Research on Mechanical Design Based on Rationalization of Mechanical Manufacturing Process

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Abstract: The advancement of science and technology in China has promoted the economic take-off. As an important part of the secondary industry, machining and manufacturing play an irreplaceable and important role, which is widely used in major fields. Many industries are moving towards the production of fully automobile machinery. The use of advanced automobile mechanical manufacturing technology has greatly improved the productivity, reduced manpower input and costs while ensuring product quality, and achieved the goal of maximizing economic benefits.

1. Introduction
The extensive application of mechanical processing automobile technology has transformed the production of the secondary industry from labor-intensive to technology-intensive. To a large extent, the productivity has been improved, and the technology has been continuously developed toward improvement and standardization. Aiming at the influencing design and manufacture of machinery, this paper conducts research and analysis from four aspects. They are the precision of production, the standardization of management, the innovation of the use of equipment and technology, and the green design of machinery.

2. Control the processing accuracy to effectively reduce the error
The traditional machinery manufacturing enterprises are mostly labor-intensive, and make up for the backwardness of technology through a lot of human activities. However, the market has put forward higher requirements for production enterprises in terms of both quality and output. Mechanical manufacturing is scientific and rigorous in the production, and any small errors will fail to reach the expected. Human operation is susceptible to errors caused by many external factors, but the automobile technology is directly controlled by the system. Once the program is set, except for forcible changes by the operator, the probability of errors is almost zero. With the support of automobile technology, every link of the manufacturing is under the control of the calculated value. The operator can find and correct the problem by observing the data change, reduce the possibility of risk, and improve the quality.

For example, transform the traditional processing technology for intelligent control to reduce calculation errors. Factors such as personnel and equipment will cause the machine operation to deviate from the previous settings, so the technician must leave room for fluctuations in the initial plan setting. First of all, technicians should make scientific planning on the initial program setting, change the traditional empiricism and adopt the method of big data collection and sorting. For example, technicians carry out information collection and infer the general reasons that affect the quality of tires based on the reported tire damage in the database. Rubber quality, heating temperature and other factors play a major role in quality. If the quality of rubber is not up to standard, the tires will be...
affected by temperature with a wide range of thermal expansion and contraction problems. Technicians have carried out many experiments and recorded information in these areas. After inputting the data into the computer system, the computer calculates a reasonable error range through big data analysis. The technicians set reasonable errors based on the results during programming, and use the program to instruct the computer to carry out large-scale production, and the mechanical equipment can be automatically produced. The operator only needs to monitor the fluctuation of various indicators in front of the computer to ensure that it changes within a predetermined reasonable range, which can reduce the intervention of artificial factors and improve quality and efficiency. In addition, similar data should be put together for comparative analysis through the data storage, so that the automatic control system can predict the problems that may occur in advance. The first time to make judgments and provide the most efficient solution can stop loss in time. The manual operation is empiric, so the technicians can reasonably draw on the advantages of experience, and use the predetermined control function to integrate the previous experience accumulation. Starting from two aspects of manual and big data information processing, it can carry out prejudgment and formulate a set of strict and standardized production, so that the automobile system can perform self-monitoring in real time. It needs to ensure that the identification and repair are completed, and the machinery is manufactured. Controlling within safe range by calculating the output, technicians understand the entire production, improve the accuracy of the maintenance, and ensure the stability. It improves the situation that production depends on experience and the overall efficiency. Automobile technology meets the current society’s expectations of the mechanical and manufacturing industry and creates greater economic benefits.

3. Change management ideas and establish data files
The quality management of the machining is the focus of the current enterprise at the center of the production. Any minor errors will have a direct or indirect impact on the subsequent links. Only when the management system is more complete and the scope of application is continuously expanded can the production links be refined. When the processing technology gradually penetrates into all aspects,
the production of the enterprise will be effectively standardized. The core of technology is to pay attention to the goals and the actual needs of customers, and it relates to how to improve product quality and the operating ability. Chemical and physical and other means can carry out testing to ensure the reliability and authenticity.

For example, in order to ensure the accuracy of various data used in mechanical processing and manufacturing, it can effectively play its role. Machinery manufacturing enterprises should implement a collection management system for data files related to processing technology. After being used for a period of time, the mechanical processing facility and factory inspection equipment will gradually experience some deviations due to the influence of the surrounding and other factors. When the error is within the range stipulated by national laws, the mechanical processing enterprise only needs to send special technicians for regular maintenance, record the data and conduct daily monitoring. However, when there is a large deviation in the data, companies need to check and adjust as soon as possible. In the daily production testing, the staff enters the testing value into the computer for file storage. When a problem occurs, the technician only needs to use the computer to call up the recent data and analyze it to know the source of the problem, save time by treating the disease to reduce economic losses. Secondly, in the calibration of measuring instruments and testing equipment, technicians must deal with their misalignment and implement every detail. The device still shows a large deviation during the calibration phase, the technical staff should take it seriously, and re-evaluate the result and record it. It is usually divided into three steps, and the first step is to determine the time of misalignment. Only when the time of inaccuracy is obtained, can the products be recovered to prevent the quality and affect the corporate image. It is also possible to judge whether the consumption of the measuring instrument can continue to be used. The second step is to use the calibration equipment to re-check the product. Qualified products can be put on the market to reduce the economic loss. The third step is to accurately assess and record the measured products and generate product quality files to facilitate future product issues. As the pillar of the the secondary industry, mechanical processing must implement quality standards and reduce the possibility of accidents. Under the social background of rapid economic growth, the needs of various fields for the machining and manufacturing industry provide a strong guarantee for the steady industrialization.

### 4. Meet the needs of customers and carry out intensive production

With the economy taking off, a large number of machinery production enterprises have appeared, and market competition has intensified. Therefore, enterprises must change the previous single production model, actively develop new products and update processes to meet market needs. The traditional manufacturing industry is mainly labor-intensive, and neither the technical level nor the production scale can adapt to the new trend. The machining process is more complicated and involves multiple technologies. Therefore, in order to meet the needs of comprehensive development, enterprises should actively upgrade their technology to form an intensive application model that combines artificial intelligence, electronic information and multimedia and others, and ensure the stable operation. To sum up, the machining and manufacturing enterprises should take the initiative to promote the integrated production mode and closely control the accuracy in all links.

For example, it needs to develop an integrated application and strictly control all production links to improve the accuracy. In the face of constant fierce market competition, machinery manufacturing companies have vigorously carried out merger activities to improve their core competitiveness. For example, a single tire manufacturing company will expand its business to complete vehicle assembly. Therefore, enterprises must have both tire manufacturing and automobile assembly technology. Enterprises learn advanced foreign management methods and use computers for integrated control. They are combining manual and automobile technologies. It needs to introduce a management model with on-time production, agile manufacturing, concurrent engineering and other computer-based automobile production supplemented by human control. It is necessary to change the traditional backward and loose system to the direction of integration, control all kinds of automobile production technologies, and handle the efficient operation of the chain. Before the formal commissioning,
data simulation system performs the function of restoring the simulation to predict the possible problems and save for the information transmission system. After the device control system is started, the production is carried out. Once the problems predicted in the previous period occur, the information transmission transmits the request to the device control system to stop the command. The device control system automatically cuts off the connection between the various links to prevent the loss from further expanding, and then starts production after the danger is removed. Machinery manufacturing enterprises make full use of the integrated advantages of systems and achieve the maximum economic benefits.

5. **Carry out green design and pay attention to the quality of the surface**

As the mainstay of the secondary industry, mechanical processing and manufacturing must pay attention to the quality of products and green production with social benefits to save energy and protect the environment. Therefore, the rational design of mechanical processing can help enterprises to carry out targeted production to meet the needs of society to maximize economic benefits, and provide continuous economic and technical support for the national industrialization.

For example, it is needed to focus on green design and the quality of the processed surface. The quality of the processed surface is an important part of the rationalization of the design. The quality will directly determine whether the product has the qualification. Therefore, the following three points should be achieved. The first point of cutting has a lot of influence on the flatness of the processed surface, so the appropriate cutting fluid should be selected according to the actual situation and maintained at a uniform speed for cutting operations. The second point is selected and the machine after designing a tool that matches the design goals. The designer selects the tool according to its own characteristics after researching the parts to reduce the deviation between the arc radius and the cutting angle. Common tools include smoothing and finishing tools. The third point should pay attention to the way of controlling product deformation in mechanical design. The deformation of some parts will cause the surface of the product to be raised or depressed, resulting in uneven surface and ultimately affecting product quality. Finally, for the possible pollution caused by some mechanical products to the surrounding environment, the enterprise should recover it and reuse it to reduce losses and avoid pollution.

6. **Conclusion**

With the development of technological economy, mechanical processing and manufacturing
Enterprises should continue to learn to improve their business capabilities in a favorable position in market competition. It is needed to reduce calculation errors, strictly control accuracy, improve production efficiency, establish a scientific management system, implement green machinery design and upgrade processing technology, introduce advanced equipment, enable enterprises to take into account social and economic benefits, and meet current development needs to improve the rationalization of the mechanical manufacturing.

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