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An Introduction to GRG for Cultural and Creative Production of Building Materials

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Abstract: Cultural and creative industries are an important driving force for economic transformation and upgrading and an important means of national soft power competition. Cultural and creative industries are characterized by knowledge intensive, high added value and high integration, and creative cultural production is one of the main sectors of the knowledge-based economy, which promotes the development of the creative economy. In the past five years, China's cultural and cultural creative industries have grown rapidly and have a promising future. In 2021, the operating income of culture and related industries reached 11906.4 billion yuan. At present, the suspended ceiling and wall art products of architectural decoration and fitment have such problems as lack of characteristics, few differences, and homogeneity of types and are not conducive to the audience's recognition of brands. Therefore, it is an important means to promote the optimization and upgrading of the industrial structure to cultivate a number of cultural and creative enterprises and creative designers who are cultural, creative, and knowledgeable in design and operation. The article takes cultural creative production of building materials GRG as the research object, introducing the cultural creative design and production process of GRG in public building space, and proposes the promotion method of GRG cultural creative design products, which provides a reference for the production of GRG similar module products.

Keywords: GRG, Cultural Creativity Production, Decoration

1. Introduction

Cultural and creative products generally take cultural creative ideas as the core. They are products that artists, designers or artisans materialize the spiritual understanding of the content, with cultural connotation, symbolic significance, aesthetic education function and other spiritual values [1]. As early as 2006, the Beijing Municipal Bureau of Statistics promulgated the Beijing Cultural and Creative Industries Classification Standards, believing that the core concept of cultural and creative industries is innovation, and engineering art design is one of the nine creative industries [2]. China's cultural and creative industries have strong development potential and vitality. From the perspective of industrial operating revenue, from 2016 to 2021, the operating revenue of cultural and related industries increased from 8031.4 billion yuan to 11906.4 billion yuan, and the operating revenue of cultural and creative design above designated scale increased from 985.4 billion yuan to 1956.5 billion yuan, accounting for 16.4% from 12.9%; in terms of the number of enterprises, the number of registered enterprises increased from 2015 to 10,955 [3]. At present, the cultural and creative products in many cities are blindly pursuing low cost without paying attention to “beautiful materials and exquisite workmanship”, which makes low-end cultural and creative products impact middle and high-end cultural and creative products; the problem of products with no characteristics and homogeneity is serious, which is not conducive to the development of cultural industry [4].

2. The Technical Nature of Cultural Creative Production of Building Materials GRG

Glass Fiber Reinforced Gypsum is short for GRG, which is made of a new type of precast material that uses ultra-fine crystalline gypsum as the base material, special continuous rigid reinforced glass fiber, and special additives, and is laminated on the mold through a special process [5]. GRG

material has the characteristics of smooth and delicate artistic sense, super plasticity, light weight and high strength [6]. The modular design of the integrated ceiling uses new energy-saving and environmentally friendly GRG building materials as the carrier of the design, which fully combines the demands of users and the creativity of designers, and also can maximum satisfaction of personalized design. In terms of quality, strength, fire resistance and radiation protection (Table 1), GRG material is superior to wood, ordinary gypsum board and glass, and has good sound reflection performance. Tested by Tongji Institute of Acoustics: 30mm thick GRG board with a weight of 48Kg. Acoustic reflection coefficient R=0.97 [7], which meets the requirements of professional acoustic reflection is suitable for various places with high acoustic requirements. There are scientific research teams abroad who have conducted practical research, perforated ceiling and sound-absorbing materials system could give a reduction of heavy floor impact noise about 3dB, which sound absorption effect is good [8].

3. Related Industries of Cultural and Creative Production

The generation and application of interior decoration products are closely related to upstream and downstream industries. For the creative industry, as a supply side, it often stimulates the increase in output; and the creative industry as a demand side often causes demand for the supply of raw materials. Changes in production, design, technology, output, and other aspects of creative industries have caused related industries to promote the creation of new technologies or new industries, and also trigger competition and changes in production patterns through the input of production factors. Based on the combination of cultural and artistic creativity with industrial design and production, it is conducive to improving the technical level and overall efficiency. The production of large-scale 3D science fiction movies such as "Avatar", "The Wandering Earth", "NEZHA Birth of Demon Child", for pursuing realistic and immersive effects, it promoted related industries development, such as computer special effects software and image technology synthesis.

Table 1. *Technical parameters of GRG.*

Column1	Standard of industry
Flexural strength (MPa)	⩾22
Tensile strength (MPa)	⩾10
Compressive strength (MPa)	⩾25
Impact resistance (kJ/m^2)	⩾15
Barcol scale of hardness (HBa)	⩾15
Bulk density (g/cm^3)	⩾20
Average value of breaking load (N)	⩾22
Adhesion between hanger and gypsum board (N)	⩾4000
Standard thickness (mm)	⩾6mm
Nuclide content (MPa)	A
Flame retardancy	A
Fire endurance	⩾3h

Source: https://wenku.baidu.com

4. The Form of Cultural Creative Production

The industrialized production of artistic creativity includes four stages: content creation, production, communication and marketing, and consumer experience, which are undertaken by different departments [9]. According to different categories of artistic creativity, there are three main organizational forms of cultural creativity production: one is scattered individual production, the other is simple collective production, and the third is concentrated social production [10]. At present, in modern cultural and creative production, these three types of forms coexist and create multiple types of creative works of art, which promote the development of the creative economy.

Generally speaking, concentrated social production is suitable for the design and production of large-scale works. This type of cultural creative production requires high technology and production division and has a large production organization network, which often requires many designers, creative artists, assemblers, corporate decision makers, etc. to work together and complete the work or programme. In addition, concentrated social production always integrates the creative design, manufacturing, marketing communication, consumer experience and other links in the artistic value chain, and strengthens competitiveness through continuous professional division of labor and product segmentation, and enhances the value and reputation of creative products, which is in order to expand economic benefits.

5. Cultural and Creative Design and Production of GRG

The idea of integrating creative culture into industrial manufacturing has been realized with the advancement of science and technology. When artistic creativity is transformed into industrial design through building materials, it "as far as mass-produced products is concerned, it uses training, technical knowledge and visual experience to give the materials, structures, structures, shapes, colors, surface processing and decorations an new quality and qualifications [11]". The design of architectural decorative panels is based on the combination of engineering technology, architectural culture, and architectural aesthetics. It not only integrates artistic design and craftsmanship, but also shows the functionality and practicality of the product. In terms of structure, shape, layout, color, and assembly, surface decoration effects and other aspects are in line with the environment, showing coordination, comfort and harmony.

Pre cast processing technology can be used to customize the geometric shapes, hollow patterns and relief textures of single curved surface, double curved surface and three-dimensional overlay, and can also give full play to imagination to design unique patterns. The raw material of GRG is high-strength composite gypsum, which can be made into high-strength waterproof gypsum by adding water and mixing it with water at

room temperature, reaching the initial setting within 3-5 minutes and the final setting within half an hour, while the hydration product is calcium sulfate dihydrate. If the waterproof agent is added, the high-strength waterproof gypsum can be made, which is conducive to use in damp spaces. Since the volume of gypsum shows micro-expansion during the hardening process at room temperature, this makes the surface smooth and dense when GRG is poured and formed, which is conducive to the various patterns to achieve angular and precise dimensions. The material is fine and has high whiteness, and does not contain any harmful elements, GRG decorative panels can be bonded with various paints to obtain rich texture and texture, forming an excellent decorative effect.

In terms of the purpose of decoration, taking gypsum texture board as an example, the design inspiration comes from people's pursuit of antique and elegant decoration style. The surface of the board is smooth and clean, and among boards can be firmly bonded together using homogeneous putty powder to form a seamless structure, which can present an artistic relief texture; different shapes of gypsum board have different application scenarios, which can replace part of the wall board shape. The main panels with grooved gypsum lines can well hide the wires or water pipes inside the grooves, and then install soft lighting strips, so that the living room can create a warm effect; similarly, the top wall in the bar can be used in this way to create a deep and high cold effect, while in the commercial exhibition hall can also create a sci-fi fashionable lighting atmosphere.

Starting from the use scene, combined with the related ergonomics theory, it is described in a specific way, the creative concept is considered the problem of the scene, and the problem is solved with new functions, which brings expectations and surprises to users. Appearance is an element that people desire to have. Appearance is attractive and can convey cultural emotions. Give preset colors of specific materials to give them an architectural sense of art. In order to have a better artistic effect in the later stage, auxiliary software technology is used to show the effect. On the basis of spatial data, CAD and Rhinoceros software are used to deepen design drawings; GRG components can be shaped arbitrarily, common relief class, curved class, pattern class components, the production process is a little different, to relief class production process of which, the production process has a rigorous steps (Figure 1); in the process of production, BIM numerical control measurement and 3D laser scanning technology are used to improve the accuracy of arc skeleton [12]. The design drawing is imported into the CNC engraving machine to make a 1:1 model (Figure 2), and then the slurry is mixed on the mold (Figure 3). After all kinds of arbitrary shape boards are dried and formed (Figure 4-5), they can be installed on site. At the same time, GRG decorative material by carving and processing can well improve the artistry [13], it can use a story to tell the development and application process of a complete creative design product, from how to achieve step by step on the selection of materials, ideas, composition, and craftsmanship, which will bring users a brand-new value experience.

Generally speaking, taking the module of a large public building as an example, the process installation process (Figure 6) is as follows: snap line positioning → light steel keel installation → GRG integrated ceiling component installation → gap treatment → surface finish → project acceptance [14]. GRG integrated construction technology can efficiently and high-quality complete the construction of complex indoor GRG decoration, with a high degree of information and fast construction speed [15]. Through the overall effect of the site (Figures 7-8), the pursuit of quality and safety, living comfort and aesthetics can be satisfied.

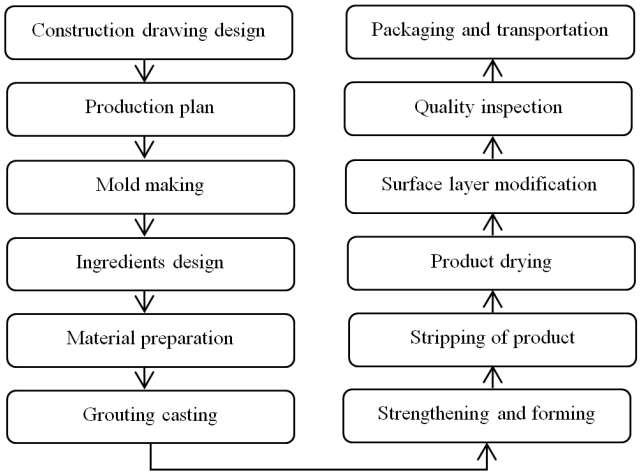

Figure 1. *Production process of GRG.*

Figure 2. *Vocational college students learn the proofing of GRG creative module.*

Figure 3. *Wooden mold of prefabricated GRG module.*

Figure 4. *Modification of GRG's unique module.*

Figure 5. *Modification and quality inspection GRG module.*

Figure 6. *GRG module installation process.*

Figure 7. *Actual decoration of GRG ceiling of Jiangsu Grand Theater.*

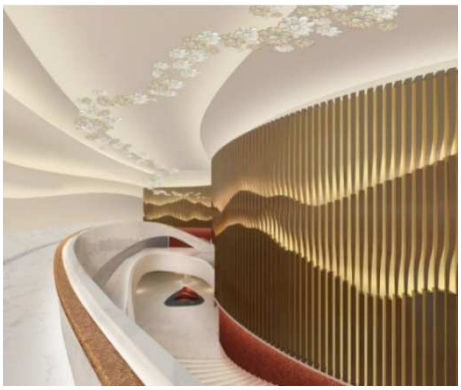

Figure 8. *The ceiling and wall decoration in the GRG aisle of Jiangsu Grand Theater.*

6. The Promotion Method of GRG Cultural Creative Design Products

GRG products have outstanding green environmental protection and strong plasticity, as creative art walls can be transformed and innovated in texture, color, composition, symbols, form and other elements to enhance artistic creativity, which can design products with distinctive national characteristics and strong local humanistic colors, deepen the cognition of various users of art walls and ceiling products, and form an emotional identification with excellent culture. Consider the preferences and consumption tendencies of different users, focus on the communication and pleasure of the consumption process in the era of experience economy, locking the target users and digging the deep demand. In the marketing process, improve the user's participation in the design stage, and shape consumption habits and behaviors, so as to find more cooperation projects for artistic and creative products, and then achieve thinking recognition as well as increased profits.

With the advancement of information technology and the application of modern communication tools and methods such as computers, mobile phones, the Internet, Internet of Things, and big data, in the era of new media, which provides a high-quality platform for the marketing and promotion of cultural and creative design products. The promotion of GRG cultural and creative design products uses WeChat, Weibo, video software, popular science videos, etc., including graphics, audio and video, video and other content to present an intuitive way to enhance interactivity, and become an important medium for creative industry marketing.

7. Conclusion

The products with the theme of GRG cultural creativity come in a variety of styles. Its design, production and promotion are conducive to enhancing the integrated artistic effect of public spaces, increasing the assembly rate, showing novel and beautiful appearance, and guiding the public to transform to an environmentally friendly and energy-saving lifestyle. As a cultural and creative enterprise, it is necessary

to pay attention to the cultural connotation of each creative product, keep innovating and show its characteristics, thus the creative production products can demonstrate the value and be promoted for long.

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References

[1] Wei Pengju. Attributes and Characteristics of Cultural Creative Products. Culture Monthly, vol. 8, 2010, pp. 3.

[2] Huang Tianwei. The Research of Formation Mechanism of Cultural Creative Industry Cluster. Wuhan University of Technology, vol. 5, 2014.

[3] Huaon Industrial Research Institute. Development Status and Prospect Exhibition of China's Cultural and Creative Industries in 2022 [EB/OL]. https://www.huaon.com. 2022-11-23.

[4] Yang Huizi. Intangible cultural heritage and culture creative product design. Graduate School of Chinese National Academy of Arts. vol. 3, 2018.

[5] Meisui building materials. GRG, "a versatile star in space modeling," November 21st, 2020. http://www.gdmssy.com/News/detail/id/931.html.

[6] Li Xiuyun, Zhong Yue, "Study on Process Technology of Integrated Ceiling Assembly Module with GRG Building Materials in Residential Buildings," Guangdong civil engineering and architecture, vol. 5, 2018, pp. 59-61.

[7] Sun Chi, Wu Jiayue, "Audio visual feast," Design, vol. 16, 2015, pp. 139-140.

[8] Kim kyungho; Kim sunghoon; Ryu jongkwan, "Development of Ceiling Construction Methods Reduced Floor Impact Sound," Proceedings of the Academic Conference of the Korean Society of Noise and Vibration Engineering, 2014, pp. 203-207.

[9] Yang Ping, "Research on the mechanism of the influence of cultural creativity on manufacturing industry," Nanjing: Nanjing Institute of art. 2015.

[10] Liu Jinyou, Zhao Ruixia, Hu Liming, "Research on the organization mode of creative industry——Based on the perspective of creative value chain," China's industrial economy, vol. 12, 2009, pp. 46-55.

[11] Industrial design [EB/OL]. https://baike.baidu.com/item

[12] Li Yunfeng, Wu Yijun, "Construction Technology of Large-area, Super-high and Large-span Curved Hyperbolic GRG Decorative Wall," Guangdong Architeture Civil Engineer, vol. 11, 2021, pp. 8-11.

[13] Liang Yue, "Research on the artistic design performance of theater decorative materials," Construction Materials & Decoration, vol. 41, 2018, pp. 77-78.

[14] Du Zhenyi, Kang Cong, Guo Yuxin, "Research on Application of GRG Wall in Large Airport Terminal Building," Construction Science and Technology, vol. 9, 2021, pp. 12-15.

[15] Ding Feng-yi, Ma Zong-yang, Wang Bin, "Plateau Adaptive Control Method of Hydraulic Excavator," Constructiong Mechanization, vol. 43, 2022, pp. 68-71.