Research on the Application of GRC Material in Exhibition Decoration Engineering

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Abstract: Glass fiber reinforced cement (GRC) is a kind of new building material which is based on cement and take the alkali resistant glass fiber as reinforcing material. It is mainly used in building decoration project and it has many advantages like environmental protection, economical, practical modeling and others. This paper mainly studies the concrete application of GRC material in exhibition building decoration project.

1. Introduction
In the construction of the construction project, the appropriate construction materials can make the construction process become more excellent, and can fully meet the specific construction needs of construction projects. The GRC as a new type of building decoration materials, which can effectively avoid many other weaknesses that the traditional cement and concrete has like the resistance are poor and they are difficult to deform, it also has been widely used in the exhibition building decoration works, and can ensure that exhibition building is on the basis of the use of functions, making its aesthetics to be further improved.

2. A Brief Analysis on the Application Advantages of GRC Materials in Art Architecture

2.1. Aesthetic Performance
Building decoration works need to involve the construction, mechanics, machinery and aesthetics and other disciplines, in recent years, with the continuous development of China's construction industry the GRC materials in the building decoration industry has also been more widely used, and able to give full play to the application of GRC material advantages in the architectural aesthetics.

The soft beauty of the GRC material is mainly reflected on its shape and strong features, through the GRC we can produce curtain wall, the curtain wall can be made directly as a single surface or hyperboloid and other forms, so that the overall performance of the building can be enhanced, and makes the shape of the building more colourful. The GRC material also has a certain masculine beauty. For example, in the process of building the Wuhan Revolution Museum, the design staff is asked to be combined with the history and culture, to make the building showing a feature of solemn, tough temperament. The use of large plates can make the decorative style of the museum become tough. And the size of the GRC sheet is not limited by the production process. Therefore, the use of GRC material in the process of museum decoration can splice out the masculine and the stimulation of the museum building [1].
2.2. Functional Performance
GRC material as a new type of building decoration materials, which has many advantages like high density, modeling ability, economic and environmental protection and fire performance and others, so in the existing building decoration works it has been widely used. With the continuous development of GRC materials, as well as the continuous improvement in the performance of admixtures, making the practicality of the material have also was improved on a certain degree. In general, GRC materials diversification products are mainly playing their own decorative role in different areas of engineering, and also need to play a certain artistic enhancement effect. In the process of decoration of modern architecture, GRC material because of the advantages of light with their own weight, it makes its construction process becomes more relaxed, in the field construction process it only needs some simple lifting machine will be able to complete Installation works, the transportation costs less, and make the construction cost of decoration decrease to a certain extent [2]. In addition, in some renovation works, through the high imitation ability of the GRC material, We can make the building facade shape, color and texture are effectively manifested, and not caused too much load to the original building, so in the building decoration the field has a very strong practicality.

3. the Application of GRC Materials in the Exhibition Building Exterior Decoration Works
The appearance of the structure of the building creation is the first aesthetic of the building, which is to create a building image and stimulate the senses of the first catalyst, so that in the exhibition building decoration design process, we also need to form a rich and varied visual space and architectural space rely on a simple and reasonable structure.

3.1 the Situation of the Application of the GRC Curtain Wall in the Exhibition Building Decoration Works
GRC material as a common modeling building materials, which itself can be molded into a variety of shapes and decorations. When the GRC curtain wall is doing the main building of the flexible docking, it will be able to fully play the architectural space of creativity and imagination of the designers, and to meet all the needs of the exhibition building decoration works, thus highlighting the landmark character of appearance of the exhibition building image.

In the process of decorating the external exhibition hall, the GRC curtain wall material composite by the special decorative layer, high-performance GRC layer and GRC ribs anda variety of other materials, so that it can effectively overcome the traditional shortcomings of GRC material Anti-cracking ability of the application, and can further enhance the decorative effect and shape size of the accuracy, so that its application performance has been greatly improved. In addition with the stone and glass curtain wall and other materials for comparison, high-performance GRC curtain wall also
has advantages like transformation high, less seam and other advantages. The strong transformation of the GRC material can directly make the various shapes and styles of curtain wall materials with the help of the advanced manufacturing technology; and through scientific product design and advanced connection technology, can also make GRC curtain wall material to make the number of the interchanges have been greatly reduced, and make the quality of the plate decrease to a certain extent, the plate width can even reach more than 20 square meters [3]. On the construction of the decoration for analysis, through the GRC curtain wall we can carry out the construction, it can be designed into a variety of decorative effects, such as imitation stone finishes, imitation wood trim. And can show a variety of effects such as clouds and ice flowers. Compared to the ordinary concrete decorative curtain wall, its decorations look more natural and colourful. Finally, analyze the performance. GRC curtain wall has good strength, density and durable line type, so applied to the exhibition building exterior decoration process, it will be able to fully meet the designers of environmental protection and energy saving and personalized material selection needs. In the existing exhibition building exterior wall decoration process, there are still frame structure, with ribbed structure and single-layer structure of three kinds of sheet structure, making the curtain wall design diversification have been further improved.

3.2 Analysis of construction technology

In the process of building exterior wall decoration works, the application of GRC materials to the curtain wall also needs to be involved in product design, manufacturing, on-site installation and surface maintenance and other four aspects of the work, which that the structure and connection as the most critical process. In the process of building exterior wall decoration, designers are required to complete the design of the curtain wall program, the design content mainly includes digital design, product design, the overall installation program design, plate segmentation and plate design, installation node support design as well as bear the steel structure design and other links. In the GRC curtain wall application of the exhibition building, so it has the characteristics of a large area, it can be digital three-dimensional technology to carry out the effective control of the production process, and GRC board shape, size and joint control of the normative and rigorous it have been a certain degree of improvement. After the application of the technology the construction error can be controlled within 3mm, to enhance the GRC curtain wall production accuracy and scientific. In addition, in the specific production process also requires the construction template surface is smooth enough and clean, and does not allow any water absorption, in addition to the joints and fixed bolts around the bolt also need to protect the situation does not occur the occurrence of slurry loss.

After the mold is finished, it is necessary to uniformly spray the mixed cement and the alkali resistant glass fiber onto the mold surface by means of a dedicated jetting machine, and then subjected to continuous compaction after a multi-layer uniform injection until it is got to the specified thickness of the design. After the curing and hardening, the mold release treatment was carried out. In addition, because the GRC boards production process is an one-time composite process, so designers and construction workers need to be in the actual production before the GRC board scientific retention, and then do a good job of production time control to ensure its durability.

In addition to the design of the construction of the GRC curtain wall panel, in addition to taking the appearance requirements of the building into account, but also need to take the performance of the joint material, GRC board size, structural deviation and the expected deformation and many other elements into account, In the process of the design of the specific joints also need to take appropriate control measures to avoid the joint sealant tensile damage and many other issues, which directly affect the construction of the external walls of the construction performance. In general, the performance of the sealing material will directly determine the width of the joint and the depth of the sealing material at the seams. When the joint width is in the range of 13 to 25 mm, the filling material of the sealing material needs to be controlled at 7 ~ 13mm or less, if the width of the seam more than 25mm, it is required to fill the depth is above13mm [4].

In the process of curing the GRC curtain wall, it can be covered by a viscous film, and then a
professional spray-type curing agent model for moisturizing conservation, but the specific conservation effect also needs to be affected by external factors, also requires related maintenance personnel can carry out a reasonable choice of conservation measures based on the exhibition building around the temperature changes.

4. The Application of GRC Materials in the Exhibition Building Interior Decoration

GRC ceiling boards with a mild high, good rigidity and flexibility and other application advantages, it can also begin to meet the designers’ needs for the ceiling of a variety of modeling. In addition, the GRC ceiling board is used to carry out the interior decoration process of the exhibition building. It also has many advantages such as flexible construction, short processing period and green environmental protection. Therefore, it can further to enhance its economic benefits fully on the basis of meeting the aesthetics and functional requirements of the interior decoration of the exhibition building.

Through the large size and texture effect of the ceiling plate application model, which can make the exhibition hall interior decoration appearance outstanding, in the use of performance can also be a good meet the needs of consumers. In addition, the safety of the GRC ceiling is relatively strong, and can effective regulate indoor humidity and temperature, so as to create a comfortable visit and joyful environment, such as Dubai's sailing hotel and the Australian Sydney Opera House are using the GRC ceiling to carry out Interior decoration. In the specific construction process, there are three steps: measurement positioning, installation docking and surface finishing [5].

The first need to carry out the measurement and positioning works, which requires the workers to set the axis of the grid, and then use the ink line to complete the measurement of the axis after the completion of its system number, for the location of the ink can not play the axis can be natural extension, for a few key control lines also need to be repeated measurements to ensure that the accuracy of the measurement results. After the completion of the axis surveying the need for the positioning of the main keel, in this part of the requirements of the construction workers can be based on the actual thickness of GRC ceiling and horizontal keel size and other factors to determine the main keel identification processing, and in the completion of measurement and after positioning the work, all the measured data is plotted.

During the installation of the steel structure, the builder is required to be able to operate the arrangement according to the steel structure conversion provided by the designer and to carry out the construction work of the main keel under the specification of the construction drawing. The use of chemical helix to some of the relatively large parts of the fixed processing, and then through the expansion of the screw for fixed operation of the other parts, after the completion of the frame is fixed, the subsequent installation work is relatively simple, the installation efficiency can also be a certain degree of promotion. After the completion of the steel structure is completed, the construction workers are also required to analyze the correspondence between the main keel and the GRC ceiling plate and analyze whether the construction results can meet the specific requirements of the construction drawings.

Finally, during the installation of the ceiling plate, the GRC ceiling plate at the construction site is also required to be counted, and the matching of the numbering and use parts must be strictly checked and installed after ensuring the correctness. The installation processes needs to start from the central axis, and then in turn from both side with the advance, so that the construction process may be some of the errors in the effective treatment, and to ensure that the entire exhibition building interior decoration effect. In the specific installation process, it is also necessary to carry out the accurate positioning of the GRC ceiling plate according to the preliminary measurement and design, and to ensure the construction effect of the next ceiling after the installation.

After the installation of the ceiling board, the need for its joint treatment and surface spraying, in the course of the operation if there is a mistake, it may lead to cracking and other circumstances, which directly affect the exhibition building decoration effects and practical performance. So the GRC ceiling on the special joint material for construction, and the use of GRC cement products of sealing treatment, so as to avoid the phenomenon of slits cracking. Prior to the site spraying process, it
is first necessary to treat the debris and dust of the ceiling plate and to ensure uniform cleaning. After this process, it is necessary to always maintain the vertical degree of the gun and the spray surface, and need to move the gun evenly, so that it can make the film thickness distribution evenly, and achieved good exhibition building interior decoration effect.

5. Conclusion:
GRC material as a new type of building decoration materials, in the exhibition building decoration works with good application performance, and can fully meet the designer's design requirements and the decoration needs of the building, it also has the advantages like a cost-effective and environmentally friendly for application, it is worth further application and promotion.

Acknowledgment
The project is funded by the Open Fund of Green Building and Energy-Efficiency Key Laboratory of Xihua University, project number: szjj2017-072.

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