Application of prestressed concrete technology in construction of civil and civil engineering

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Abstract: in the construction of the industrial and civil works, Steel member stiffness is low, Low Concrete strength, The problem of poor concrete cracking is more frequent. Pre-stressed concrete technology appear, The provides a good technical condition to further reduce the occurrence of the above problems. This article mainly from the prestressed concrete structure overview As the starting point, Combining Project Cases Analyzing concrete application of prestressed concrete technology in engineering projects, discusses the phase off protect and monitor, In order to improve the overall quality of the project to provide some the Reference and comments.

Keywords: Civil Engineering; prestressing; Concrete

1. Technology quotes

In recent years, as the city scales up, The number of building works is increasing, The construction process and quality requirements for buildings are higher. prestressed concrete Technology is an important part of building construction system, is an important construction link, so, The Construction Unit should reinforce this link to the importance of. in civil engineering construction, General reinforced concrete has obvious disadvantages, while prestressed concrete technology can make up for the general Pass Reinforced concrete disadvantage. This technology has saving material, Reducing construction time, To improve Concrete member stiffness and concrete strength, widget used for long time, reduce deadweight, anti Good press, anti-strong advantages, is therefore widely used in the field of construction engineering. especially It is an application of architectural components and structures, the has a positive effect on improving the overall quality of building construction with the.

2. Overview of prestressed concrete Structures

2.1. prestressed concrete Structure

For prestressed concrete design ideas, The mainly adds high-strength rebar to the mix condensate materials together, Use external forces exerted by prestressing to promote concrete members Get enough load. The purpose is to reduce the tensile stress of concrete members, reduce blending coagulation crack occurrence. Increasing stiffness of concrete members, is grouped by structure type, Three. First, full prestress. Second, partially prestressed. its three, non-sticky knot prestress. According to the construction method, can divide prestressed concrete into first pouring coagulation soil, Precast concrete etc. The is in the form of a tensioning, and is divided into two. One is the first method, two is after tensioned. in concrete construction, to select the appropriate construction method, to Achieve expected quality and usage.

2.2. Advantage Analysis

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compared to ordinary concrete technology, The advantages of prestressed concrete technology are more obvious explicit. The is mainly embodied in the following areas: first, Increase stiffness of concrete members. on, body construction, Anti-cracking problems with artifacts are common. The reason is the component bearer capacity binding with prestressing, to ensure that the widget remains in a stable state. second, reaching section effect on material charges. combination of high-strength materials can not only save material to log, can further reduce the Component section area, To reduce construction units unnecessarily economic losses, finally achieving the goal of improving the economic efficiency of construction projects. last, mention High building shear performance. using prestressed concrete technology and prestressed structure both increased construction shear pressure area, to improve overall stability and shear of buildings Host Performance. After the prestressing structure is unloaded, to highlight the closed work of the building will be huge. to reduce structural distortion, Increase build anti-fatigue strength, reduce stress on steel bars ring Amplitude, Increase the service Life of steel bars. compared to ordinary reinforced concrete works, The properties of prestressed materials can be fully played. inaddition to, prestressing coagulation earth can increase the seismic performance of a building to some extent, to reduce earthquake Harm.

3. Engineering Overview

3.1 Project Case

a high-rise commercial building, total area is 64080 m2. where, ground 20 six level, Three layers underground. combined with architectural reality, Project Department decides to take the Cast-in-place box frame shear

Wall structure. based on the use of the building, base backplane and first level to 10 Two-storey frame beams with post-tensioned unbonded prestress respectively, back Zhang () Bonded prestressing technology.

3.2. Construction Difficulties

For the underlying backplane feature, The number of prestressed tendons in the backplane layer is more, but spacing smaller. The prestressing tendons on the upper plate of the column are more densely distributed, quantity up to root. base backplane thickest up to 1250 mm. Therefore, the construction difficulties of this construction project are in advance Force reinforcement Tji to grasp the page order, The linear control of prestressed tendons.

3.3. Concrete application of prestressed concrete technology

First, combines T Path actual situation, to further improve the stiffness of the widget, To resolve material, reducing deadweight, increases the durability of the structure, requires a high intensity of material, from and reduce the amount of steel bars, to save steel while reducing component section size. due to T The difficulty coefficient of the linear control of the process prestressed tendons is greater, This is required in the T Reducing vertical shear of concrete beams in, to control the web thickness of the beam. take pre Stress Concrete technology should follow the following principles: First, Scientifically Reasonable mix soil. before The expanded prestressed concrete application T Job, should reasonably arrange T Shun preface. Its purpose is to avoid prolonged bursts of leakage or to cause cracks in the base too large. in the design mixcondensate application T Scenario, Focus on the design of concrete structures and the thickness of cast-in-place slabs degree, steel position and thickness of steel cover are the key factors to consider. steel position design and rib position design T for, should be staffed with professionals, then forward High concrete pouring apply T the quality, reduces the occurrence of a stepping case. Its purpose is to reduce The use of high-strength concrete, ensure concrete quality, Increase build strength, reduce steeltendon prestressing loss. before strengthening and stabilizing concrete structures, designers should stipulate and clear the number of prestressing tendons, and make appropriate additions and deletions, especially prior method. The bond strength between the prestressed steel bar and the concrete should be up to the specified in scope. prestressed concrete should have a good plus T performance. Concrete strength to high, Ensuring the full use of prestressed reinforcement. second, Note coagulation soil pouring problem. to ensure
that the reinforcement position is correct by elevating the concrete pouring of the building. T key elements of overall quality . in specific T in , If the location is found to be biased move , should expand the adjustment in a timely manner . corrects the rebar position to the correct position , and then guaranteed to buildBuild the stability of the main structure . The main girder structure position has more steel number , distributed secret set . A large number of irregular bars will increase the concrete pouring. T Difficulty . This will be need to be combined with architectural reality , Select the appropriate concrete vibrating method and pouring construct . For example Select Cement Mix fine stone , to Person T Vibrating to expand a coagulation Earth Vibration , to ensure the correct position of rebar .

Second , design of steel structure . in construction , steel structure design works particularly Important . should be based on the actual situation of the construction of steel structure design , in design should focus on the load action of prestressed concrete structures and the use of the overall structure Can . at the same time , in construction phase , Construction Unit needs to strengthen acceptance concrete structure strong degree , controls stress on concrete materials , to lay the groundwork for later construction .

last , Anchor Construction Application . for assembly of assembly parts of concrete , have explicitly specify , Its design strength must not be less than 40%. Concrete design strength is not low to 75%. vertical prestressed pipe section , Select weld-resistant iron tube . during installation procedure , Check the connector position in time after installing the pipeline . in particular import and export paste will be to be sealed with special tape . Its purpose is to prevent the slurry from clogging . the pipeline is blocked, affects the paste effect . tensioning construction , Check to see if threaded bars are pulled off . If there is a solder joint , indicates that the welding has been injured and reinforced in the welding operation . This need to be installed before the threaded bars , Check to see if the welding equipment is intact .

3.4. related protection and monitoring measures
prestressed concrete construction , Construction personnel should be responsible for awareness and self-protection Awareness . especially in vibrating concrete , should be kept at a certain distance from the pipe , no to only hold the pipe, to avoid pipeline offsets , to increase pipeline and rebar friction . in addition to, Need to focus on the quality of concrete casting and pouring., do prestressed coagulation Soil Maintenance . for concrete curing methods , mainly includes two kinds of . One is from then maintenance ; Two is steam maintenance . generally under ambient temperature , with Natural conservation method , maintenance 28 Day . Steam maintenance means maintenance on a pedestal . affected by outside temperature Change effect , the prestressing steel Bar expands . But the console temperature has not been affected by to ambient temperature changes , The temperature difference between the prestressed steel bar and the pedestal is greater , from ( up page page )

keel can be reused if 10 times ( approximately 4 one 6 Year , and common wood life short , more Change Fast , cause forest consumption is large , causes great damage to forest resources ; and Steel-wood The keel solves these problems extremely well , service life at least 4 year , and Sawdust and scrap all used for charcoal processing , make The most of the resources, minimize resource consumption , saves Forest resources , to protect forest resources .

WPC Templates for easy construction , easy to clean up , field scrap clutter is significantly reduced ; now Farm All wood-plastic sheet breakage , plate , Useless plate clean up after the factory reached 100% Recycle , do not pollute TJ See field , does not pollute the environment , onsite Green color Construction requirements .

Steel Wood side due to its high turnover , There is no damage to the wood item base wood , after use complete return to the lease manufacturers , to apply T Field , has no for the surrounding environment affect , pollution-free , and no material waste .

3.5. can swing Steel road
apply for traditional projects T temporary roads generally use concrete hardened pavements , Road Surface hardened after maintenance can be used by the master . A section of a Wood project with a T section with steel
Plate road instead of hardening, after laying steel, can slightly mitigate the temporary installation to items T period effects. In addition, steel pavement can be used as a turnover, Green.

to cause prestress loss. to prevent this from happening, need temperature difference manual. When the concrete is not fully hardened, Expand Concrete Curing. knotrelated experience See, Concrete strength to 8MPa or tenMPa above, is the best time to control the temperature difference between concrete and pedestal. other than, also need to overwrite Concrete cast members. during maintenance, rain weather, should be done in time measures. such as building a canopy, Avoid rain effects on concrete; To ensure that Protect concrete strength.

4. Epilogue

Compared to plain concrete, The advantages of prestressed concrete are more pronounced, in T dab T apply more. with t dab t Number of threads increased, prestress increased use of concrete. This needs to be applied t personnel in concrete apply t in, focus on prestressed concrete proportions, Concrete Placement T Program, and Inventory The number of pre-tendons, Concrete Curing Management, on site technology management, and so on, and then from improve overall building quality, And give full play to the prestressed concrete technology apply effects and use features. in a later t min min t Process, also required for pre Force Technology to enhance research innovation, make it play a greater role.

5. Conclusion

Construction is the pillar industry of the national economy, Implement green apply T, Development can be held continue, follow bad reuse, Minimum energy consumption T Technical Imperative. Green apply T push line, Its root tree is to admin, Benefits for technology and savings, in creating environmental benefits at the same time, convert it to economic benefits, Social benefits.

References: