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Review Article

Discussion on the Application of Post-pouring Belt Construction Technology in Building Construction Processes

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Abstract: In recent years, with the rapid development of modern social economy, the urbanization process has continued to grow, and with it, so as to the demand for housing construction in urban areas. From the development perspective of construction projects, the construction involved would not only has to have a strong structural quality, but attention is also needed in the overall quality of the building. In this, a reasonable introduction of post-pouring belt construction technology in the building construction process can effectively control cracks in concrete structures. This article takes the post-pouring belt construction technology as the main research object and focuses on its application in the housing construction process, which has shown to provide better assistance in aiding construction.

Keywords: *post-casting belt construction technology; housing construction; application*

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0 Introduction

Usually, the process of implementing the construction of a building is easily affected by construction-related problems that increase the probability of cracks in the concrete structure. To avoid these problems, it is necessary to rationally apply the use of post-pouring belt construction technology. Through the application of this technology, the construction cracks can be set up rationally where the structures are first separated temporarily, and after the structural expansion and contraction phenomenon, the use of concrete within a specified time to effectively fill the construction cracks will enable the separated structures to connected to each other and finally, leading to the formation of the whole structure. Therefore, it is of practical significance to study and analyze the application of post-pouring belt construction technology in the process of building construction.

1 The specific application of post-pouring belt construction technology in the housing construction process

In general, there are three types of post-pouring belt construction that mainly include post-pouring temperature belt, post-pouring subsidence belt, and post-pouring telescopic belt, of which can be used to solve the problems of shrinkage deformation of reinforced concrete and differential settlement of post-pouring belts. It should be noted that these types of post-pouring belts have many deformation joint functions, as such only one function should be emphasized in design while the other functions should be used as an auxiliary[1]. After the completing the construction of the main structures, the finished concrete will then not only able to solve the differential settlement problem of the high-rise main building and the low-rise podium but also circumvents the setting of the permanent deformation joints.

1.1 Structural concrete pouring

In the process of pouring concrete, it is necessary to complete the operation according to the specified requirements, especially in the thickness of concrete pouring. The construction workers are required to control the thickness, carefully in avoiding excessive concrete pouring, so as to avoid the convexity of the

steel mesh formwork. In the concrete construction aspect, the vertical construction seam of the steel wire mesh formwork should be used in the process of pouring or vibrating the concrete. The construction operator should emphasize on the thickness of the pouring and effectively control the distance between the wire mesh formwork and the vibrator. To prevent the loss of water slurry, it is necessary to use a professional vibrator to vibrate, and the distance between the template and the vibrator is required to be no < 40 cm[2].

1.2 Concrete curing

After the concrete is poured, it needs to be cured within a specific time frame, especially in the aspect of local curing. As long as a cloth is covered on it, watering and curing works can be performed. At the same time, temporary guardrails should be placed around the curing in preventing possible man-made trampling or contamination by steel bars[3]. After dismantling, it is necessary to apply professional curing liquid in a timely manner to prevent dead ends and blanks formation. After sealing and before belt pouring, to ensure for structural safety, the formwork support should be retained and not be removed if possible. Temporary curing work on both sides of the post-casting belt should be actively carried out and also ensure that no construction equipment is placed in the surrounding area, as well as prohibiting the piling of construction materials[4].

1.3 Waterproofing basement outer wall by post-pouring belt retention

During the implementation of the external wall steel reinforcement construction, it is necessary to properly arrange the steel plate water stops, separate the column welding stirrups at the steel plate, and weld a short steel bar to the position of the water stop plate and the vertical ribs of the shear wall[5]. Subsequently, a double layer steel mesh binding operation was carried out in reinforcing the steel bars. Concrete is first poured to one side of the steel mesh and after the outer wall of the shear wall was closed and reinforced, additional concrete is then poured on both sides of the post-pouring belt.

1.4 Floor surface post-pouring belt construction

The post-pouring belt formwork should be supported independently. The flooring steel bars should be tied with short steel bars welded onto the bottom ribs reinforcement bars as well as the plate surface. A double layer steel mesh should be tied at the position of the steel bars. To begin with, concrete is first poured to one side of the steel mesh. Subsequently, concrete is then poured on both sides of the post-pouring belt. Thereafter, concrete residue from post-pouring belt needs to be effectively cleaned up[6]. On this basis, the concrete on both sides of the post-poured belt can be cured, and the operation of the formwork is, therefore, completed leading to the protection of the reinforcement steel bars.

1.5 Basement floor post-pouring belt concrete pouring

Cleaning and chiseling should be performed on the concrete interface to adjust the steel bars and to remove rust. It is also necessary to drain the water from the post-pouring belt and to complete the installation of water stop belts or strips[7]. In addition, a mortar with the same strength as the post-pouring belt is placed at the interface of the concrete, or with a treatment, agent is applied to the concrete interface on the basis of carrying out post-pouring belt concrete construction and curing operations.

1.6 Waterproofing basement outer wall by post-pouring belt concrete pouring

First, clean the interface of the concrete pouring, straighten the reinforcement bars, and conduct timely rust removal work. Thereafter, water stop belts or strips are placed and treated, sealing the post-pouring belt formwork, simultaneously strengthening the reinforcement. On this basis, it is necessary to wet or water the formwork. Subsequently, the post-pouring belt concrete pouring construction work was completed.

1.7 Floor surface post-pouring belt concrete pouring

It is necessary to first deal with the interface of the concrete pouring, and systematic inspection should be made in regard to the rigor and reliability of the existing formworks. At the same time, it is also necessary to effectively adjust the post-pouring steel bars and carry out rust removal work. On this basis, it is also necessary to pour concrete onto the post-pouring belt and actively carry out curing work.

2 Effective paths in improving the construction quality of post-pouring belt

2.1 Emphasizing the quality of concrete materials

In the process of selecting the construction materials for the post-pouring of a building, the structural features should be considered comprehensively, and concrete materials that do not shrink should be selected as much as possible. When the concrete material is mixed, the water reducing agent and the admixture are added to ensure that the concrete mix ratio is up to standard[8]. In addition, the concrete should be vibrated in a timely manner to ensure the continuous improvement of the strength of the post-pouring structure. At the same time, the construction should be carried out in combination with the construction plan to optimally control the lateral pressure of the formwork, which is in line with the project requirements[9]. On this basis, the quality of concrete construction is also very important. It is necessary to avoid the products that are not up to standard in the construction site, and emphasize on the role of vibrating, optimize the location of the concrete formwork of the facility, and rationally adopt the vibrating tool to reduce the problem of concrete losses.

2.2 Managing the construction area of the post-pouring belt

Due to the differences in the shape and structure of each building project, in-depth analysis in consideration to the construction conditions with regard to the setting-up of the post-pouring belt should be performed. Construction work can only be carry out when the construction requirements and positions of the post-pouring belt are consistent. In the process of setting-up the post-pouring belt, the construction company should attach great importance to the construction unit and ensure that the middle distance of the post-pouring belt in relative to a rectangular building is maintained between 30 and 40 m. In terms of setting the width, the analysis should be carried out on the structure of the building in understanding the specific conditions of the construction site, and try to maintain the width between 700 and 1000 mm[10].

2.3 Managing the pouring time

It is well known that there are large differences in the types of post-pouring belts, and thus, the time used in pouring is also significantly different.

a) Post-pouring settling belt: The use of such post-pouring belts in high-rise buildings is common, especially in building foundations and podiums. On the settling of the foundation, promptly carry out the post-pouring settling belt pouring construction work. As for the determination of the pouring time needed by the post-pouring settling belt, construction processes and their respective costs should be comprehensively analyzed, and the pouring construction work should be carried out in accordance with the specific needs of the construction.
b) Post-pouring shrink belt: In a long-term process, after the construction of a concrete structure is completed, the building structure normally shrinks by about 50%. If the shrinking speed is much faster, then the building structure can shrink to 100%[11]. In such a situation, as far as the post-pouring shrink belt is concerned, the pouring construction work can still be carried out as long as it is within 2 months.
c) Post-pouring temperature belt: Due to the close proximity of the time needed for pouring between the use of post-pouring shrink belt and normal pouring, pouring operation is usually carried out 2 months later. In addition, the influence of numerous factors such as construction materials and climatic conditions will cause the pouring time of the post-pouring belt to be appropriately extended, but it must be carefully marked in the construction drawings.

3 Application points of post-pouring belt construction technology

According to the long-term application practice of post-casting belt construction technology, the deviation of post-casting concrete pouring is summarized and concluded, as shown in Tables 1 and 2.

In addition, it should be ensured that the connection effect of the main ribs of the post-casting structure in the seam remained connected. If it is necessary to disconnect, ensure that the length of the main rebar

Table 1: Concrete casting axis position, section size, and surface leveling deviation

Concrete pouring project	Acceptable deviation
Axis position	5 mm
Section size	Plastering: +8 mm, −5 mm; no plastering: +5 mm, −2 mm
Flat surface	Plaster: 8 mm; no plastering: 4 mm

Table 2: Deviation table of the centerline position of the reserved concrete pouring hole and the centerline of the embedded facility

Description	Acceptable deviation
Reserve centerline position	15 mm
Embedded centerline facility	Embedded parts: 10 mm; pre-embedded tube: 5 mm; embedded bolt: 5 mm

overlap exceeds 4 times the diameter of the main rebar. It should be noted that the joints should be staggered, and additional steel bars should be added according to the specific design requirements. After the completion of the post-pouring concrete construction work, the post-pouring belt is to be covered for 12 h emphasizing on the effects of curing[12]. It is also necessary to comprehensively test the strength of the post-pouring belt, the strength of the concrete and possible leakage occurring from the post-pouring belt, and concrete test samples are reserved in advance to provide necessary safeguards for the inspection work.

As for the use of post-pouring belt technology in building construction, it is necessary to ensure compliance with the construction standards and effectively avoid the occurrence of related problems. Furthermore, it should also be noted that the materials required for the construction of the post-pouring belt will have a decisive influence on the construction quality. To this end, before construction, the construction company should also make reasonable choices for raw materials, actively carry out professional inspection work, and provide the necessary protection for improving construction quality.

4 Conclusion

To sum up, applications the post-pouring belt technology in building construction projects are continuously expanding. Practical usage of the technology in the construction process enables the solving of differential settlement problem as well as in effectively avoiding the occurrence of cracks and deformation problems in concrete construction, which, in turn, significantly reduces the probability of temperature stress deformation. To this end, construction companies should emphasize on the importance of post-pouring construction maintenance and reconstruction works and continuously strengthen supervision and management in the course of practice. In addition, further optimization of the construction project should be performed to improve its quality and as such willing to extend the building construction period to ensure the smooth development of the post-pouring belt construction operations. The above specific applications and key points of the post-pouring belt construction technology in building construction processes are listed and discussed to provide a valuable reference for the construction of building projects.

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