21世纪全国本科院校土木建筑类创新型应用人才培养规划教材

建筑工程管理专业英语

主　编　杨云会

提供电子课件

- 结合实际系统阐述国际工程管理内容
- 介绍全球国际工程管理最新发展趋势

北京大学出版社
PEKING UNIVERSITY PRESS

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内 容 简 介

本书对国际工程从招投标、实施至交工的项目全过程管理内容用英文进行了系统化的介绍；对国际工程项目参与各方的角色地位、责任和工作内容，FIDIC 合同条件，JCT 合同及 ICE 合同的简要对比，国际工程合同类型，国际工程招标程序，国际工程业主对承包商的选择和评估程序，承包商投标决策与风险分析，项目成本预算与控制，国际工程合同管理，项目进度控制，质量与安全管理，进度款申请与结算，项目风险管理等内容进行了阐述；对国际工程管理过程中的文件如世界银行标准招标文件、国际通用工程量清单、会议纪要、信函、月付款申请、项目结算和索赔等文件均通过实例予以清晰说明。本书还简要介绍了国际工程项目管理领域近年来的一些发展特征和最新知识，如 EPC、BOT、PPP、DB 总承包模式等高端项目管理模式和合同特点，建筑信息模型(BIM)的 3D/4D/5D 技术对国际工程项目管理的影响，国际工程咨询行业及其发展，国际大型项目的施工性评审等。此外，本书还增加了国际工程管理会议，合同和索赔谈判，谈判策略及跨文化交流技巧等内容，对国际工程管理中的难点内容(如变更管理和施工索赔)进行了重点介绍。

本书可作为高等学校工程管理专业及土木建筑类专业的教材，也可作为高职高专建筑工程技术、建筑工程管理、工程监理和工程造价等专业的教材，还可作为我国跨国承包商或外经公司的国际工程项目管理培训教材；同时，本书对国际工程承包公司、外经企业、招标代理机构、造价和监理等咨询机构的工程管理人员也具有参考价值。

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前　言

近年来，随着我国经济的快速发展和工业化水平的不断提高，我国承包商对外工程承包发展迅猛，我国已经进入世界承包商强国行列。然而，随着全球经济一体化的发展和国际工程项目大型化、复杂化的变化趋势，我国许多承包商在国际工程市场竞争中正面临对国际标准和项目管理惯例不熟悉的困难。本书以与国际接轨的视野，对国际工程项目管理的主要内容和特征，国际工程合同和国际惯例，以及国际工程从招投标、实施至交工的项目管理内容进行系统化的阐述，并根据工程管理专业学生从事国际工程项目管理的要求进行编写，以国际工程项目的全过程发展为主线，将国际工程项目管理的理论知识与实际工作内容相结合。本书的编写特点如下。

(1) 主线明确，结构清楚，内容完备，结合国际工程管理实践和工作实际需要，全面介绍了国际工程管理内容。本书介绍了国际工程项目参与各方的角色与作用，国际通用合同模式与国际工程合同类型，国际工程招标程序，世行标准招标文件，国际通用工程量清单，国际工程业主对承包商的选择和评估程序，承包商投标决策与风险分析，项目成本预算与控制，国际工程合同管理，工程信函写作，项目进度控制，质量与安全管理，进度款申请与结算，项目风险管理，国际工程管理会议及会议纪要，商业谈判策略，以及国际环境中的跨文化交流技巧等内容，尤其对国际工程管理中的难点内容如变更管理、施工索赔和争端解决等进行了重点介绍。

(2) 突出理论知识的系统性，注重实用性和可操作性。学生可通过对典型国际工程管理实例文件的学习，不断加深对国际工程管理理论知识的理解，提高工作实际问题的解决能力。例如，对国际工程项目管理涉及的过程文件和典型文件，如招投标文件、工程量清单、合同谈判、会议文件、信函、月付款申请、结算和索赔等文件均通过实例予以清晰说明；对熟悉国际工程惯例和管理经验，熟悉国际工程招投标文件、国际工程通用合同条件类型和管理模式，熟悉合同的谈判签订，熟悉国际工程项目施工合同的进度、质量与安全、造价控制，提高国际工程项目实际问题的分析能力和管理能力，具备工程谈判、案例分析和工程索赔的基本能力和项目风险管理能力都有很大的帮助。

(3) 介绍了全球国际工程管理的最新发展趋势。本书介绍了国际工程招投标和国际工程管理领域近年来的一些发展成果，如 EPC、BOT、PPP、DB 总承包模式等高端项目管理模式和合同特点，建筑信息模型(BIM)的 3D/4D/5D 技术对国际工程管理的影响，国际工程咨询行业及其发展，国际大型项目的施工性评审等，使学生能够接触国际工程管理的最新知识和操作实务，了解国际工程管理的现状和发展趋势，为将来参与国际工程管理打下良好的基础。

本书教学建议安排 60～80 学时，对于开设 40 学时左右的专业可以重点讲授第 1～16 单元的内容，阅读内容建议可作为选学与参考学习材料，作为对单元内容学习的巩固和提高。

本书由杨云会任主编，负责全书的总体策划及定稿，赵移山、龙彬任副主编，舒畅参与编写。本书具体编写分工如下：杨云会负责全书的编写，赵移山负责第 1～16 单元的翻译工作，龙彬编写第 1～12 单元的练习，舒畅编写第 13～16 单元的练习。

由于编者水平有限，本书不当之处在所难免，敬请读者、同行批评指正。

编　者

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目　录

Unit 1

Development in Global Construction Market

1. Fluctuating Construction Market Demand And Increasing Competition

The engineering and construction is one of the oldest industries which provides infrastructure for all other industries, and it is the largest industry in the world; it constitutes one of the largest services sectors in the economy – both in terms of its contribution to GDP and employment in most developed and many developing countries. The importance of the construction industry lies in the function of its products which provide the foundation for industrial production, and its impacts on the national economy cannot be measured by the value of its output or the number of persons employed in its activities alone.

International construction marketing in the 21st century is for better organization and the use of influence through new approaches, namely new business models including changed project delivery models and long-term supplier or service relationships to maintain competitiveness:

- Information knowledge (not just data) technologies;
- Increased "value" focuses (life cycle costs, flexibility, and resiliency);
- Performance-based standards and regulations;
- Human resources;
- Sustainability.

Those who accept these new fundamental shifts will be better off in the short and long term to compete well into the future. But market in the new millennium isn't easy, the international contracting community has been enduring difficult economic headwinds during the past five years. The world financial market collapse in recent years has affected and still affects the international construction market. Many international projects were delayed, put on hold, or cancelled at an unprecedented rate. However, even as the U.S. continues to fight off the prospect of a double-dip recession and European nations pull back from stimulus programs to stabilize the troubled Euro, opportunities are bubbling for international contractors in developing countries, particularly those rich in resources. The downturns in many major regions have caused an increase in competition as more firms enter unfamiliar markets; moreover, when global financial crisis persisted and world demand slumped, the global market competition has gotten downright vicious with technology improvement, therefore we have witnessed a fundamental shift of how construction operations are attracting business.

2. The Relationship with International Agencies and Its Importance

Before entering any of the global markets, a basic understanding of that market, namely, the likely sources of the projects and players including the employers, contractors, specialists and designers, understanding who will be making the decisions on procurement, including political influence, the role of the multilateral organizations such as the World Bank and a detailed knowledge of the various procurement and funding strategies is essential. The major multi-lateral organizations' projects are supported either by countries in the region or by international agencies such as the World Bank, International Finance Corporation that operate on a global basis, and agencies with more regional focus including the Asian Development Bank, the African Development Bank, the European Bank for Reconstruction and Development, the Commonwealth Development Corporation. In fact, the international agencies have, over the past few years, moved from mainly funding specific projects to supporting institutional strengthening.

Success in the construction industry requires effective inter-organizational management. That is, construction projects often require collaboration and management of diverse firms in order to achieve a common goal. With putting up the buildings, there are great numbers of projects activities around global market which are mainly supported by above agencies with some extent of promotional efforts.

3. Major Players of Global Construction Market

Mega-projects require cutting-edge technology; those included are hydroelectric projects, thermal and nuclear power projects, urban transport, roads, tunnels, bridges, tunnels, oil projects, and technology projects. Besides the technology the companies involved in mega-projects need the ability to deal with the extreme complexity of such projects which includes the ability to establish the necessary network around the project in any part of the world.

Many of the major corporations have had many years experience in the global market, particularly those in the oil and gas prospecting and processing industries such as BP and Shell, and the power sector. The oil and gas sector continues to expand in the Middle East, but Central Asia, Russia and Africa are the main growth areas, both to recover new sources and to lessen the dependence on the Middle East.

The international EPC (Engineering Procurement Construction) contractors who carry out major parts of the oil, gas and power construction works include Bechtel, Fluor and Parsons from the USA, Amec from the UK and a number of major contractors from Korea and Japan.

In the infrastructure field, major contractors with a global presence come primarily from Europe, the USA, Korea and Japan. Chinese contractors are becoming bigger competitors, since Chinese contractors have been pushing into the international market with some success, such as China Railway Group Ltd., China Railway Construction Corp. Ltd., China State Construction Engineering Corp., China Communications Construction Group and China Metallurgical Group Corp. etc.

4. Various Procurement and Funding Strategies

Many companies try to enter the global market without any knowledge of the various procurement and funding strategies used on specific projects. For those, the strategies of avoidance have become constructive. This knowledge is fundamental in understanding the entry point in the market as well as assessing the risks involved. These strategies can be summarized generally under five main headings:

- Traditional;
- Design and Build;
- Turnkey EPC;
- Financed;
- Cost Plus (Management/CM/Target Cost).

With the development and delivery of large, complex projects worldwide, one would expect the permanent combination of engineer and constructor in a permanent enterprise to promote innovation. The increasingly technical, procedural complexity of the projects requires the construction companies' active participation in all the phases of the projects. This is consistent with findings in industries that typically rely on an EPCM or EPC approach rather than those that rely on purpose assembled design and construction teams. Limited resources as well as other factors have caused the public sectors to consider the adoption of non-traditional procurement methods for the public projects. Similarly performance benefits from tighter integration of industry participants can be seen in the performance results for design-build projects, such as privatization and financed projects of PPP/BOT/PFI or DBO.

5. International Partnerships and Strategic Alliances

Construction services supplied internationally are typically related to large-scale projects, such as airports, harbours and petrochemical plants and are often undertaken by specialized contractors with local sub-contracting. In recent years, increasing competition among companies and the growing size and technical sophistication of projects have encouraged construction companies to enter into partnership agreements and strategic alliances in bidding for and implementing construction projects. Construction, architectural and engineering services are primarily traded through commercial presence, that is, the establishment of foreign affiliates and subsidiaries of foreign companies.

Allying with foreign partners would not only provide international companies the access to local markets, but also a better understanding of local environment. This strategy would also make international companies better use of their reputed technology and management skill in international markets, especially Africa and Asian markets, where these advanced services are highly demanded and cannot be fully provided by local companies.

Some of the major consultants operate on a global basis including the USA firms above, all now very strong in all markets, especially, Jacobs and AECOM are increasing their presence by purchasing UK and European companies. Consultancy firms from the UK, German, Denmark, the Netherlands and Japan dominantly ally with major contractors and operate worldwide.

6. Global Market Competition of Sustainable Tactics

The construction industry in global market is one of extreme competitive operations, with high risks and generally low profit margins when compared to other areas of the economy. Accordingly, major construction players have made several attempts to gain and sustain competitive advantage in the relevant industry all over the world. This often resulted in the adoption of new philosophies such as concurrent engineering, lean production and many others such as just-in-time (JIT), total quality management (TQM), benchmarking, business process reengineering (BPR) in service.

Construction industry has a significant impact on people and the environment; paying attention to the needs of building owners and occupiers, major construction players have aimed to market construction systems that are cleaner, healthier and more sustainable. This approach will gradually turn modern environmental requirements into real opportunities for sustainable construction.

Therefore, in order to sustain competitiveness and to survive in a national and international market, construction companies should properly understand how they are currently performing and how they need to perform in the future. Increasing competition is forcing companies to evaluate their status in the business environment and therefore make appropriate strategic decisions and plan strategic decisions in the long term.

7. Strategy and Competitiveness Change

With less construction work available and heavy competition for projects, many large global construction companies have been forced to reassess their strategies in order to remain viable. Some construction companies' confidence declined and organizations began to rethink their strategy and prepare for a dramatically changing landscape by analyzing their micro-environment: markets, customers and competitors. Many construction companies experienced problems adapting to the environmental changes, and, preparing for a change, they adopted a survival strategy rather than a growth strategy. These changes demand the construction company even larger capabilities, in terms of technology, human resources, capital, etc. While large global construction companies will probably weather the storm because they have a strong clientele base in the governmental sector and private sectors, as those companies have stable relations with client and strong competitive advantages in expertise, cutting-edge technology and management skills. Moreover, those companies have taken a number of options to continue working through tough periods:

- Integrate the construction industry value chain to enhance productivity and efficiency;
- Strengthen the international construction market image;
- Strive for the highest standard of quality, occupational safety, and health and environmental practices;
- Develop human resource capabilities and capacities in the international construction market;

- Innovate through research and development, and adopt new construction technologies;
- Leverage on information and communication technology in the international construction market;
- Upgrade the export of construction products and services.

Reading

Project Management for Construction

1. Definition of Project Management

1.1 Term of Project Management

The term project management is defined:

- by PMBOK(Project Management Body of Knowledge)as "The application of knowledge, skills, tools and techniques to project activities to meet project requirements."
- by PRINCE2 (Projects In Controlled Environments) as "The planning, monitoring and control of all aspects of the project and the motivation of all those involved in it to achieve the project objectives on time and to the specified cost, quality and performance. "

1.2 Project Management Processes

Project management processes can be organized into five groups of one or more processes:

- Initiating processes: recognizing that a project or phase should begin and committing to do so.
- Planning processes: devising and maintaining a workable scheme to accomplish the business need that the project was undertaken to address.
- Executing processes: coordinating people and other resources to carry out the plan.
- Controlling processes: ensuring that project objectives are met by monitoring and measuring progress and taking corrective action when necessary.
- Closing processes: formalizing acceptance of the project or phase and bringing it to an orderly end.

2. Project Management for Construction

The construction industry is a conglomeration of diverse fields and participants that have been loosely lumped together as a sector of the economy. The construction industry plays a central role in national welfare, including the development of residential housing, office buildings and industrial plants, and the restoration of the nation's infrastructure and other public facilities.

The management of construction projects requires knowledge of modern management as well as an understanding of the design and construction process. Construction projects have a specific set of objectives and constraints such as a required time frame for completion. While the relevant technology, institutional arrangements or processes will differ, the management of such

projects has much in common with the management of similar types of projects in other specialty or technology domains such as underground tunnel, chemical and energy developments.

Generally, project management is distinguished from the general management of corporations by the mission-oriented nature of a project. A project organization will generally be terminated when the mission is accomplished. Project management is the art of directing and coordinating human and material resources throughout the life of a project by using modern management techniques to achieve predetermined objectives of scope, cost, time, quality and participation satisfaction.

Specifically, project management in construction encompasses a set of objectives which may be accomplished by implementing a series of operations subject to resource constraints. There are potential conflicts between the stated objectives with regard to scope, cost, time and quality, and the constraints imposed on human, material and financial resources. These conflicts should be resolved at the onset of a project by making the necessary tradeoffs or creating new alternatives. Subsequently, the functions of project management for construction generally include the following:

- Specification of project objectives and plans including delineation of scope, budgeting, scheduling, setting performance requirements, and selecting project participants.
- Maximization of efficient resource utilization through procurement of labor, materials and equipment according to the prescribed schedule and plan.
- Implementation of various operations through proper coordination and control of planning, design, estimating, contracting and construction in the entire process.
- Development of effective communications and mechanisms for resolving conflicts among the various participants.

3. Construction Management Approach

Construction management is the coordinated effort of all parties involved in providing the employer with a successful project. The objectives of construction project management are to complete a project within the plans and specifications provided in accordance with the contract requirement. Moreover, the employer may, in time, continue the facility life cycle through the process of renovation or alteration to accommodate new requirements. With the complexity of the construction process increasing, employers demand accountability and accurate guidance during the entire planning and construction process. In recent years construction practices have changed dramatically, since technology, materials, financing, design, and engineering have all advanced fast.

3.1 Traditional Construction Management

The traditional construction management is usually for ordinary projects of moderate size and complexity, and employer often employs a designer (an architectural/engineering firm) which prepares the detailed plans and specifications for the constructor (a main/general

contractor). The designer also acts on behalf of the employer to oversee the project implementation during construction. From the viewpoint of project management, the terms "employer" or "client" or "owner" are synonymous because they have the ultimate authority to make all important decisions. The contractor is responsible for the construction itself even though the work may actually be undertaken by a number of specialty subcontractors.

The employer may select a constructor either through competitive bidding or through negotiation. Public agencies are usually required to use the competitive bidding mode, while private organizations may choose either mode of operation. In using competitive bidding, the employer is forced to use the designer-constructor sequence since detailed plans and specifications must be ready before inviting bidders to submit their bids. If the employer chooses to use a negotiated contract, it is free to use phased construction if it so desires.

The general contractor may choose to perform all or part of the construction work, or act only as a manager by subcontracting all the construction to subcontractors. The general contractor may also select the subcontractors through competitive bidding or negotiated contracts. The general contractor may ask a number of subcontractors to quote prices for the subcontracts before submitting its bid to the employer.

Although the designer-constructor sequence is still widely used because of the public perception of fairness in competitive bidding, many private employer/owners recognize the disadvantages of using this approach when the project is large and complex and when market pressures require a shorter project duration than that which can be accomplished by using this traditional method.

3.2 Professional Construction Management

Professional construction management refers to a project management team consisting of a professional construction manager and other participants who will carry out the tasks of project planning, design and construction in an integrated manner. Contractual relationships among members of the team are intended to minimize adversarial relationships and contribute to greater response within the management group. A professional construction company is a firm specialized in the practice of professional construction management which includes(some issues will be deliberated in Unit 3):

- Work with employer/owner and the architectural/engineering firms from the beginning and make recommendations on design improvements, construction technology, schedules and construction economy;
- Propose design and construction alternatives if appropriate, and analyze the effects of the alternatives on the project cost and schedule;
- Monitor subsequent development of the project in order that these targets are not exceeded without the knowledge of the employer/owner;
- Coordinate procurement of material and equipment and the work of all construction contractors, and monthly payments to contractors, changes, claims and inspection for conforming

design requirements;

➢ Perform other project-related services as required by employer.

Professional construction management is usually used when a project is very large or complex.

4. Organization of Project Participants

There are two basic approaches to organize for project implementation, even though many variations may exist as a result of different contractual relationships adopted by the employer and builder. These basic approaches are divided along the following lines:

➢ Separation of organizations. Numerous organizations serve as consultants or contractors to the owner, with different organizations handling design and construction functions. Typical examples which involve different degrees of separation are:

- Traditional sequence of design and construction;
- Professional construction management.

➢ Integration of organizations. A single or joint venture consisting of a number of organizations with a single command undertakes both design and construction functions. Two extremes may be cited as examples:

- Owner-builder operation in which all work will be handled internally by force account;
- Turnkey operation in which all work is contracted to a vendor which is responsible for delivering the completed project.

Since construction projects may be managed by a spectrum of participants in a variety of combinations, the organization for the management of such projects may vary from case to case. There are many variations of management manners between these two extremes, depending on the objectives of the organization and the nature of the construction project. For example, a large chemical company with internal staff for planning, design and construction of facilities for new product lines will naturally adopt the matrix organization. On the other hand, a construction company whose existence depends entirely on the management of certain types of construction projects may find the project-oriented organization particularly attractive. While organizations may differ, the same basic principles of management structure are applicable to most situations.

New Words and Expressions

project management for construction 施工项目管理
PMBOK(Project Management Body of Knowledge) 项目管理知识体系
project management processes 项目管理流程
a workable scheme 切实可行的方案
taking corrective action 采取纠正措施
construction industry 建筑行业

conglomerate 凝聚成团；聚合物
conglomeratation 兼并，重组
lumped together 聚集，合成
national welfare 国家福利
residential housing 住宅
office buildings 写字楼
industrial plants 工业厂房
nation's infrastructure 基础设施
public facilities 公共设施
knowledge of modern management 了解现代管理
design and construction process 设计与施工过程
a specific set of objectives and constraints 一系列具体的目标和约束
institutional arrangements 制度安排
underground tunnel 地下隧道
be distinguished from 有别于，不同
the general management of corporations 一般企业管理
predetermined objectives 预定目标
participation satisfaction 参与满意度
resource constraints 资源约束
tradeoff 折衷，权衡；交易
specification of project objectives 特定的项目目标
delineation 描述，画轮廓
procurement 采购，购买
implementation of various operations 实施各种操作
development of effective communications 开展有效的沟通
mechanisms for resolving conflicts 解决冲突的机制
general contractor 总承包
project implementation 项目实施
oversee 监督，审查；偷看到，无意中看到
synonymous 同义的，同义词的；同义突变的
ultimate authority 至高无上的权威
specialty subcontractors 专业分包商
competitive bidding 招标
competitive bidding mode 竞价模式
mode of operation 运作模式
bidders 投标人
negotiated contract 协商合同
quote prices 报价，询价
professional construction management 专业的施工管理