



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

土木工程基础英语教程

主 编 陈 平 王凤池
主 审 李 莹

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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

土木工程基础英语教程

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内 容 简 介

本书根据我国高校应用型人才培养需要,在CBI内容依托教学理念指导下,将外语语言技能的培养与土木专业基础内容有机结合在一起,使读者在获取专业基础知识的过程中提高语言应用水平。本书共分9单元,分别是土木工程、土木材料、结构工程、道路工程、桥梁工程、隧道工程、基础工程、灾害及防灾及工程项目管理。在课文内容的安排上采取点面结合的方式,即每单元的三篇文章分别侧重在概况介绍、重点陈述和经典个案分析等不同方面。在练习内容的设计上则充分考虑了对听说读写译的全面训练,在练习的题型上尽量采用大学英语四六级题型。全书每单元由三部分构成。第一部分是听说部分,结合后面的第一篇阅读文章设计了听写填空练习,结合单元主题设计了情景对话练习。第二部分是阅读部分,是全单元的核心构成。该部分有侧重点不同的三篇文章。每篇文章后列有注、音标和词义的词汇短语表,之后会有不同训练侧重点的两项练习。第三部分是写作翻译部分,对专业英语特别是土木工程专业英语的特点、翻译技巧及专业英语论文写作的基本知识分九个部分进行了系统介绍。本书特别适合有一定大学英语基础的学习者在进入专业英语学习阶段前使用。

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前 言

当今世界正处在一个人类生存观念深刻变化，科学技术领域高速发展，现代产业体系高效运转的时代。社会急需能够全面适应 21 世纪竞争需要的在个人素质、学识和经验、合作与交流、创新与决策等不同方面都拥有足够潜力与修养的复合型人才。高等教育结构布局面临严峻考验。

为了实现中国的经济强国梦，科技强国梦，为了满足国际国内土木工程专业人才市场需求，为了在高等院校的教育改革中，探索一门在教学内容体系结构方面能突显与我国土木工程发展相适应，与国际土木工程惯例相衔接的课程，在教学内容组织模式方面，以教材基本内容为依托，及时地将前沿的土木工程建筑信息转化成教学内容，融入教学过程，保持课程内容的先进性，《土木工程基础英语教程》教材应运而生。本书不仅满足学习土木工程类专业英语课程学生的需要，也满足了广大土木工程类的从业人员提高专业英语交流、阅读、翻译、猎取专业信息的要求。

本书特点之一：本书在编写过程中既遵循了 CBI(Content-based Instruction)理论，即以内容为依托的教学理念，又借鉴了文秋芳教授的“输出驱动假设”理论，以交流、翻译、写作能力为目的驱动，在每个单元后面都附加会话、理解、翻译的练习，特别设定了专业英语翻译技巧和专业英语论文写作的基本知识。根据学生的能力特征，从学生已有的知识经验和能力中发挥学生在学习英语过程中的主动性、自觉性、创造性。

本书特点之二：本书在编写过程中充分考虑到未来土木工程师的培养和社会职责定位。在选材方面，坚持以国际最新土木工程发展动态为基本内容，在土木工程、土木材料、结构工程、道路工程、桥梁工程、隧道工程、基础工程、灾害及防御和项目管理等 9 个方面，猎取前沿信息，注重原汁原味，突出个案分析，配置经典图片，插入数据表格，使读者在使用本书时，即享受到纯正专业英语的魅力，又领略了土木工程的发展势态。

中国正在成为世界最大的经济实体。培养具有国际化眼光的新世纪的土木工程专业人才是我们教育工作者的责任。在编写本书中，所有参编人员均为高校教师，其中有英语专业、土木工程专业的具有高级职称的一线教师，也有从事多年土木工程专业实践，在本专业中的知名教授，还有海归学者。但在英语语言和土木工程专业交叉方面难免有不妥之处，真诚希望读者在使用此书时给予宝贵意见和建议。

本书由陈平、王凤池主编，曹晨负责 Unit 1 编写，孙凯元、王晓晶负责 Unit 2，李炎书、王美华负责 Unit 3，武明飞负责 Unit 4，王晓濛负责 Unit 5，杨柳荃负责 Unit 6，禹霆负责 Unit 7，郭旭负责 Unit 8，张焕芹负责 Unit 9，赵中华负责全书参考译文的校审，李莹负责全书的策划和主审工作。

编者
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Unit 1

Civil Engineering

Part I Listening and Speaking

Section A Listening Practice—Spot Dictation

Directions: The following passage is the summary of Passage 1 in Part II. Complete the passage by filling in each of the blanks with the word or words you've heard from the teacher.

Civil Engineering is one of the oldest engineering _____. The importance of civil engineering may be revealed according to its usefulness in people's life.

There are many _____ of civil engineering and a wide range of specialties. Structural engineers face the _____ of designing structures that support their own weight and the loads they carry, and that resist extreme forces from wind, earthquakes, bombings, temperature and others. Environmental engineers are called upon to protect our _____ resources. They translate physical, chemical and biological processes into systems to destroy toxic substances and remove pollutants. Geotechnical engineering is required in all aspects of civil engineering because most _____ are supported by the ground. Water is essential to our lives, and water resources engineers deal with the physical control of water. They design, construct and _____ hydroelectric infrastructure. Transportation engineers work to move people, goods and materials safely and _____. Using technical and management skills, construction engineers turn designs into reality on time and within budget. Urban engineers are _____ with the full development of human society.

Civil engineers build the world's infrastructure and they quietly _____ the history of nations around the world. To be a civil engineer, one must be able to design safe structures which meet standard codes in the regions that they are being built in. However, another very important area of study, although classes aren't offered for it, is problem solving. _____, drawing is another important skill for civil engineers to learn.

Section B Situational Dialogue

A: Good morning, Jadon.

B: Good morning, Bell.

A: How's everything going?

B: Really fine. Thank you.

A: How is your son? I haven't seen him for a long time.

B: Quite well. Thank you. Oh, I'm meeting my wife and son for lunch at 12 o'clock. Would you care to join us? John really missed you.

A: Oh, me too. I'd love to, but I'm afraid I can't. I already have a lunch engagement with some civil engineers in my department. How's John?

B: He's fine.

A: What's he doing these days?

B: Oh, he's studying civil engineering recently.

A: That's good.

B: Well. Then, perhaps we can get together another time.

A: I hope so, too.

B: Are you free for our party in the next Friday evening?

A: Friday? Yes, I'm free that evening.

B: Well, we're having civil engineers for dinner, and we'd like to invite you and your son to join us.

A: It's very kind of you, Bell. We'd be much delighted to accept your invitation.

B: Well. I think I'd better be running along, my wife is waiting for me.

A: OK. Have a nice time. Remember me to your wife.

B: I certainly will. Thank you.

A: I'm glad I ran into you today.

B: Me too. See you.

A: See you.

Part II Reading

Passage 1

Introduction to Civil Engineering

Civil Engineering is one of the oldest engineering disciplines. It focuses on aspects of public

works like transportation, water treatment, government buildings, public facilities such as airports and train stations, and other large scale projects which benefit the public. The function of civil engineering commences with the start of the day when we take a shower, since the water is delivered through a water supply system including a well designed network of pipes, water treatment plant and other numerous associated services. The network of roads on which we drive while proceeding to school or work, the huge structural bridges we come across and the tall buildings where we work, all have been designed and constructed by civil engineers. Even the benefits of electricity we use are available to us through the contribution of civil engineers who constructed the towers for the transmission lines. In fact, no sphere of life may be identified that does not include the contribution of civil engineering. Thus, the importance of civil engineering may be determined according to its usefulness in our daily life.

There are many branches of civil engineering and a wide range of specialties, including structural engineering, environmental engineering, geotechnical engineering, water resources engineering, transportation engineering, construction engineering and urban engineering.

Structural engineers face the challenge of designing structures that support their own weight and the loads they carry, and that resist extreme forces from wind, earthquakes, bombings, temperature and others. Bridges, buildings, amusement park and many other kinds of projects are included within this specialty. Structural engineers develop appropriate combinations of steel, concrete, timber, plastic and new exotic materials. They also visit project sites to make sure that the work is done properly.

The skills of environmental engineers have become increasingly important as we protect our fragile resources. Environmental engineers translate physical, chemical and biological processes into systems to destroy toxic substances, remove pollutants from water, reduce hazardous solid waste volumes, eliminate contaminants from the air and develop groundwater supplies. Environmental engineers are called upon to resolve the problems of providing safe drinking water, cleaning up contaminated sites with hazardous materials, disposing of waste water and managing solid wastes.

Geotechnical engineering is required in all aspects of civil engineering because most projects are supported by the ground. A geotechnical engineer may develop projects below the ground, such as tunnels, foundations and offshore platforms. They analyze the properties of soil and rock that support and affect the behavior of these structures. They evaluate potential settlements of buildings, the stability of slopes and fills, the seepage of ground water and the effects of earthquakes. They investigate rocks and soils at a project site and determine the best way to support a structure. They also take part in the design and construction of dams, embankments and retaining walls.

Water is essential to our lives, and water resources engineers deal with the physical control of water. They work with others to prevent floods, supply water for cities, industry and agriculture, to protect beaches or to manage and redirect rivers. They design, construct and maintain hydroelectric power facilities, canals, dams, pipelines, pumping stations, locks, seaport

facilities or even waterslides.

The quality of a community is directly related to the quality of its transportation system. Transportation engineers work to move people, goods and materials safely and efficiently. They find ways to meet our ever-increasing travel needs on land, air and sea. They design, construct and maintain all types of transportation facilities, including airports, highways, railroads, mass transit systems and ports. An important part of transportation engineering is upgrading our transportation capability by improving traffic control and mass transit systems, and by introducing high speed trains, people movers and other intermodal transportation methods.

The construction phase of a project represents the first tangible result of a design. Using technical and management skills, construction engineers turn designs into reality on time and within budget. They apply their knowledge of construction methods and equipment, along with the principles of financing, planning and managing, to turn the designs of other engineers into successful facilities.

Urban engineers are concerned with the full development of a community. They analyze a variety of information to coordinate projects, such as projecting street patterns, identifying park and recreation areas, and determining areas for industrial and residential growth. They employ their technical and people skills to coordinate with other authorities to integrate freeways, airports and other related facilities.

Civil engineers build the world's infrastructure. In doing so, they quietly shape the history of nations around the world. Most people can not imagine life without the many contributions of civil engineers to the public's health, safety and standard of living. Only by exploring civil engineering's influence in shaping the world we know today, can we creatively envision the progress of our tomorrows.

To be a civil engineer, one must be able to design safe structures which meet standard codes in the regions that they are being built in. However, another very important area of study, although classes aren't offered for it, is problem solving. Like all types of engineering, civil engineering is about solving problems. The engineer is presented with a problem and expected to find a solution for it. Whether that problem is spanning a river, stopping coastal erosion, providing water for farmers in arid climates or preventing a building from falling in an earthquake, everything a civil engineer does is problem solving.

The best problem solvers are those that learn how to think outside the box. When an "impossible problem" is presented, it takes a new approach to solve it. What makes that problem impossible is that nobody has found the right way to think of it yet. But there is always someone who can approach that problem from a different viewpoint and solve it. A student who wants to become an outstanding civil engineer needs to learn how to think outside of the box.

Besides, drawing is another important skill for civil engineers to learn. The solution to every problem must be drawn in order to share that solution with others. This isn't artistic drawing, but rather technical drafting, whether done with a pencil and ruler, or on a computer with a CAD (Computer Aided Drafting) program.

Words and Expressions

- engineering [endʒɪ'nɪərɪŋ] *n.* 工程, 工程学
- discipline [dɪ'sɪplɪn] *n.* 学科; 纪律; 训练; 惩罚
- transportation ['træns'pɔ:t(ə)n] *n.* 运输; 运输系统; 运输工具
- facility [fə'sɪlɪtɪ] *n.* 设施; 设备
- commence [kə'mens] *vi.* 使……开始
- numerous ['nju:m(ə)rəs] *adj.* 许多的, 很多的
- proceed [prə'si:d] *vi.* 开始; 继续进行; 发生; 行进
- transmission [trænz'mɪʃ(ə)n] *n.* 传递; 传送; 播送
- branch [brɑ:n(t)ʃ] *n.* 分支; 分部; 支流; 树枝
- appropriate [ə'prəʊprɪət] *adj.* 适当的; 恰当的; 合适的
- fragile ['frædʒaɪl] *adj.* 脆的; 易碎的
- toxic ['tɒksɪk] *adj.* 有毒的; 中毒的
- substance ['sʌbst(ə)ns] *n.* 物质; 实质
- pollutant [pə'l(j)u:t(ə)nt] *n.* 污染物
- hazardous ['hæzədəs] *adj.* 有危险的
- eliminate [ɪ'lɪmɪneɪt] *vt.* 消除; 排除
- contaminate [kən'tæmɪneɪt] *vt.* 污染, 弄脏
- evaluate [ɪ'veljueɪt] *vt.* 评价; 估价; 求……的值
- co-ordinate [kəu'ɔ:dɪneɪt] *n.* 坐标 *v.* 使……协调
- coastal ['kəʊstl] *adj.* 沿海的; 海岸的
- public facilities 公共设施, 市政设施
- water supply system 给水系统, 供水系统
- hydroelectric power 水力发电; 水电力
- mass transit system 公共运输系统
- along with 连同……一起, 与……一道, 随同……一起
- be concerned with 干预; 关心
- standard code 标准规定; 法则
- be presented with 面临; 面对; 被提出(要求或问题等)
- think outside of the box 打破固有思维模式; 创造性思考
- Computer Aided Drafting (CDA) 计算机辅助制图

Exercises

I. Vocabulary Practice

Directions: Fill in the blanks with the words or phrases in the text.

1. There are _____ brands for customers to choose and compare on the Internet, thus, online shopping is becoming a major trend in modern society.

2. He had devoted himself to his business since he _____ to take over the job.
3. Though your intentions were good, you should still find a/an _____ way to tell him the truth.
4. If the software is not _____ on time, it won't be compatible with this newly installed computer system.
5. Because of the intoxicating scenery and fresh seafood, more and more couples would fly to some _____ cities to spend their honeymoon.
6. The candidates are _____ to prepare a short speech and communicate with the foreigners in fluent English.
7. The most important thing is that you can actively _____ the class to complete the group tasks assigned by your teachers.
8. New graduates from universities are _____ the severe situation to find their ideal jobs, because some of them are too ambitious to become successful overnight.

II. Short-Answer Questions

Directions: Answer the following questions in the fewest possible words from the text.

1. What do civil engineers deal with in their jobs?
2. How many major branches are included in civil engineering?
3. How do you understand the saying "to think outside the box" in the last but one paragraph?

Passage 2

The Development Process of Civil Engineering

It is difficult to determine the history of emergence and beginning of civil engineering, however, the history of civil engineering is a mirror of the history of human beings on this earth. The earliest human beings were lived in the cave to protect themselves from weather and harsh environment, but later on they realized the need of shelter and made use of the materials like clay, sand, wood, rocks, even twigs and leaves to construct buildings, which being the demonstration of ancient age civil engineering.

Civil Engineering has been an aspect of life since the beginning of human existence. The earliest practices of civil engineering may have commenced between 4000 and 2000 BC in ancient Egypt and Mesopotamia (Ancient Iraq) when humans started to abandon a nomadic existence, thus causing a need for the construction of shelter. During this time, transportation became increasingly important leading to the development of the wheel and sailing.

The construction of pyramids in Egypt (around 2700—2500 BC) might be considered the first instances of large structure constructions. Around 2550 BC, Imhotep, the first documented engineer, built a famous stepped pyramid for King Djoser located at Saqqara Necropolis. With simple tools and mathematics he created a monument that stands to this day. His greatest

contribution to engineering was his discovery of the art of building with shaped stones. Those who followed him carried civil engineering to remarkable heights using skill and imagination.

Ancient historic civil engineering constructions included the qanat water management system, the Parthenon by Iktinos in Ancient Greece (447—438 BC), the Great Wall of China by General Meng Tian under orders from Qin Emperor (220 BC) and Li Bing's irrigation projects in China (around 220 BC). The Romans developed civil structures throughout their empire, including especially aqueducts, harbors, bridges, dams and roads.

In ancient China, a fundamental achievement of architecture is the load-bearing timber frame, a network of interlocking wooden supports forming the skeleton of the building. This is considered China's major contribution to worldwide architectural technology. However, it is not known how the builders got the huge wooden support columns into positions.

Unlike western architecture, in ancient Chinese wooden architecture, the wall only defined an enclosure, and did not form a load-bearing element. Buildings in China have been supported by wooden frames for as long as seven millennia. These articulated wooden Chinese frame emerged during the neolithic period. Seven thousand years ago mortise and tenon joinery was used to build wood-framed houses. Over a thousand of these sites have been identified, usually with circular, square or oblong shaped buildings. During the Yangshao culture in the Middle Neolithic, circular and rectangular semisubterranean structures are found with wooden beams and columns.

During this historic civil engineering period, clay and soil were mainly used as construction materials. This kind of buildings had been developed and spread widely in western and northern Europe, which can be considered as the stepping stone for the developments of building.

Until the recent era, there was no major difference between the terms "civil engineering" and "architecture", and they were often used interchangeably. The first self-proclaimed civil engineer was John Smeaton who constructed the Eddystone Lighthouse. In 1818 the Institution of Civil Engineers was founded in London, and in 1820 the eminent engineer Thomas Telford became its first president. The institution received a Royal Charter in 1828, formally recognizing civil engineering as a profession. The charter defined civil engineering as the art of directing the great sources of power in nature for the use and convenience of man, as the means of production and of traffic in states, both for external and internal trade, as applied in the construction of roads, bridges, aqueducts, canals, river navigation and docks for internal communication and exchange, and in the construction of ports, harbors, moles, breakwaters and lighthouses, and in the art of navigation by artificial power for the purposes of commerce, and in the construction and application of machinery, and in the drain age of cities and towns.

The first private college in the United States that included civil engineering as a separate discipline was Norwich University which was established in the year 1819. Civil engineering societies were formed in the United States and European countries during the 19th century, and similar institutions were established in other countries of the world during the 20th century. The American Society of Civil Engineers is the first national engineering society in the United States.

It was founded in 1852 with members related to the civil engineering profession located globally. The number of universities in the world that included civil engineering as a discipline had increased tremendously during the 19th and the 20th centuries, indicating the importance of this technology.

The industrial revolution had a profound influence on development of civil engineering by the arrival of electricity, mechanization, mass production and the replacement of human and animal muscle power by water and steam. Devising ever more ingenious machines became a new goal of engineers. Mining and metallurgy were more important as coal and iron becoming main materials in industry and construction.

During this period, many projects had been executed and amazed the world. The Thames Tunnel was built between 1825 and 1843 using Thomas Cochrane and Marc Isambard Brunel's newly invented tunnelling shield technology. It is an underwater tunnel built beneath the River Thames in London, United Kingdom, connecting Rotherhithe and Wapping. It was the first tunnel known to have been constructed successfully underneath a navigable river.

Since World War II, numerous technologies have assisted in the advancement of civil engineering in the modern world, including high-tech machinery, selection of materials, test equipment, and other sciences. Civil engineering had experienced another leap with the invention of new construction materials and technology. However, the most prominent contributor in this field is considered to be Computer-Aided design (CAD) and Computer-Aided Manufacture (CAM). Civil engineers use this technology to achieve an efficient system of construction, including manufacture, fabrication, and erection. Three-dimensional design software is an essential tool for civil engineers that facilitates them in the efficient designing of bridges, tall buildings, and other huge complicated structures.

The most typical material used in modern civil engineering is prestressed concrete. This type of concrete was invented by Frenchman Eugène Freyssinet in 1928 to overcome the natural weakness of concrete in tension. It can be used to produce beams, floors or bridges with a longer span that is practical with ordinary reinforced concrete.

The Chinese have also witnessed the rapid development of this industry. The famous railway named Jing-Zhang railway was completed in 1909, two years ahead of time by chief engineer Zhan Tianyou. It had added a brilliant page in the history of the Chinese Railway Construction. In 1889, Tangshan Cement Factory was started up by Kaiping Mining Bureau as the first cement factory of China and it produced the first barrel of machine-made cement for China.

Meanwhile, numerous skyscrapers have sprung up in construction to utilize the land more efficiently. Both residential buildings and commercial buildings are becoming higher and higher. Asia's Tallest Building—Taipei 101 in Taipei, China was completed in 2004 with 101 stories and a height of 1667 feet (508 meters). In 2008, China's tallest building, Shanghai World Financial Center, was completed with 101 stories and a height of 1614 feet (492 meters). In January 2010, the world's tallest building—Burj Khalifa in Dubai was completed with 160 stories which reach

2,716 feet(828 meters) high. In the same year, the International Commerce Centre was completed with 108 stories and a height of 1588 feet (484 meters) in Hong Kong, China.

Additionally, high-speed railways (HSRs) have been one of the most innovative elements affecting passenger transport in modern engineering. Shortly thereafter in the mid-1960s, Japan introduced the world's first high volume high speed train that operated with a standard gauge. It was called the Shinkansen and officially opened in 1964. It provided rail service between Tokyo and Osaka at speeds of around 135 mph (217 km/h). The word Shinkansen itself means “new main line” in Japanese but because of the trains' design and speed, they became known around the world as “bullet trains” .

After the opening of the bullet trains in Japan, Europe also started developing high capacity high speed trains in 1965 at the International Transport Fair in Munich, Germany. Several high speed trains were tested at the fair but Europe's high speed rail service was not fully developed until the 1980s. The world's longest line opened in China on December 25, 2012, which runs 2,298 kilometers (1,428 miles) from the country's capital in the north, Beijing, to Guangzhou.

Therefore, the large-scale appeared industrial workshops, skyscrapers, nuclear power stations, the highway and railway, large-span bridges, long tunnel and grand canal, big dams, marine engineering, etc., are demonstrating the epic achievements of civil engineering. This profession has been creating more amazing physical environment for human beings to live, which also plays a significant role in the process of modern civilization.

Words and Expressions

Shelter ['feltə] *n.* 庇护; 避难所; 遮盖物

Twig [twɪɡ] *n.* 小枝; 嫩枝

pyramid ['pɪrəˌmɪd] *n.* 金字塔

document ['dɒkjʊm(ə)nt] *vt.* 用文件证明

n. 文件, 公文

timber ['tɪmbə] *n.* 木材; 木料

column ['kɒləm] *n.* 圆柱; 列

millennia [mɪ'leniə] *n.* 一千年

identify [aɪ'dentɪfaɪ] *vt.* 确定; 鉴定; 识别, 辨认出

circular ['sɜ:kjʊlə] *adj.* 循环的; 圆形的; 间接的

rectangular [rek'tæŋɡjʊlə] *adj.* 矩形的; 成直角的

interchangeable [ɪntə'tʃeɪn(d)ʒəbl] *adj.* 可互换的; 可交换的; 可交替的

mechanization ['mekənəɪ'zeɪʃən] *n.* 机械化; 机动化

ingenious [ɪn'dʒɪ:niəs] *adj.* 有独创性的

tunnel ['tʌnl] *n.* 隧道; 坑道; 洞穴通道

leap [li:p] *n.* 飞跃; 跳跃

vt. 跳跃, 跳过; 使跃过