



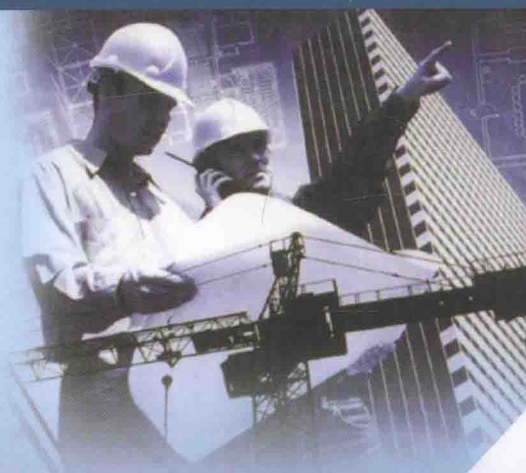
高等学校土建类专业**应用型本科**“十二五”规划教材

工程管理专业英语

GONGCHENG GUANLI ZHUANYE YINGYU

(第2版)

主编 柳立生



武汉理工大学出版社
WUTP Wuhan University of Technology Press

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主 编 柳立生
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· 武汉 ·

内 容 提 要

本书共包括 20 个单元,40 篇文章,内容系统、紧凑,涉及工程管理的各个方面,主要包括:建设项目类型(Types of Construction Project)、管理对土木工程的重要性(Emerging Role of Management in Civil Engineering)、工程管理(Construction Management)、高层建筑(High-Rise Building)、荷载作用和传递(Load Action and Propagation)、钢筋混凝土(Reinforced Concrete)、混凝土浇筑(Placing Concrete)、投标文件的编制(Preparation of Bids)、投标文件的提交和开标(Submission and Opening of Bids)、建造成本估算的类型(Types of Construction Cost Estimates)、成本估算的方法(Approaches to Cost Estimation)、施工计划(Construction Planning)、项目控制过程(Project Control Process)、施工技术的选择(Choice of Technology and Construction Method)、工程质量管理(Construction Quality Management)、工程安全管理(Construction Safety Management)、合同类型(Types of Contracts)、合同争议与仲裁(Contract Disputes and Arbitration)、房地产的特性(Characteristics of Real Estate)、建筑物维护导论(An Introduction to Building Maintenance)等,涵盖工程建设的全过程,且顺序编排遵循了工程管理工作的一般过程。

本书选材新颖、针对性强、难度适中,有助于读者增加专业英语词汇量,提高阅读、翻译相关专业英语书刊和文献的能力,并可获取相关专业信息和掌握专业学科发展动态。

本书是为满足高等学校工程管理、工程造价管理专业本科学生学习专业英语的需要而编写,亦可供广大工程管理人员、土木工程领域从业人员、自学者和研究生学习参考。

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前 言

(第2版)

经济全球化及我国建筑业的迅猛发展,不断推动着工程管理的国际化和专业化,从而对工程管理从业人员的国际视野和专业外语水平提出了更高的要求。本书作为一本实用型的工程管理专业英语教材,旨在使读者掌握够用、实用的工程管理专业英语术语,培养和提高读者阅读、理解以及翻译专业英语文献资料的能力,同时开阔其工程管理专业领域的国际视野,为将来从事工程管理工作,尤其是涉外的工程管理工作打下一个较坚实的专业英语基础。

本书既克服了部分专业英语教材选材过于宽广、针对性不强的缺点,也摒弃了有些教材理论性过强、专业知识过于深奥的不足,做到了选材新颖,针对性与系统性强,且难度适中,教材第1版出版后特别受到应用型本科高校土建类专业广大师生的欢迎。本次改版对原有内容作了适当的删减、补充,并对内容编排体系进行了进一步优化,因此,这是普通高等学校工程管理、工程造价、土木工程等应用型本科专业高年级学生一本好的实用型教材。

为了便于读者使用,每篇文章后均附有生词及疑难句的分析注释。同时,为提高读者专业英语阅读能力,拓宽其专业视野,书中每个单元都提供了相关的阅读材料。此外,书中每个单元均提供了参考译文,并在书末附有较系统的“专业英语翻译基本知识”,以有助于读者专业的学习和英语翻译能力的提高。

本书由武昌理工学院、武昌工学院、武昌首义学院、文华学院、长江大学工程技术学院联合编写。参加编写的人员有:柳立生(第1~3、7、12~14、17~20单元),杨倩(第4、5、6单元),陶妍艳(第8、9单元),明杏芬(第10、11单元),陈玉萍(第15单元),张妮(第16单元)。本书由柳立生担任主编,杨倩、明杏芬、陶妍艳担任副主编。湖北水利水电职业技术学院陈天照教授对本教材的改版工作提出了一些宝贵意见,并给予了大力支持,在此深表感谢!

借此书第2版付梓之际,编者向武汉理工大学出版社的责任编辑以及关心和支持本书编写的武昌理工学院城建学院的老师们表示诚挚的谢意!

本书大部分文章摘选、改编自各种书刊、文献以及网络信息,在此表示衷心的感谢!

由于时间仓促、水平有限,书中难免有不足之处,敬请广大读者批评指正,以便今后改进和提高。

编 者

2015年7月于武汉

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Unit 1 Types of Construction Project

Construction intersects almost all fields of human endeavor, and this diversity is reflected in its projects. Designers of hospitals interact closely with medical professionals to serve the needs of patients best. Educational philosophies and practices take shape in the architecture of schools and colleges, while governments and corporations express their “images” with structures that house their offices and production facilities^①. The design and construction of refineries, factories, and power plants generally require that the builders be more knowledgeable of the related industrial technologies than the manufactures and utilities that operate them. Builders of dams, tunnels, bridges, and other civil engineering today must be geologists, ecologists, and sociologists as well as architects, engineers, and managers. And most of us recognize how intimately the design and quality of our building environment either enhance or frustrate our personal lives.

It is difficult, if not impossible, to categorize neatly so great a spectrum of projects. The exceptions, the ones that transcend the boundaries, often seem to outnumber those that are clearly recognizable. What follows, nevertheless, are four somewhat arbitrary but generally accepted major types of construction. In large measure, these categories parallel the general specialties into which designers and constructors tend to group themselves^②.

Residential Housing Construction

Residential housing construction includes single-family homes, multiunit town houses, garden apartments, high-rise apartments and condominiums. The latter, in particular, are technologically less closely related to residences than to the following description of nonresidential building construction and are sometimes incorporated as part of multipurpose commercial developments. They are classified here from the users' point of view.

Residential housing construction accounts for about 30 to 35 percent of construction expenditures in an average year. Although largely financed by the private sector, the supply and demand for residential construction is heavily impacted by governmental regulation and fiscal policy. There are a few very large firms, but as a rule the low capital and technology requirements in this sector of the industry means that it is characterized by large quantities of very small firms^③. Demand instability, among other things, causes a high rate of business failures among them. Designs are generally done by either architects, home designers or the builders themselves, and construction is usually handled by either independent contractors or developer-builders. Whether in single units or in large developments, however, there has been a small but growing trend toward industrialization and factory mass production of some major components in recent decade, and even complete modular homes.

Office and Commercial Building Construction

Office and commercial building construction encompasses a great variety of project types and sizes, such as schools and universities, medical clinics and hospitals, recreational facilities and sports stadiums, retail chain stores and large shopping centers, warehouses and light manufacturing plants, and skyscrapers for offices and hotels. This sector typically accounts for 35 to 40 percent of the construction market. The owners of such buildings may or may not be familiar with construction industry practices, but they usually are able to select competent professional consultants and arrange the financing of the constructed facilities themselves. Specialty architects and engineers are often engaged for designing a specific type of building, while the builders or general contractors undertaking such projects may also be specialized in only that type of building.

Though labor-and-materials-intensive like residential construction, the scope and technology of these buildings are generally much larger and more complex^④. Because of the higher costs and greater sophistication of office and commercial buildings in comparison with residential housing, this market segment is shared by fewer competitors. Since the construction of some of these buildings are a long process which once started will take some time to proceed until completion, the demand is less sensitive to general economic conditions than that for speculative housing. Consequently, the owners may confront an oligopoly of general contractors who compete in the same market. In an oligopoly situation, only a limited number of competitors exist, and a firm's price for services may be based in part on its competitive strategies in the local market.

Heavy Engineering Construction

Though accounting only for 20 to 25 percent of the market, heavy engineering construction includes many of the structures for which the industry is best known. Dams and tunnels provide hydroelectric power, flood control, and irrigation; bridges range from footpaths to internationally famous landmarks such as spanning San Francisco's Golden Gate^⑤; other transportation structures include interstate railways, airports, highways, and urban rapid transit systems; ports and harbor structures fall into this category, as do many of those in the deep open sea. Pipelines are included here, as are some of our more utilitarian structures, such as water treatment and distribution systems, sewage and storm water collection, treatment and disposal systems, power lines, and communication networks.

Both the design and construction phases of heavy construction are primarily the domain of civil engineers, though almost all disciplines play important roles. The construction phase is much more equipment-intensive, characterized by fleets of large earthmovers, cranes, and trucks, working with massive quantities of basic materials such as earth, rock, steel, concrete, timber, and pipe. Another major distinction is that many, if not most, heavy construction projects are publicly financed, and this fact in turn limits other alternative contractual arrangements in this sector. Typically, design is done either by, or under contract with, a public agency, and construction is by competitive open bidding. Construction contractors here usually require much greater expertise in engineering and geology than to those in office and commercial building and residential housing construction.

Industrial Construction

Industrial construction represents only about 5 to 10 percent of the market, but it has some of the largest projects and is dominated by some of the largest engineering and construction firms. These projects include petroleum refineries and petrochemical plants; synthetic fuel plants; fossil-fuel and nuclear power plants; mine developments, smelters, steel mills, and aluminum plants; large heavy-manufacturing plants; and other facilities essential to our utilities and basic industries.

Both design and construction require the highest levels of engineering expertise, from not only civil engineering, but also chemical, electrical, mechanical, and other disciplines, and typically all phase of the project are handled by the same firm on a negotiated design-construct or “turnkey” contractual arrangement, with considerable overlap among design, procurement, and construction[®]. The designers and constructors must be intimately familiar with the technologies and operations of the facility from the owner’s point of view, and often they hold some of the key patents for advanced process technologies needed therein. In the western free-enterprise countries, most of these industrial constructions are privately financed.

In contrast with the basic materials characteristic of heavy engineering construction the major factors in industrial construction generally consist of large amounts of highly complex mechanical, electrical, process piping, and instrumentation work. This work tends to be much more labor-intensive, though some of the largest hoisting and materials-handling equipments are also required.

Words and Expressions

intersect	<i>vi.</i>	相交,交叉,横断
take shape		成形,形成,具体化,体现
refinery	<i>n.</i>	精炼厂,炼制厂
intimately	<i>adv.</i>	密切地
transcend	<i>vt.</i>	超越,胜过
in large measure		在很大程度上,大部分
high-rise	<i>n.</i>	高楼,大厦;
	<i>adj.</i>	高层的
town house		(居住在乡间者的)市内住宅,城内住宅
condominium	<i>n.</i>	共管,共有房产
account for		占,说明
fiscal	<i>adj.</i>	财政的
skyscraper	<i>n.</i>	摩天大楼
sophistication	<i>n.</i>	老于世故,老练;复杂
oligopoly	<i>n.</i>	垄断,求过于供(的市场情况)
footpath	<i>n.</i>	人行道,小路
pipeline	<i>n.</i>	管道,管线

earthmover	n.	重型推土机
crane	n.	起重机
fossil-fuel	n.	矿物燃料
smelter	n.	熔炉, 熔炼工
procurement	n.	获得, 取得
speculative	adj.	推测的, 纯理论的, 投机的
labor-intensive		劳动力密集型的
hoist	n.	升起, 提升间

Notes

① ...while governments and corporations express their “images” with structures that house their offices and production facilities.

此句可译为:……而政府与企业则以容纳其办公或生产的建筑物来体现他们的形象。

本句中的 that house their offices and production facilities 是修饰 structures 的定语从句, 其中的 house 在此作动词, 为“容纳”、“为……提供建筑空间”的意思。

② What follows, nevertheless, are four somewhat arbitrary but generally accepted major types of construction. In large measure, these categories parallel the general specialties into which designers and constructors tend to group themselves.

此句可译为:不过, 以下就是划分的四种主要的建筑类型, 如此的划分有些武断, 但通常被人们接受。如此分类在很大程度上与设计者和建造者们通常使用的分类是一致的。

本句中的 into which designers and constructors tend to group themselves 是修饰 the general specialties 的定语从句。

句中的 parallel 在此为“相似”、“类似”的意思。

③ There are a few very large firms, but as a rule the low capital and technology requirements in this sector of the industry means that it is characterized by large quantities of very small firms.

此句可译为:住宅建筑领域有不少大型企业, 但由于该行业对于资本和技术的要求一般较低, 所以占主导地位的还是大量的小型企业。

句中的 as a rule 为“通常”、“一般”的意思。

④ Though labor-and-materials-intensive like residential construction, the scope and technology of these buildings are generally much larger and more complex.

此句可译为:虽然它们和住宅类建筑一样, 也是劳动力与材料密集型, 但是此类项目范围更广, 所包含的技术更复杂。

句中的 labor-and-materials-intensive 为“劳动力与材料密集型”的意思。much larger 与 more complex 分别对应前面的 the scope 与 technology。

⑤ ...spanning San Francisco's Golden Gate.

横跨旧金山的金门大桥。

金门大桥是世界著名的大桥之一, 是旧金山的象征, 被誉为近代桥梁工程的一项奇迹。该桥的设计者是工程师约瑟夫·斯特劳斯。金门大桥于 1933 年动工, 1937 年 5 月竣工, 用了 4 年时间和 10 万多吨钢材, 当时耗资高达 3550 万美元(如图 1-1 所示)。



图 1-1 金门大桥

⑥ ...and typically all phase of the project are handled by the same firm on a negotiated design-construct or “turnkey” contractual arrangement, with considerable overlap among design, procurement, and construction.

此句可译为:此外,(工业建筑)项目各阶段的工作一般依据设计建造或交钥匙合同方式由同一家企业来承担,因而其设计、采购与施工等各阶段工作之间存在相当大的工作联系。

“turnkey” contractual arrangement,可译为“交钥匙合同方式”,即工程项目建设的全过程,包括设计、采购、施工、运行试验等都由同一家企业承包,最后将一个随时可以使用的工程交给合同另一方的方式。

Comprehension Exercises

I. Answer the following questions briefly.

- (1) Why is it difficult to categorize the construction projects neatly?
- (2) Why is residential construction industry dominated by large numbers of very small firms?
- (3) Give some examples of project types that office and commercial building construction may encompass.
- (4) What are the major distinctions of heavy construction compared to office and commercial building and residential housing construction?
- (5) What are the major distinctions of industrial construction in contrast with the basic materials characteristic of heavy engineering construction?

II. Translate the following into Chinese or English.

- (1) civil engineering
- (2) town house
- (3) onsite hand fabrication and installation
- (4) factory mass production
- (5) specialty architects and engineers
- (6) 办公与商业建筑

- (7) 大型购物中心
- (8) 总承包商
- (9) 重型推土机
- (10) 交钥匙合同方式

Reading Material

The Nature of the Construction Industry

The construction industry is a paradox in many ways. In its roughly 8.3 percent, \$418 billion-plus share of the United States' gross national product (1988), it is the largest industry, but the vast majority of its hundreds of thousands of participants are small business. There are over half a million construction firms in the United States alone. These firms are intensively competitive among themselves in the best traditions of the free enterprise system, yet, compared with other industries, construction's technological advances sometimes appear trivial.

Construction has many characteristics common to both manufacturing and service industries. Certainly, as in other manufacturing, there are physical products, and often these are of mind-boggling size, cost, and complexity. But in other ways, construction is more like a service industry because such as steel, transportation, petroleum, and mining. One sees this in comparative financial surveys, such as the Forbes and Fortune magazines' listings of the "top 500" businesses. Although several of construction's the largest firms are listed each year on the basis of sales (cumulative annual contract awards or revenues), and sometimes on the basis of profits, few, if any, are even near the "top 500" on the basis of assets. Also, as in other service industries, success or failure in construction is by far more dependent on the qualities of its people than it is on technologies protected by patents or on the sheer availability of capital facilities, though the latter, in particular, is often also very important.

Construction is highly fragmented and sometimes divisive, yet in response to pressing national needs, such as a major war effort, few industries can mobilize resources more quickly. Each of its elements—designers, constructors, regulators, consumers, suppliers, crafts can be highly skilled in its own area, yet there is little general perspective on how all the pieces fit together. There really is no central focus.

Indeed, there is no clear definition as to just the construction industry is. Certainly it must include the hundreds of thousands of general and specialty construction contractors. But to understand the industry really, one must extend its scope to include designers of facilities, materials suppliers, and equipment manufacturers. Labor organizations add still another dimension, as do public and private consumer of construction services, many of whom have considerable construction expertise of their own. Government regulatory agencies in such areas as safety, health, employment practices and fair trade also play an increasingly important role.

The construction industry is very custom-oriented; there is a strong feeling that if something is unique, it is better. Yet, this orientation also means that the industry has been slow to respond to the benefits of mass production. Its structure is highly specialized and layered, with complex interlocking

interests and traditions. Its character makes it highly effective on practical or project matters, yet often ineffective on general or program matters.

Research and development fall in the latter category of the less practical and more general and speculative. Accurate data is not available, but it is generally assumed that only a fraction of 1 percent of the industry's gross revenues are invested even in applied research, let alone basic research. This is in strong contrast to industries, such as electronics, where an estimated 10 to 20 percent of revenues go into research and development. This investment, in turn, at least partially accounts for the quantum leaps the high-technology industries have taken in recent years.

It has been observed that the construction industry is almost completely incentive-oriented. If there is little programmatic activity, it is likely that there is little incentive for investing in it. This reluctance to invest probably results in part because advances in construction tend to develop from innovations, or "better ideas". Most of these cannot be protected by either secrecy or patents, and therefore disseminate rapidly through the industry. Thus, there is little incentive for one firm to invest heavily in new developments that can soon be expected to benefit its competitors equally.

Owing to the comparatively large numbers and small sizes of its businesses, its fragmentation and divisiveness, and its service characteristics, the construction industry, as a whole, cannot significantly influence the demand for its output or control the supply. The consequent instability of demand thus dominates everything. For example, seasonality is chronic, and construction has an amplified reaction to basic business and resources. Consequently, there is often too much work in some regions at the same time that others are suffering localized recessions. Major problems recur in funding both large and small projects, and these difficulties can be aggravated by government competition for and manipulation of the finite funds that are available. Construction also is often placed in the forefront of government fiscal and social policy.

参考译文：

第一单元 建设项目类型

建设活动与人类行为的几乎所有领域都相联系,且其多样性在工程项目中得以体现。如医院建筑的设计者与专业医疗人员有着紧密的相互作用,以使之最佳地服务于患者。学校建筑使得人们的教育观念与实践在那里得以形成,而政府与企业则通过容纳其办公或生产的建筑物来体现他们的形象。设计与建造炼钢厂、工厂以及电厂等建筑时,往往要求其建造者要比使用该厂房的制造商们更懂得有关的工业技术知识。当今,大坝、隧道、桥梁以及其他土木工程的建造者不仅仅是建筑师、工程师和管理者,还必须是地质学家、生态学家和社会学家。我们大多能意识到,建筑环境的设计与质量是怎样密切地促进或阻碍人们生活的。

如果有可能进行分类的话,面对范围如此广泛的建设项目,也还是很难对之加以明确分类的。那些不能进行分类的(跨越分类界限的特殊情况)常常比我们能够明确识别的还要多。不过,以下就是划分的四种主要的建设类型,如此的划分带有一定程度的武断性,但通常被人们接受。如此分类在很大程度上与设计者和建造者们通常使用的分类是一致的。

居住类房屋的建设

居住类房屋的建设包括独户住宅、多单元的城内住宅、花园式公寓住宅、高层公寓以及共管式建筑等。特别是后者,即共管式建筑,它们与居住的技术关联性不如它们与下述非居住类建筑的建设那样联系紧密,所以,共管式建筑有时被整合成为多功能商业发展区的一部分。此处我们是从居住建筑用户的视角来对之进行分类的。

居住类房屋建设支出占正常年份建设总支出 30% ~ 35% 的份额,虽然其大部分由私营部门投资,但住宅建筑的供求受到政府的相关法规及财政政策的很大影响。住宅建筑领域有不少大型企业,但由于该行业对于资本和技术的要求一般较低,所以占主导地位的还是大量的小型企业。和其他行业相比,住宅建筑需求的不稳定性使得其经营失误的比例很高。住宅建筑一般由建筑师、住宅设计师或者建造商自身来设计,其施工则常常由独立的工程承包商或者开发-建造商来承担。然而,近十年来,不管是独立单元的住宅,还是大型住宅发展区,住宅建筑的施工已经开始出现了一种小的工业化趋势,一些主要建筑构件在工厂里批量生产,甚至可在工厂预制完全模块化的住房。

办公和商业用房建设

办公和商业用房建设包括许多不同规模和类型的建筑,如学校、医疗诊所与医院、娱乐场所、体育馆、零售连锁店与大型商业中心、仓库与轻工制造厂房、办公与酒店摩天大楼等。该类工程项目的建设通常占到建筑市场的 35% ~ 40%。这类房屋的业主可能并不熟悉房屋建设的实务,但他们可聘请有能力的专业咨询人员为其服务,然后他们自己只需考虑项目融资上的安排。专业的建筑师和工程师通常致力于某一特定类型的房屋的工程设计,而承担该项目建设建造商或总承包商也可能仅仅擅长该类房屋的建设。

虽然它们和住宅类建设一样也是劳动力与材料密集型,但是此类项目范围更广,所包含的技术更复杂。同住宅类房屋建设相比,此类房屋建设成本高且功能复杂,所以市场份额由较少的竞争者来瓜分。同时,这类房屋建设从开工到完工所经历的时间比较长,故其对市场宏观经济条件的反应不如投机性的商业住宅房屋建设那么敏感。于是,这类房屋建设的业主通常面对的是在同一市场竞争的垄断式总承包商,在这种情况下,一个市场只有为数不多的竞争者存在,企业的服务价格在一定程度上取决于它在当地市场的竞争策略。

重型工程建设

虽然仅占建筑市场 20% ~ 25% 的份额,但是重型工程建设包括许多该行业赖以出名的建筑物。如提供水电能源、防洪以及灌溉等的大坝与隧道;从乡间小道上的桥梁到国际知名的地标性桥梁,如横跨旧金山的金门大桥;其他交通建筑物,包括洲际铁路、机场、公路以及城市快速运输系统;港口及海港建筑物,包括远海深处的该类建筑物;管线工程以及更具实用性的一些建筑物,如水处理与供水(分配)系统,污水及雨水的收集、处理系统,电力线路,通信网络工程等。

对于重型工程建设的设计与施工,虽然各个专业的人员都起着重要的作用,但主要还是属于土木工程师的领域。其施工阶段更多的是设备密集型,因而表现出的特征之一就是许多大型推土机、起重机和卡车围绕一些基本材料开展工作,如土方、岩石、钢材、混凝土、木材、管道