

# Construction Technology and Innovation Research of Municipal Civil Engineering

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**Abstract:** Since the reform and opening-up, relationship between construction industry and economic market in China has had fundamental changes, and has laid good foundation for updating and reforming of domestic architectural technologies influenced by continuous increase of total market investment. In the construction process of architectural engineering project, as the basic structure of the entire building, theoretical system of construction technologies in civil engineering should be deeply studied in the future to fully satisfy strategic requirements of modern construction system, innovation of original and core technologies should be emphasized to improve civil engineering technology and construction means and play a positive role for maximum construction benefits of civil engineering, and it has great practical significance. The article has made all-round representation on authority and importance of construction technology innovation of civil engineering architecture from the global perspective, discussed and exchanged construction technology features of civil engineering in current period, continuously deepened innovation and reforming of construction technology of civil engineering to effectively facilitate improvement of natures of the building based on summary of construction experience of engineering oriented with technical innovation.

**Keywords:** Municipal engineering; civil engineering; construction technology; innovation

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## Introduction

With advancement of modernization and technicalization, various new technologies have emerged and expanded, the advantages of traditional construction technology of civil engineering are weakened to some extent, and new construction technologies gradually enter daily life of the people to create good development environment for construction technologies of municipal civil engineering. For civil engineering construction of increasing construction qualities and construction scale, innovation is far beyond limitation of traditional architectural thought, and directly challenges it. Therefore, optimization and perfection of construction technologies of municipal civil engineering in the future are used to abandon drawbacks and deficiencies of traditional technological concept, reserve effective forms of technologies, and undertake continuous innovation and reform based on years of actual technical operation experience, make sure precise combination between new technologies and old elements via current resources and technical conditions, form one brand new technical form to adapt to a series of new requirements of “modern engineering technology innovation”, highlight and deepen civil engineering construction, and indicate the directions for reform and development of the all industry to some extent<sup>[1]</sup>.

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# **1. Necessity of construction technologies innovation of civil engineering construction**

On the one hand, seen from current development status of civil engineering industry of our country, the whole industry keeps rising status, and internal competition is increasingly fierce, in order to make sure that it takes one place on the complex market economic conditions, as mainstay industry of national economy, civil engineering needs to speed innovation steps by combining its own actual and public demands. Furthermore, based on the system of survival of the fittest advocated by economic market, it is extremely important in current market environment, in order to adapt to trend of the times, keep a foothold in modern society, civil engineering enterprises should start from the two aspects of construction technology means and technical concepts, and steadily promote innovation of construction technologies of civil engineering. <sup>[1]</sup>In addition, besides optimization of innovation mechanism, enterprises need to continuously enhance its own sense of innovation, for instance, positively bringing in and absorbing advanced construction technologies, construction equipment and construction techniques of developed countries to fundamentally realize good development of civil engineering.

On the other hand, no matter whether it is architectural industry or life service industry, once it has strong sense of innovation, and keeps this sense in every step of industrial development, it can get the best performance, including civil engineering. On the whole, civil engineering in China is still in the development stage, has some gaps with developed countries, this kind of gaps is mainly reflected by two aspects of construction technologies and construction management, hereinto: comparing with other countries, construction technologies adopted by domestic civil engineering severely lack technological innovation. Therefore, for civil engineering of China, it needs to reexamine its flaws and deficiencies from its own perspective, constantly strengthen sense of self innovation, expand wide development space belonging to civil engineering on the basis of innovation, while making sure overall quality of architectural projects, it can still follow up trend of the times to expedite sustainable, healthy and rapid development of architectural industry in China.

## **2. Features and current status of construction technologies of civil engineering**

### **2.1 Features of construction technologies of civil engineering**

Different from other projects, civil engineering buildings have such features as variety, mobility, stationarity and assistance, making it take the lead in civil engineering construction, and the derived construction technologies of civil engineering are widely promoted and applied. But seen from current status of its practical application, due to regional differences, different regions have different demands on civil engineering construction, quality of construction technologies directly determines quality and safety of the whole project to some extent. <sup>[2]</sup>Furthermore, during the process of actual development of projects, the determined projects generally cannot be arbitrarily altered except special situations, due to the feature of variety of the project itself, it imperceptibly increases complexity of the project construction. Therefore, in order to effectively guarantee overall quality of the engineering project, work demand on every department should be strengthened, specific position duties of every department should be cleared to improve construction technologies and construction qualities of civil engineering from the real sense.

### **2.2 Current status of construction technology of civil engineering buildings**

In current period, domestic civil engineering has rapid development, especially in recent years, almost the whole country becomes one big construction site, the rapid development and large quantities amaze countries all over the world, but behind its rapid development, more and more construction issues constantly have appeared, and the influence scope of perniciousness is continuously broadened to create severe threat to development of the whole architectural industry of China. For instance, during early phase design and planning period of the project, due to lack of experience of relevant personnel participated in civil engineering in current period, it leads to severe errors formed with the actual

project while making or designing the specific schemes, it is not only adverse to construction quality of civil engineering building, but also creates great waste to cost investment of early phase construction. <sup>[2]</sup>If it does not radically promote good development of civil engineering, it should be started from management to speed establishment of management system with perfect systems, make strict control and management of work contents and work quality of every department to effectively improve construction quality of civil engineering.

### **3. Innovation strategies of construction technologies of municipal civil engineering buildings**

#### **3.1 Establishment of innovation mechanism**

Through deep analysis on features and current status of construction technologies of civil engineering, in the process of reform and innovation of construction technologies of civil engineering in the future, importance of innovation in civil engineering construction should be re-recognized, relevant innovation mechanism should be established and perfected based on this, and staff team dedicated to innovation work should be established, then various featured innovative construction technologies suitable to development of enterprises can be researched and developed for enterprises, and they can be gradually changed to be internal core technology of enterprise development. With rapidly developed architectural industry and constantly upgrading of construction technologies, the direct influence is to improve requirements on comprehensive and professional qualities of internal staff of architectural enterprises, but seen from current status of internal human resources allocation of most of architectural enterprises in current period in China, the degree of professionalism of construction staff is low, non-professional personnel account for large percentage, to some extent, it has a series of passive impact on innovation of construction technologies of civil engineering. <sup>[3]</sup>Therefore, firstly, the enterprises should make strict selections and integration of current construction staff, and positively bring in technical talents, regularly or irregularly provide trainings for the construction staff, or set up various training courses and training activities in the enterprises, inspire construction personnel to positively participate in studies through various vivid and interesting curriculum activities, while absorbing new knowledges, new technologies and new concepts, professional qualities of the staff should be strengthened. Secondly, well-known professors or practical application experts in the industry are employed to deepen theoretical knowledge of staff, making them combine theories and practice, improving accuracy and normalization of construction, and reduce rates of various major safe accidents. In addition, relevant reward system should be specified, remuneration rewards should be given to construction personnel with good performance, for severe casualty incidents during construction due to personal fault, severe criticism should be given to them, the staff with severe situations should be delivered to the judicial authorities in time for disposal, work initiative and positivity of the staff can be fully inspired through implementation of reward system.

#### **3.2 Emphasis on innovation concept of construction technologies of civil engineering building**

In order to guarantee quality and safety of the whole process of construction, as modern architectural enterprises, they should widely popularize technical innovation concept in every construction department, and keep this concept before and after construction to make construction technologies of civil engineering buildings yield the benefits and play a key role in improvement of architectural project qualities. Renovation of architectural engineering technologies and improvement of enterprise economic benefits should be realized to turn technical innovation capacity into tangible profit growth of enterprises, and this also makes relevant contributions for improvement of economic benefits of enterprises. <sup>[3]</sup>Renovation of civil engineering technologies is not only the demand of projects, but also necessary development requirement of social progress, some outdated technical means will be gradually eliminated during social development, and some advanced technical means and innovative thoughts will replace them. Relevant departments of civil engineering architectural industry in China can refer to some advanced foreign experience, bring in some advanced innovative concept to improve qualities of civil engineering buildings in China.

### **3.3 Enhance application of innovation technologies**

Currently, regarding to civil engineering, bringing in and practice of advanced construction technologies do not only impact qualities of civil engineering, but also have direct impact on costs and efficiencies of the principal unit. Therefore, during the process of actual development of civil engineering, construction enterprises should gradually get rid of restriction of traditional construction technology concept, and integrate modern innovative technology concept into the construction process, for instance, in the construction process of fundamental project construction, the traditional construction technologies mainly adopt such construction means as steel structure, concrete structure or foundation, through constant innovation in the aspects of pile anchor support technology, rotary drilling technology, automation technology, prestressing technology and bored pile technology, enterprises get better development and huge economic benefits and social benefits. <sup>[3]</sup>In addition, application of innovative construction technologies should be based on satisfying sustainable development demands, lay emphasis on protection of ecological environment, scientifically and reasonably use various advanced construction technologies to avoid severe impact of construction of civil engineering building on the environment, and realize harmonious and friendly development between human beings and nature.

## **4. Development trend of construction technologies of municipal civil engineering**

### **4.1 Intellectualization**

In the current social progress of fast changes, modern intelligent information technology is widely applied in the building construction field, strong function of information technology makes construction even more convenient and faster. <sup>[4]</sup>Furthermore, application of information technology in civil engineering can realize accuracy and safety during the process of materials transportation at the construction site, and during operation high above the ground, actual feedback of construction situations of operation staff will be sent to the project detection center through real time detection system to effectively reduce occurrence of casualty incidents.

### **4.2 Technicalization**

In the actual construction process of civil engineering, detection and control of the whole construction environment can be all-roundly realized through information and data provided by advanced scientific technologies in every construction phase, for instance, in the accounting process of expenses in the early phase of construction, application of advanced scientific technologies can guarantee accuracy and effectiveness of the accounting work.

### **4.3 Ecologicalization**

With diversified energies, crisis of environmental pollution and energy consumption is increasingly serious, and due to popularization of energy conservation and emission reduction, the sense of low carbon and energy saving is gradually infiltrated to all walks of life, and sustainable development of every field has a long way to go. <sup>[4]</sup>As high resources consumption industry of architectural project, especially gradual increase of demand of construction raw materials, future civil engineering construction should gradually develop to the ecological direction to maximumly realize optimization and application of construction raw materials, and improve construction equipment and decoration materials through scientific construction technologies to make it meet demand of people in current period on energy saving and environmental protection of green buildings.

#### **Conclusion**

In the background of new era, civil engineering construction development in China faces many challenges, especially conflicts of short life of project structure, poor safety, etc., while the main reason for the quality issues is severe lack of innovation in the aspect of construction technologies, improvement of construction technologies innovation of municipal civil engineering becomes key of development, and technical innovation becomes main road

and direction of civil engineering development of China.

## References

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1. Cong He, Pengfei Wang. Future Prospects of Civil Engineering --- Brief Discussion on Current Development Status and Development Trend of Civil Engineering [J]. Trade News 2011; 16(05): 339-341.
2. Ziheng Yi, Ge Bai, Aiping Lin. Discussion on Innovation and Development of Construction Technologies of Civil Engineering [J]. Construction Materials of Jiangxi 2016; 19(10): 108-110+113.
3. Zhaoyang Xie, Biao Yu, Lijun Zhang. Construction Technologies of Concrete Structure in Civil Engineering Buildings [J]. New Technology and New Products of China 2014; 11(06): 197-199.
4. Xiaoying Shi, Xiaojuan Wang, Shunqi Zeng. Investigation on Construction Technologies of Civil Engineering and Its Future Development [J]. Urban Construction Theory Research 2014; 15(07): 251-252.