

Exploring How the Professional Ethics of Engineers Can Be More Effectively and Deeply Integrated with Today's Social Reality

-- Chinese Engineers Should Be Guided by The Spirit of Craftsmanship

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Abstract: Under the impact of the epidemic in the past two years, the economic situation in various industries has been not optimistic. More and more members of the engineering community have begun to adhere to the principle of economic supremacy and utilitarianism, ignoring the most basic professional ethics. This has led to an increasing number of substandard products on the market, and the quality of some engineering products is worrying. Many large engineering projects have also suffered accidents as a result. Perhaps this is the last resort to "supporting the family" during the epidemic. With the end of the epidemic and the recovery of the economy, how to effectively integrate the professional ethics of engineers with the current social reality has become a problem that needs to be considered. In this situation, it is urgent to cultivate the professional ethics and ethical concepts of engineers guided by the spirit of craftsmanship.

Keywords: Professional ethics; ethical concepts; spirit of craftsmanship.

1. Research Significance

With the development of the times, in order to be more efficient and convenient in fast-paced life, more and more work and life things have been systematically planned. We often use engineering as an application to provide faster, safer, and beneficial things for people's lives in the shortest time and with minimal labor. In the Oxford English Dictionary, engineering is defined as a meticulous plan and design to achieve specific goals. However, in the process of engineering planning and implementation, whether it is due to external factors or the inherent drawbacks and loopholes of the project, as long as there is "human" participation, there will be various problems and reflections. Problems at the technical, theoretical, and material levels can be optimized and compensated for through the development of technology. However, spiritual and ethical issues need to be learned and cultivated by ourselves. To more effectively integrate the professional ethics of engineers with social reality, we need to start from various aspects such as education, norms, public welfare, innovation, and communication, in order to promote engineers to better shoulder social responsibilities, and continuously explore innovative spirit and new methods of serving society in daily life and work. I believe that cultivating the spirit of craftsmanship is the integration of engineer professional ethics and social reality. Important orientation.

2. The Emergence and Development of Professional Ethics for Engineers

2.1. The Meaning of Professional Ethics and Ethics for Engineers

Engineering is not simply a scientific application, nor a simple stacking and patchwork of related technologies. It is

the integration, selection, and optimization of many elements such as science, technology, economy, management, society, culture, and environment. It is the sum of all the complete practical activities of human transformation of the material nature. It is a purposeful and organized activity to transform the world. Ethics, in simple terms, refers to the correct behavioral norms of people in secular society. It is a branch of philosophy, and many people have heard of family ethics, medical ethics, military ethics, etc., but it is a bit unfamiliar to engineering ethics. In fact, engineering ethics is widely used in our daily lives, and it belongs to a part of professional ethics, from the construction of the Three Gorges Water Conservancy Project to community garbage. Plan for categorizing projects. Engineering ethics is the study of the ethical principles and behavioral norms of engineers in engineering activities, including the design, construction, operation, and maintenance of a series of processes.

Engineering ethics generally include the principles of people-oriented, caring for life and nature, safety and reliability, and fairness and justice. Engineering ethics is based on the theoretical achievements and universal theoretical values of general ethics, and makes moral judgments on ethical issues in engineering activities. At present, the study and cultivation of engineering ethics have been recognized and widely valued by various universities, and various engineering ethics lectures related to this major have been conducted to teach engineering ethics.

2.2. The emergence and development of engineer professional ethics and ethics

Engineering ethics emerged with the emergence of engineers and professional groups. At first, people believed that engineering naturally brings happiness and benefits. However, in the process of planning and implementing engineering, whether it is due to external factors or the inherent drawbacks and loopholes of the project, as long as

there is human participation, there will inevitably be various problems and thoughts. Issues such as technology, theory, and materials can be optimized and compensated for through the development of technology. However, ethical and moral issues are easily influenced by economic interests, and the goals of engineering practice are often influenced by commercial interests. People have begun to realize the enormous power of engineers, which also means that engineers should bear more ethical responsibilities and obligations.

In the early days of modern engineering and engineering, engineering ethics was still in a naive stage of development, and there were no relevant regulations or constraints. Various engineering organizations did not record and describe them in written form, and they mostly relied on verbal descriptions or peer pressure to maintain them. The term "engineer" first appeared in the late Middle Ages in the West, and at that time, it was used for soldiers or engineers, such as those who built or operated siege hammers, stone crossbows, and other military equipment. Engineers served in the military, so the engineering ethics at that time were mainly focused on loyalty and obedience to superiors or organizations.

The first informal Society of Civil Engineers was founded in 1717 by engineer John Smith in England, and was renamed the Smith Society after his death. In 1818, the first officially recognized professional engineer organization, the Society of Civil Engineers, was founded in England. At the same time, similar organizations emerged like mushrooms in countries such as the United States and Europe, marking the official emergence of the engineering profession. From the second half of the 19th century to the early 20th century, many engineering organizations began to explicitly incorporate ethical norms into their organizational charters. The explicit provisions of engineering ethics became an important means of promoting career development and enhancing professional reputation. For example, the Code of Ethics formulated by the American Institute of Electrical Engineers in 1912. The requirement of loyalty is clearly defined as loyalty to the professional community, loyalty to employers, and loyalty to customers, in order to achieve a degree of public recognition and professional autonomy.

Since the 20th century, the focus of engineering ethics has shifted to efficiency. Engineers are more focused on improving technology and increasing efficiency to obtain more benefits. At the same time, engineers in the era have gained greater political and economic power due to the popular technology governance movement at that time.

After World War II, engineers suffered from the invasion of war and began to reflect on where their abilities should be applied. Engineering ethics entered a new stage of focusing on the social responsibility of engineers in engineering. Like a series of anti war movements, anti nuclear weapons movements, environmental safety movements, etc., society has also begun to demand that engineers participate in projects that benefit the public and promote public health and safety. Engineers begin to assume social responsibility based on the significant impact they can bring.

At the beginning of the 21st century, engineering ethics began to participate in more and more social issues. In a sense, the previous engineering ethics were an individualistic engineering ethics, where engineers who adhered to social responsibility made decisions on engineering issues based on rigorous technical analysis and risk assessment, acting as experts and authorities, and did not advocate for the

participation of all citizens or stakeholders in engineering decision-making. The new participation ethics emphasizes the public's expression of opinions on ethical issues in engineering practice. Engineers are no longer independent decision-makers in engineering, but rather one of the contributors to dialogue and regulation in participatory democratic governance platforms or frameworks. Of course, participating in ethical practice is not yet mature and is still under development.

2.3. What professional ethics should engineers possess

Engineers play a crucial role in building a whole in society, and their role and responsibility are extremely important. Therefore, a qualified engineer with professional ethics should care about society, make contributions to society in their field, and explore how the professional ethics of engineers can be more effectively integrated with today's social reality. Firstly, we should understand what professional ethics engineers should possess.

1. To regulate personal behavior in accordance with current national laws, regulations, and rules, and take responsibility for one's own behavior

Law is the minimum requirement for morality, which is to maintain order by restraining people's inner selves. Observing laws and regulations is the responsibility and obligation of every citizen. As an engineer, not only should we abide by laws and regulations, but we should also abide by industry rules and regulations, understand the law and abide by the law, and have the courage to take on our own actions and responsibilities.

2. Services should be provided within one's own abilities and professional field, and their qualifications should be clearly stated

Engineering originated from the needs of human survival, and the concept of modern engineering is also very broad, involving a wide range of fields. However, there are specialties in the field, and engineers should provide services to others within their professional field, and be responsible for others and themselves.

3. Relying on professional performance and service standards to maintain professional dignity and personal reputation

The public's understanding and evaluation of an industry is mainly determined by its professional performance and service level. And professional performance and service level are based on their professional dignity and personal reputation. The professional dignity and personal reputation that engineering practitioners possess are their business quality, efficiency, level, and service attitude, which are commonly referred to as service level. Therefore, the level of self-discipline management in the engineering industry has also become one of the standards for measuring the quality of services.

4. Dealing with professional relationships should not involve discrimination or prejudice based on race, religion, gender, age, nationality, or disability

Gender and racial discrimination are common issues in the workplace. Whether in interactions with peers or cooperation between Party A and Party B, one should not underestimate others based on gender, age, or other factors. One should first learn to respect others, which is also the engineer's respect for oneself.

5. Be a loyal agent or principal when handling business for

organizations or users

Any engineer who undertakes business for an organization or user must be loyal to the principal or user, and shall not harm the interests of the principal or user in the process of handling business, nor engage in any behavior that harms the interests of the principal or user. Must be loyal to the client or user, and is not allowed to request any form of kickbacks, commissions, remuneration, prizes, or other property from the client. No illegal activities such as bribery and kickbacks shall be carried out in any way.

6. Treat colleagues or professionals with integrity

Honesty and trustworthiness are traditional virtues of the Chinese nation. Engineers should treat colleagues or other professionals with honesty and integrity in their work, which is also the foundation of cooperative development and the fundamental basis for establishing themselves in the industry.

3. Professional Ethics and Craftsmanship Spirit of Engineers

3.1. The emergence and development of the spirit of engineers and craftsmen

The spirit of Western craftsmanship originated from the ancient Western handicraft civilization. In the early days, there was no independent handicraft industry, but as a "byproduct" of agricultural or daily production, people did not have extra energy to develop handicrafts. With the popularization of ironware, agriculture has greatly developed, labor productivity has increased, and handicrafts began to transform from a "byproduct" into an independent industry. At this time, Western craftsmen began to emerge.

From the 12th to the 13th century, handicrafts developed rapidly, and various types of craftsmen such as carpenters, bricklayers, and blacksmiths became essential members of social groups. Handicraft associations began to flourish, and with the development and influence of religion, the status of craftsmen also began to change, from low manual laborers to "God's praisers". The emergence of the Renaissance in the 14th century once again transformed the positioning of craftsmen towards themselves. Advocating a people-oriented humanistic spirit helped craftsmen affirm their significance, awaken their subjective initiative, and develop a sense of mission and responsibility towards their profession. They became "pursuers of art", and from then on, the spirit of craftsmen began to be passed down from generation to generation.

The early development of the craftsmanship spirit in China was similar to that of the West. With social changes and the separation of handicrafts and agriculture, people began to pursue more refined life products. Stone carving, wood carving, bone carving, and others all showcase the ingenious ideas and exquisite craftsmanship of craftsmen. During the Spring and Autumn period and the Warring States period, a hundred schools of thought were contending, and social groups began to pay attention to "moral" education, which had a profound impact on the spirit of craftsmanship.

The culture of apprenticeship and the inheritance of father's work in China have also laid a certain foundation for the spirit of craftsmanship in China. The transmission of skills from generation to generation is not only the transmission of knowledge, but also the inheritance of ideological and cultural values. For example, Lu Ban, who came from a family of craftsmen, passed down his skills from generation to generation; Yu Wenkai, an expert in construction

engineering during the Sui Dynasty; Cai Lun, the pioneer of papermaking; Tang Dynasty guqin maker Lei Wei; There are also many hundred year old families passed down from father to son in the family handicraft industry, and so on. These craftsmen, through their words and deeds, not only impart their skills, but also impart their perseverance, meticulous attention, perseverance, and patience to future generations.

The contemporary Chinese craftsman spirit inherits the wisdom and spirit of the ancients, but also meets the new requirements of the development of the times. We need to be innovative and international, which is the development direction of contemporary manufacturing handicraft industry. We should combine the essence of Chinese traditional craftsman spirit and western craftsman spirit to create modern Chinese craftsman spirit.

3.2. The influence of craftsmanship spirit on the professional ethics of engineers

The spirit of craftsmanship emphasizes a work attitude and value orientation that pursues excellence, pays attention to details, strives for excellence, and constantly innovates. In the profession of engineers, the spirit of craftsmanship can be understood as an enhancement of the professional ethics of engineers. This is reflected in the following aspects:

1. The spirit of craftsmanship has elevated the professional ethics of engineers:

The spirit of craftsmanship requires engineers to pursue excellence in their work. This means that engineers not only need to have a high level of technical proficiency, but also need to have a strong sense of responsibility and mission. This is their responsibility for the project and themselves, always maintaining a love for their work and striving to do their best. At the same time, engineers pursue not only personal benefits and income, but also contributions to society, a pursuit of self belief and a sense of achievement.

2. The spirit of craftsmanship enriches the content of engineer professional ethics:

The spirit of craftsmanship pays attention to details. In the work of engineers, details determine success or failure. Only by achieving the utmost in every aspect can the quality and reliability of the project be guaranteed. Therefore, engineers need to have a serious and meticulous work attitude, starting from small things and doing every detail well.

3. The spirit of craftsmanship requires engineers to strive for excellence:

This is reflected in continuous learning and optimization of work processes. Engineers need to constantly learn new knowledge and skills, keep up with the development trends of the industry, and also constantly reflect on their work methods and approaches, seeking more efficient and high-quality workflows.

4. The spirit of craftsmanship contributes to the development and improvement of the professional ethics of engineers:

The spirit of craftsmanship encourages engineers to constantly innovate. The engineering field is a rapidly changing field, and only continuous innovation can maintain competitiveness. At the same time, more and more humanistic care is also permeating into various project projects, which helps to cultivate the value of "people-oriented" among engineers. Therefore, engineers need to have an innovative spirit, be brave enough to try, break through traditional constraints, explore new solutions while paying attention to "people", and promote the progress of technology and

industry.

In short, the enhancement of craftsmanship spirit can elevate engineers to a higher level of professional ethics. It can not only bring more opportunities and challenges to the personal career development of engineers, but also bring more value and contribution to the entire industry and society.

4. Cultivation of the Spirit of Chinese Engineers and Craftsmen

4.1. Reasons for lack of craftsmanship spirit

1. Incorrect value orientation

In ancient China, professions were divided into three, six, and nine categories, with various professions being ranked as "scholars, farmers, and merchants". This resulted in the social status of merchants and craftsmen being very low for a long time. Therefore, people did not choose to be craftsmen when choosing professions. Even becoming a craftsman was to support their family and did not have more spiritual pursuits. This ideology also influenced the career choices of modern young people.

Modern society often emphasizes speed, efficiency, and economic benefits, while neglecting the importance of quality, durability, and exquisite craftsmanship. The dominance of these values makes people more inclined to produce large quantities of cheap products rather than investing time and effort in creating an excellent product, thus reducing the motivation to create satisfactory products.

In addition, some companies focus on short-term profits rather than long-term development, so they tend to outsource a lot of work to cheap labor or use machine automated production lines to reduce costs. In this environment, workers often only use mechanical tools and cannot truly experience the satisfaction of making exquisite products, thus lacking the pursuit of craftsmanship spirit.

2. Prejudiced career outlook and imperfect education system:

The modern education system generally focuses on students achieving good grades and admission rates, while neglecting the cultivation of their craftsmanship spirit. Many schools focus more on standardized testing and paper-based knowledge rather than practical skills and creative thinking. This education system makes it difficult for students to adapt to the challenges in practical work due to a lack of experience and knowledge in practical work. In addition, modern education systems often lack relevant training and support for practical skills such as handicrafts and manufacturing, which results in young people lacking basic manufacturing skills and knowledge, and a lack of understanding and recognition of craftsmanship culture.

In many cases, people have a certain degree of prejudice against handicrafts and manufacturing industries, believing that these industries are low-end, dirty, tiring, and difficult to pursue and learn from. Some people may also have negative evaluations of handicrafts and manufacturing industries, believing that these industries produce low-quality products, and that workers only operate like machines without much skill or creativity. This view leads young people to lack interest in handicrafts and manufacturing, and choose to develop in other industries, which affects their understanding and cultivation of the spirit of craftsmanship.

3. Social changes:

In the early years of the founding of New China, there was a severe shortage of social resources, and the living standards

of the people were generally low. The entire society lacked the ability to reflect on the spirit of craftsmanship. Since the reform and opening up, China's science and technology have developed rapidly, and living standards have greatly improved. People tend to invest in short-term and high-yield ways, and few are willing to invest their time, energy, and financial resources in long-term and slow to achieve results. People are increasingly pursuing efficiency first and economy first. Social thinking about the craftsman spirit has not kept up with the rapid development of society.

4.2. The significance of cultivating the spirit of craftsmanship

For the country, to store energy for achieving great rejuvenation

The manufacturing industry is the foundation of the real economy. Currently, China is facing a background of profound changes in the internal and external environment, unprecedented changes in a century, and the rapid development of information technology such as digital twin technology, the Internet of Things, and big data. The new era calls for new achievements. As the foundation of our country and the foundation of a strong nation, we must solidly promote the innovation and refinement of high-end manufacturing, equipment technology, and the Internet of Things industries. Therefore, workers need to possess the concept of upholding integrity, innovation, and meticulous craftsmanship. For example, Hu Shuangqian, a technician for China's large aircraft project, can produce high-precision components with his specialized and refined hands and traditional iron drilling machines. Only by integrating the spirit of craftsmanship into the system of vocational education and talent cultivation can we accumulate energy for realizing the great rejuvenation of the Chinese Dream and provide solid support for China's modernization.

For schools, in order to optimize the orientation of vocational education

Vocational colleges bear the special mission of cultivating vocational talents. They should truly regard the spirit of craftsmanship in the new era as the engine of talent cultivation, attach importance to cultivating students' professional ethics and spirit, and focus on cultivating their practical spirit and research abilities. From the perspective of the total supply of graduates from vocational colleges, it can basically meet the needs of industrial development, but the quality is not suitable for industrial transformation and upgrading, and there is a large gap and small quantity of applied and technical skilled talents. Only specialization, only refinement, craftsmanship. The spirit of craftsmanship is the standard for cultivating talents in vocational colleges, the development goal of vocational education, and the guiding ideology of vocational education. Under the guidance of the spirit of craftsmanship, modern apprenticeship, integration of industry and education, and school enterprise cooperation have emerged, which is an important measure to strengthen students' understanding and internalization of the spirit of craftsmanship. Vocational colleges should deeply explore the contemporary connotation and significance of the spirit of craftsmanship, accelerate the construction of modern vocational education, and help cultivate the spirit of craftsmanship and professional pride in students.

3. For students, to promote career growth and lead the way

The spirit of craftsmanship in the new era is of great significance to vocational college students. Under the

guidance of the spirit of craftsmanship, vocational college students can clarify their goals, recognize their direction, and strengthen their professional values, employment views, and innovation views. In daily learning, they will pay more attention to strengthening their foundation and filling in their weaknesses, from every process, every process, and every assembly. Their proactive attention in thinking is far more important than the teacher's "thousands of words" and constant reminders. College students in the new era are in the period of opportunity superposition, and also face the problem of difficult employment. In addition to the COVID-19, both the supply and demand sides of the graduate employment market are affected. The employment situation is more severe than ever before, and professional quality with craftsmanship has become a necessity for job hunting. By cultivating the spirit of craftsmanship throughout the entire process, vocational college students can establish a solid work philosophy, master professional skills, and develop good professional ethics, which can not only win recognition from enterprises but also help them realize their life value.

4.3. Methods for cultivating the spirit of craftsmanship

The spirit of craftsmanship has a positive impact on the professional ethics of engineers. Cultivating the spirit of craftsmanship in the new era is to cultivate the professional ethics of engineers and integrate them more effectively with the current social reality. Ultimately, it should be implemented in vocational education of craftsmanship spirit and in moral education.

1. Emphasize practical skills training:

Government departments, schools, and enterprises can strengthen investment in skill training, provide more skill training courses, establish more manufacturing schools or practice studios, increase young people's understanding of handicrafts and manufacturing industry, stimulate their enthusiasm for craftsmanship spirit, and help employees improve their skill level. Students should receive systematic and comprehensive practical skills training, learn the application methods of various tools and materials, clarify the product production process, and thus improve their skills and practical operational abilities.

2. Advocate for innovative thinking:

Encourage people to be brave enough to try new approaches and methods, and improve their ability to think independently. Cultivating innovative thinking can not only improve students' professional competence, but also help employees better adapt to market demand and improve production efficiency. We also need to promote technology, innovation, and quality in society, encourage young people to invest time and energy in creating better products, and thus promote the revival of the craftsmanship spirit.

3. Promote craftsmanship culture and create communication platforms:

Strengthen the promotion and dissemination of craftsmanship culture and spirit. Governments and enterprises can promote the value of craftsmanship culture and spirit to the public through media, exhibitions, speeches, and other forms. At the same time, relevant awards and honors can be established to recognize and speak out for outstanding craftsmen, provide better growth platforms and development opportunities for employees, and integrate them into the company culture.

The government and enterprises should increase

investment in craftsman training, improve their practical skills and innovative abilities, and closely integrate them with practical work needs to help them better adapt to market demand and improve production efficiency. And establish a craftsman exchange platform to provide opportunities for craftsmen from different fields to exchange, learn, and share experiences with each other. The government and enterprises can invest in organizing activities such as craftsman conferences, seminars, and skill competitions to promote communication and cooperation among craftsmen.

4. Encourage professionalism:

Advocate employees to pursue the depth and breadth of professional knowledge and skills, improve their professional literacy, and maintain enthusiasm and motivation for work. Training employees in professional ethics can enhance their understanding and dedication to the industry, such as professional ethics education, vocational skills training, and professional psychological counseling. Developing and implementing an honor system can motivate employees to demonstrate professionalism in their work, such as establishing honorary titles such as Best Engineer and Best Technician, providing employees with a sense of honor and achievement.

Overall, cultivating the spirit of craftsmanship requires joint efforts from all aspects of society. The government and enterprises can provide better training resources and development opportunities, schools can incorporate practical operations into the education system, and individuals should also focus on cultivating professional knowledge and skills, enhancing innovation and teamwork spirit. Through these methods, we can jointly promote the revival of craftsmanship spirit, improve overall production efficiency and product quality level.

5. Conclusion

With the advancement of technology and economic development, engineers not only need to possess professional skills, but also need to possess profound professional ethics and craftsmanship spirit. The spirit of craftsmanship is the attitude and spirit of pursuing excellence and perfection, which contains content such as self challenge, quality pursuit, innovation spirit, and commitment and responsibility. In the engineering profession, the spirit of craftsmanship is particularly important because it involves producing high-quality products, increasing work efficiency, and enhancing competitiveness. The spirit of craftsmanship guides engineers to integrate their sense of responsibility and mission into their work.

At the same time, we should attach importance to the cultivation and practice of craftsmanship spirit, establish industry norms and moral standards, strengthen the professional ethics training and corporate culture construction of engineers, encourage engineers to adhere to quality first and pursue excellence in their daily work, while paying attention to social responsibility and public interest actions, in order to better serve society. Only by guiding the spirit of craftsmanship can we effectively integrate the professional ethics of engineers with the current social reality, and continuously promote the process of technological progress and social development.

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