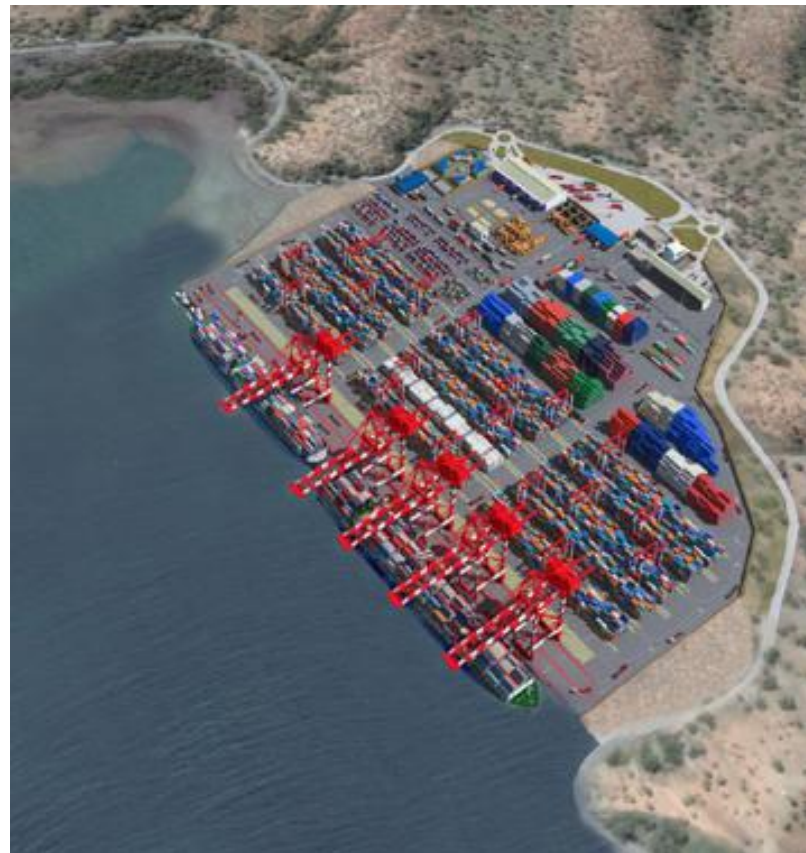
DB Contractor: **China Habor**

Designer: **CCCC No. 4 DI**

Constructors: **CCCC No.4 Beurea, Shanghai Habor**

Construction Duration: **32 months**

Building Cost : **153 million USD**



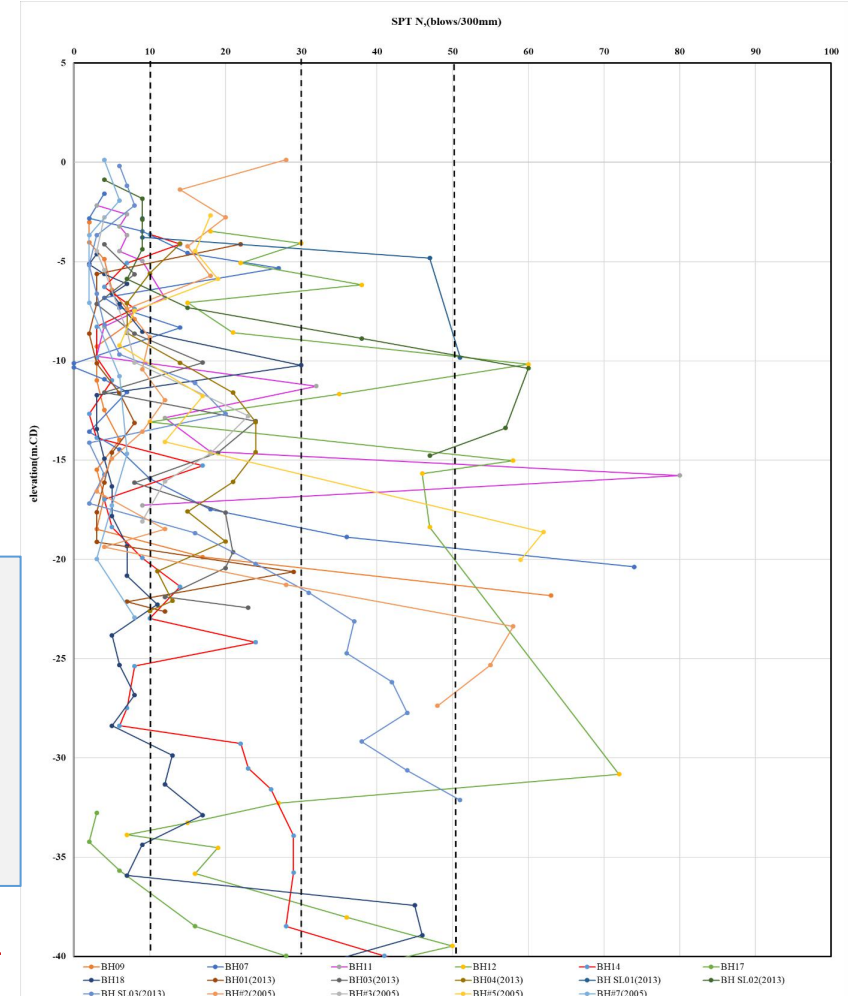


## Geological profile

Most of the backfill in the land area is coral sand with higher calcium content and more gaps, which is not meet the requirement of settlement and stability in the rear of the wharf. The stone column should be used to reinforce the composite foundation to meet the requirements of seismic anti-liquefaction

In 60-70% area the SPT value are lower than 20 blows. There are **few boreholes with more than 30 blows and very few with more than 50 blows.** particular position shows 100 blows

**Penetration capacity of vibro equipment is the key controlling point of successful vibroflotation implementation**



SPT value distribution in different boreholes



### Vibro Stone Column Profile

- Stone column distributes at 6 area: A, B, C, D, F1, F2
- Land construction: C, D, F with total 37,053 stone columns
- Offshore construction: A, B with total 17,543 stone columns
- Gravel size: 20mm~50mm graded gravel



Layout of stone column treatment area



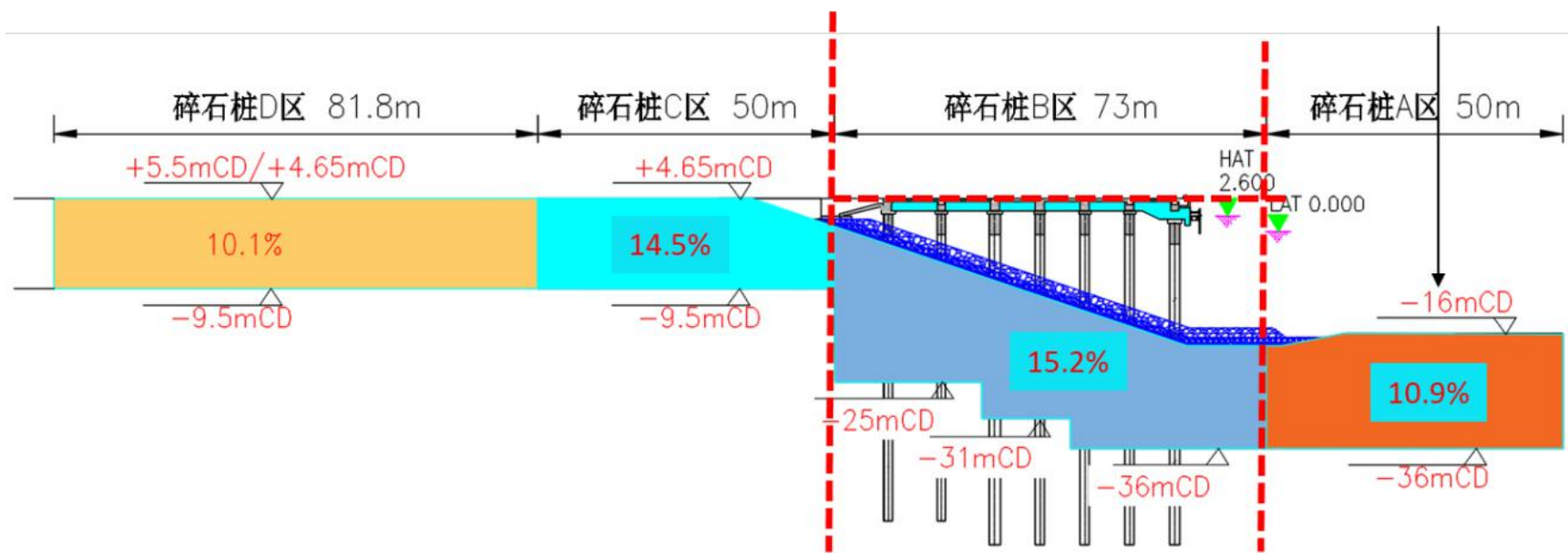
### Parameters of stone column

| Area | Location                          | Area (m <sup>2</sup> ) | m      | Dia (m) | quantity (Nos) | Length(m)                     | Volumn of stone (m <sup>3</sup> ) |
|------|-----------------------------------|------------------------|--------|---------|----------------|-------------------------------|-----------------------------------|
| A    | Offshore (Bottom protection area) | 38920                  | 10.90% | 0.9     | 6669           | 12m~20m                       | 77004.9                           |
| B    | Offshore (Wharf area)             | 51082.7                | 15.20% | 0.9     | 10874          | 13m~26m                       | 128102.6                          |
|      | Summary                           |                        |        |         | 17543          |                               | 205107.5                          |
| C    | Land                              | 30501                  | 14.50% | 0.8     | 8799           | 14.35m, 18.35m                | 64238                             |
| D    | Land                              | 115070                 | 10.10% | 0.8     | 23121          | 14.15m, 14.35m, 18.85m, 15.2m | 170676                            |
| F1   | Land                              | 9067.6                 | 14.50% | 0.8     | 2616           | 14.7m, 20.9m                  | 26205                             |
| F2   | Land                              | 8725.9                 | 14.50% | 0.8     | 2517           |                               |                                   |
|      | Summary                           |                        |        |         | 37053          |                               | 261119                            |
|      | Total                             |                        |        |         | 54596          |                               | 466266.5                          |





## Cross Section Diagram of Stone Column





### Bottom Feed Vibroflotation Serve to Both of Land and offshore Area



Vibro-BF in Land Area



Vibro-BF in Offshore Area



## Breif Introdution of Vibro-BF Land Job



Land vibro-BF Construction Scene





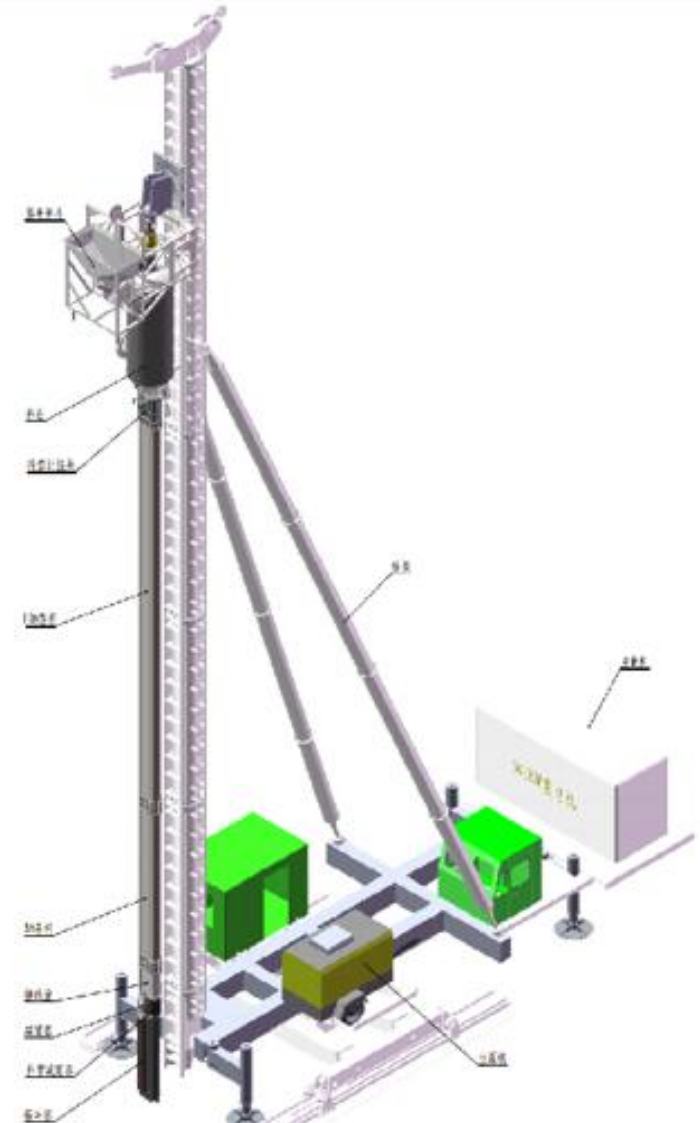
## Vibro-BF Equipment for Land Job

### Bottom Feed Vibroflot

BVEM **BJZC-BFS-400-180** bottom feed vibroflot with double lock pressure container system

### Supporting Pile Frame

Zhejiang ZhenZhong **JZB200** walking pile frame





## BJZC-BFS-400-180 Bottom Feed Vibroflot System Introduction

### -Vibroflot

#### The Bottom Feed Electrical Vibroflot Spec. /底部填料电动振冲器参数

|   |                                |
|---|--------------------------------|
| Type/型号                                     | BJZC-BFS-400-180               |
| Power/功率 (kW)                               | 180                            |
| Frequency/频率 (Hz)                           | 40-60                          |
| Rotation speed/转速 (rpm)                     | 1200-1800                      |
| Working pile diameter/ 工作桩径(mm)             | 900-1200                       |
| System air pressure/系统压力 (bar)              | 6                              |
| Centrifugal force/激振力(kN)                   | 200-300                        |
| Cooling mode/电机冷却方式                         | Circulating water cooling/循环水冷 |
| Air flow rate/配置空压机排量 (m <sup>3</sup> /min) | 10                             |
| Vibrator size/振冲器尺寸L/W/H (mm)               | 2600×600×700                   |



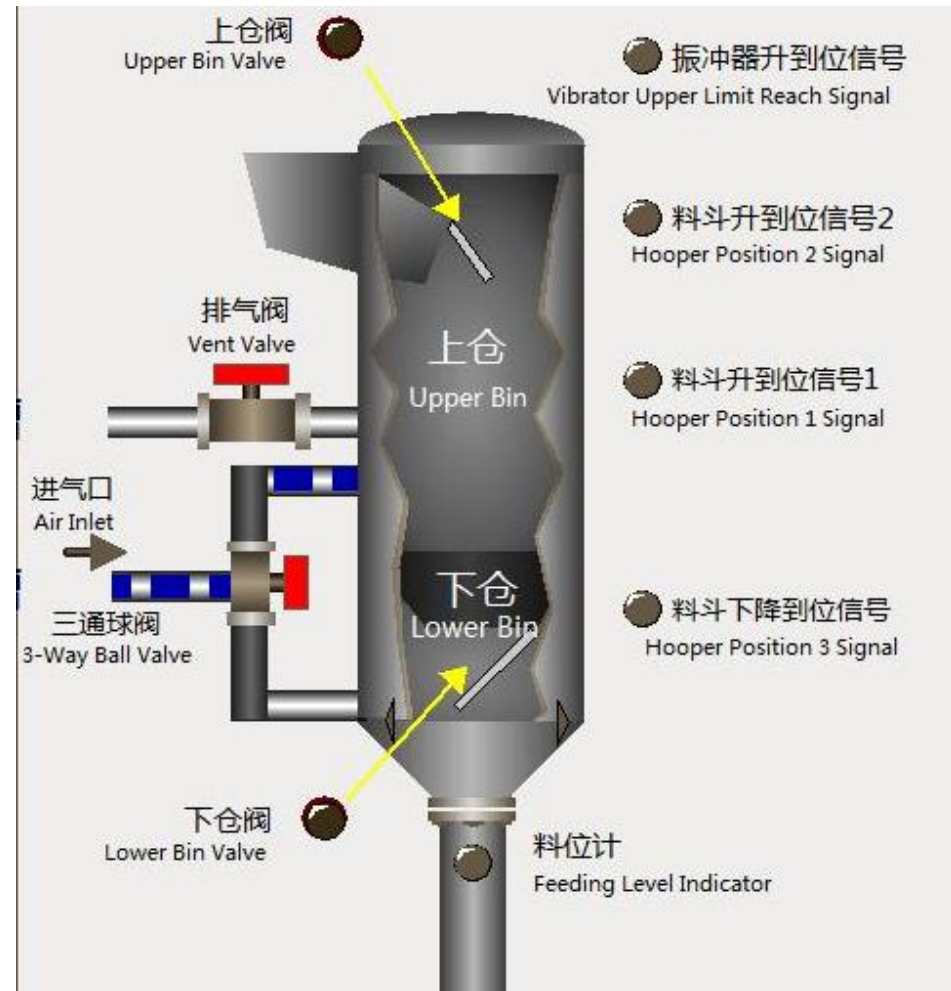


### BJZC-BFS-400-180 Bottom Feed Vibroflot System Introduction

#### -Double lock pressure container system

- Air operated valves
- Volume of container: 1.2 cubic meters
- Material level indicator and camera setting outside to monitor stone in real time
- Flap valve structure of hopper (less clamp of stone)

Double lock function of valves can keep sustainable air pressure in feeding pipe during working time.





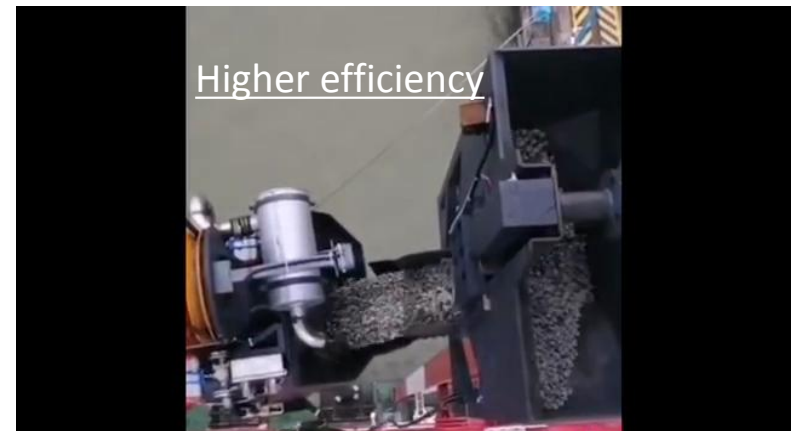
### BJZC-BFS-400-180 Bottom Feed Vibroflot System Introduction

#### -Track type lift hopper system

- Volume of lift hopper: 1.2 cubic meter
- Internal slope greater than 45 degree( greater than the Rest Angle of stone) to ensure the smooth blanking
- Air-controlled discharge door with both function of door and spout
- Can be attached to the track and slide up and down under the hoisting of the auxiliary winch



Winding type roll-over hopper



Track type spout hopper





### BJZC-BFS-400-180 Bottom Feed Vibroflot System Introduction

#### - Vibroflot Electrical Inverter Control System

| Technical spec./技术参数          | Inverter control cabinet/变频电控柜 |
|-------------------------------|--------------------------------|
| Inverter model/变频器型号          | 英威腾GD200-200G/220P-4           |
| Cabinet protection grade/保护等级 | IP65                           |
| Input/输入频率(Hz)                | 47~63Hz                        |
| Input/输入电压(V)                 | AC380V(-15%)~440V(+10%)        |
| Weight and Dimensions/重量和尺寸   |                                |
| L/W/H(m)                      | 1.1×9×1.7                      |
| Weight 重量/kg                  | 500                            |

- With frequency conversion function, excitation force can be changed against the soil to achieve the best effect
- With full range protection function of vibroflot(over or under voltage, phase loss, overload, grounding, short circuit)
- Digital interface of operation panel for easy using





### BJZC-BFS-400-180 Bottom Feed Vibroflot System Introduction

#### - Container Control System

- Simulation operation panel for easy using
- Freely switch between manual and automatic modes
- Automatically control the relief and compression of container, opening and closing of discharge door
- Set the one-click pause function and the emergency stop button





### BJZC-BFS-400-180 Bottom Feed Vibroflot System Introduction

#### - Whole Construction Process Data Recorder

- Be placed in cab to assist the operator's operation
- Wireless connection for remote operation within 100 meters
- Colorful touch screen for easy using
- English/Chinese language interface
- Display the whole process of pile making in real time





### Typical Process showing of Vibro-BF Land Job



Reclamation



Transportation of vibro equipments





### Typical Process showing of Vibro-BF Land Job



Assembly and installation



Commissioning



### Typical Process showing of Vibro-BF Land Job



Start boring



Surface of borehole



### Typical Process showing of Vibro-BF Land Job



Complete hole making and feed  
stone into hopper



Feed stone to container and start  
to make pile





### Typical Process showing of Vibro-BF Land Job



Continualling pile making



Appearance of pile cap





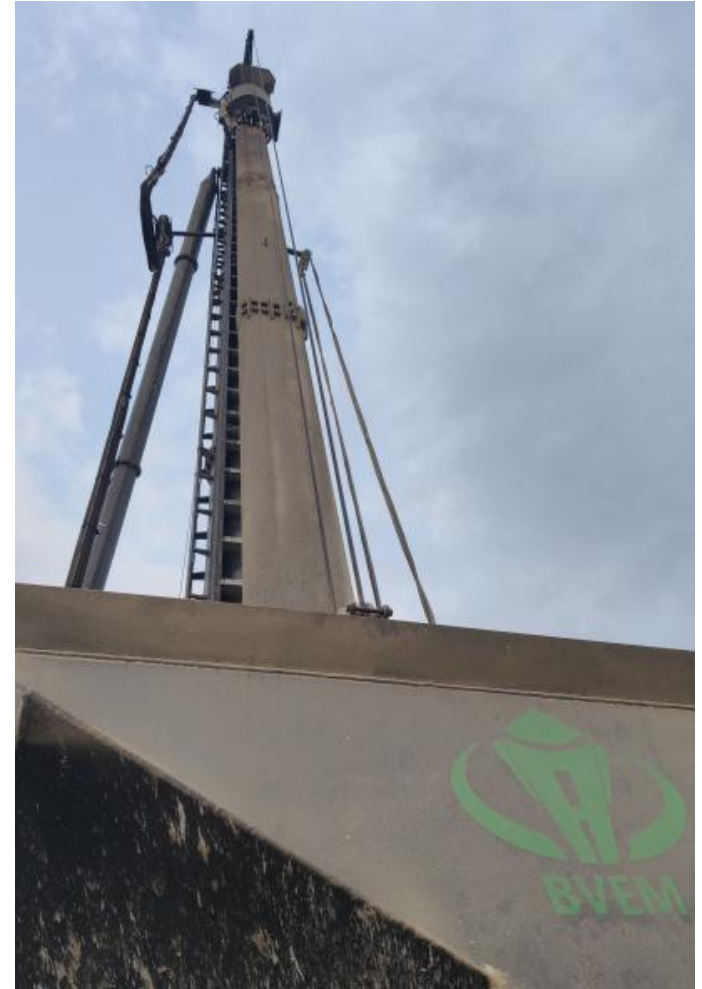
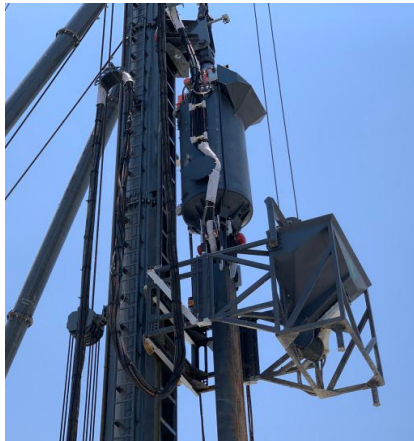
## Typical Process showing of Vibro-BF Land Job



Construction site Scene



## Typical Process showing of Vibro-BF Land Job







### Description of Land Vibro-BF Construction

- Scope of pile length: 15-21 meters
- Time of hole making: 15-25 minutes
- Time of compaction: 30-35 minutes
- Time of whole process: 50-70 minutes
- Maximum SPT of initial soil: > 50 blows
- Quantity of pile: 37,000 pcs





## **Breif Introdution of Vibro-BF Offshore Job**



Construction Scene of Offshore Vibro-BF





### Vibro-BF Equipment for Offshore Job

#### Bottom Feed Vibroflot

BVEM **BJZC-BFS-400-180**  
bottom feed vibroflot with  
double lock pressure  
container system

#### Construction Vessel

Two construction vessels are  
equipped with 4 sets and 3  
sets of bottom feed vibroflot  
system in parallel





## **Vibro-BF Equipment for Offshore Job**



**BF Vibroflot in assembly and installation**



**Completed Installation of BF Vibroflots**





## **Vibro-BF Equipment for Offshore Job**



**BF Vibroflots Dipped into Sea Water**



## **Construction Showing of Vibro-BF in Offshore Job**



BF vibroflots in underwater boring





### Construction Showing of Vibro-BF in Offshore Job



The Main Stone Stock Bin located on Deck



Transitional Hopper and Belt Conveyor



### Construction Showing of Vibro-BF in Offshore Job



Transitional Hopper



Lifting Hopper



## **Construction Showing of Vibro-BF in Offshore Job**

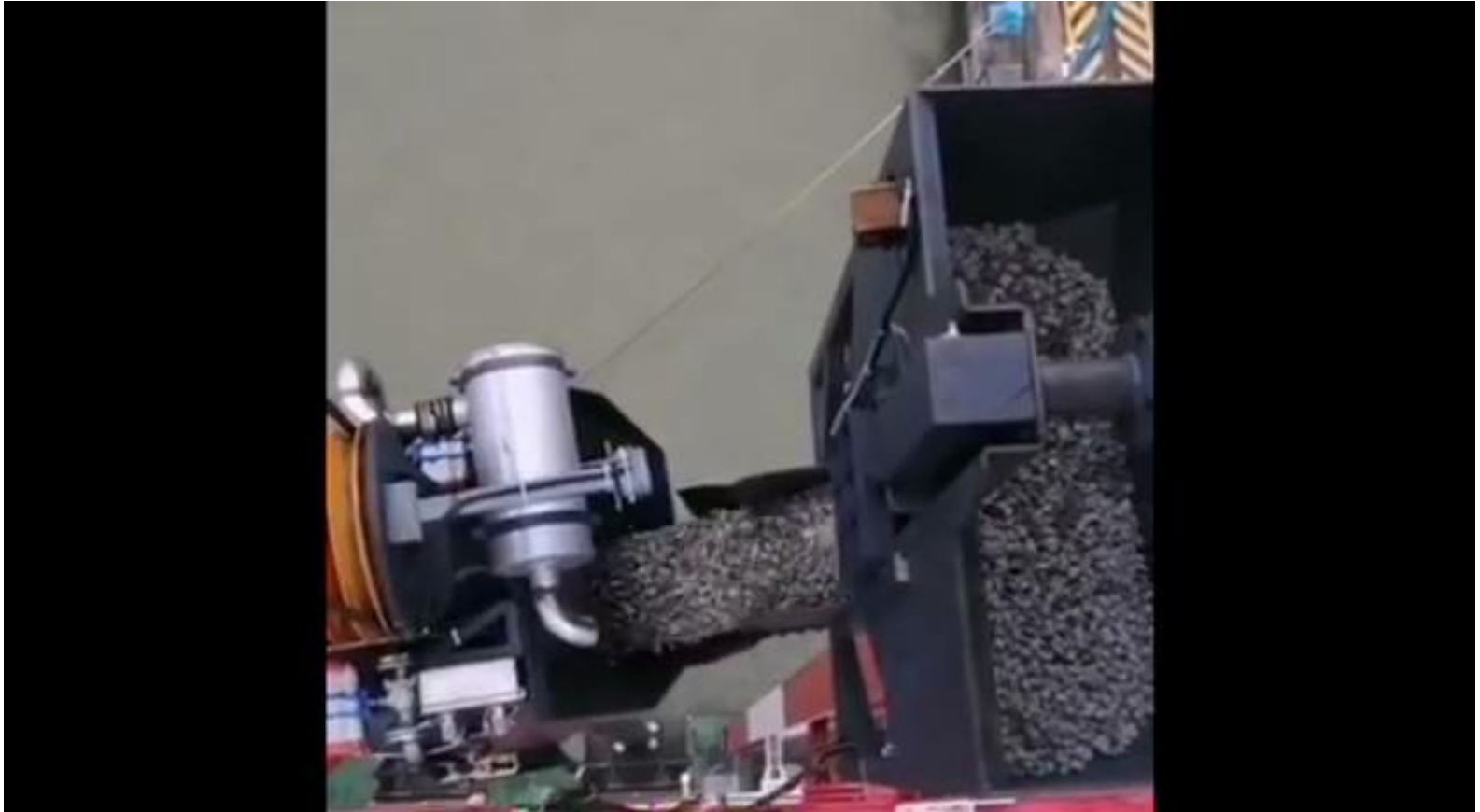


**Belt Conveyor Send Stone from Stock Bin to Transitional Hopper**





### Construction Showing of Vibro-BF in Offshore Job

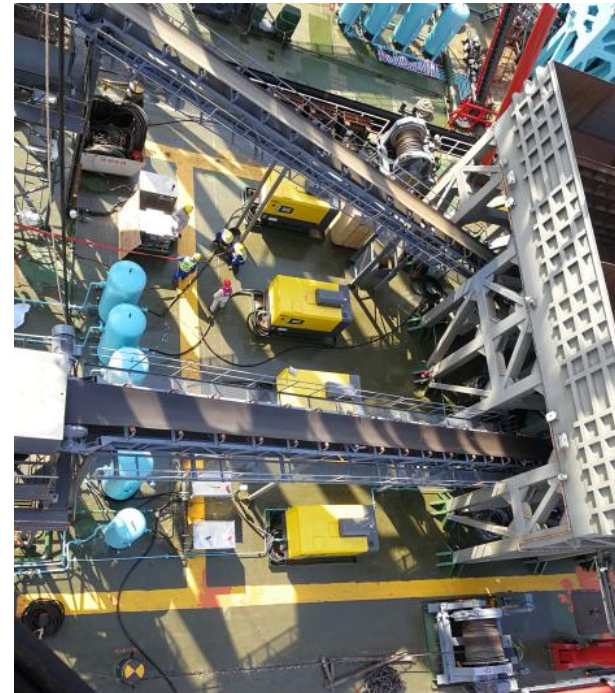


After feeding stone to lifting hopper from transitional hopper, lifting hopper go up and feed stone to vibroflot container and start to make pile





## Construction Showing of Vibro-BF in Offshore Job



Overhead view of deck accessories



### Construction Showing of Vibro-BF in Offshore Job



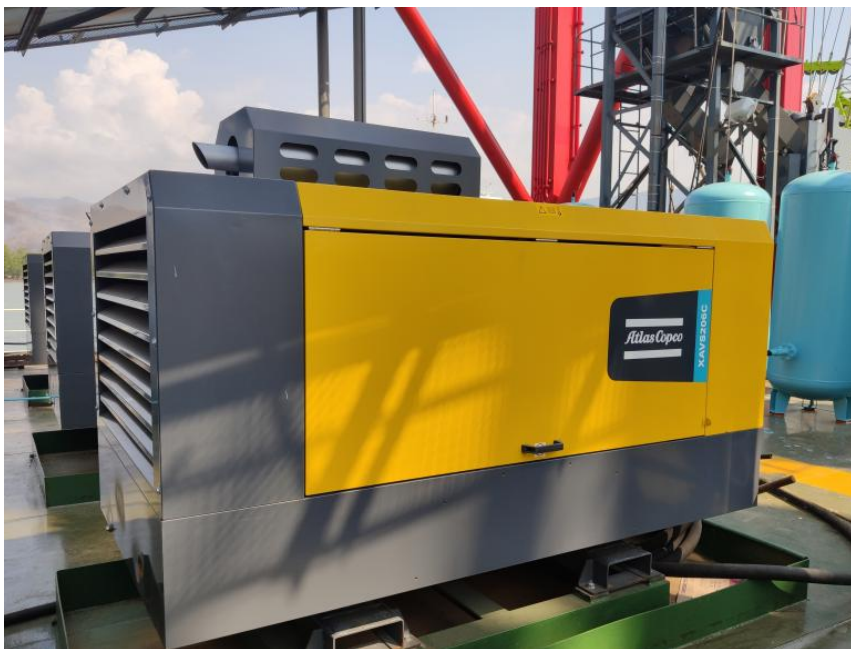
Vibroflot Inverter Control Cabinet in Cabin



Construction Quality Management Control Cabinet in Cabin



### Construction Showing of Vibro-BF in Offshore Job



Air Compressors on Deck



Pressure Air Storage Tank on Deck





### Construction Showing of Vibro-BF in Offshore Job



Vibroflot Motor Circulation Cooling System on Deck



Hoisting Winding Winch on Deck



### Construction Showing of Vibro-BF in Offshore Job



Center Control Room in Cabin Realize Automatic Pile Making



### Construction Showing of Vibro-BF in Offshore Job



4 sets (3 sets) of vibroflots can be operated at same time





## Construction Showing of Vibro-BF in Offshore Job



Interface of automatic pile making system



Operation panel  
(hoisting system, vibroflot, feeding system)



The image shows a large industrial control panel for a hopper management system. The panel features a large central display showing a graphical user interface (GUI) with various control buttons and status indicators. The interface is divided into several sections:

- Top Status Bar:** Displays the date and time (2019/10/26 16:59:48) and the system name (振冲施工管理系统 VC Monitoring System).
- Left Sidebar:** Contains a menu with options like 系统信息 (System Info), 参数设置 (Parameter Settings), 运行状态 (Running Status), 报警记录 (Alarm Record), 历史数据 (Historical Data), 用户管理 (User Management), and 系统维护 (System Maintenance).
- Main Control Area:**
  - Top Left:** A section for 料仓料斗工作模式 (Hopper/L斗 Work Mode) with buttons for 手动 (Manual) and 自动 (Auto).
  - Top Center:** A section for 提升料斗阀门 (Lift Hopper Valve) with a red stop button and a green start button.
  - Top Right:** A section for 提升料斗溜槽 (Lift Hopper Chute) with a red stop button and a green start button.
  - Middle Left:** A section for 料仓工作模式 (Storage Tank Work Mode) with buttons for 手动 (Manual) and 自动 (Automatic).
  - Middle Center:** A section for 中间料仓阀门 (Intermediate Hopper Valve) with a red stop button and a green start button.
  - Middle Right:** A section for 中间料仓溜槽 (Intermediate Hopper Chute) with a red stop button and a green start button.
  - Bottom Left:** A section for 排气阀 (Vent Valve) with a red stop button and a green start button.
  - Bottom Center:** A section for 3通球阀 (3-Way Ball Valve) with a red stop button and a green start button.
  - Bottom Right:** A section for 上仓阀 (Upper Bin Valve) and 下仓阀 (Lower Bin Valve) with red stop buttons and green start buttons.
- Right Sidebar:**
  - Operation Mode:** A section for 振冲实际频率 (Hz) (Vibrator Actual Frequency) and 振冲设定频率 (Hz) (Vibrator Set Frequency) with a slider and numerical input.
  - Frequency Control:** Buttons for 频率增 (Increase) and 频率减 (Decrease).
  - Motor Control:** Buttons for 振动器 (Vibrator) and 空压机 (Compressor) with Remote and Local control options.
  - Water and Cooling:** Buttons for 水泵 (Water Pump) and 冷却泵 (Cooling Pump) with Local and Remote control options.
  - Exit:** A button for 退出 (Exit).
  - Status Display:** A section for 测压阀 (Pressure Valve) showing a value of 0.00.

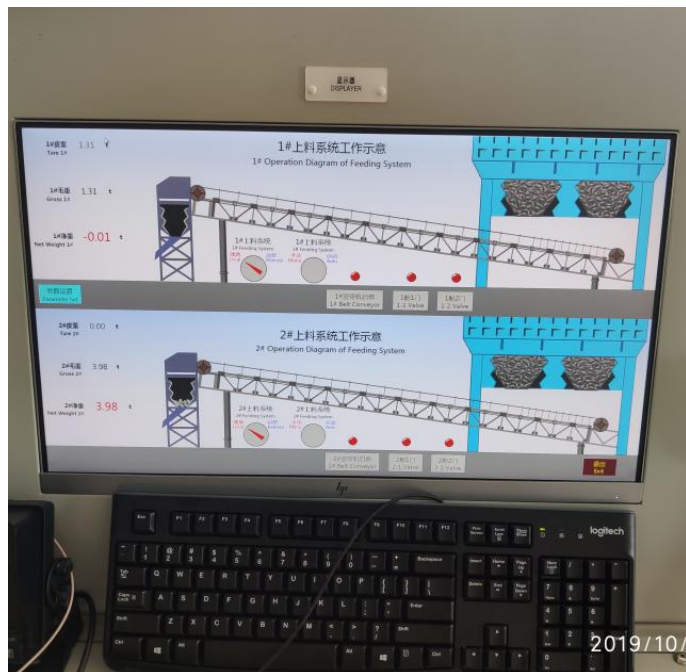
The panel is mounted on a wall, and a power cord is visible at the bottom.



## Construction process information and data monitoring



### Construction Showing of Vibro-BF in Offshore Job



Belt Conveyor Control System



Vessel Moving Control panel





### Construction Showing of Vibro-BF in Offshore Job



All-around Camera for Construction Monitoring



### Description of Offshore Vibro-BF Construction

- Depth of sea water: 15 meters
- Depth of pile: Maximum 26 meters
- Maximum SPT: 70 blows
- Quantity of pile: 17, 000 pcs
- Automatic pile positioning system(RTK system for sea area)
- Automatic operation (vibroflot, double lock container, stone supplying system and feeding system)

