

## 前言

《工程研究——跨学科视野中的工程》第三期的出版时机，幸逢中华人民共和国 60 华诞。值此甲子盛年，隆重志庆国人心同此愿，本刊岂能自外？

“忆往昔，峥嵘岁月稠”。60 年的岁月，60 年的征程，多少辉煌，多少坎坷，共和国一路高歌，无数中华儿女以汗水，以鲜血，以勇气，以百折不回的精神，成就了共和国今天的伟业。放眼神州，已然是一幅绚丽多姿的美景，已然是一座身姿雄伟的大厦。如果时光可以倒流，如果可以回到那如火如荼的年代，我们就会看到成就这一切的宏大工程场景。正是那些凝聚着全体人民智慧和劳动的伟大工程，建造了一座座新的“都江堰”，构筑了新的“万里长城”，铸就了共和国大厦的脊梁。

于是，本刊决定以“共和国经典工程”为题，以“回顾经典工程的建设历程，讴歌经典工程建设者的历史功绩，总结经典工程的经验教训，展望重大工程建设的美好愿景”为宗旨，隆重推出特刊，献给伟大的祖国，献给工程建设领域的开拓者和劳动者。

经者，久也，常也；典者，法也，则也。合之，不衰垂范之作，堪称经典。依此，本刊将满足如下条件者谓之经典工程：(1) 新中国成立以来，工程建设领域中具代表性者；(2) 新中国成立以来，工程建设领域中对于国民经济的发展曾经而且至今仍发挥重大作用者；(3) 新中国成立以来，工程建设领域中具示范作用者。特刊不设栏目，大体按照工程建设的时间顺序编排文章，依次为 156 项工程、包钢建设工程、大庆油田、核武器工程、石油化工、黄河小浪底工程、北京正负电子对撞机重大改造工程、曙光高性能计算机工程以及杂交水稻工程，试图从一定程度上揭示我国工程建设由技术引进起步，经过模仿创新而后转向自主创新的艰辛历程，由此呈现一幅仁人志士携手共筑共和国经典工程的历史画卷。

在旧中国的废墟上建立起能够支撑国民经济、国防和人民生活的现代技术体系和工业体系，缩小与西方发达国家之间的工程技术差距，是摆在一穷二白新中国的领导人及人民面前的艰巨使命。张久春先生的文章《20 世纪 50 年代工业建设“156 项工程”研究》，将我们重新带回那热火朝天的建设场景。凭借扎实的史料功底，高屋建瓴的宏观视野，有说服力的逻辑推论，文章澄清了许多鲜为人知的事实，真实地还原了那些至今仍对共和国工业建设有着重大意义的历史事件。鉴往知来，从中读者一定会受到深刻的启迪。

曾几何时，辽阔的内蒙古草原上，白云鄂博圣山旁，一匹“神马”奔腾而来。作为共和国诞生后第一个新建的大型现代钢铁企业，包钢拔地而起。从此，通过模仿创新，我国的钢铁工业日益壮大，孱弱的身躯日益挺拔。邱成岭先生以丰富的史料，条理分明的梳理，有说服力的论证，展示了这一神奇故事的发生过程及其深刻意义。温故而知新，中国的钢铁企业如何发展？中国的工业向何处去？读《包头钢铁基地创建工程的技术引进研究》一文可得启示。

“石油工人一声吼，地球也要抖三抖”。曾几何时，大庆人以其坚苦卓绝的劳动，一举摘掉了中国贫油的帽子，为共和国的机体贡献出源源不断的石油“血液”。从此，作为自力更生、奋发图强的典范，大庆精

神激励着亿万人民投入伟大的建设事业之中。大庆油田不但创造出了巨大的物质财富,也创造出了伟大的精神财富。回首往事,当如何认识这一经典工程的伟大意义呢?李伯聪先生将其独特、深邃的目光投向了大庆。《对大庆油田发展历程的若干哲学反思》一文,从工程哲学、管理科学、伦理学、创新研究的视角,对大庆的管理经验、科技创新、战略决策、“百年油田”目标的确定等问题,进行了分析和研究。在应该如何认识企业本性这个大问题上,文章扬弃了曾经出现过的两种错误倾向:即肆意贬低甚至否认企业的“生产性”倾向以及在“单纯经济观点”支配下迷失企业性质之“全面性”的倾向。结论是什么呢?文章读罢,方知高论。

似一声声惊雷,原子弹、氢弹的成功爆炸震动了整个世界,西方世界的核垄断被打破,核讹诈失灵了。如果说,有什么法物能为共和国撑起一片安全的天空,两弹无疑是此任的重要担当者。屹立于世界之林的共和国,“赖以柱其间”。随两弹爆炸蘑菇云蒸腾而出的不止是一件武器,还有更具时代意义的“两弹精神”。俞大光院士不顾高龄,不避酷暑,应本刊之约辛勤撰稿,以其行动诠释了这一伟大精神。两弹的意义书之不尽,著者云集,然而读俞先生的文章《我国核武器工程的开创》,读者绝不会产生雷同之感。可以说,非亲历者不能为此等文章,从中读者将感受到真切的魅力、细节的力量。

创新是一个民族生生不息的动力。创新之难,难于上青天。20世纪60年代,苏联陡然停止向我国供应催化剂,我国石化工业陷入危局。当此之时,闵恩泽院士以其卓越的技术创新成果挽狂澜于既倒,使我国的石化工业保持了生机。如何创新?闵恩泽院士等为我们贡献了一篇见地独到的论文《石油化工自主创新——规律性认识及案例》,以其亲身的创新经历,归纳出切身的体会,有说服力地回答了此一问题。他们的答案不是现成理论的简单复制,不是学术术语的繁复堆砌,言简意赅却堪称通向创新之路的方便之门。

“我们一定要把黄河的事情办好”。毛泽东语重心长的嘱托,凝结着数千年来无数中华儿女的一个梦想,“三年两决口,百年一改道”的黄河何时惊涛化安澜?李中锋先生的文章《治理黄河的关键工程——小浪底水利枢纽》,视野宽广,逻辑清晰,资料翔实,充分说明了小浪底水利枢纽工程对于黄河治理的重大意义。读罢此文,读者或可长舒一气,根治黄河不再只是梦想!

大科学工程——科学与技术交互作用的平台,担负着实现国家重要科学技术目标的重要使命,是国家最高科学水平和技术水平的标志性装置。陈和生院士等贡献的文章《北京正负电子对撞机重大改造工程》,以规范的学术语言,顺畅的叙述风格,详尽地介绍了这一经典大科学工程的改造始末,展现了大科学工程的风貌,揭示了大科学工程的内涵。何为国家科学事业的制高点?大科学工程的独特意义何在?读此文可窥一斑知全豹。

“中国要搞四个现代化,不能没有高性能计算机!”邓小平铿锵有力的话语,吹响了向计算机高科技领域进军的号角。面对着外国人在高技术领域对我们的严密封锁和投向中国科研能力怀疑的目光,中国的科技人员以中国人特有的志气,特有的智慧,以曙光计算机的高性能交出了一份满意的答卷。付向核先生的文章《曙光高性能计算机的创新历程与启示》,回顾了曙光高性能计算机诞生的艰辛历程。中国的高科技之路当如何走?如何使高科技在国计民生中发挥作用?扎实的史料功底,透彻的理论分析,或许可收发人所未发之效。

三军易得，一帅难求。过硬的科研成果离不开过硬的科研队伍，而过硬的科研队伍必有一位出色的领军人物作为灵魂。其作用发挥得如何，往往成为科研活动成败的关键。袁隆平就是这样一位出类拔萃的科研帅才。“民以食为天”，对于我们这样一个有着十三亿人口的大国，粮食安全是头等大事。今天时代中的我们，之所以未感到粮食问题的紧迫性，农业专家的卓越工作功不可没。袁隆平院士的“杂交水稻”工程就是其中的代表。“杂交水稻”种植技术及其推广是一项经典的农业工程。原美国农业部副部长助理、农业经济学家唐·帕尔伯格在其著作《走向丰衣足食的世界》中，对这一工程的意义有着精当的概括：“袁隆平为中国争取到了宝贵的时间。随着农业科学的发展，饥饿的威胁在退却。袁正引导我们走向一个营养充足的世界。他还给为数极少的一些人上了难能可贵的一课——东方农业科学的成就已经超越其发源地西方各国。”李浩鸣先生等贡献的文章《袁隆平与中国杂交水稻工程》详尽地梳理了杂交水稻自主创新的全过程。尽管国人对于袁隆平这一响亮的名字已耳熟能详，然而，新的史料仍给人以耳目一新的感觉。

请展开“特刊”吧！真切的回顾，令人激动；雄辩的逻辑，令人深思；睿智的思想，给人启迪。

当然，由于我们的专业知识不足，本刊谓之经典工程的条件未必能够全面契合经典要义；面对共和国之累累硕果，受编者能力和作者资源所限，经典工程的选择和撰写困难重重，挂一漏万在所难免，弃重就轻亦有可能。然而，确信无疑的是，经典工程有其恒久价值，深入研究确有必要，其内涵之丰富、意义之重大或许超过我们的预期。因此，本刊将把“共和国经典工程”作为持久的关注对象，热诚欢迎有志于此的学者，贡献才智。特刊所及乃初步尝试，不妥之处，尚祈读者赐教，以求工程问题研究的深入。

编者

二〇〇九年九月

## Introduction

This special issue is fortunately published on the sixtieth birthday of the People's Republic of China. All the compatriots are grateful and happy on such a grand day. And this journal is no exception.

Recalling back, China has experienced lots of eventful and extraordinary years. A journey of 60 years is a journey of glamour and also of ups and downs. People's Republic of China has achieved great accomplishment through the hard work, courage and perseverance of Chinese sons and daughters. Taking a broad view, China is now a land of splendor and magnificence. If time would flow backwards, if we would go back to the old days, we could then see the grand scene of how these great achievements were realized. All these mighty projects, like new "Dujiang Weir" and new "Great Walls", which condense the wisdom and hard work of Chinese people, form the solid ridge beam of this country.

As a result, this journal decides to take "China's Classical Engineering Projects" as the theme to "review the construction history of the classical projects, eulogize the merits of the builders, sum up experiences and lessons from the projects and envisage the wonderful vision of the major projects." The publishing of this special issue is dedicated to our great motherland and the pioneers and workingmen in the field of construction.

The durable projects refer to the ones that could last for a long time; the canonical projects are the ones in accordance with the rules. The combination of the two can be called classic. This issue classifies the projects that possess the following features into classical projects: (1) the representatives in the field of engineering construction after the founding of PRC; (2) the projects that has played and is still playing a crucial role in the development of the national economy after the founding of PRC; (3) the model projects in the engineering construction field after the founding of PRC.

The special issue has no columns, but articles arranged by time sequence of the projects: 156 projects, the construction of Baotou Iron and Steel Base, Daqing Oilfield, nuclear weapons project, petrochemical engineering, Xiaolangdi Multi-purpose Dam project, the Beijing Electron-Positron Collider, The Dawning High-performance Computer and the hybrid rice project. All these, to some extent, display the progress China has made in engineering construction through technical improvement and innovation. It is also a journey from copy-mode to innovating, which records the historical events of Chinese classical projects.

The great challenges lying ahead of leaders and people of the new China were to set up a modern technical and industrial system on the ruins of old China to support the national economy, national defense and people's lives and to reduce the gap between China and western developed countries on hard technology. The article, *A Study of the 156 Projects of Industrial Construction of China in 1950s*, written by Zhang Jiuchun, takes us back to the passionate scene of the construction. With a solid historical foundation, a strategically advantageous position of the macro-vision and a convincing logic, the article clarifies many facts that are rarely known by people and honestly reflects the historical events that are meaningful and significant to China's industrial construction. Undoubtedly, the reader would surely be edified and enlightened.

Baotou Iron and Steel Group, as the first modernized enterprise of new China, just like a magic horse galloping on the vast Inner Mongolian prairie, near the saint mountain of Baiyunebo. Afterwards, through copy-mode, this country's iron and steel industry has been getting powerful day by day just like a delicate body getting stronger day by day. Mr. Qiu Chengling illustrates the developmental process and the profound meaning of the magic story with rich, historical data, coherent explanations and convincing arguments. As the saying goes,

“Learning the new while reviewing the old”, so if you want to know “how should China’s iron and steel industry develop?” or “to which direction should industry of China advance?” just read *A Study of the technology imports in the construction of Baotou Iron and Steel Base*. And then you can be inspired.

There was a time when the workers of Daqing Oilfield worked painstakingly to shake off the “poor-oil-nation” nickname for China and provide China with a lot of supplies of oil “blood”. From then on, Daqing spirit, as a model of self-reliance and hard working, inspired millions of Chinese into the great cause of China’s construction. Daqing Oilfield not only created a great material wealth, but also contributed to spiritual wealth. Looking back, how to understand the significance of this classical project? Mr. Li Bocong puts his sharp eyes with deep and unique understanding on Daqing Oilfield. In the article *Some philosophical reflections on the development of Daqing Oilfield*, Mr. Li Bocong analyzes the management experience, technological innovations, strategic decision-making of Daqing Oilfield by drawing insights from engineering philosophy, management science, ethics, innovation studies. Concerning the big issue of how to understand the nature of an enterprise, the article discards the two erroneous tendencies: deliberately belittle and even deny the company’s “productive” orientation; as well as the tendency of “all-sidedness” under the domination of “purely economic viewpoint”. So what is the conclusion? After reading the article, you could tell.

Like thunder, the explosion of atomic bomb and hydrogen bomb shook the world and the western world’s nuclear monopoly was broken. If there are something that could secure the safety of China, atomic bomb and hydrogen bomb are undoubtedly the ones, which make China stand firmly in the world. With the two bombs exploded out of the mushroom cloud, not only a weapon is produced, but more importantly, is the spirit brought into being by them. An Academician of Chinese Academy of Sciences, Prof. Yu Daguang, regardless of his advanced age and hot weather of the year, received the invitation of the editors and contributed one article, which is just a clear and strong proof of the spirit. There are so many books on the spirit of the two bombs, but reading Mr. Yu’s article, *China’s Initiation of the Nuclear Weapon Project*, you would surely experience something new, fresh and creative. It is true that this article can only be written by someone who has personally experienced the matter. We are sure readers could feel the charm of trueness and the power of details in this article.

Innovation is the power that pushes a nation to constantly march forward. However, it is so difficult to make innovation that it is much harder than to climb the sky. This country’s petrochemical industry was put in crisis because the Soviet Union unexpectedly and suddenly stopped providing catalyst in the 1960s. At this crucial period, Academician Min Enze saved the desperate situation by his remarkable technological achievements, which succeeded in keeping the vitality of our country’s petrochemical industry. Then how to innovate? Here, *Independent Innovations in Petrochemical Engineering: Principles and Cases*, contributed by Academician Min Enze and Dr. Xie Wenhua, who have experienced innovations by themselves and have concluded their own personal experience convincingly, offer the answer. In spite of the plain language, their reply is not the simple duplication of present theory or complicated stack of academic terminology but may fairly claim to be the convenient door open to the way of innovation.

“We must harness Yellow River!”, Chairman Mao’s words of sincerity and affection express the aspiration of numerous Chinese people for thousands of years. Then when will Yellow River, who was frequently and irregularly in flood, be brought under control? *The Crucial Project for Harnessing the Yellow River: Xiaolangdi Hydro Dam Project* by Mr. Li Zhongfeng logically shows the significant meaning of Xiaolangdi Hydro Dam Project from a broad horizon and with detailed and authentic materials. After finishing the essay, readers may sigh with relief because they know the harnessing of the Yellow River is no longer an illusion!

The big scientific project, as a platform of interaction between science and technology, shoulders the

important mission of achieving national aims of development of science and technology. It is a landmark system symbolizing the highest scientific level and technological level of this country. The paper *A Major upgrade of the Beijing Electron-Positron Collider* by Academician Chen Hesheng, with a canonical and academic language and smooth narrative style, fully introduces the reform process of this classical big scientific project, shows its styles and features and reveals its connotation. What is the commanding height of our country's science industry? What is the unique meaning of the big scientific project? You can get the answers of all these questions by reading this essay.

"If China plans to realize four modernizations, we have to be equipped with high-performance computers." These emphatic words by Deng Xiaoping sounded the clarion call to march towards the field of computer high-technology. Though some foreigners tightly covered their high technology field and suspected China's research abilities, Chinese scientists and technicians succeeded in designing the Dawning High Performance Computer with determination and wisdom of Chinese characteristics, which handed in a satisfying paper. The article, *The Dawning High Performance Computer: Innovation Process and Experiences* by Mr. Fu Xianghe, reviewed the arduous process of the invention of the Dawning Computer. How should China walk on the way of high technology? What should China do to take use of high technology for the livelihood of the people? The authentic and detailed records and penetrating theory analysis may take some more effect than expected.

Just as the saying goes, "It's easy to assemble three troops but difficult to hunt for a leader". A good research team is necessary for good scientific achievements and this good research team must have an excellent leader as its soul. How he or she conducts is often the key to success or failure. Academician Yuan Longping is such a distinguished scientific talent and leader. "Bread is the staff of life." Food security is paramount for China with a population of 1.3 billion. Chinese, for decades, have no longer experienced the urgency of grain, which should be greatly credited to the brilliant work of agriculture experts. Yuan Longping, leader of the project of hybrid rice, one of the classical agriculture projects, is such a distinguished expert, that the famous American agronomist Don Paarlberg once said, "Yuan led toward a well-fed world". And as the food crisis spreads, his words seem particularly apt. *Yuan Longping and the Hybrid Rice Project of China* co-authored by Li Haoming, Xiang Peng and Chen Yachen fully and thoroughly tells the whole process of the hybrid rice project. Though Chinese people have been already familiar to him, new materials still gives us a feeling of novelty.

Please unfold the "special issue"! The vivid review would excite you; the tight logic would provide you food for thought; the wise and farsighted thinking would enlighten you.

Due to the editors' insufficient professional knowledge, this special issue which is called "classical projects" may not fully meet the demands of classical tenor. With so many achievements of this country and yet relatively limited abilities of the editors and resources of the authors, the choice and writing of classical projects have met with many difficulties. So it is inevitable to miss some information and is possible to overlook some importance. However, what we can be sure is that classical projects have their durable values, that it is necessary to do some deep and continuous researches and that their rich connotation and significant meaning maybe go far beyond our expectation. So, this journal will take China's classic projects as a long lasting theme, and we warmly welcome all who would like to devote their energy and wisdom into this subject. This special issue is our first attempt and if there is something inappropriate, please tell us so that we can do better in the future.

**Editors**

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翻译: 贺珺、程艳