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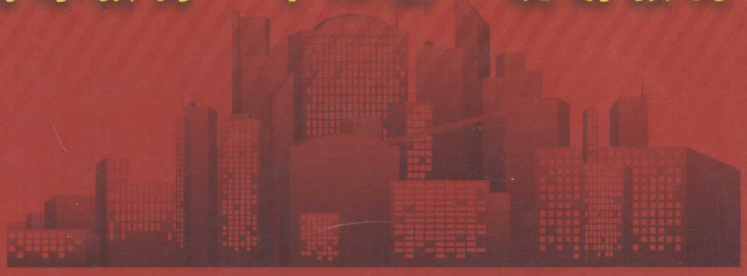

土木工程专业英语

赵 莹 袁云博 石飞停 吴 芳 主编

Specialized English for Civil Engineering

化学工业出版社

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·北京·

本书旨在培养学生用英语作为工具获取、应用、交流专业信息的能力。内容涉及：土木工程，土木工程师，土木工程材料，力学性能，框架结构，高层建筑，混凝土结构，钢结构，结构分析，基础工程，施工技术，土木工程测量，道路工程，环境工程，隧道工程，地震工程，项目管理，网络技术，工程招投标，控制与管理，计算机辅助设计，工程对话等。本书可作为土木工程、工程管理、道路工程、桥梁工程等专业学生的专业英语教材或课外阅读材料，也可供从事土木工程专业的技术人员和管理人员自学使用。

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前 言

在当今时代，土木工程从业人员除了要具备坚实的专业知识外，还应该拥有良好的专业英语水平。作为土木工程从业人员，只有学好专业英语，才能更加高效地获取专业信息、掌握学科发展动态、参加国际间学术交流，从而不断提高自己的专业技能。本书吸收国外原汁原味英语，经精心加工编写而成，旨在培养学生用英语作为工具获取、应用、交流专业信息的能力。编者希望本书能对读者专业英语知识的更新、充实和完善有所裨益。

本书共 22 章，分别为：土木工程（Civil Engineering），土木工程师（Civil Engineer），土木工程材料（Civil Engineering Materials），力学性能（Mechanical Behavior），框架结构（Frame Structure），高层建筑（Tall Building），混凝土结构（Concrete Structure），钢结构（Steel Structure），结构分析（Structural Analysis），基础工程（Foundation Engineering），施工技术（Construction Techniques），土木工程测量（Civil Engineering Surveying），道路工程（Road Engineering），环境工程（Environmental Engineering），隧道工程（Tunnel Engineering），地震工程（Earthquake Engineering），项目管理（Project Management），网络技术(Network Techniques)，工程招投标(Tendering and Bidding)，控制与管理(Control and Management)，计算机辅助设计(Computer-Aided Design)，工程对话(Engineering Dialogue)。

第 1 章至第 21 章，每章包括一篇课文（Text）和一篇阅读材料（Reading Material）。课文内容紧扣章节主题，在课文后面提供了生词解释（New Words）和短语解释（Phrases and Expressions）。生词解释通过双解，让读者对比汉语和英语两种语言各自的特点；通过一词多解，让读者对比专业英语和普通英语的区别和联系。短语解释，旨在强调专业概念的表达。同时，每篇课文后都附有丰富的习题（Exercises），包括阅读理解、翻译、专业词汇理解、专业知识应用等题型，旨在培养学生的书面英语的综合应用能力。阅读材料与课文内容相近或相关，是对每章课文内容的扩展和补充。

第 22 章（Engineering Dialogue）提供了大量与土木工程相关的对话练习，旨在培养学生运用专业英语进行口语表达和交流的能力。本章内容涉及土木工程会议安排、甲方与乙方的会谈、土木工程招标与投标、土木工程的前期准备、土木工程现场勘察、土木工程施工组织和管理、土木工程施工进度、土木工程质量控制、土木工程质量评估等。教师可酌情将这一部分融入到每次课的教学过程当中，在课堂上组织学生进行对话练习，或组织学生课下录制视频，在课堂上播放，并加以点评。这一环节对活跃课堂气氛，激发和调动学生的学习兴趣有积极作用。

参加本书编写的人员有：吉林建筑大学城建学院赵莹（主编，编写第1章、第2章、第4章、第5章、第6章、第8章、第9章、第10章、第11章）；吉林建筑大学城建学院袁云博（主编，编写第22章）；盐城工学院石飞停（主编，编写第15章、第16章、第17章、第18章、第19章、第20章、第21章）；长春建筑学院吴芳（主编，编写第3章、第7章）；盐城工学院乔慧萍（参编，编写第13章、第14章）；吉林建筑大学城建学院马丽霞（参编，编写第12章）。参加编写工作的还有盐城工学院贾程、马爱群、殷勇、吉林建筑大学土木工程学院研究生何书明、吉林建筑大学城建学院学生管镇、王英华、王帅等。

在本书的编写过程中，得到了化学工业出版社的大力支持和帮助，在此表示衷心的感谢。限于编者水平，书中不妥之处在所难免，敬请读者和同行批评指正。

编者

2013年12月

目 录

Unit 1
Civil Engineering

Text Introduction to Civil Engineering

What is Civil Engineering? The word civil derives from the Latin for citizen. In 1782, Englishman John Smeaton used the term to differentiate the nonmilitary engineering work from the military engineering work. Civil engineering included the whole of nonmilitary engineering at the time of the founding of the ICE in 1818, but now excluding chemical, electrical, electronic, ***marine***, mechanical engineering, etc. It includes airfields, bridges, ***canal***s, ***dock***s, foundations, ***harbors***, ***offshore*** constructions, railways, river ***basin*** management, roads, ***sewage*** treatment, ***sewerage***, soil mechanics, structural design, traffic engineering, tunnels, water supply, etc.

Civil engineers not only build public facilities essential to modern society and large population concentrations but also build privately owned facilities and other large structures designed for industrial, commercial, or residential use. In addition, civil engineers plan, design, and build complete cities and towns, and more recently have been planning and designing space platforms to house self-contained communities.

Because it is so broad, civil engineering is subdivided into a number of technical specialties. Depending on the type of project, the skills of many kinds of civil engineer specialists may be needed. When a project begins, the site is surveyed and mapped by civil engineers who locate ***utility*** placement—water, ***sewer***, and power lines. Geotechnical specialists perform soil experiments to determine if the earth can bear the weight of the project. Environmental specialists study the project's impact on the local area: the potential for air and groundwater pollution, the project's impact on native animal and plant life, and how the project can be designed to meet government requirements aimed at protecting the environment. Transportation specialists determine what kinds of facilities are needed to ease the burden on local roads and other transportation networks that will result from the completed project. Meanwhile, structural specialists use preliminary data to make detailed designs, plans, and specifications for the project. Supervising and coordinating the work of these civil engineer specialists, from beginning to end of the project, are the construction management specialists. Based on information supplied by the other specialists, construction management civil engineers estimate quantities and costs of materials and labor, schedule all work, order materials and equipment for the job, hire contractors and subcontractors, and perform other supervisory work to ensure the project is completed on time and as specified.

Throughout any given project, civil engineers make extensive use of computers. Computers are used to design the project's various elements (computer-aided design, or CAD) and to manage it. Computers are a necessity for the modern civil engineers because they permit the engineers to efficiently handle the large quantities of data needed in determining the best way to construct a

project.

In the specialty of structural engineering, civil engineers plan and design structures of all types, including bridges, dams, power plants, supports for equipment, special structures for offshore projects, the United States space program, transmission towers, giant astronomical and radio telescopes, and many other kinds of projects. Using computers, structural engineers determine the forces a structure must resist: its own weight, wind and hurricane forces, temperature changes that expand or contract construction materials, and earthquakes. They also determine the combination of appropriate materials: steel, concrete, plastic, stone, asphalt, brick, aluminum, or other construction materials.

Civil engineers in the specialty of water resources engineering deal with all aspects of the physical control of water. Their projects help prevent floods, supply water for cities and for irrigation, manage and control rivers and water runoff, and maintain beaches and other waterfront facilities. In addition, they design and maintain harbors, canals, and locks, build huge hydroelectric dams and smaller dams and water impoundments of all kinds, help design offshore structures, and determine the location of structures affecting navigation.

Civil engineers who specialize in the field of geotechnical engineering analyze the properties of soils and rocks that support structures and affect structural behavior. They evaluate and work to minimize the potential settlement of buildings and other structures that stems from the pressure of their weight on the earth. These engineers also evaluate and determine how to strengthen the stability of slopes and fills and how to protect structures against earthquakes and the effects of groundwater.

In this branch of environmental engineering, civil engineers design, build, and supervise systems to provide safe drinking water and to prevent and control pollution of water supplies, both on the surface and underground. They also design, build, and supervise projects to control or eliminate pollution of the land and air. These engineers build water and wastewater treatment plants, and design air ***scrubber***s and other devices to minimize or eliminate air pollution caused by industrial processes, ***incineration***, or other smoke-producing activities. They also work to control ***toxic*** and hazardous wastes through the construction of special dump sites or the neutralizing of toxic and hazardous substances. In addition, the engineers design and manage ***sanitary*** landfills to prevent pollution of surrounding land.

Civil engineers working in the specialty of transportation engineering build facilities to ensure safe and efficient movement of both people and goods. They specialize in designing and maintaining all types of transportation facilities, highways and streets, mass transit systems, railroads and airfields, ports and harbors. Transportation engineers apply technological knowledge as well as consideration of the economic, political, and social factors in designing each project. They work closely with urban planners, since the quality of the community is directly related to the quality of the transportation system.

In the branch of pipeline engineering, engineers build pipelines and related facilities which transport liquids, gases or solids ranging from coal slurries (mixed coal and water) and semi liquid wastes, to water, oil, and various types of highly ***combustible*** and noncombustible gases. The engineers determine pipeline design, the economic and environmental impact of a project on regions it must ***traverse***, the type of materials to be used—steel, concrete, plastic, or combinations of various materials—installation techniques, methods for testing pipeline strength, and controls for

Patience and perseverance will pay off. ——Einstein
耐心和恒心总会得到报酬的。——爱因斯坦

maintaining proper pressure and rate of flow of materials being transported. When hazardous materials are being carried, safety is a major consideration as well.

Construction engineers oversee the construction of a project from beginning to end. They apply both technical and managerial skills, including knowledge of construction methods, planning, organizing, financing, and operating construction projects. They coordinate the activities of virtually everyone engaged in the work: the surveyors; workers who lay out and construct the temporary roads and ***ramp***s, excavate for the foundations, build the forms and pour the concrete; and workers who build the steel framework. These engineers also make regular progress reports to the owners of the structure.

The engineers who engaged in the area of community and urban planning may plan and develop communities within a city, or entire cities. Such planning involves far more than engineering consideration; environmental, social, and economic factors in the use and development of land and natural resources are also key elements. These civil engineers coordinate planning of public works along with private development. They evaluate the kinds of facilities needed, including streets and highways, public transportation systems, airports, port facilities, water—supply and wastewater—***disposal*** systems, public buildings, parks, and recreational and other facilities to ensure social and economic as well as environmental well-being.

Civil engineering contains the specialties of photogrammetry, surveying, and mapping. The civil engineers in this specialty precisely measure the Earth's surface to obtain reliable information for locating and designing engineering projects. This practice often involves high technology methods such as satellite and ***aerial*** surveying, and computer—processing of photo graphic imagery. Radio signals from satellites, ***scan***s by laser and ***sonic*** beams, are converted to maps to provide far more accurate measurements for boring tunnels, building highways and dams, plotting flood control and irrigation projects, locating subsurface geologic formations that may affect a construction project, and a host of other building uses.

Two additional civil engineering specialties that are not entirely within the scope of civil engineering but are essential to the discipline—engineering management and engineering teaching. Many civil engineers choose careers that eventually lead to management. Others are able to start their careers in management positions. The civil engineer manager combines technical knowledge with an ability to organize and coordinate labour power, materials, machineries, and money. These engineers may work in government—***municipal***, county, state, or federal; in the U. S. Army Corps of Engineers as military or civilian management engineers; or in ***semiautonomou***s region or city authorities or similar organizations. They may also manage private engineering firms ranging in size from a few employees to hundreds. The civil engineer who chooses a teaching career usually teaches both graduate and undergraduate students in technical specialties. Many teaching civil engineers engage in basic research that eventually leads to technical innovations in construction materials and methods. Many also serve as consultants on engineering projects, or on technical boards and commissions associated with major projects.

In a word, civil engineering is a broad field. As long as you keep earnest and down-to-earth, making efforts all the time, you will find what fit you in this field and your profession must can bring all your facilities into full play. Good luck!

Patience and perseverance will pay off. ——Einstein
耐心和恒心总会得到报酬的。——爱因斯坦

New Words

1 **marine** *adj.* （近）海的；海生（产）的 of, near, living in, or obtained from the sea
船舶的；船货的；海上贸易的，海运的 of or for ships and their goods and trade at sea
n. 水兵，（尤指）（皇家）海军陆战队队员 a soldier who serves on a naval ship, esp. a member of the Royal Marines or the Marine Corps

2 **canal** *n.* 运河，灌溉渠 a long straight passage dug in the ground and filled with water for boats and ships to travel along, a smaller passage used for carrying water to fields, crops

3 **dock** *n.* 船坞，码头 a park of a port where ships are repaired or where goods are put onto taken off them
v. （使）驶入码头（船坞）；（使）停泊在码头（船坞）(cause to) sail into, or remain at a dock

4 **harbor** *n.* (海）港，港口，港湾 an area of water on the coast, protected from the open sea by strong walls, where ships can shelter
v. 窝藏，庇护（罪犯等) to hide and protect somebody who is hiding from the police

5 **offshore** *adj.* 海上的，近海的 happening or existing in the sea, not far from the land

6 **basin** *n.* 盆；大碗；盘 a round container that is wide but not very deep, used for holding liquids or food; bowl
水洼；贮水池 a hollow place containing water, or where water collects
流域；盆地；低洼地 an area of land from which water runs down into a river; a large valley
内港；内湾 the deep part of a habour almost surrounded by land

7 **sewage** *n.* 污水，污物 used water and waste substances that are produced by human bodies,that are carried away from houses and factories through special pipes

8 **sewerage** *n.* 排水系统，污水处理 the system by which sewage is carried away from houses, factories, etc. and is cleaned and made safe by adding chemicals to it

9 **utility** *n.* 公共事务 a service provided for the public, for example, an electricity, water or gassupply.
adj. 多用途的，多效用的，多功能的 that can be used for several different purposes

10 **sewer** *n.* 污水管，下水道，阴沟 an underground pipe that is used to carry sewage away from houses, factories, etc.

11 **scrubber** *n.* 洗涤器 a tool used to wash
婊子，淫荡女人 an offensive word for a prostitute or for a woman who has sex with a lot of men

12 **incinerate** *v.* 把…烧成灰烬，焚烧 to burn it is completely destroyed

13 **toxic** *adj.* 有毒的，引起中毒的 containing poison，poisonous.

14 **sanitary** *adj.* 卫生的，环境卫生的，公共卫生的 Connected with keep places clean and healthy to live in, especially by removing human waste

15 **combustible** *adj.* 易燃的，可燃的 able to begin burning easily

16 **traverse** *v.* 横过，穿过，横渡 to cross an area of land or water

n. 侧向移动，横过，横越，可横越的地方 An act of moving sideways or walking across a steep slope, not climbing up or down it, a place where this is possible or necessary

17 **ramp** *n.* 斜坡，坡道 a slope that joins two parts of a road, path, building

18 **disposal** *n.* 去掉，清除，处理 the act of getting rid of sth

19 **aerial** *n.* 天线 a piece of equipment made of wire or metal rods for receiving or sending radio and television signals

adj. 空中的 空气中的，地表以上的 existing above the ground

20 **scan** *abbr.* 网络系统自动程序控制 scheduling control automaton by network system

21 **sonic** *adj.* 声音的，声速的 connected with sound or the speed of sound

22 **municipal** *adj.* 市政的，地方政府的 connected with or belonging to a town,city or district that has its own local government

23 **semiautonomous** *adj.* 半自治的 not controlled all by oneself

Phrases and Expressions

1 structural engineering 结构工程

2 water resources engineering 水利工程

3 geotechnical engineering 岩土工程

4 environmental engineering 环境工程

5 transportation engineering 运输工程

6 pipeline engineering 管道工程

Exercises

1. Translate the followings into Chinese.

① What is Civil Engineering? The word civil derives from the Latin for citizen. In 1782, Englishman John Smeaton used the term to differentiate the nonmilitary engineering work from the military engineering work.

② It is important for a novice designer to understand the fact that beautiful and practical design

solutions don't appear out of thin air like magic. There are no esoteric formulas or secret states of mind that produce good designs effortlessly. And designs are not created by only moving a pencil around on a piece of paper. Designs that work well and affect our emotions require a great deal of sensitive observation, analysis, studying or thinking and restudying as well as some degree of inspiration and creativity. It should be noted here that producing a design does involve both rational aspects (inventory, analysis, program development, construction knowledge) and intuitive aspects (the feel of putting forms and shapes together, aesthetic appreciation, etc.). The design process, then, is a framework of steps, incorporating both rational and intuitive phases, that aid the designer to organize his or her work, thoughts, and feelings in an effort to produce the best design solution possible.

③ In a word, civil engineering is a broad field.As long as you keep earnest and down-to-earth, making efforts all the time, you will find what fit you in this field and your profession must can bring all your facilities into full play. Good luck!

2. Choose the right answer according to the text.

① Which of the followings is not true according to the passage?

A. In the past, civil engineering meant the whole of nonmilitary engineering, but now excluding chemical, electrical, electronic, marine, mechanical engineering, etc.

B. Many English words are derived from Latin and Greek. For example, the word civil derives from the Greek. In 1782, An Englishman named John Smeaton used the term to differentiate the nonmilitary engineering work from the military engineering work.

C. Civil engineering includes airfields, bridges, canals, docks, foundations, harbors, offshore constructions, railways, river basin management, roads, sewage treatment, sewerage, soil mechanics, structural design, traffic, mechanical engineering, tunnel, water supply, etc.

D. Civil engineering now excludes airfields, bridges, canals, docks, foundations, harbors, offshore constructions, railways, river basin management, roads, sewage treatment, sewerage, soil mechanics, structural design, traffic engineering, tunnel, water supply.

② Which of the followings is not civil engineering?

A. As the main stadium for Beijing Olympics, National Stadium is located in the south central area of Beijing Olympic Green.

B. Researchers are searching for a way to keep deep-sea animals alive indefinitely, so that

their entire life cycles can be studied.

C. The Eiffel Tower is one of the most famous structures in the world.

D. Shanghai is the first city in the world to build a high-speed magnetic train.

③ Which of the followings is true according to the passage?

A. Environmental specialists perform soil experiments to determine if the earth can bear the weight of the project. Geotechnical specialists study the project's impact on the local area: the potential for air and groundwater pollution, the project's impact on native animal and plant life, and how the project can be designed to meet government requirements aimed at protecting the environment. Structural specialists determine what kinds of facilities are needed to ease the burden on local roads and other transportation networks that will result from the completed project.

B. Civil engineers build complete cities and towns, while, they don't plan or design.

C. A project begins with the site location, the site is surveyed and mapped by civil engineers.

D. Transportation specialists use preliminary data to make detailed designs, plans, and specifications for the project.

④ Throughout any given project, civil engineers make extensive use of computers, which of the following expressions is true according to the passage?

A. PKPMCAD has no relationship with CAD.

B. Computer is a necessity for a modern civil engineer because it permits the engineer to handle the large quantities of data much more efficiently. As a result, computer will replace human sooner or later.

C. Computers are used to help engineers design the various elements of the project and to manage the whole project.

D. Sutherland is not the father of the CAD.

⑤ In the specialty of structural engineering, civil engineers

A. plan and design structures of all types, including bridges, dams, power plants, supports for equipment, special structures for offshore projects, the United States space program, transmission towers, giant astronomical and radio telescopes, and many other kinds of projects.

B. needn't the help of computers.

C. shouldn't determine the forces a structure must resist: its own weight, wind and hurricane forces, temperature changes that expand or contract construction materials, and earthquakes.

D. determine the building sale price.

⑥ Civil engineers in the specialty of ____?

A. pipeline engineering design, build, and supervise systems to provide safe drinking water and to prevent and control pollution of water supplies, both on the surface and underground.

B. water resources engineers deal with all aspects of the physical control of water. They also design and maintain harbors, canals, and locks, build huge hydroelectric dams and smaller dams and water impoundments of all kinds, help design offshore structures, and determine the location of structures affecting navigation.

C. water resources engineers analyze the properties of soils and rocks that support structures

and affect structural behavior. They evaluate and work to minimize the potential settlement of buildings and other structures that stems from the pressure of their weight on the earth. These engineers also evaluate and determine how to strengthen the stability of slopes and fills and how to protect structures against earthquakes and the effects of groundwater.

D. transportation engineers build pipelines and related facilities which transport liquids, gases; or solids ranging from coal slurries and semi liquid wastes, to water, oil, and various types of highly combustible and noncombustible gases.

⑦ Among the following expressions, which is not mentioned in the passage?

A. Mastering the plentiful knowledge of construction methods, planning, organizing, financing, and operating construction project the construction engineers can hold the whole project from beginning to end.

B. The teachers in the civil engineering department may engage in basic research that eventually leads to technical innovations in construction materials and methods.

C. A building code is a set of detailed regulations to ensure that all the buildings meet certain minimum standards of health and safety. Building codes have been enacted to protect citizens from any harm likely to come to them because of unhealthy or unsafe conditions.

D. A student who wants to be an outstanding civil engineer should work hard.

⑧ Which of the following expressions is not right?

A. BOT is the short form of Build Operate transfer.

B. A person who has graduated from Civil Engineering can serve as consultants on engineering projects, or on technical boards and commissions associated with major projects.

C. It is an impact that cause the collapse of the World Trade Center during the 9.11 event in 2001.

D. Design is an optimization process of all aspects of a client's brief. It requires the integration of all the requirements to produce a whole that is efficient, economic and aesthetically acceptable.

Reading Material Structural Engineering

Structural engineering is a branch of civil engineering concerned with the designing and execution of all types of structures. Its applications are extremely ***diverse***. A great deal of what structural engineers do involve designing things to be built, and then helping to build them. The architect comes up with a building design, and then it's the structural engineer's responsibility to fit the structure to the architecture, and decide on what structural system is best suited to that particular building. Structural engineers design the beams, the columns, the basic members to make the building stand up.

The designing starts with the understanding of the project. The structural engineer must design structures to be safe for their users and make sure what they designed to be serviceable.

A structural engineer needs to know about the forces that act on structures: the stress put on a bridge by heavy traffic or on every structure by seasonal temperature changes or earthquake,or on a