高等职业技术教育教材

English for Construction Engineering

建筑工程专业英语

主　编　陆伟成
副主编　傅　奕　尹春霞

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

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内容简介

本书是高等职业技术院校建筑工程相关专业的专业英语教材。全书共12个单元，以Building Construction为主线贯穿其中，每个单元有一个主题，包括2～4幅插图、两篇课文和相应的习题，书后还附有一套房屋建筑图纸。本书选材新颖，语言规范，点面结合，编排独特，实用性强，突出了建筑工程专业的实际需求。

本书可供高职高专院校以及成人类院校建筑工程类专业的学生使用，也可供本科应用技术方向的学生使用。

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前　言

随着大学英语课程教学改革的推进以及土木建筑工程专业新的教学计划的实施，专业英语课程究竟在其中起一个什么作用，即土木建筑工程专业对本门课程的要求有什么变化？这是我们一直思考的一个问题。经过调查研究和总结多年的教学实践，我们认为专业英语课程教材的编写应达到：(1)使学生能阅读并正确理解本专业英文文章，能进行现场交流；(2)从基础英语到双语教学的过渡课程；(3)成为中外合作专业过渡到外教教授专业课的桥接课程。为此，我们在教材的选编上力求突出应用性、技能性、操作性，减少理论性、学术性，尽可能介绍行业内最新的技术和工艺。

本书文章及插图全部选自英语国家新近出版的原版专业教科书，语言规范，并具有时代感和专业特色，选文在保持原汁原味的基础上稍有删改。在选编过程中，编者曾在三个方面煞费苦心，即概述性的“面”上论述、细节性的“点”上描述以及篇幅的控制。为此，编者从数倍量的文章中精选提取，既要顾“面”，又要“点”到，力求“面”“点”结合，篇幅精当。

本教材适用于高职高专院校，也适用于本科应用技术方向，成人类院校和中外合作办学专业的桥接课程。

本教材共有 12 个单元，以 Building Construction 为其主线，每个单元都围绕着一个主题进行，配有 2～4 幅插图，两篇课文，每篇课文都控制在 800 词左右，内容包括建造程序、基础工程、砌体结构、钢结构、混凝土结构、混凝土现浇和预制结构以及围护结构和建筑设备等。附录中配有一套房屋建筑图纸。本教材中的习题针对性强，除了针对理解课文的问答题、讨论题以外，还编写了对专业术语的学习理解和应用性习题，如专业术语的提示性互译、中英句子上下文情景互译等，以增强学生的表达能力。每个单元末尾还列出了数个有关该单元主题的机构及其参阅网站。

本教材中的部分材料已在上海城市管理职业技术学院土木 05 级各班中试用，普遍反映效果良好，因而在总结经验的基础上组织出版。本教材由陆伟成担任主编，傅奕、尹春霞、倪宇红等参加编写。

由于时间紧迫，加上编者专业水平有限，书中疏漏和不妥之处在所难免，敬请各位读者不吝指正。

编　者

2007 年 5 月

Contents

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Introduction

Civil Engineering and Its Career

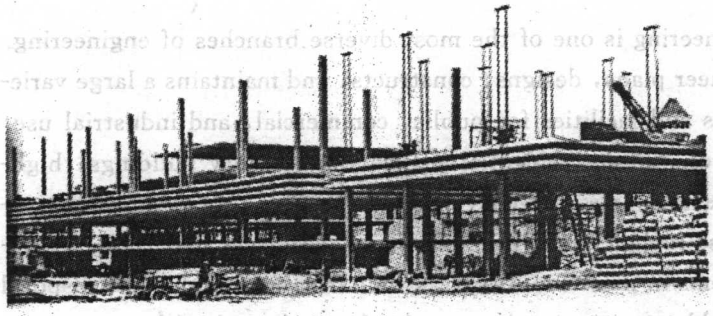


Figure Ⅰ Lift-slab construction in progress. The paired steel rods silhouetted against the sky to the right are part of the lifting jacks seen at the top of the columns.

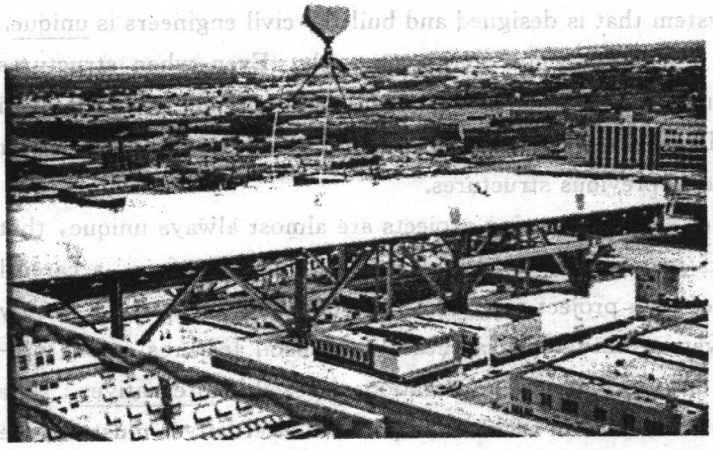


Figure Ⅱ Flying formwork for a one-way concrete joint system being moved from one floor to the next in preparation for pouring. Stiff metal trusses allow a large area of formwork to be handled by a crane as a single piece.

Professional Words

civil	['sivl] *adj.*	土木的;民用的
civil engineering		土木工程(学)
construct	[kən'strʌkt] *v.*	建造,施工,建筑
structure	['strʌktʃə] *n.*	结构
tunnel	['tʌnl] *n.*	隧道
pipeline	['paip,lain] *n.*	管道,管线
topographical	[,tɔpə'græfikəl] *a.*	地形学的
subsoil	['sʌbsɔil] *n.*	下层土,天然地基
surveyor	[sə: 'veiə] *n.*	测量员
sewage	['sju(:)idʒ] *n.*	下水道,污水
waste disposal system		废水处理系统
maintenance	['meintinəns] *n.*	维护,保养
feasibility study		可行性研究
terrain	['terein] *n.*	地形
soil mechanics		土力学
technical specification		技术规范,技术说明书

Civil engineering is one of the most diverse branches of engineering. The civil engineer plans, designs, constructs, and maintains a large variety of structures and facilities for public, commercial, and industrial use. These structures include residential, office, and factory buildings; highways, railroads, airports, tunnels, bridges, harbors, channels, and pipelines. They also include many other facilities that are a part of the transportation systems in most countries, as well as sewage and waste disposal systems that add to our convenience and safeguard our health.

海港

Civil engineering offers a particular challenge because almost every structure or system that is designed and built by civil engineers is unique. One structure rarely duplicates another exactly. Even when structures seem to be identical, site requirements or other factors generally result in modification. Large structures like dams, bridges, or tunnels may differ substantially from previous structures.

独特的,唯一的

复制

更改,修改,修正

充分地

All kinds of civil engineering projects are almost always unique, that is, each has its own problems and design features; therefore, a careful study is made of each project even before design work begins. The study includes a survey of both topographical and subsoil features of the proposed site. It also includes a consideration of possible alternatives. The economic factors involved in each of the possible alternatives must also be

二中择一,替换方案

weighted. Today, a study usually includes a consideration of the environmental impact of the project. Many engineers, usually working as a team that includes surveyors, specialists in soil mechanics, and experts in design and construction, are involved in making these feasibility studies.

The civil engineer, a member of the civil engineering profession, may work in research, design, construction supervision, maintenance, or even in sales or management. Each of these areas involves different duties, different emphases, and different uses of the engineer's knowledge and experience. Much of the work of civil engineers is carried on outdoors, often in rugged and difficult terrain or under dangerous conditions.

崎岖的,高低不平的,严酷的

The civil engineer may work in research, which is one of the important aspects of scientific and engineering practice. He is often employed in a laboratory that is financed by government or industry. Areas of research connected with civil engineering include soil mechanics and soil stabilization techniques , and also the development and testing of new structural materials.

Civil engineers may work in design. They work on many different kinds of structures, so it is normal practice for one engineer to specialize in just one kind. In designing buildings civil engineers are often invited to work as consultants to architectural or construction firms. Dams, bridges, water supply systems and other large projects ordinarily employ several engineers whose work is coordinated by a system engineer who is in charge of the entire project, in many cases engineers from other disciplines are involved. In a dam project, for example, electrical and mechanical engineers work on the design of the powerhouse and its equipment.

顾问,咨询者

使同等;使协调

学科;纪律

发电站

Civil engineers may work in construction and maintenance; construction is a complicated process of almost all engineering projects. It involves scheduling the work and utilizing the equipment and the materials so that costs are kept as low as possible. Safety factors must also be taken into account, since construction can be very dangerous. After the structure has been completed, it must be kept from falling into disrepair; therefore many civil engineers work in maintenance.

失修,塌毁,破损

Some civil engineers also work in sales companies that supply products or equipment, for construction often employ civil engineers as part of their sales staff. The customers are engineers themselves, and so they must be given the opportunity to communicate with sales people who can understand the same technical specifications. A few engineers may also go into management. Construction companies are often headed by civil-engineers; some of these companies were founded by engineers. No matter what the path into management may be, these engineers must have administrative as well as technical skills.

管理的,行政的

Note

1. The customers are engineers themselves, and so they must be given the opportunity to communicate with sales people who can understand the same technical specifications. 顾客本身就是工程师，因而必须使他们有机会去和懂得同样技术规范的销售人员打交道。

2. Dams, bridges, water supply systems and other large projects ordinarily employ several engineers whose work is coordinated by a system engineer who is in charge of the entire project, in many cases engineers from other disciplines are involved.

1) a systems engineer：系统工程师；如是制造加工类工程，则为负责整个工程的工艺工程师。

2) discipline：此处解释为专业、学科。

Exercise

Check Your Understanding

Ⅰ. Mark the following statements with T (true) or F (false) according to the passage.

[ ] 1. The civil engineer designs and constructs structures that include residential buildings.

[ ] 2. Some structures seem to be identical as they can duplicate one another.

[ ] 3. The feasibility study includes a survey of topographical and subsoil features of the site but not the economic factors.

[ ] 4. The civil engineer working in the different areas involves different duties that are carried on indoors safely.

[ ] 5. Areas of research that the civil engineer may work in include soil mechanics and the development of new structural materials as well.

[ ] 6. Only civil engineers are engaged in design of such projects as a dam project.

[ ] 7. Many civil engineers work in maintenance to keep the completed structures in good repair.

[ ] 8. Only those civil engineers who have administrative skills can go into management.

Ⅱ. Answer the following questions based on the passage.

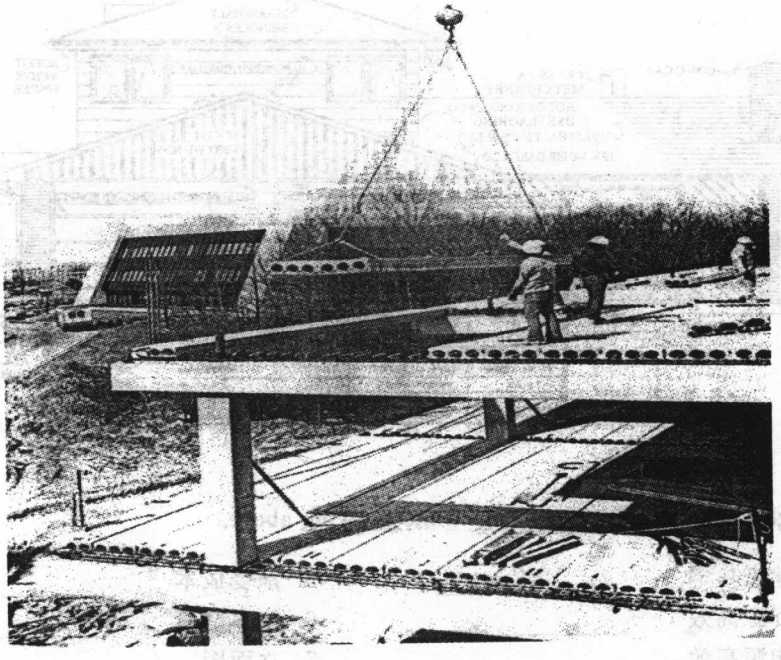
1. What are the professional duties of a civil engineer?
2. Why does civil engineering offer a particular challenge?
3. Why is a careful study needed before design work begins?
4. What does a careful study include?
5. Who participate in these feasibility studies?
6. What areas may a civil engineer work in? Can you describe the places and conditions in which he/she often works?
7. Can you give some examples of the areas of research related to civil engineering?
8. What does construction work involve? Why should safety factors be taken into consideration?
9. Why do some civil engineers work in sales?
10. What skills must civil engineers engaged in management have?

Ⅲ. Group Discussion

Are you devoted to the civil engineering profession? Why or why not?

Unit 1

Making Buildings



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Part Ⅰ Illustrated Words and Concepts

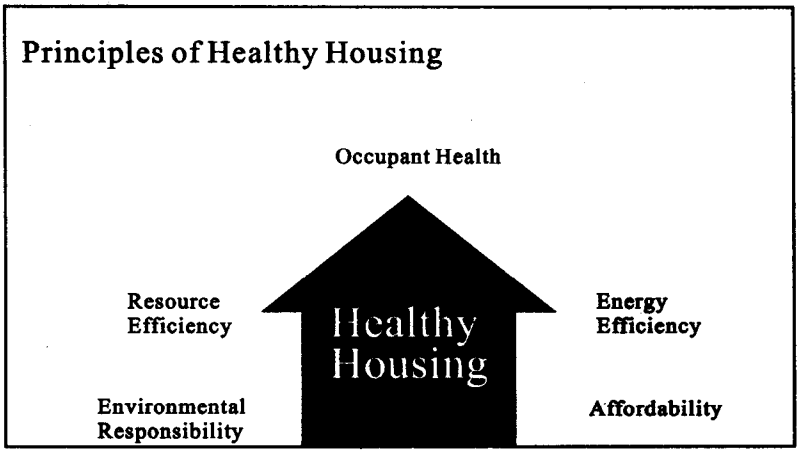

Figure 1—1 Healthy House

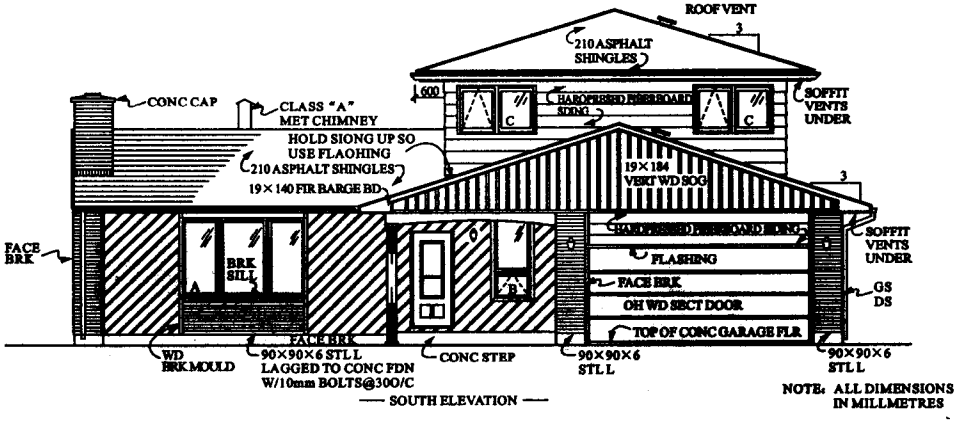

Figure 1—2 South Elevation of a House

Write the English expressions according to the drawing above.

1. 健康住宅 _____
2. 资源高效 _____
3. 能源高效 _____
4. 环境责任 _____
5. 承受成本 _____
6. 住户健康 _____
7. 立面图 _____

Part Ⅱ Passages

Passage A

Designing Buildings

Professional Words

foundation	[faun'deiʃən] *n.*	基础,地基
structural	['strʌktʃərəl] *a.*	结构的
architect	['ɑ:kitekt] *n.*	建筑师,设计师
mechanical	[mi'kænikl] *a.*	机械的
electrical	[i'lektrik(ə)l] *a.*	电气的
communications services		通信设备
specification	[ˌspesifi'keiʃən] *n.*	说明书,规范
drawing	['drɔ:iŋ] *n.*	图纸
bidding	['bidiŋ] *n.*	投标,出价
general contractor		总承包商
subcontractor	[ˌsʌbkən'træktə(r)] *n.*	分包商
zoning ordinance		分区规划
building codes		建筑法规(条例)
texture	['tekstʃə] *n.*	(材料等的)结构,质地
budget	['bʌdʒit] *n.*	预算
contractual	[kən'træktjuəl] *a.*	契约的,合同的
craft	[krɑ:ft] *v.*	有技巧地制作
	n.	技能,技艺
sustainability	[sə'steinəbiliti]	可持续性

A building begins as an idea in someone's mind, a desire for new and ample accommodations for a family, many families, an organization, or an enterprise. For any but the smallest of buildings, the next step for the owner of the prospective building is to engage, either directly or through a hired construction manager, the services of building design professionals. An architect helps to consolidate the owner's ideas about the new building, develops the form of the building, and assembles a group of engineering specialists to help work out concepts and details of foundations, structural support, and mechanical, electrical, and communications services.

宽敞的

将来的,预期的

巩固,使坚固

召集

This team of designers, working with the owner, then develops the

计划

scheme for the building in progressively finer degrees of detail. Drawings and written specifications are produced by the architect-engineer design team to document how the building is to be made and of what. A general contractor is selected, either by negotiation or by competitive bidding.

专业的

The general contractor hires subcontractors to carry out many specialized

提交地方政府的

portions of the work. The drawings and specifications are submitted to the

市政的

municipal inspector of buildings, who checks them for conformance with zoning ordinances and building codes before issuing a permit to build. Construction may then begin, with the building inspector, the architect, and the engineering consultants inspecting the work at frequent intervals to be sure that it is carried out according to plan.

Building Constraints

抽象化

Although a building begins as an abstraction, it is built in a world of

实在

material realities. The designers of a building—the architects and engineers—work constantly from a knowledge of what is possible and what is

调色板,品种

not. They are able, on the one hand, to employ any of a limitless palette of building materials and any of a number of structural systems to produce a building of almost any desired form and texture. On the other hand,

不可避免地

they are inescapably bound by certain physical limitations: how much land there is with which to work; how heavy a building the soil can support; how long a structural span is feasible; what sorts of materials will perform well in the given environment. They are also constrained by a construction budget and by a complex web of legal restrictions.

Those who work in the building professions need a broad understanding of many things, including people, climate, the physical principles by which buildings work, the technologies available for utilization in build-

契约的

ings, the legal restrictions on buildings, and the contractual arrangements under which buildings are built. This passage and the passages followed are concerned primarily with the technologies of construction materials—what the materials are, how they are produced, what their properties are, and how they are crafted into buildings. These must be studied, however, with reference to many other factors that bear on the design of buildings, some of which require explanation.

The Work of the Design Professional

The designers of a building must make many choices before its design is complete and ready for construction. In making these choices, they confront several basic questions:

- What will give the required functional performance?

美学的

- What will give the desired aesthetic result?

- What is possible legally?
- What is most economical?
- How can we build in a sustainable manner? 持续的

This passage and the passages followed examine primarily the first of these questions, the functional performance of the materials and methods of building construction most commonly employed. Reference is made constantly, however, to the other four questions, and the reader should always have them uppermost in mind. The last question, which concerns sustainability, deserves further explanation.

Note

1. zoning ordinance 分区规划

The legal restrictions on buildings begin with local zoning ordinances, which govern the types of activities that may take place on a given piece of land, how much of the land may be covered by the building or buildings, how far buildings must be set back from each of the property lines, how many parking spaces must be provided, how large a total floor area may be constructed, and how tall the building may be.

2. building codes 建筑法规

The local government regulates building activity by means of a building code. The intent of a building code is to protect public health and safety, primarily against building fires, by setting a minimum standard of construction quality.

Exercise A

Check Your Understanding

Ⅰ. Mark the following statements with T (true) or F (false) according to the passage.

[ ] 1. An architect helps to consolidate the owner's ideas about the new building.

[ ] 2. It is the owner who develops the scheme for the building in progressively finer degrees of detail.

[ ] 3. The general contractor himself carries out many specialized portions of the work.

[ ] 4. The municipal inspector of buildings checks the drawings and specifications for conformance with zoning ordinances and building codes before issuing a permit to build.

[ ] 5. The architects and engineers are constrained by a construction budget and by a complex web of legal restrictions.

[ ] 6. A general contractor is selected always by competitive bidding.

[ ] 7. Those who work in the building professions do not need an understanding of the legal restrictions on buildings, and the contractual arrangements under which buildings are built.

[ ] 8. Drawings and written specifications are produced by an architect to document how the

building is to be made and of what.

Ⅱ. Answer the following questions based on the passage.

1. What does an architect do to consolidate the owner's ideas about the new building?
2. Does the owner of the prospective building need to engage a construction manager for the services of building design professionals?
3. Whom does the general contractor hire to carry out many specialized portions of the work?
4. Who do you think are the designers of a building?
5. What physical limitations are the designers of a building bound by?
6. Are the designers constrained by a construction budget and by a complex web of legal restrictions?
7. Can you give some examples of the broad understanding of many things that the people working in the building professions need?
8. What is this passage primarily concerned with?

Ⅲ. Group Discussion

1. Describe the members of the typical team that designs a major building and their respective role.
2. The designers of a building would confront several basic questions before his design is complete and ready for construction, according to your understanding, what are these questions?

Build up Your Professional Vocabulary

Ⅳ. Match the English in Column A with their Chinese equivalents in Column B.

Column A	Column B
1. communications services	a. 竞投标
2. general contractor	b. 建筑法规
3. zoning ordinance	c. 可持续性
4. building codes	d. 通信设备
5. subcontractor	e. 图纸
6. competitive bidding	f. 建筑材料
7. written specifications	g. 分包商
8. drawing	h. 总承包商
9. issuing a permit	i. 建筑预算
10. construction budget	j. 书面说明书,书面规范
11. building materials	k. 颁发(建筑)许可
12. sustainability	l. 分区规划

Ⅴ. Translate the following phrases into Chinese or English.

1. legal restriction _____ 契约限制

2. mechanical services _____ 电气设施

3. a sustainable manner _____ 可持续性发展

4. construction budget _____ 年度预算

5. written specifications _____ 契约说明书

6. building materials _____ 原材料

Translation

Ⅵ. Complete the following sentences by translating the parts given in Chinese.

1. For any but the smallest of buildings, the next step for the owner of the prospective building is to engage, either directly (或者通过雇用建筑经理人聘请建筑设计专业人员).
2. They are able, on the one hand, (在无限的建筑材料品种中选用任何材料), (以及在多种结构系统中采用任何结构系统) to produce a building of almost any desired form and texture.
3. They are also (受限于建筑预算及一系列复杂的法律约束).
4. Those who work in the building professions need a broad understanding of many things, including people, (气候, 建筑物运作施工原则, 建筑可利用的技术, 有关建筑的法律限制), and the contractual arrangements under which buildings are built.
5. This passage and the passages followed are concerned primarily with (建筑材料的施工工艺).
6. The designers of a building must make many choices (在完成设计及准备施工之前).

Ⅶ. Translate the following paragraph into Chinese.

This team of designers, working with the owner, then develops the scheme for the building in progressively finer degrees of detail. Drawings and written specifications are produced by the architect-engineer design team to document how the building is to be made and of what. A general contractor is selected, either by negotiation or by competitive bidding. The general contractor hires subcontractors to carry out many specialized portions of the work. The drawings and specifications are submitted to the municipal inspector of buildings, who checks them for conformanee with zoning ordinances and building codes before issuing a permit to build. Construction may then begin, with the building inspector, the architect, and the engineering consultants inspecting the work at frequent intervals to be sure that it is carried out according to plan.

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