

3D Printing Technology and Computer-Aided Design

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Abstract: The widespread application of computer-aided production technology can effectively and directly assist enterprises in completing all aspects of production smoothly and efficiently. With the rapid development of 3D printing application technology, research and promotion of new material manufacturing applications have basically begun. This article mainly focuses on analyzing two technologies: computer-aided technology and 3D printing technology.

Keywords: Computer-Aided Technology; 3D Printing Technology; Information Age

1. Computer Aided Technology

1.1 Technical classification

With the continuous progress of the industrial information age, the rapid development of networks and industrial big data, the arrival of 5G new era data accelerators, the rapid development of Industry 4.0 era and new product development and production management models, industrial computer engineering aided design system software development has been widely applied in various equipment manufacturing (including product) manufacturing processes. The practical application process of computer-aided technology, that is, the development of equipment manufacturing (electronic products) technology industry, enters a process of comprehensive digitization and informatization. At the same time, 3D printing technology is also a new rapid material forming production method based on the modern Industry 4.0 new material manufacturing technology environment. Contrary to a traditional manufacturing process used in rapid stacking forming, it refers to a new manufacturing process that quickly stacks and combines laser cured materials based on the overall shape of the material product. It is currently widely used in the development and manufacturing of various material products that require rapid stacking forming.

1.2 Auxiliary Applications

The widespread application of computer-aided design (CAD) in manufacturing engineering in China can help manual design and drawing personnel transition from a traditional professional manual design and drawing job. The engineering design management software system in the computer software application environment can be used to assist design technicians in quickly completing design scheme comparison data analysis, drawing design data review, design process content data storage and information retrieval, etc., shortening the system design product cycle work time and improving product design efficiency, And at the same time, it is conducive to the analysis of the internal structure design and timely feedback of product manufacturing process information after completing the design. The monitoring application software of Computer Aided Software Manufacturing (CAM) can be controlled by multiple computers throughout the entire manufacturing process, and the computer-aided software manufacturing monitoring system can directly achieve real-time monitoring of the manufacturing production environment and the working status of manufacturing equipment. In chemical experiments, not only can various digital control prototypes and simulation software on the computer be used to accurately verify the practical application of various computers for auxiliary chemical engineering, but also can various molecular physics and chemical properties necessary for manufacturing products be analyzed, and physical analysis and research can also be carried out.

2. 3D printing technology

2.1 Introduction to 3D Printing Technology

3D printing technology is currently a rapidly developing and widely used new industrial manufacturing information technology in recent years, with a relatively short development period. However, with the continuous development of industrial hardware and application software, it plays an important role in the manufacturing industry. It can be understood that a 3D device printing system is a device printing system of a device manufacturer. Import relevant data into a mobile computer, analyze the data, establish a coordinate model, and convert the pre designed coordinate model into a coordinate calculation program that exists in the data. Then, through digital printing, the laser cured material is directly printed based on various digital models to form various physical and mechanical models. With the continuous development of current material printing and processing methods, there are various materials printed layer by layer, liquid printing, and so on. With the continuous development of the selectivity of plastic printing products and the diversification of material varieties, the offset printing products produced by printing can fully meet the requirements of users in various physical properties and appearances. They are no longer just a single product model printing sample that can only be used for customer reference, but a small batch of products.

2.2 Characteristics of 3D printing technology

The application of 3D printing technology still has a certain degree of development timeliness and controllability. In the current traditional large-scale industrial mold manufacturing, after the production process of model molds is completed, it is necessary to develop new molds to produce large molds. The application of 3D model printer technology can greatly reduce the model production process cycle and time for mold production. By quickly printing and producing goods in bulk, it can completely replace other traditional industrial printing production methods to a certain extent. When customers urgently need a large number of products, it can quickly print and complete batch production in a short period of time.

It can replace the use of traditional large-scale industrial machinery molds, effectively reducing production and operating costs. The direct manufacturing process characteristics of 3D model printing mold technology determine that the printing technology products can directly produce printed products without the need for self-developed mold processes, thereby greatly saving a certain amount of product production costs, improving product user experience, and investing in small batch rapid development of products in the early stage of the market, generating certain economic benefits.

A collaborative space with coordinated IoT concepts. 3D printing technology mainly relies on the transmission of printing data streams to automatically execute the printing process in printing devices. The design and establishment of an effective 3D printing control equipment management platform can be used to automatically control and build an IoT industrial production management platform through the use of Internet technology. It has an undeniable role in industrial spatial economic development control for automatic scheduling and management of industrial production resources.

2.3 Application of 3D Printing Technology

Create a conceptual model. In modern industrial part design, various industrial parts and product models with different functions and application types need to be repeatedly designed and manufactured according to different product functional requirements. Compared with other traditional three-dimensional manufacturing printing technology products, 3D full printing manufacturing technology has greater technological advantages in production accuracy, strength, and production cost. It can achieve faster and more accurate acquisition of product parts and production models required by customers, improve production operation management efficiency and production quality.

Manufacturing of required tools. Many printing tools can be designed and produced by designers based on their actual requirements. By using 3D printing control technology, we can greatly shorten the working time required to build the entire tool system and invest more time and energy in new product design in the future. Meanwhile, 3D printing control technology can significantly shorten printing time and reduce construction management costs. The design tools manufactured can be lighter and more precise, fully meeting the requirements of professional product designers as much as possible.

Carry out wholesale production of small batch processed products. The widespread application of 3D printing technology not only effectively realizes the rapid production of various small batch printing products, but also greatly reduces production costs due to the variety of printing process materials and operation methods. Compared to using traditional materials to manufacture printing process products, production requires less time and operator procedures. In terms of actual production application display effects, it can also greatly reduce production time, space, mold and other machine tool movement restrictions, and can automatically adjust various production process plans according to customer needs, with higher flexibility.

3. The combination of 3D printing technology and computer-aided design

3.1 Application Relationship

The development of computer-aided design has emerged ahead of the development of 3D printing design technology. It can be said that although 3D printing design technology is driven by computer-aided design processing technology on a computer, it is completely not independent of computer-aided design on a computer. The rapid development of computer software assisted design can provide more scientific data models and basic theoretical design data for the practical application development of 3D digital printing application technology. 3D digital printing application technology transforms the product concept of auxiliary designers from traditional computer-aided software design to virtual reality, allowing modern human products to present various products that were previously unable to be directly produced by humans, Improve the social productivity and living service level of modern humans.

3.2 Improvement space

The widespread application of 3D printing auxiliary materials cannot fully meet the basic requirements of modern computer-aided printing design. Especially in some application fields with specific performance requirements, the scope of overall material application will be greatly limited due to the inability of the overall material chemical properties to fully meet practical application requirements. Strengthening in-depth research on the application performance and technical applicability of printing materials is currently one of the main focus research topics in the field of 3D printing technology, and it will have broad industry market prospects in the future industrial development and application process.

The efficiency of software design platforms needs to be improved. Due to the significant gap in the development status of China's software industry compared to some developed countries internationally, achieving a good combination of 3D printing technology and computer-aided design takes a long time, and it cannot have a lower cost advantage in the entire market competition. This has to some extent led to low overall production efficiency and the inability to achieve large-scale applications in a short period of time. In this regard, there is still room for improvement.

4. Conclusion

In short, both computer-aided design and 3D printing technology, whether single or combined, have had a huge impact on the production and development of the world. It is necessary to increase the analysis and research of these two technologies to make them more conducive to social development.

References

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