

Reflections on the Current Situation and Prospects of Mechanical Design, Manufacturing and Automation Specialty

Duan Mingzhong

Wuhan Railway Vocational College of Technology, Wuhan, 430205, China

Keywords: Machinery; Design and Manufacturing; Automation

Abstract: Mechanical design, manufacturing and automation is a traditional engineering specialty with a long history in China. The capability of mechanical design and manufacturing represents the level of heavy industry of a country to a certain extent. Therefore, the author makes an analysis of the present situation and Prospect of mechanical design and manufacturing and automation specialty. The present situation and existing problems of mechanical design and manufacturing and its automation specialty construction are analyzed. Studies have shown that in today's era, the advancement of science and technology is very rapid. The integration of computer network technology and other advanced technologies in mechanical manufacturing and automation can improve the efficiency and quality of industrial production, and also improve the mechanical manufacturing industry. Modernization and intelligence.

1. Introduction

Mechanical design, manufacturing and automation are comprehensive technical disciplines that study the management of various industrial machinery equipment and electromechanical products from design, manufacture, operation control to production process [1]. Only under the premise of ensuring the specifications of the medium, adhere to and carry forward the discipline advantages that have been formed in the reform and development over the years, closely combine the market demand and highlight the professional characteristics, in order to cultivate high-quality unique senior engineering and technical talents [2]. However, from the perspective of the entire industry structure, many high-end fields of machinery manufacturing are still occupied by foreign companies, a large number of technologies need to be introduced and digested, and Chinese enterprises are mainly engaged in competition in the low-end and mid-range [3]. In today's era, the level of modernization and intellectualization in machinery manufacturing industry is gradually improving, which also speeds up the modernization of China's industrial industry, and the good application of automation technology can effectively enhance production efficiency and quality [4]. Moreover, it can save a lot of labor force and play an active role in improving the social and economic benefits of enterprises [5]. As the basis of national economic development, mechanical design, manufacturing and automation will certainly drive and influence the development of other industries and technologies in the corresponding technological changes and development. There are many kinds of computer software and hardware, and the application of machinery manufacturing is very extensive. The demand for talent stability is very strong.

Machinery design, manufacturing and automation is based on mechanical technology and electronic technology as the main body, combined with computer technology, network technology, information technology and software programming and other technical disciplines [6]. They penetrate and combine with each other, and gradually develop and improve a new frontier discipline, which has broad development potential [7]. The development and popularization of mechanical manufacturing automation not only improves the labor productivity, but also reduces the labor intensity to a great extent. The manufacture and production of large-scale complete sets of equipment make the project which was impossible to realize possible [8]. The development of this major is not only an important reflection of a country's industrial level, but also an important criterion to measure a country's comprehensive strength [9]. According to the specific reality of the development of this discipline and the advantages and conditions of the school that have been formed in the field of

agricultural machinery, the reform and development are closely carried out in conjunction with market demand. Therefore, whether applied undergraduate colleges can guarantee the teaching quality of mechanical manufacturing and automation, and whether the cultivation of talents can adapt to the development needs of the manufacturing industry is a topic that must be taken seriously and studied in depth [10]. However, at present, the development and application of China's machinery manufacturing and automation expertise are still far from the developed countries. Therefore, in order to continuously reduce the gap between the two, we must vigorously promote the application of automation technology and other advanced science and technology to accelerate the sustained development of China's machinery manufacturing industry.

2. Current Status of Mechanical Design and Manufacturing and Automation

China has been a big country in mechanical design and manufacture since ancient times. It can be seen from the unearthed cultural relics that China has mastered advanced metallurgy and forging technology more than 2,000 years ago. Engineering application talents are mainly engaged in engineering design work, which can transform scientific principles and professional knowledge into engineering plans or drawings. The machinery manufacturing industry in these developed countries is very deep in the application of advanced computer network technology, thus accelerating the development of machinery manufacturing and improving production efficiency and quality. Although there are still deviations in the perception of mechanical work, it is a one-sided view that mechanical work is no different from factory workers. The mechanical design, manufacturing and automation professions are compounded by a combination of talents with a wide range of adaptability and employment in multiple fields. Intelligentization is the combination of human and intelligent computers, enabling human-computer interaction and helping humans to work better. Mechanical manufacturing can design ideas, analyze judgments, make decisions, etc., which are the result of intelligence. At the same time, with the help of intelligent machinery, it is possible to optimize the work of human experts, and even to do more perfect. At present, the employment market has stipulated the automation control ability of the system. We should not only understand the core tailoring and driver development, but also control the language programming skills smoothly. That is to set up the main position of senior software development engineer to ensure the integrity of the business quality of the candidates.

At this stage, the number of such research is increasing. Figure 1 shows the trend of increasing and decreasing the number of such projects in recent years. This shows that this kind of research is attracting the attention of scholars.

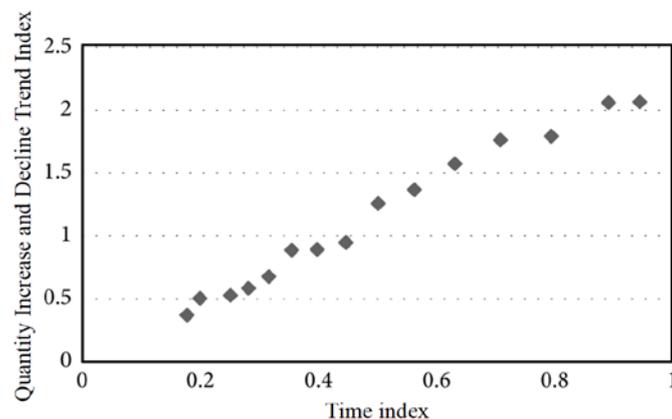


Fig.1. The Trend of Increase and Decrease in the Number of Relevant Research in Recent Years

The specialty of mechanical design, manufacture and automation is based on mastering the basic knowledge of mechanical design and manufacture, and mastering certain computer technology, information technology and automation technology, so as to cultivate NC talents with development ability. China is not as good as developed countries in this respect. At present, the management and operation methods used in China's machinery manufacturing industry are all related staff's

technology and experience. Technical and technical talents are mainly engaged in on-site management, development, and crafts, and can assume corresponding responsibilities in the process of converting design plans into products. After arriving in New China, China's industrial production scale has developed rapidly, and heavy industrial bases have been established in some important cities. After the reform and opening up, with the influence of information technology, China's mechanical design and manufacturing level has reached a new height. It is difficult for us to find a suitable baseline between higher vocational education and academic education to position applied undergraduate level education, because it is neither a higher vocational education, a simple ascending or upgrading, nor a simple scientific theory education. .

3. Prospects for Mechanical Design, Manufacturing and Automation

With the continuous development of science and technology, mechanical design and manufacturing automation will achieve great achievements in the future. The author makes a brief analysis of the development trend of mechanical design and manufacturing automation through some observations and understandings in the industry. In the field of mechanical manufacturing and automation, the use of computer network technology is very common, which can effectively improve production efficiency and precision of machine manufacturing, save a lot of manpower and material resources, and reduce the input cost of machinery manufacturing enterprises. Educational administrators should strengthen the specialty construction in the reform of campus teaching, and build the specialty of mechanical design, manufacturing and automation into a university specialty with demonstration function and distinct characteristics. Moreover, the scientific and rational use of computer network technology can also strengthen the intelligent degree of mechanical manufacturing industry, at the same time, it can also integrate more advanced technology and science together, promote the intelligent degree of mechanical manufacturing industry to gradually improve, so that the production efficiency and quality have been greatly improved. Because of this, the ability orientation of Applied undergraduate talents is obvious. Not very clear and clear.

The field of mechanical design and manufacturing has distinct characteristics, and it is the best application field of artificial intelligence. Therefore, the future development of mechanical related fields must be intelligent. Many institutions of higher learning not only emphasize higher mechanical professional accomplishment, but also pursue higher humanistic accomplishment when formulating training objectives. It not only emphasizes the breadth of knowledge, but also pursues the depth of knowledge in the field of machinery. It is very difficult to modularize the management of equipment components because they all have different automation manufacturers. The application of artificial intelligence in the mechanical design manufacturing industry minimizes the labor cost and increases the production efficiency. At the same time, it can greatly reduce the occurrence of production accidents and maximize the protection of the life safety of the production workers. It not only emphasizes strong professional technology application ability, but also pursues strong innovation ability. When developing power equipment, the functions of the engine and reducer are often integrated. When developing testing equipment, it is usually necessary to develop quality identification equipment. Only a comprehensive and in-depth understanding of professional training can achieve the best results.

4. Conclusions

Mechanical design, manufacturing and automation are the embodiment of the strength of the national heavy industry. As a comprehensive big country, China must have its own national industry in industry. In the future work, the professional mechanism of our institute will continue to focus on the cultivation of applied talents and focus on the characteristics of the manufacturing era. In the course of development in China, the machinery manufacturing industry has always played a very important role, which can play an irreplaceable role in industrial and agricultural production, thus providing a solid foundation for China's social development and economic construction. In the future industrial development, we should grasp the trends of the times, understand the motives of the

market, strive to enhance our own advantages, improve our shortcomings, get rid of the dependence on technology and equipment of western industrial powers, and give full play to foresight and creativity. To enable mechanical design and manufacturing to achieve more outstanding results, and to make outstanding contributions to China's modernization and information industry production. Therefore, the application of intelligent technology should be strengthened and the advanced science and technology should be reasonably integrated, so as to continuously strengthen the technical level of machinery manufacturing and automation in China and promote the further development and progress of society.

References

- [1] Gamzina D, Barnett L R, Ravani B, et al. Mechanical Design and Manufacturing of W-Band Sheet Beam Klystron. *IEEE Transactions on Electron Devices*, 2017, PP(99):1-8.
- [2] Sharma A, Bandari V, Ito K, et al. A new process for design and manufacture of tailor-made functionally graded composites through friction stir additive manufacturing. *Journal of Manufacturing Processes*, 2017, 26:122-130.
- [3] Grodzki W, ukaszewicz, A. Design and manufacture of unmanned aerial vehicles (UAV) wing structure using composite materials. *Materialwissenschaft und Werkstofftechnik*, 2015, 46(3):269-278.
- [4] Hengsbach S, Lantada, Andrés Díaz. Direct Laser Writing of Fractal Surfaces: Strategy to Design and Manufacture Textured Materials. *Advanced Engineering Materials*, 2015, 17(2):172-180.
- [5] Maidin S, Jaafar M H. Design and Manufacture of Recurve Bow Riser Using Fused Deposition Modeling and Fibre-Reinforced Composite Material. *Applied Mechanics and Materials*, 2015, 786:300-304.
- [6] Ahmed N A, Day T R. Design and Manufacture of the Prototype of an Innovative Pump for 'Proof of Concept' Test. *Applied Mechanics and Materials*, 2014, 607:536-541.
- [7] Ustun O, Cakan M, Tuncay R N, et al. [IEEE 2014 XXI International Conference on Electrical Machines (ICEM) - Berlin, Germany (2014.9.2-2014.9.5)] 2014 International Conference on Electrical Machines (ICEM) - Design and manufacture of electric powertrain and its cooling system for ITU EV project. 2014:730-735.
- [8] Entekhabi E, Haghbin N M, Moztarzadeh F, et al. Design and manufacture of neural tissue engineering scaffolds using hyaluronic acid and polycaprolactone nanofibers with controlled porosity.. *Mater Sci Eng C Mater Biol Appl*, 2016, 69:380-387.
- [9] Cazon A, Aizpurua J, Paterson A, et al. Customised design and manufacture of protective face masks combining a practitioner-friendly modelling approach and low-cost devices for digitising and additive manufacturing. *Virtual and Physical Prototyping*, 2014, 9(4):251-261.
- [10] Cohen K, Katz R. Teaching Mechanical Design Practice in Academia. *Procedia CIRP*, 2015, 36:177-181.