Modern mold making

I .The stamping die development history and status of technology

In 1953, the Changchun First Automobile Works in China for the first time established a die shop, the car plant in 1958 began manufacturing automotive panel die. 60 years of the 20th century began producing fine blanking dies. Come a long road of development, China has formed about 300 billion (not including Hong Kong, Macao and Taiwan statistics.) Production capacity of various types of stamping dies. Formed, such as Ningbo and Zhejiang HUANGYAN region "Die village"; Guangdong Corporation and some large rapid rise of township enterprises, K el o n, M id e a, K on ka and other groups have established their own mold manufacturing center; joint ventures and wholly foreign-owned the mold companies now have thousands. With the pace with international standards continues to accelerate, increasing market competition, production and design of the mold has been growing recognition that product quality, cost, and new product development capacities. Mold manufacturing technology to measure a country's manufacturing sector has become an important indicator of the level, and largely determine the survival space. At present, China stamping die, whether in quantity or in quality, technology and other capabilities have made significant progress, but with national needs and the world advanced level, the gap is still great. In the international competition situation, I had the mold industry has rapidly developed, many specialized research centers continue to die set up, mold steel of the structure and made significant achievements, but there is still a big gap. First, imports of high-tech mold most of the large precision molds, mold and exports most of the lower middle and low-tech die, so high-tech high-grade die stamping die market, the overall satisfaction rate is lower than satisfaction rate, which mold development has lagged behind the production of stamping parts, and low-technology market to meet the rate of middle and low die stamping die is higher than the overall market to meet the rate; second is due to the price of the mold is much lower than international market prices, has some competition force, so its prospects in the international market; third in recent years, Hong Kong-and Taiwan-owned, foreign-funded enterprises in China developed rapidly in a large number of these enterprises stamping dies produced for own use no precise statistics, it is not included in the figures being.

II. Modern mold manufacturing technology development

The development of modern technology should die mold products to meet the "short delivery time", "high precision", "good quality", "low price" request for service. Urgent need to develop to meet this requirement as a number of

(1) to comprehensively promote universal DBD / DBM / DBE technology

Die DBD / DBM / DBE technology is the development direction of mold design and manufacturing. With the computer software development and progress, universal DBD / DBM / DBE technology, conditions are ripe, the businesses will increase DBD / DBM technical training and technical service efforts; further expand the scope of DBE technology. The development of computers and networks are making DBD / DBM / DBE technology trans-regional, cross-enterprise, campus-wide in the industry as possible to promote and achieve re-integration of technical resources to enable virtual manufacturing possible.

(2) High-speed milling

The development of foreign high-speed milling process in recent years, significantly improve the processing efficiency, and to get a high surface finish. In addition, the module can also be processed with high hardness, but also with low temperature rise, thermal deformation and so on. High-speed milling technology, automotive, home appliance manufacturing industry in the large cavity mold injected new vitality. It currently has more agile, intelligent, integrated direction.

(3) die scanning and digitizing system

High-speed scanner provides scanning system and mold from the model or in kind to the processing of the scanned model of the desired number of features required, greatly reducing the manufacturing cycle in the development of mold. Some quick scan system can be quickly installed in existing CNC milling machine and machining center, for fast data acquisition, automatic generation of a variety of CNC machining process, the DBD data in different formats, for mold manufacturing "reverse engineering . "

(4) the degree of standardization to improve die

Degree of standardization of the mold is increasing, estimates that the current use of standard mold coverage has reached about 30%. Developed countries is generally about 80%.

(6) high-quality materials and advanced surface treatment technology

Application of high quality steel and the corresponding surface treatment technology to improve the life of the mold it is very necessary. Mold heat treatment and surface treatment can fully mold steel material properties play a key part. Direction of development of mold heat treatment is the use of vacuum heat treatment. In addition to the mold surface should improve the development of advanced technologies such as laser surface treatment.

(7) Mold Polishing

Automation, intelligent mold surface quality of mold life, the appearance of

quality parts and so have a greater impact of automation and intelligence of the grinding and polishing methods replace the existing manual in order to improve the quality of the mold surface is important trends.

(8) die development of automatic processing system

This is our long-term development goals mold industry. Automatic mold machine processing system should be more than the rational combination; with accompanying plate positioning fixture or positioning; a complete equipment, tool CNC database; a complete CNC flexible synchronization system; a quality monitoring and control system. Of course, as the user to choose the right equipment, if the selection properly, not only can not make money but make the machine work into the bitter situation.

III. Modern mold manufacturing technology trends

Die technology is mainly towards the future development trend of information technology, high-speed high-precision production and development. Therefore, the design technology, the development focus is to promote DBD / DBE / DBM technology, and continue to improve efficiency, especially in sheet metal forming process of the computer simulation analysis. Die DBD, DBE technology should be declared human, integration, intelligence and network direction, and improve the mold DBD, DBM system-specific level. To improve the DBD, DBE, DBM technology, establish a complete database and development of the mold expert systems and improve software usability is very important.

From the processing technology, the development focused on high-speed processing and precision machining. At present, the development of highly processed high-speed milling, high speed polishing and high-speed electronic processing and rapid tooling technologies. At present, the development of precision machining parts precision mold and the surface roughness of less 1μm Pa ≤ 0.1μm variety of precision machining.

, I V. the modern mold manufacturing

1.CAD/CAE/CAM computer-aided design, simulation, manufacturing integration

CAD / CAE / CAM integration, integration technology is the most advanced modern mold making the most reasonable mode of production. Use of computer-aided design, support engineering and manufacturing systems, according to the respective mold parts designed to prepare the NC machining of parts from design to manufacturing process is an inevitable process, which is from CAD / CAE / CAM system carried out, The processing line cable input

directly from the processing machine, can be used in the preparation of procedures of processing the system analog functions, will be part tool, tool holder, fixture, platform and tool speed, path, etc. are displayed, to check the program prepared correctness. In short the CAD / CAE / CAM system development and simulation of processing can not fully understand the problems identified, resulting in processing prior to prepare the complete set of processing change work, which for the efficient and accurate processing of the mold has a very important part .

2. Advanced equipment in the modern mold making role

The inevitable trend of modern mold making, machining is possible to replace the manual process, especially now that CNC lathes, multi-axis machine tools, CNC mold engraving machine, EDM machine, CNC precision grinding machines, coordinate measuring machines, scanners and other modern equipment widely used in factories, but most of these devices are basically the application of the procedures used CAD / CAE / CAM system to produce, the operator of work procedures in accordance with the provisions of work piece clamping, with a cutting tool and operation of the machine will be able to automatically complete the processing tasks, and created the ideal mold parts or complete the processing operation for the next part.

3. Die materials and surface treatment technology

Due to improper selection and use of materials, resulting in premature failure of the mold, which accounts for more than 45% die failure. Price structure throughout the mold, the materials, the proportion of small, generally 20% to 30%, therefore, the choice of high quality steel and application of surface treatment technology to improve the life of the mold it is very necessary. For tool steel, the ESR technique to be used, such as the use of powder metallurgy high speed steel powders manufactured. Variety of different specifications tool steel, refined products, products of, try to shorten the delivery time is also an important trend.

Mold heat treatment of the main trends: the infiltration of a single element to the multi-element penetration, complex permeability (such as TD method) development; by the general spread of the CVD, PVD, PCVD, ion penetration, ion implantation and other direction; addition, the current laser enhanced glow plasma technology and electroplating (plating) and other anti-corrosion technology to strengthen more and more attention.

V.reverse engineering

Reverse engineering is the first of the parts (the processing of the product) to scan the CAD data generated in multiple formats, and then in the other CAD / CAE / CAM software in the modified design, the technology is the most popular modern mold manufacturing mold manufacturing technology. mold

manufacturing company dedicated to development and production of the scanning system, it can be successfully applied to reverse engineering, mold manufacturing, it can not only improve the performance of CNC machine tools, expanding the function of CNC machine tools, CNC machine tools but also improve efficiency., Renscan200, Cyclone high-speed scanner has been Qingdao H a l e r, Jinan Q l n g q i, national mold center and other units started.

V l .Summary and Outlook

With the development and progress of computer software, CAD / CAE / CAM technology is getting more mature, and its application in the modern mold will become more widespread. Can be expected in the near future, mold manufacturing to separate from the machine manufacturing industry, and independent national economy to become an indispensable pillar industries, while also further promote the integration of the mold manufacturing technology, intelligence, beneficiary , efficient direction.