



Adaptive Generation Technology of Lightweight Cellular 3D Printing Path

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Abstract: With the continuous development and progress of the economy and society, the demand for innovative high-tech development in all walks of life has gradually increased, and the corresponding requirements have also been raised in due course. Because the development and application of advanced and innovative technologies can cover a wide range, it is also conducive to vigorously promote the improvement of the fineness of each production product, and better meet the actual development needs of society. Therefore, as a representative of innovative advanced technology, 3D printing technology should be innovated and optimized by relevant technical developers in order to enhance its practical adaptability.

Keywords: 3D printing; lightweight; adaptive path; generation technology

As far as the actual development situation is concerned, product users pursue their lightweight, that is, while maintaining their original structure and technology to the greatest extent, appropriately reducing their overall weight, thereby promoting the improvement of their lightweight performance. The additive manufacturing technology was developed under the influence of this environmental background, and is widely used in product production, aiming to effectively improve the convenience of product handling. However, most of the companies do not integrate the theoretical knowledge and practical operations in a timely manner when researching and using lightweight technology, resulting in a lack of solid mechanical theory knowledge support for their technology, and a series of serious material loss and poor bearing capacity problems have emerged. , Seriously affecting the overall quality level of the product.

1. 3D printing technology overview

3D printing technology is one of the important components of rapid prototyping technology and one of the main representatives of modern advanced development technology. The application of 3D printing technology is carried out on the technology of familiar with the analysis of model files. After deep understanding of the content of the files, the staff chooses the appropriate materials, and constructs the structure by layer-by-layer printing to restore the structure of the object. Compared with the traditional two-dimensional printing technology, the 3D printing technology has a strong three-dimensionality, which can fully display the overall structure of the printed object, which is convenient for the follow-up in-depth research work to be carried out in an orderly manner. Normally, 3D printing technology is realized using digital technology material printers, and is widely used in tool model manufacturing, industrial design and other industries. In addition, because 3D printing technology is more intuitive and vivid, it can also be used in jewelry design, parts production, automobile manufacturing and other fields, so that its early design work can be targeted, and the occurrence of design and production work errors can be reduced to the greatest extent. Probability.

2. Lightweight 3D printing technology

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2.1 Lightweight concept

The concept of light weight was first produced in the automobile manufacturing work. Its advantage is that the overall weight of the product is reduced, and the degree of lightness is increased, and the ease of handling is also increased. Moreover, 3D printing technology involves a wide range of applications. If it is timely to carry out lightweight innovation, it will not only help to improve its practicability, but also help to broaden its development path appropriately, which will fully reflect the structural demonstration effect of 3D printing technology. .

2.2 Lightweight method of 3D printing technology

2.2.1 Lightweight modeling

The main purpose of 3D printing technology to read data files is to obtain the parameters, spatial conditions, logical relationships and other contents of its feature model construction, and then use this as the development direction to build a scientific and reasonable reference model. Lightweight modeling is to re-select the materials and structures of its model based on this theoretical development, and strive to meet the requirements of lightweight and mechanical characteristics at the same time, so as to efficiently reduce material losses, optimize structural mechanical properties and reduce overall weight. the goal of.

2.2.2 Internal scanning path

Lightweight modeling not only needs to reduce its actual weight, but also should simplify and update the internal structure of the model in time, so as to achieve the purpose of lightweight design. Therefore, after using 3D printing technology to slice the model, the relevant staff can scan the path inside the model along the slicing direction to avoid too many internal paths in the later model construction, which is not conducive to the manifestation of lightweight features.

3. Adaptive Generation Technology of Lightweight Cellular 3D Printing Path

3.1 Overview

The lightweight honeycomb 3D printing path adaptive technology is innovatively implemented on the development technology of honeycomb structure printing, because the honeycomb structure has excellent bearing capacity and unique mechanical mechanics, on the one hand, it is conducive to highlight the high structure of its model Performance, on the other hand, also responds to lightweight requirements in a timely manner. The lightweight cellular 3D printing path adaptive generation technology refers to the optimization design and selection of the internal path and material of the honeycomb after the parameterized honeycomb path and its rough model structure are completed, and then the performance is analyzed using software to design The out-of-path path of the lightweight honeycomb under non-uniform load. Compared with 3D printing technology, this technology has more comprehensive performance, higher model fineness, and more intuitive path trajectory.

3.2 Lightweight cellular 3D printing path generation process

The path position is inside the model, so the first step in generating a lightweight cellular 3D printing technology path should be to build a rough model framework, and then effectively reduce the material and optimize the structure based on the mathematical analysis results of the model, and evolve into a compressive stress model. Then, the relevant staff carried out bearing capacity test and performance analysis on the model, and optimized the local path trajectory appropriately. The outline path of the honeycomb structure model is relatively simple to generate. Therefore, the actual molding quality and efficiency of its printing technology are also effectively improved. The development of various design work of the adaptive path generation technology will also be promoted because of the advantages of the honeycomb structure, and then realize the lightweight of the local path trajectory.

4. Conclusion

To sum up, after explaining the basic concepts of traditional 3D printing technology and lightweight cellular 3D printing path adaptive generation technology, this paper explores and analyzes the importance of lightweight

characteristics for the construction of print models, and in-depth analysis can achieve lightweight Specific implementation methods for the purpose. As far as the current development status is concerned, the realization of 3D printing technology is realized under the requirements of parameter indicators, and it does not have the function of self-adaptive optimization path, which makes the overall load pressure of the model as a whole increase, which can not meet the requirements of lightweight design. Echoes. Therefore, the future development of 3D printing technology not only needs to fully highlight the lightweight of the model, but also needs to realize the optimization of the internal path trajectory, in order to achieve adaptive generation.

References

1. Sun Dengguang, Dai Ning, Huang Renkai, Zhang Min, Meng Lingyin, Zhang Zhuang. Lightweight cellular 3D printing path adaptive generation technology[J]. Computer Integrated Manufacturing System, 2018, 24(08): 1902-1909.
2. Feng Xiaowei, Xue Fei, Song Wanxin. Basic mechanical properties and preliminary application of 3D printed coal roadway bolts based on metal powder [J/OL]. Journal of China University of Mining and Technology: 1-11[2020-07-04].
3. Zhao Yaping, Zhao Min, Yao Meng, Weng Yunxian, Zhu Jun. Research on function improvement and upgrade of FDM 3D printer [J]. China Equipment Engineering, 2020(13): 99-100.
4. Zhang Yuan, Shan Haofeng. On the problems and countermeasures of 3D printing technology from the perspective of intellectual property law [J]. Legal System Expo, 2020(20): 21-23.