

# On the Innovative Practice of Intelligent Manufacturing Technology in Precision Mold Design and Manufacture

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**Abstract:** Precision mold design plays a very significant role in industry and design of molding. Compact speed mode has strict design principles and requirements in the design and processing, which can reduce the production cost, improve the enterprise efficiency, and provide a good quality guarantee for the plastic parts. Owing to the continuous progress of science and technology, intelligent manufacturing technology has been applied to the design and manufacture of precision mold. The traditional design technology and method of precision mold have been improved and innovated to meet the progress needs of the current industrial manufacturing industry and the innovation needs of precision mold technology. Therefore, from the perspective of the practical application of precision mold, this paper analyzes the application advantages of intelligent technology and the innovation of intelligent manufacturing technology in the design and manufacture of precision mold, and expounds the prospect of precision mold.

## 1. Introduction

Owing to the continuous progress of science and technology, intelligent technology has been widely used in various fields. The effective integration of intelligent manufacturing technology and precision mold design and manufacturing technology provides new ideas and ways for the promotion of mold design and manufacture, improves the mold production, and promotes the further progress of enterprises. According to the requirements of precision mold design and manufacture, we can combine with the application characteristics of intelligent manufacturing technology, retain the advantages of traditional precision mold design and manufacturing technology, realize the organic combination of traditional mold design and manufacturing technology and modern manufacturing technology, and promote the further progress of precision mold design and manufacturing industry.

## 2. Analysis on Application Advantages of Intelligent Manufacturing Technology

From an objective point of view, the effective application of modern intelligent technology in various fields and industries has played a role in promoting the economic benefits and work effectiveness of enterprises, and also in the precision mold design and manufacturing industry.

### 2.1 Help to Promote the Work Efficiency of Enterprises

In the process of precision mold design and manufacture, due to the high precision requirements for mold design and manufacture, mold designers are required to adhere to a rigorous working attitude in mold design, optimize and improve each work process, and grasp the detailed control of each link. On the one hand, it is necessary to improve the accuracy of injection mold. On the other hand, it is necessary to ensure the work efficiency. As a result, it is easy to cause the contradiction between the work efficiency and the precision requirements of mold design and manufacture <sup>[1]</sup>. Intelligent technology effectively solves this problem. In precision mold design and manufacture, the staff can adopt intelligent working means to complete the drawing, data analysis and the production of the model mold in the mold design, so as to ensure the precision and data accuracy of

the mold design, promote the overall work efficiency, and realize the common progress of the two. Compared with the previous mold design and manufacture work, the effective application of intelligent technology in precision mold design and manufacture greatly improves the work efficiency and enterprise benefit of related enterprises, and is more conducive to improving the market economic competitiveness of enterprises.

## **2.2 Make Mold Design More Standardized**

In the process of precision mold design and manufacture, designers should fully understand and master its design standards, because only in this way can they achieve the standardized design requirements of mold and give full play to the role of standard basis. If there are some problems in the accuracy of the mold in the design process, the use function of the mold will not be able to guarantee the normal play, affecting the later use effect. From the perspective of enterprises, although a small mold design error does not seem to have much difference, it will have a serious substantive impact on the standardization design of enterprises, and may cause huge economic cost loss to the industrial production and manufacturing industry, not conducive to the long-term and stable progress of enterprises.

## **3. Application Analysis on Intelligent Manufacturing Technology in Precision Mold Design and Manufacture**

There are several innovative ways of intelligent manufacturing technology in precision mold design and manufacture.

### **3.1 Effective Application in Product Design Stage**

During product modeling, the effective application of intelligent manufacturing technology realizes the accuracy control of modeling data, makes the mold more scientific. Firstly, the intelligent drawing software is used to realize the primary drawing of the mold shape, and then the accurate control of the data is realized through the data detection software. Finally, the scientific modeling technology is used to model the mold <sup>[2]</sup>. In the process of modeling, CAD modeling technology is mainly used. The collection and analysis of data and information in the whole process of mold design and manufacture can give effective production basis for the precision design of later mold. In addition, to ensure the practical value of reference data, after the scientific collection, integration and analysis of the data by the rational use of intelligent manufacturing technology, it is necessary to establish a corresponding database to effectively sort out and store the data, so as to provide a reasonable scientific basis for reusing the data in the later mold design and manufacturing process. Meanwhile, to further ensure the quality of mold product design work, the staff can reasonably use intelligent manufacturing technology to carry out large-scale application testing on the function of the mold itself <sup>[3]</sup>.

### **3.2 Effective Application of CAD and CAM Technology in Mold Design and Manufacture**

CAD technology and CAM technology are mainly used in the design and manufacturing process of automobile panel mold, which is a new intelligent manufacturing technology. The specific design and manufacturing method is to use cold stamping mold manufacturing technology, including five links: overall work management of intelligent system, preliminary design draft of mold, design and re-manufacturing process analysis, mold structure design analysis and final mold sample products. In addition, intelligent manufacturing technology also includes part of the information collection and analysis technology, such as analyze and sort data parameters in the process of electronic technology implementation, strictly review the existing problems, so as to further ensure the accuracy and rationality of the parameters. Moreover, in the process of automobile mold design, the effective application of intelligent manufacturing technology improves and optimizes the internal design structure of the mold to make it more scientific and reasonable. It makes up for the deficiency of some independent function development in its timeliness and application mode.

### **3.3 Application of Integrated Intelligent Manufacturing Technology**

Integrated intelligent manufacturing technology refers to a set of standardized technology structure and basic operation process by making full use of intelligent manufacturing technology and combining with the design and manufacturing requirements of precision mold. From the perspective of mold design and manufacturing layer, it is to rely on intelligent manufacturing technology to develop a practical and technologically advanced mold design and manufacturing scheme. From the technical level, the effective application of intelligent manufacturing technology provides a good technical guarantee for the design and manufacture of mold. In addition, with the support of intelligent manufacturing technology, the mold manufacturing design process realizes mechanical automation and intelligent management, saves a lot of labor resources and enterprise costs, and improves enterprise efficiency and mold quality.

### **3.4 Application of Engineering**

According to the analysis of the current mold market situation, most of the molds are completed by network and information technology. Every function or operation process of the system needs information machine software technology to collect and analyze the system data parameters. Meanwhile, it can realize the corresponding independent operation. The design and manufacturing process of the entire precision mold has good modernity and advanced nature. In the precision manufacturing of the whole mold, advanced network and information technology can provide more accurate construction, processing and manufacturing conditions and design technology, which is of great significance for the long-term progress of mold manufacturing industry in the future.

## **4. Development Prospect of Precision Mold**

### **4.1 Increase Market Share**

Owing to the continuous progress of social economy, it promotes the progress of precision mold industry, and makes its market area increase year by year. According to the research data in recent years, the overall development situation of precision mold is relatively large, and the market share is increasing year by year. The market share of specific precision mold processing parts has reached more than 90%, ranking in the forefront of national progress. In addition to the field of large industrial machinery parts, it also includes parts manufacture of some household appliances and vehicles, such as TV, telephone, automobile lamps and household instruments<sup>[4]</sup>.

### **4.2 Accelerate the Progress of Design**

Compared with traditional mold design and manufacturing industry, the progress of precision mold design and manufacture has greater significance of the times, more in line with the prospect of the future mold industry. Its total weight is far more than that of traditional mold manufacturing industry, and holds the trend of continuous growth and faster speed. Therefore, the progress of precision mold manufacturing industry is more in line with the current social and economic trend, holding faster progress speed and keeping up with the pace of the times, helpful to promoting the long-term healthy progress of domestic mold manufacturing industry.

### **4.3 China's Mold Manufacturing Industry Is Still in Its Infancy**

All kinds of data show that China's mold manufacturing industry is in its infancy in both design and manufacture and industrial management, far behind other developing countries. In the process of design and manufacture, the number of enterprises that make the precision of mold be as high as  $5\ \mu\text{m}$  is relatively small, let alone accurate to  $1\text{-}2\ \mu\text{m}$ . In a word, influenced by the monopoly of mold manufacturers in Japan and the United States, it will take a long time for China's precision mold manufacturing technology to reach the mold level of developed countries such as the United States, Japan and even South Korea.

## **5. Conclusion**

It can be seen from the above that in the progress of precision mold design and manufacturing

industry, the integration of intelligent manufacturing technology is the inevitable trend of today's social and economic progress, playing a key role in improving the production quality and effect of mold manufacturing industry. It requires relevant staff to keep perfecting their understanding of intelligent technology and equipment, improve their professional knowledge and technical ability, and apply it to the actual precision mold design and manufacture, further promote the level of economic competitiveness of precision mold manufacturing industry.

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