Technology Dealing with the Soft Soil Foundation

Yanguang Wang¹, a, *, Xiaoxia Liu², b

¹ Wuhai Highway Administration, Wuhai 016000, China
² Wuhai Traffic information management center, Wuhai 016000, China

a, * Corresponding author E-mail: 1184575094@qq.com
b E-mail: L1184575094@163.com

Abstract. Soft foundation is one of the important factors affecting the quality of construction in the building construction, so in order to better improve the quality of construction, we must take corresponding measures to deal effectively with this problem, mainly discusses the profound advances in treatment of soft soil subgrade, this paper probes into the combination of the characteristics of the silt along the beach area of the soft foundation treatment technology progress. Aiming at the current development process of municipal beach road construction problems, based on the analysis of deep soft soil subgrade treatment methods, introduces the recent progress in the exploration of China's tidal silt characteristics in rock and soil engineering, combined reinforcement technology research methods, the combination of the developed new technology of deep soft foundation treatment hope can be applied to practical engineering.

1. Introduction

In China, soft soil subgrade construction of the road is a very important project, and in deep soft soil subgrade is also plagued by problems of road construction in china. Deep soft soil foundation is the road construction in the more difficult to deal with the type of roadbed, deep foundation generally refers to the depth of more than 15m, and in the 40~60m deep silt geological area is more common. The formation of deep soft soil foundation is directly related to the impact of rivers and lakes. In this foundation construction, it is required to take the relevant technology to deal with the roadbed. In the process of construction, soft soil foundation construction need to be improved constantly and control link, the development of China's construction technology, construction technology for soft soil subgrade in deep layer has also been developed rapidly. The development of this technology is to better promote the effective promotion of the quality of construction, has a very important significance for the healthy development of the construction industry.

In China's coastal areas with dense population and land scarcity, along with economic development, construction land increasingly tense, to ease the contradiction between supply and demand of land, the country set off a land reclamation and development of mudflat climax, in recent years, coastal sludge treatment technology has become a research hotspot.

Coastal mud and crust (silty clay or clay) under the silt with water content, low strength and compression characteristics of large, but the main difference is the latter has completed the self-weight
consolidation, the former did not complete the self-weight consolidation (even if the overlying recent filling). Beach silt is under the state of consolidation, and the engineering performance is even worse.

In order to meet the requirements of urban economic development and environmental improvement, in recent years, the municipal road construction of rain, sewage pipes and pipelines is set up. Built in the coastal area of the municipal road engineering has the following characteristics: (1) the settlement of rainwater and sewage pipelines on the roadbed settlement and the different requirements than the general sections of the highway; (2) the deep buried rainwater and sewage pipes, in the excavation of the buried pipeline pipe must ensure the stability; (3) is located in the coastal area the municipal road high embankment. Therefore, the municipal road engineering for subgrade treatment put forward higher requirements. Soft foundation treatment has become an important factor to control the quality, cost and schedule of the project.

2. Processing methods and problems of conventional deep soft foundation

2.1. Drainage Consolidation
Drainage consolidation method usually refers to the building before loading a certain amount in the construction site, when the soft soil depth is relatively large, inserted in the ground vertical drainage pipe, so it can effectively make the vertical drainage pipe and water drainage pipe on the square to mix together, to form a complete drainage system, which can effectively promote the foundation of water can be effectively discharged, so it can make the soil strength is effectively enhanced, which also makes the foundation shear strength of the foundation to the stability and safety of effective improvement has been strengthened to a certain extent. In such a case, it can effectively prolong the service life of the foundation and reduce the settlement of foundation in the process of use.

Drainage consolidation method does not require the construction process very difficult in the process of construction, the construction technology requirements are relatively low, in the building does not require high cost of the construction costs, this technology has been developed very well in a very long time, there are many successful cases, but need a lot of a period of time, in the process of consolidation of so, in order to better ensure the quality of construction, the construction period must have enough, for some relatively short construction period is not very suitable for engineering. Because in order to ensure the construction cycle is to sacrifice the quality of construction, to ensure the construction quality, construction time cannot be effectively guaranteed.

2.2. Cement mixing pile
Cement mixing pile method, is in the process of the construction of cement as a curing agent, then mixing machinery will be the foundation of soft soil and cement in accordance with the relevant standards and requirements of the construction of soft soil mixing improves the hardness effectively, more able to meet the strength requirements of the construction, with good integrity and the water stability of soil structure of cement mixing piles and piles to form a composite foundation structure, so that the overall strength of foundation bearing capacity and to continue to strengthen.

Generally speaking, divided into dry and wet cement mixing pile method, the dry water in the relatively high rate of soft soil and reinforcement can play a very good effect in many developed countries, this technology has been widely used, but in our country the construction of this technology has not been widely used but, in the construction of the performance and the effect is not very good, in the construction process is difficult to control for factors of the construction environment, the mixing quality is relatively large, so the quality is not guaranteed, many regions have stopped using the construction technology by constraints on relevant technical factors, in recent years. The construction industry continues to develop, so a lot of construction projects, the construction period is greatly reduced, so the reduction of the wet in engineering construction instead of the dry, is widely used in the whole of the reinforcement construction.
2.3. **Cement fly ash gravel pile and low-grade concrete pile**

Because of the poor pile integrity of cement mixing pile, the depth of reinforcement is not large enough, the treatment effect is worse in the coastal mud layer, CFG pile and LC pile composite foundation is gradually to be popularized and applied. CFG pile is made of gravel (stone debris), fly ash, cement and water mixing pile, the strength of the pile in C5 ~ C20. LC pile is developed on the basis of CFG pile, the pile body material with sand instead of the CFG pile of fly ash, LC pile of strength grade in C10 ~ C20. Compared with the cement mixing pile, pile CFG pile and LC pile stiffness and strength of large, pile-soil stress ratio, pile cap, which must be with the cushion of rigid composite foundation.

At present, our country uses a lot of building construction are vibrosinking pile, the construction will appear in the process of squeezing phenomenon is very obvious, this phenomenon will make the pile tilt phenomenon obviously, even the pile body fracture, the surrounding people housing quality has a great effect very large. In the process of subgrade will also appear the phenomenon of instability, affecting the stability of the roadbed, which also makes the entire road construction quality is greatly reduced, so in order to be able to effectively control this phenomenon, must give reinforcement, pile setting appropriate length at the same time, in order to improve the roadbed the stability, but also in the construction process of the construction of back berm, pump pressure bored pile can reflect the very good effect and can effectively control the squeezing effect, at the same time, but also reduce the construction process of the construction of the noise to a great extent, but the cost of this construction method in the process of implementing consumption is relatively high, very requirements in the construction technology is strict, so the application of the width and brightness are relatively small.

3. **New development of deep soft soil treatment technology**

3.1. *Development on the basis of traditional drainage consolidation method*

Reinforcement technology of drainage concrete cored sand gravel pile. Concrete cored sand gravel pile composite pile by precast reinforced concrete core pile and gravel pile core shell wrapped in the composition of the composite foundation with piles and cushion. Precast reinforced concrete pile as a vertical reinforcement, sand and gravel as the vertical drainage body, gravel cushion or sand cushion as the horizontal drainage, the pile load as a compression system. This method can accelerate the dissipation of pore water pressure in the foundation through the consolidation of the foundation soil, the pile compacting consolidation within the scope of control settlement after construction, improve the bearing capacity and stability of foundation. Long board short pile method. Long short pile method is the use of plastic drainage plate and long short cement mixing pile foundation, long plastic drainage plate to drainage consolidation effect, can improve the bearing capacity and stability of foundation in the short term short cement mixing pile, make up the drainage consolidation problem of long duration, speed up construction.

3.2. *Based on the traditional cement soil mixing method*

HAS Soil solidifying agent mixing pile. HAS soil firming agent is a kind of high strength and water resistance of cementitious materials, instead of mixing cement and soft soil, has the early strength of steady growth, high long-term strength, water resistance, corrosion resistance, good durability, with micro expansion, dry shrinkage, easy cracking and other advantages, basic construction method and traditional cement mixing the same pile, pile strength and pile body integrity is obviously superior to the traditional cement mixing pile, the cost is slightly lower than the traditional cement mixing pile. Concrete core cement soil mixing pile. Concrete core soil cement mixing pile is the soil cement mixing pile, cement soil before the initial setting, by pile machinery will be rigid solid pressure into the soil cement pile body, such as cement, precast reinforced concrete core pile and cement soil interaction under the upper load, the construction method for pile improve the integrity of the cement soil mixing pile.
In summary, the deep soft soil subgrade is common in coastal areas in China, this kind of foundation is more complex, but also a major difficulty in this construction, foundation construction, need to do the subgrade treatment work, first in the development and processing of better tidal silt before construction to increase the strength of the soft soil foundation, but also increase the stability the foundation of structure, cost and cost control project. For deep soft soil foundation, the construction personnel to the relevant technology, the foundation reinforcement and condensation, so as to achieve the requirements of road construction. This paper discusses the technology of deep soft soil subgrade treatment and the development process, hope that through these contents can effectively guarantee the quality of foundation, so as to improve the overall quality of road construction.

4. A Case studies
Subgrade treatment is the foundation stage of road construction, but also an important part of the construction, the author according to the example of a road construction, the process of deep soft soil roadbed in detail. A coastal city, due to the requirements of the municipal construction, the need to expand the road, due to the lack of land resources in the city, it is necessary to carry out the construction of the road by the sea. Road construction in the seaside can not only ease the shortage of urban land resources, but also expand the area of urban roads, to bring some convenience to the road.

The soil is very special, its foundation is generally deep soft soil foundation, which also gives the road construction has brought great difficulties, the need to improve the skills of the construction personnel, strengthen the consciousness of road safety. Will the land transformation of the city road, need to develop the beach, the beach due to high water content and silt, silt strength is very low, but also has greater compressibility, so this condition must be on geological foundation reinforcement treatment in mining process. The project in the deep soft soil subgrade treatment, faced with the following problems:

The seaside city general rain is more sufficient, but in the process of road construction in construction, in the dry environment so in the treatment of deep soft soil foundation, to avoid the rainy weather. Road subgrade treatment process, but also pay attention to the sewage pipe wiring problems, if these are not ready to do a good job, it will cause the problem of foundation settlement. Coastal road construction on the foundation of the quality of the higher requirements, so, in the construction must be done before the accurate work, to avoid the weather, pipeline layout and other issues on the construction of the impact.

In the process of road construction, to control the rain and sewage pipe laying, these factors affect the stability of pipelines, but also affect the quality and safety of road construction. In the process of beach treatment, to prevent the invasion of rain, but also to prevent the laying of sewage pipes too deep. These issues to consider the overall level of the construction unit is also a test of the experience and technical level, so, construction managers must work in the usual accumulation of experience, and constantly improve the technology.

The process of development in the development of the beach, the road embankment must choose in high position. Beach is an important land resource in the coastal city, it is not only a relatively large area, but also a relatively good location condition. The establishment of the municipal road on the beach, must choose good fill position, otherwise it will affect the quality of road construction and the foundation of quality.

5. Conclusion
The reclamation and construction projects in the implementation of beach in the city in view of the unique properties of silt tidal flat so above the municipal road construction project must first on the beach was used for the treatment of scientific and rational, long-term and effective to beach, or deep thick soft soil foundation reinforcement, which can meet the setting the construction of municipal road construction foundation requirements to improve foundation stiffness, strength and stability so as to ensure the construction quality of the foundation to improve the quality of the municipal road engineering purpose. During the development of tidal flat, the treatment technology of deep and deep
under consolidated silt which is encountered in the municipal road construction has become a hot research topic in geotechnical engineering field. The new method is to explore the achievements in engineering practice, but the application is wide enough, the accumulated experience is not enough, there is the theory behind the practice of the problem. The hope project construction, design units, research institutions cooperate closely, make this new technology more mature, more widely used.

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