Construction method of vibroflotation stone column

Catalogue

1. BVEM Profile

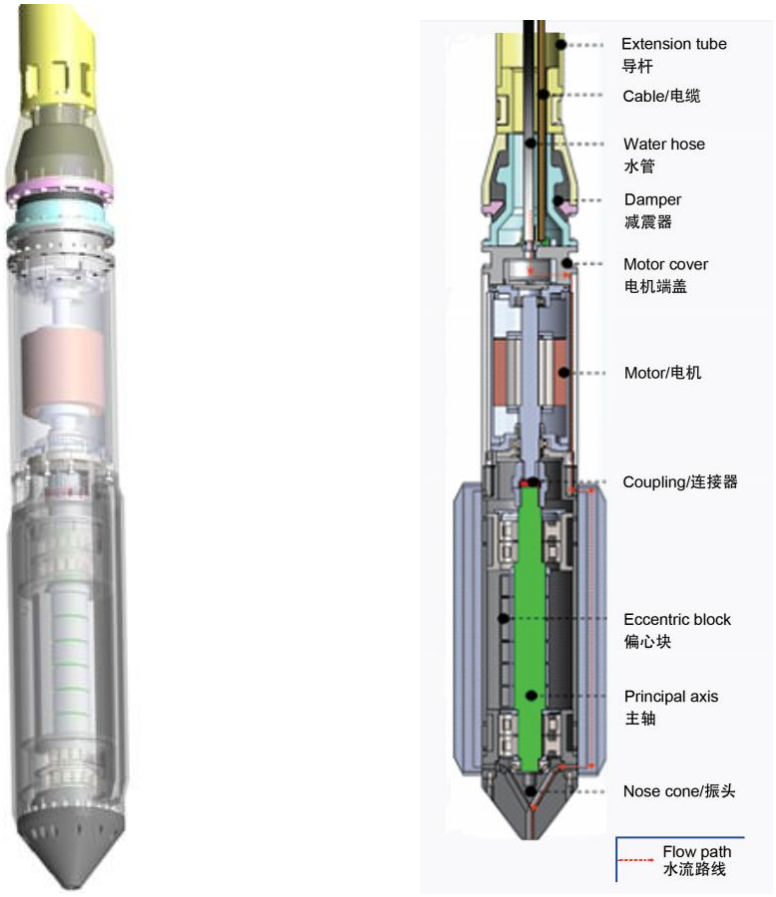
Beijing Vibroflotation Engineering Machinery Co., LTD (BVEM) started from a special R&D team worked for a vibroflot strategic localization project and organized by Ministry of Water Resources and Hydro-power. After 40 years development of products and market, BVEM has grown to be a well-known enterprises in China's foundation engineering industry. With the main business of complete sets of equipment supplying for vibroflotation construction, BVEM was included into the group of National High & New Technology Enterprise. As an active participant of vibroflotation industry, BVEM is one of the editor-in-chief of national industry manufacturing standard <Electric Deep Vibrator DL/T 1557-2016>, and participated numerous national key projects including Yangtze River Three-Gorge project and Hong Kong- Zhuhai- Macao Bridge project. BVEM's holding company is Beijing Vibroflotation Engineering Co., LTD (BVEC), who is a leading enterprises in domestic vibro-industry.

Focusing in mechanical design, manufacturing, sales, maintenance, construction, leasing and consultant platform development, BVEM condenses 40 years of industry experience in design, construction, improvement, optimization, and manufactures high-class series electrical vibroflots including multiple models applied to different soil layer condition, and have implemented the assembly line of production capacity. Products have been sold to more than 30 countries in the world, involving many foundation engineering field as power, transportation, petrochemical, ports, airports and offshore reclamation etc.

For years always, nailing on the core conception of " CREATING BOUTIQUE to SERVING VIBRO-PEOPLE", adhering to the grand vision of " WORLD VIBROFLOTATION", BVEM has been being down-to-earth, fearless of difficulties, unremitting efforts, continuous innovation and keeping pace The Time! In the pursuit of outstanding, BVEM people develop themselves and face the common destiny with company together, seize the moment, unremitting self-improvement!The future can look forward to being better. Development need unlimited power and the power can make achievement of unlimited life.

2. Vibroflot Profile

2.1 Vibrator structure



2.2 Working principle

Vibroflot equipment makes a joint action of horizontal vibration and high pressure water shock to compact the loose sand layer or formed in soft soil of stone column to compose the composite foundation with original soil together, finally achieve the improvement of soil on load capacity, settlement controlling as well as the anti-seismic capacity.

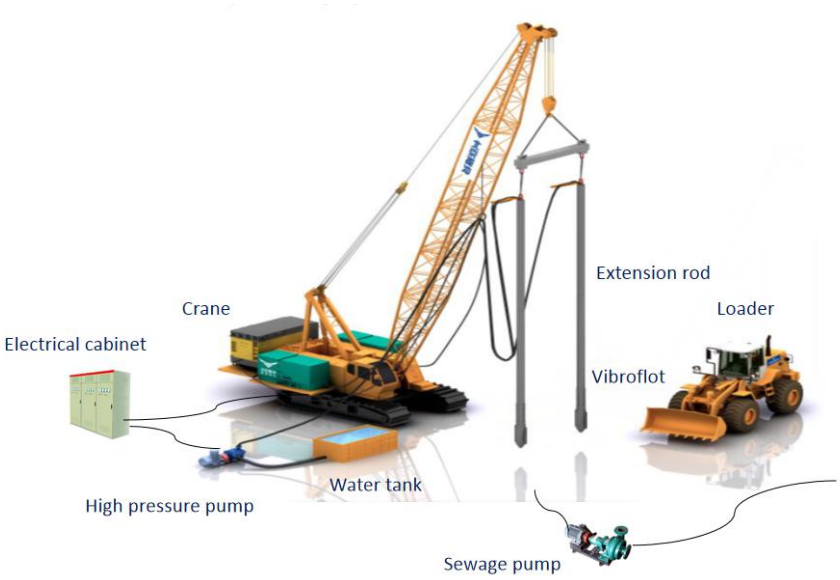
3. Vibroflotation Profile

3.1 Vibroflotation introduction

Vibroflotation is one of a typical technique which is a widely used application for foundation soil improvement. Vibroflotation method can be divided into vibro-compaction method and vibro-replacement method or Vibroflotation stone column method according to different requirements of construction.

The construction method is to lift the vibroflot device with a crane, start the submersible motor to drive the eccentric block, so that the vibroflot device will generate high-frequency vibration, at the same time start the high-pressure water pump,under the effect of vibration and high-pressure water, vibroflot will be reach the design depth of pile. After cleaning hole , stone shall be filled from the ground to the hole section by section. Each compaction period is 30-50cm. After the vibroflotation meets the design requirements, the vibroflotation device is lifted and another pile section is built.

3.2 Complete equipment of vibro-construction



3.3 Stone column working method

3.3.1 Preparation for construction

1) Feeding Material

It is advisable to adopt hard materials such as gravel, pebble,coarse sand and slag, mud content is less than 5% and appropriate gradation is suggested. The particle size range of material is generally 20mm!150mm.

2) Main construction machines and tools

Vibroflot: Model selected according to the soil condition and design requirement

Lifting machine: Crawler crane or truck crane or movable pile frame, etc

Other auxiliary equipment: electrical cabinet, high pressure pump, mud pump, submersible pump, loader or small excavator, generator, etc

3) Other preparations

Joint review of drawing, technical disclosure, site preparation (electricity, water,road and site formation), sewage system, pile placement

3.3.2 Stone column construction

1) Trail construction

Before the normal construction, the trail construction should be carried out to determine the construction parameters such as working electrical current, water pressure, vibration holding time and amount of filling.

2) Construction process

A. Clean the site. Connect the power supply,water resource and measure the pile position

B. Machines are in the place and vibroflot is aligned with the pile point

C. Hole boring

a. Open the pressure pump. When water spray from the outlet of vibrator, start the vibrator and begin the hole boring when vibrator operate normally. Slowly penetrate the

vibroflot into the soil, until the design depth.

b. The vibroflot should be in a suspended state in the whole boring process.

c. The boring speed depend on the soil hardness and the type of vibroflot and the water pressure, etc., the maximum speed is generally controlled at no more than 2.0m/min.

D. Pore-hole cleaning: put the vibroflot out of the pore-hole and then insert it again at a fast speed to make the hole unblocked. This process can be repeat 2 to 3 times in order to facilitate stone falling into the bottom of pore-hole.

E. Filling and compaction: feed stone into the pore-hole, sink the vibroflot and compact the filling stone. When the electrical current increase to the specified value, lift the vibroflot to continue the next compaction segment. Generally, the length of compaction segment should be less than 50cm.

F. Compaction job should start from the bottom of the pore-hole and goes up segment by segment, and no leakage is allowed in the middle.

G. Continue the stone column making until achieve to the ground.

H. Finish this stone column making