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# Research on application of computer technologies in jewelry process

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ABSTRACT: Jewelry production is a process of precious raw materials and low losses in processing. The traditional manual mode is unable to meet the needs of enterprises in reality, while the involvement of computer technology can just solve this practical problem. At present, the problem of restricting the application for computer in jewelry production is mainly a failure to find a production model that can serve the whole industry chain with the computer as the core of production. This paper designs a "synchronous and diversified" production model with "computer aided design technology" and "rapid prototyping technology" as the core, and tests with actual production cases, and achieves certain results, which are forward-looking and advanced.

*Keywords*: computer technology; rapid prototyping; jewelry; application

## 1 RESEARCH BACKGROUND

With the continuous popularization and ever-changing development of computer technology, the depth and dimensions of application for computer technology in various fields are constantly extending and expanding, jewelry production and processing industry is of no exception [1]. From the initial design and material collection, organization, two-dimensional aided design to three-dimensional aided design, analogue simulation design, display design and rendering post-processing and other aided design means in the research and development links, the computer technology gradually penetrates and develops into the rapid and precision manufacturing means in the production link. At present, in the field of jewelry production and processing, the cutting-edge technology of computer applications mainly includes simulation of three-dimensional aided design, style effect display design and high-precision rapid prototyping technology.

Compared with the traditional jewelry production and processing technology and process, the involvement of computer technology has a revolutionary significance. On the one hand, in the stage of research and development of jewelry products, the establishment and continuous improvement of the database makes the designer's research and development work quick and convenient, greatly improving work efficiency; simulated three-dimensional design and texture material performance not only reduces the link of making samples, but also shortens the cycle of research and development; dynamic effect display not only facilitates interactive exchanges with retailers, but also adds a sense of possession for end customers to choose products. On the other hand, for the jewelry production and manufacturing, especially precious metal jewelry manufacturing, today, with constantly transparent and cheap processing fees, in addition to the rapid return of funds, to improve production efficiency and reduce the losses in the processing and manufacturing links are the key factors for the manufacturers to win in competition. The involvement of computer can just greatly improve the performance of these two decisive factors, so that the manufacturers can obtain higher profits.

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## 2 APPLICATION STATUS OF COMPUTER TECHNOLOGY IN JEWELRY PRODUCTION AND PROCESSING

### 2.1 *Application status of aided design software*

Currently, there are many types of design software in the field of jewelry design [2]. The designers select different design software according to their own conditions and the required design style and effect, which is summarized as the following three types: (1)

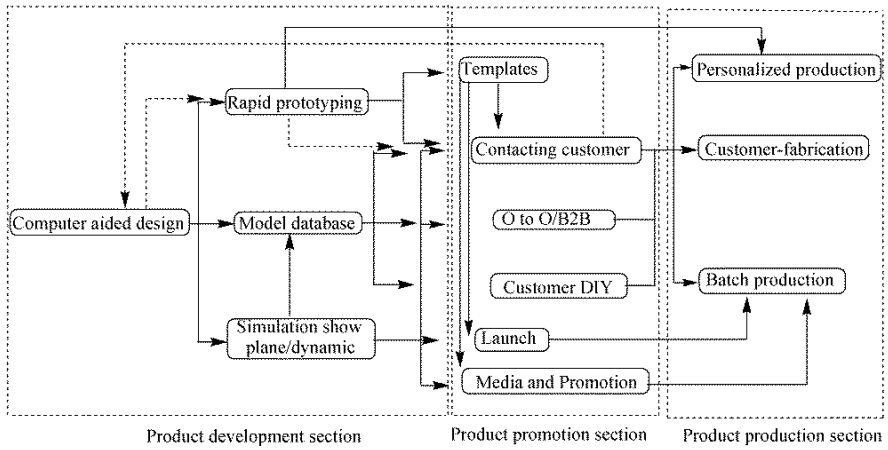


Figure 2. Model design in jewelry production and processing via computer technology

and "simulation show" plane; "product promotion section" designs six links, which are mutually independent and also connected, and achieve 9 synchronous projects; "product production section" can achieve 3 synchronous projects, while the entire production process chain can achieve 34 synchronous projects.

### 3.3 *Comparison with the application of new technology and traditional production process*

Efficiency is profit, while profit is the lifeline of the enterprise. Today, with the processing fee getting lower, in addition to brand awareness, product market recognition and service, the enterprises should fight for the efficiency. Compared with Figure 1 and 2, it is not difficult to know that the advantages of computer application model in the jewelry production and processing are mainly manifested in the following three aspects: 1. It can achieve a number of "synchronous projects" and "diversified production" in the jewelry production; 2. It can achieve "zero inventory" in the enterprise production, thus saving a lot of manpower, materials and financial resources; 3. The application for computer aided design and rapid prototyping technology can greatly reduce production losses and improve production efficiency. In this paper, the three-dimensional printer of American 3D system CPX 3000 (wax spraying) and the traditional manual silver version and carved wax version are compared with, and the details are shown in the table below.

## 4 APPLICATION PRACTICE OF COMPUTER TECHNOLOGY IN JEWELRY PRODUCTION AND PROCESSING

### 4.1 *Application for computer technology in jewelry development section*

#### 4.1.1 *Application method of computer aided design technology*

Currently, the computer aided design software used in the field of jewelry design is divided into three categories: 1. Two-dimensional design software, such as Corel draw, Auto CAD; 2. Three-dimensional design software, such as Jewel CAD, Matrix, 3Design, Rhino, Art CAM; 3. Plane post-processing software, such as Photoshop. The production model developed in the development section of the project is 3D model, so the following elaboration is mainly based on the three-dimensional design software [10].

The basic idea of three-dimensional aided design modeling is mainly to first draw the two-dimensional curve (guide rail, section and contour line) of the required three-dimensional modeling, and then use the corresponding modeling tools to generate the basic three-dimensional modeling; and then edit and carry out local special effect processing according to the requirements of the product modeling; edit the corresponding material after determination of the model modeling, size, structure and level; finally, output application data for different purposes according to the needs, as shown in Figure 3.

Table 1. Comparison with the speed of traditional manual plate making and rapid prototyping plate making

| Type | Completed amount of silver version in 32h | Completed amount of wax version in 32h | Rapid version (work surface: 187×165 mm, height: 25 mm) | | |
|---|---|---|---|---|---|
| | | | Completed amount in 16h | Relative silver version / multiple | Relative wax version / multiple |
| Diamond ring | 4 | 8 | 536 | 134 | 67 |
| Luxury ring | 2 | 4 | 160 | 80 | 40 |
| Luxury pendant | 2 | 4 | 168 | 84 | 42 |
| Bracelet | 1 | 2 | 22 | 22 | 11 |

### 4.2 *Application for computer technology in product production section*

A huge “jewelry style model database”, “style plane display rendering database”, “style interactive animation database”, “rapid prototyping plate making” and other computer technology support and “B2B model”, “O to O mode”, “customer DIY” and other flexible product promotion sales channels meet the needs of different customers, “individualized production”, “custom production” and “batch production” can be carried out. These three production models are independent and advanced.

### 4.3 *Application for computer technology in product promotion section*

#### 4.3.1 *Application for computer technology in market launch*

There are many ways to launch products on the market, which are mainly the exhibition halls for their own brand, usually used for seeing products by the suppliers and distributors, or customer DIY experience; flagship stores, franchised stores, retail stores, which are facing the end consumers; jewelry fairs, which are facing potential customers around the world. There are many kinds of jewelry exhibitions around the world every year, which can be participated in according to the nature of different exhibitions.

After drawing the three-dimensional model, the jewelry research and development department selects the featured style for direct rapid prototyping plate making, and processes into samples to launch on the market to test marketing. After launching samples on the market, the improved design and depth development of products should be carried out according to the reaction situation on the market, in order to constantly upgrade and optimize the products, and make the brand effect have a virtuous circle.

#### 4.3.2 *Application for computer technology in product propaganda and promotion*

Product propaganda and promotion media include online, offline, soft media, hard media, indoor, outdoor and many other means, but its fundamental source materials are mainly the plane rendering of the product and dynamic display, which can be made by sample shooting, or perfectly presented by the computer analogue simulation. The “plane display rendering database” and “interactive animation database” provide the convenience for propaganda and promotion that is insurmountable by the traditional manner (made by sample shooting). Jewelry holographic display instrument (jewelry shopping guide) displays by using the materials of “plane display rendering database”, and has a very good analogue simulation effect, which is currently one of popular trends of the jewelry enterprises in the propaganda and promotion. Figure 7 is the shopping guide of MY-DID co-brand in the retail store.


Figure 6. Shopping guide for the retail store

## 5 RESEARCH CONCLUSION

With popular application for computer technology in all walks of life, many traditional manual processing industries have gradually introduced computer technology. Jewelry processing industry is a very good case. Despite the late start, in recent years, it has a rapid development, and more and more enterprises need the support of computer technology. At present, the problem of troubling and restricting the application for computer technology in jewelry production and processing is mainly a failure to find a production model that can serve the whole industry chain with the computer technology as the core of production in this industry. This paper designs a “synchronous and diversified” production model with “computer aided design technology” and “rapid prototyping technology” as the core, and tests with actual production cases (application for the computer technology in the product development section, production section and promotion section), and finds that the production model has a strong operability, which is forward-looking and advanced, and can create values for the community and enterprises, and can be used for reference by the jewelry industry and even similar products processing and production enterprises in a period of time.

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