



# The Application of Guan Zhong's Thoughts in the Basic Class of Mechanical Design

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**Abstract.** The application of Guan Zhong's thoughts in the classroom of mechanical design foundation seems to be a combination of two different fields, But in fact, Guan Zhong's thoughts on governance and economic strategy can be cleverly integrated into the teaching of the fundamentals of mechanical design. Integrating Guan Zhong's thought into the basic class of mechanical design can not only enrich the teaching content and methods, but also improve the comprehensive quality and innovation ability of students, and provide strong support for cultivating outstanding talents with modern mechanical design concepts and abilities.

**Keywords:** Guan Zhong's thoughts, Governance and State Administration, Mechanical Design, Innovation

## 1 Introduction of Guan Zhong

Guan Zhong was an outstanding statesman and reformer in the State of Qi during the Spring and Autumn Period. His surname was Ji, Guan's family name was Yiwu, and his character was Zhong. He was born in Yingshang (now Anhui Yingshang), after a rough early years, Guan Zhong and Bao Shuya became friends and conspired. With Bao Shuya's recommendation, Guan Zhong became Shangqing (Prime minister) of the State of Qi and assisted Duke Huan of Qi in implementing a series of political, economic and military reforms, which made Qi quickly rise to the top of the Spring and Autumn Period. Guan Zhong emphasized governing the country by law, respecting the king and resisting the emperor, promoting the worthy and appointing the able, and paying attention to economic efficiency and cost control. His thoughts had a profound influence on later generations. He was not only the forerunner of ancient Chinese legalism, but also an important protector and promoter of Chinese civilization<sup>[1]</sup>.

## 2 Guan Zhong's Thought

### 2.1 Political Thought

**Rule by Law.** Stressing the important role of law in national governance, Guan said the law is an important tool for maintaining social order and justice and must be strictly enforced and observed. He introduced a series of legal reforms to rule the country by law and ensure its stability and prosperity.

**Respect the King and Resist the Barbaries.** Guan Zhong put forward the diplomatic strategy of "respecting the king and resisting Yi", that is, respecting the authority of the Zhou royal family while resisting foreign aggression. This strategy not only enhanced the international status of Qi, but also promoted peaceful coexistence among the vassal states.

**Appointing the Worthy.** Guan Zhong advocated breaking the system of hereditary power and wealth, selecting talented people to hold official posts, and choosing people based on their ability, regardless of their rank and rank<sup>[2]</sup>. He attaches great importance to the selection and training of talents, and believes that the prosperity of a country cannot be separated from the support of talents.

### 2.2 Economic Thinking

**Development of Production.** Guan Zhong regards the development of production as the foundation of the country, and he advocates improving the production capacity of farmers and increasing the wealth and strength of the country through reforming the mode of agricultural production. At the same time, he also advocated the expansion of production, the development of industry and commerce, to promote economic prosperity<sup>[3]</sup>.

**Land and Decline Tax.** Guan Zhong broke the restriction of the well field system in the economy, and adopted the progressive measure of "land and decline tax" for a large number of developed private fields, That is, taxes are levied according to the quality of the land. This policy lightens the burden on the poor and encourages the development and use of land.

**Attach Importance to Agriculture.** Guan Zhong believes that land is the foundation of the country, and the livelihood of the people depends on the land. He proposed the equalization system, through the redistribution of land, so that every farmer can own a suitable piece of land. This policy has greatly stimulated the enthusiasm of farmers in production and improved the level of agricultural production.

### 2.3 Social Thought

**People-Oriented.** The Guan Zhong School respects people and emphasizes humanity. They believe that people are the fundamental driving force for the development of social production, and engaging in any kind of industry is not as high as the rate of return brought by "people". Therefore, we should attach great importance to people's problems and regard people as "the pole of the world". The Guan Zhong school also pays attention to the role of talents, and believes that a strong country must first strengthen talents. They advocate enhancing the competitiveness of the country by attracting and training talents, and believe that "the king of the world is the king, and the half of it is the tyrant."

Guan Zhong's idea of governing the country deeply reflects the respect and understanding of human nature. He advocated that the governance of the country should conform to human nature, meet the reasonable needs of the people, and allow the people to live in a free, equal and just environment. He put forward the "nine benefits of education" and other policies to benefit the people, it fully reflect the deep concern for the people's livelihood.

**Propriety, Integrity and Shame.** According to Guan, "decency, integrity and shame" is the spiritual pillar to maintain national stability and development. This concept not only emphasizes the importance of personal moral cultivation, but also advocates that people should live in harmony and respect each other. In the complex and changing political environment of the Spring and Autumn Period, he implemented a series of reforms to strengthen these values and make them deeply rooted in the people. This emphasis on moral norms and social responsibility had a profound impact on the society at that time, not only promoting the unity and stability within the state of Qi, but also leaving valuable spiritual wealth for later generations and becoming an indispensable part of traditional Chinese culture<sup>[4]</sup>.

## 3 The Application of Guan Zhong's thought in the Basic Class of Mechanical Design

### 3.1 Focus on Student Needs and Student Development

The "people-oriented" proposed by Guan Zhong, its core connotation is people as the foundation, emphasizing that the interests of the people should be put in the first place in national governance. In the basic class of mechanical design, teachers should first understand students' grasp of basic knowledge, such as mechanical drawing, CAD, tolerance and coordination, metal materials, engineering mechanics and other related courses, so as to teach students according to their aptitude. Stimulate learning interest: By designing project cases close to students' life or interests, stimulate students' interest in basic mechanical design courses and improve their learning enthusiasm.

Pay attention to student development and cultivate comprehensive ability. The basic course of mechanical design should not only impart theoretical knowledge, but also

focus on cultivating students' practical operation ability, innovative thinking ability and teamwork ability<sup>[8]</sup>.

Focus on individual differences. Individualized guidance and assistance are provided for different students' learning characteristics and ability levels to ensure that each student can grow in the course.

### **3.2 Combination of System Thinking and Overall Design**

In governing the country, Guan Zhong pays attention to formulating an overall strategy from a macro perspective. Mechanical design requires students to start from a global perspective and consider the interaction and influence between various components, which is just like the wisdom of developing an overall strategy from a macro perspective when governing a country. By introducing Guan Zhong's system thinking, students can better understand the complexity of mechanical design and cultivate their global concept<sup>[5]</sup>. In the basic class of mechanical design, students can be guided to think about mechanical design problems from a systematic perspective, treat each component as a part of the whole, and understand the interaction and influence between them. For example, when explaining the mechanism analysis, it not only analyzes the working principle of a single mechanism, but also considers it in the whole mechanical system, so as to cultivate students' systematic thinking and global concept.

### **3.3 Fostering a Spirit of Change through Innovation**

Guan Zhong has demonstrated excellent innovation ability in many fields such as economy and politics. Mechanical design itself is a challenging and innovative field that requires constant experimentation with new design methods and concepts. Guan Zhong's spirit of daring to break the rules and innovation can inspire students not to be satisfied with the status quo, have the courage to explore the unknown, and cultivate their innovative thinking and innovative ability. In the basic class of mechanical design, students can be encouraged not to adhere to traditional design methods, but to try new ideas and solutions. For example, when explaining design cases, introduce some innovative design examples, such as new transmission mechanism, intelligent control system, etc., to stimulate students' enthusiasm for innovation<sup>[6]</sup>.

### **3.4 Efficiency and Cost Control**

Guan focused on improving efficiency and reducing costs in his economic reforms. In the process of mechanical design, students need to pay attention to the economy and practicality of the design to ensure that the design scheme is optimized and the manufacturing cost is reduced under the premise of meeting the functional requirements<sup>[9]</sup>. This consensus of economic efficiency and cost control can help students form more scientific and reasonable design concepts, improve their design ability and market competitiveness. In the basic class of mechanical design, students can be guided to pay attention to the economy and practicability of design, learn to optimize the design scheme and reduce the manufacturing cost under the premise of meeting the functional

requirements. For example, when explaining the selection of materials, in addition to considering the performance of materials, students should also be guided to pay attention to the price and availability of materials, and choose cost-effective materials.

### **3.5 Respect the Laws of Nature and Cultivate a Scientific Attitude**

Guan not only had profound insights in the political and economic fields, he also attached great importance to following the laws of nature and scientific principles. This concept is also applicable to modern education, especially in the teaching process of the basic course of mechanical design. Cultivating students' scientific attitude and the spirit of seeking truth from facts is one of the core objectives of the course. Teachers encourage students to test the feasibility of design schemes through experiments, rather than relying solely on theoretical analysis or subjective assumptions. This approach helps students build confidence in their practical problem-solving skills and learn how to make decisions based on empirical data. In addition, it promotes the development of critical thinking and enables students to evaluate their work results more objectively, thus avoiding design mistakes caused by blind confidence.

In order to further enhance the learning effect, when explaining the principle of mechanism movement, teachers will use the way of demonstration experiment, so that students can intuitively observe how different institutions operate. Such a teaching method not only improves the classroom interaction and interest, but more importantly, it greatly stimulates students' learning interest and promotes the growth of their observation and analysis ability. When students see for themselves that the institution is functioning as intended, they can gain a deeper understanding of the underlying physical laws and technical details. This approach not only deepens the understanding of theoretical knowledge, but also lays a solid foundation for future research or work in related fields. Through this combination of practical teaching methods, students are able to master the basic knowledge, while developing practical skills to solve problems, and lay a good start to become excellent engineers.

### **3.6 Pay Attention to Details and Cultivate Artisan Spirit**

Guan Zhong's rigorous attitude and fine management in governance can be likened to the craftsman spirit in mechanical design. Mechanical design is a scientific subject, which requires students to have a solid theoretical foundation and rigorous experimental spirit. By inheriting Guan Zhong's scientific attitude and rigorous academic spirit, we can cultivate students' rigorous academic attitude, spirit of seeking truth from facts and attention to details, so that they can achieve more excellent results in the field of mechanical design<sup>[7]</sup>. In the basic class of mechanical design, students can be guided to pay attention to the details of design and pursue the spirit of craftsmanship. For example, when explaining parts processing, the importance of processing accuracy and surface quality is emphasized, so that students can understand the truth that details determine success or failure.

## 4 Conclusions

The application of Guan Zhong's thought in the basic class of mechanical design not only enriches the teaching content and methods, but also improves the comprehensive quality and innovation ability of students. By introducing the essence of Guan Zhong's systematic thinking, innovative spirit, economic efficiency concept and scientific attitude, students can better understand the basic knowledge and basic skills of mechanical design, and lay a solid foundation for their future study and career.

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