

Emergency Plan and Suggestion for Foundation Pit Support

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Abstract

According to the hydrogeological conditions, construction characteristics and natural environment conditions of the project, a rigorous and effective monitoring system is set up for similar emergencies, such as landslides and water gushing, which may occur during the construction process, and the pre-control work is well done. Once the emergencies occur, emergency measures are taken immediately to prevent the development and expansion of the accidents. Once an accident occurs, the loss and social impact of the project will be much greater than that of the general construction. Scientific management methods, the whole process, all-round analysis, control, supervision and treatment of various risk factors, to ensure the safety of the project.

Keywords

Foundation Pit Engineering; Emergency Plan; Deep Foundation Pit; Emergency Material.

1. Introduction

According to the hydrogeological conditions, construction characteristics and natural environment conditions of the project, a rigorous and effective monitoring system is set up for similar emergencies, such as landslides and water gushing, which may occur during the construction process, and the pre-control work is well done. Once the emergencies occur, emergency measures are taken immediately to prevent the development and expansion of the accidents. Once an accident occurs, the loss and social impact of the project will be much greater than that of the general construction. Scientific management methods, the whole process, all-round analysis, control, supervision and treatment of various risk factors, to ensure the safety of the project.

2. Emergency content

Once an accident occurs, the loss and social impact of the project will be much greater than that of the general construction. Scientific management methods, the whole process, all-round analysis, control, supervision and treatment of various risk factors, to ensure the safety of the project. For this reason, the construction unit should compile the following emergency contents for the construction of the retaining structure and foundation pit excavation of the project:

- (1) Quicksand appears at the bottom of the pit.
- (2) Longitudinal slope instability landslide of foundation pit;
- (3) Upheaval of pit bottom;
- (4) Excessive displacement of retaining structure of foundation pit;
- (5) Defects of enclosure structure lead to water leakage, soil gushing and sand blasting in the excavation stage of foundation pit.
- (6) Non-uniform settlement and dangerous deformation of surrounding buildings.

3. Emergency plan

- (1) Quicksand appears at the bottom of the pit

A. Stop Excavating Foundation Pit

B. Backfilling earth to suppress quicksand

C. To analyze the causes, we should formulate further countermeasures: take remedial measures for precipitation in pits, reduce the groundwater level and prevent the occurrence of quicksand. Put sheet pile close to the enclosure structure into the bottom of the pit. Increase the depth of enclosure, reduce hydrodynamic pressure and prevent quicksand.

(2) Longitudinal Slope Instability Landslide in Foundation Pit

A. If the slope is too steep, the slope should be slowed down when the slope is repaired.

B. Strengthen the surface drainage around the foundation pit and take effective measures to prevent surface water from intruding into the foundation pit.

C. Take remedial measures for precipitation inside and outside the slope.

D. Before repairing the slopes of landslides or landslides, temporary support should be done outside the foot of the slope, then the slope should be repaired according to the safe slope gradient, and the work of slope protection should be done well.

(3) Bottom heave

A. Setting up monitoring points for settlement outside foundation pit.

B. Loading in the pit or inserting sheet piles along the periphery of the pit to prevent external soil from squeezing into the pit, and dewatering treatment of the pit bottom soil.

C. To reinforce the foundation soil of the pit bottom according to the actual situation, and then dig to the elevation.

(4) Excessive displacement of retaining structure of foundation pit

A. Stop excavation immediately, install temporary support close to the soil surface in weak parts, and control the continued displacement of the enclosure structure.

B. According to the monitoring report and displacement situation, find out the reasons for the displacement of the enclosure structure, and formulate specific countermeasures. The foundation pit shall be excavated when the pre-dewatering at the well point in the pit reaches the dewatering depth, and the soil reinforcement inside and outside the pit reaches the age or design strength; the excavation principle of sublevel, stratification, subdivision and time-limited excavation shall be strictly implemented, and the excavation principle of time-limited support in place shall be implemented.

(5) Defects of enclosure structure

A. If the leakage point is limited above the excavation surface and the leakage is not large, it is advisable to use double-fast cement grooving and pressure injection polyurethane method to plug it.

B. If the leakage point is confined to the excavation surface and the leakage is not large, it is advisable to enter the drain pipe at the leakage point and seal the drain pipe with steel pipe and double fast cement. The valve of the drain pipe should be closed after the strength of the surrounding sealing material is reached.

C. If the leakage point extends from the excavation surface to below the excavation surface, double grouting should be injected near the leakage point outside the foundation pit. The grouting should be controlled by pressure, and the maximum pressure should not exceed 0.3Mpa.

D. If the leakage point extends from the excavation surface to the excavation surface and the flow rate is large, polyurethane should be injected near the leakage point outside the foundation pit after local backfilling in the foundation pit to reduce the flow rate.

E. If the seepage point is unknown and the water gushes upward from the excavation surface, the excavation should be stopped immediately, and the local backfilling should be stopped until the seepage stops. Then the above-mentioned measures of double grouting outside the foundation pit should be adopted.

F. If the seepage flow is turbid and the seepage time is long, attention should be paid to the possibility of serious soil loss and voids near the seepage point. At this time, the approach of heavy machinery should be strictly prohibited, and the vibration tube grouting method should be used immediately to fill the voids.

(6) Non-uniform settlement and dangerous deformation of surrounding buildings.

A. Stop precipitation or control the level of precipitation.

B. Recharge wells should be adopted.

C. Take other measures, such as grouting on the side with large settlement.

4. Emergency materials

(1) Yellow sand: After the abnormal displacement and deformation of the surrounding buildings occur in the foundation pit construction, the remedial measures often involve backfilling with yellow sand in detail. Therefore, yellow sand will be reserved in advance at the site, and nylon bags and bagged sand will be prepared.

(2) Section steel: After the displacement and deformation of surrounding buildings and the displacement of supporting structure are abnormal, the deformation and displacement of foundation pit can be reduced by erecting support in the foundation pit, and the situation can be prevented from deteriorating further. H-section steel and angle steel should be reserved in advance.

(3) Generator set: In the process of foundation pit dewatering construction and foundation pit alarm and rescue, in case of power failure, standby generator set should be started to ensure normal power supply. The power and other parameters of the generator set should meet the field requirements.

(4) In addition, we should spare enough welding machines, cranes, excavators and other equipment related to emergency rescue of foundation pits.

5. Seasonal construction measures and emergency plans

Construction face should not be too large in rainy season. It should be completed by stages and stages. When excavating, the thickness of 20-30 cm should be reserved for demolition before construction cushion.

The construction in rainy season should keep abreast of meteorological changes at any time, ensure smooth transportation roads during rainy season construction, check the stability of soil walls and supporting structures in rainy season, and continue to work under the condition of ensuring safety.

In rainy season, it is necessary to check the sensitivity of grounding and zero connection protection devices of electrical equipment. Double protection measures (leakage protection and insulating labor protection tools) should be adopted when using electrical equipment and electric tools in rainy season. Attention should be paid to check whether the insulation of electric wires is good, whether the joints are good or not, and not to immerse the wires in water.

For the distribution boxes of machinery and equipment, measures should be taken to ensure the safety of electricity consumption in rainy season, while for motor vehicles driving in rainy season, attention should be paid to anti-skid, and stopping devices should be used for unloading materials beside the foundation pit.

Vehicles entering and leaving the construction site should be kept clean and clean. Municipal roads are often polluted by strong convective weather such as gale and thunder in rainy season. Wind and lightning protection measures of various machinery and equipment should be carefully checked.

Do a good job of slope inspection to avoid rain erosion; do a good job of pit bottom drainage ditches, catchment wells layout to ensure timely and smooth drainage of rainwater. Before construction in rainy season, it is necessary to investigate the setting of drainage ditches in surrounding areas. When the drainage ditches are close to the pit edge, reinforcement and water retaining measures should be taken.

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