

高等学校试用教材

建筑工程专业英语教程

ARCHITECTURAL ENGINEERING
SPECIALIZED ENGLISH COURSE

《建筑工程专业英语教程》编写组



武汉工业大学出版社

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主 编:魏万德 谢伟平
副主编:马云霞 谢艳明 邓绪新
编 委:魏万德 谢伟平
 马云霞 谢艳明
 邓绪新
主 审:李桂青 彭少民

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建筑英语

前 言

本书是为高等院校建筑工程专业高年级学生学习专业英语而编写的，亦可供广大从事建筑工程专业工作，且具有一定英语基础的工程技术人员及自学者学习参考。

本书采用单元教学形式，每单元都编有三篇阅读材料，分三个部分：

1. 课文部分——类似精读材料，教师可以精讲此部分，要求学生掌握课文的词汇及内容。前十单元的课文练习之后，编有“科技英语翻译基本技巧”，分为十讲，每讲后都配有相应的翻译练习，便于学生巩固掌握所学的翻译知识。从第九单元起，课后还编写了一些科技英语语法和用法。课文部分编有两种练习题，阅读理解练习用于检查对课文理解的程度，翻译练习是为加强对课文有关词组和内容的掌握。

2. 阅读材料——此部分可在教师指导下阅读，阅读材料一之后编有阅读练习，以便检查阅读效果。

3. 第三部分属于学生自学部分，一般是对前两部分内容的扩充。

在内容方面，本书均采用新发表的科技文章，选材广泛，针对性强。语言规范，合乎时代要求，且在教学中反复使用，具有很强的代表性。本书所涉及的内容包括：特种水泥、钢筋混凝土、预应力钢筋混凝土、建筑结构、高层建筑、施工管理、力学、土力学、材料力学、计算机辅助设计和分析、给排水、污水处理等等。每单元前两部分阅读材料之后都对疑难句子和表达作了注释说明，本书后面还附有专业词汇表，中文意义贴切、齐全。

具有一定英语基础和专业水平的读者，学习本书可从以下三方面受益：①对日常英语作进一步提高，扩大词汇量，提高阅读能力；②巩固和补充专业知识；③在建筑工程专业里沟通中文和英文之间的表达方式，读者学完之后，能够较容易地阅读翻译相关的外文资料，从事国际科技交流。

众所周知，学习专业英语不同于学习日常英语（基础英语），后者注重于语言运用能力的综合培养，力求在摆脱母语的情况下进行语言能力的训练；专业英语则注重于培养学生阅读和翻译资料的能力，它以日常英语为基础，学习目的明确。同时，学习专业英语又是一种双语言活动（bilingual activity），学生通过学习，最终达到能正确进行英汉互译。为此，我们建议读者从以下两方面入手进行学习训练：

1. 专业英语和日常英语对照

在现代社会里，由于科技领域的知识范畴不断发展扩大，从而需要越来越多的专业词汇和术语来解释、定义新的现象和事物。大多数此类词汇和术语来自日常英语，在意义上有或多或少的变化，这就需要将其与基础英语词汇对照学习，并注意它们的用法差别。我们不能轻易地用日常英语中的意义来阅读理解科技文章，否则就会导致误解和阅读障碍。因为，在语法和文体上，专业英语比较规范，逻辑性强，多属于正式文体。句子所含的信息多，容量大，读者应理清句子的语法结构，找出文章用词的文体特征。

2. 专业英语和汉语对比和沟通

读懂了专业英语文章的意思之后，要译成汉语仍不是一件易事。英语是一种“变形”语言，其语法和句法变化体现在词语变化上，而汉语则是一种“意变”语言，通过词义变化体现其语法和句法。为了更好地对比沟通这两种语言，我们特编有十讲翻译技巧。

目前，我国出版的建筑工程专业英语教材尚不太多，因此，我们在本书的编写过程中，花费了大量人力物力，精心编写，广泛征询了专家学者及使用者的意见，得到了他们的大力帮助。尤其是西安矿业学院结构专业工程博士高兑现先生，在专业上提出了宝贵的意见。还有在武汉工业大学任教的 Dr. Dennis B. Hagen 及其夫人 Jennet Hagen，他们通读本书英文部分，并提出了一些宝贵意见，在此，一并向他们表示谢意。

编者

1995年5月

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UNIT ONE

AN INTRODUCTION TO THE ENGLISH OF SCIENCE AND TECHNOLOGY

When you read a piece of technical writing in English for the first time, or when you first hear scientists or engineers talking in English, you may find it very difficult to understand what is written or spoken, particularly if you have learned English as a language of everyday conversation and of literature. You may think that there is a special kind of English which is used only in science and technology and which has to be learned as a separate language. You may also feel that somehow the English of science and technology is much more difficult than everyday English, because of the specialized contexts in which it is used and because of the specialized interests of scientists and engineers. But the differences do not present any great problems once they have been recognized.

The following passage illustrates some of the features of technical English:

(Mr. Smith enters Dr. Brown's office. Dr. Brown is a consultant. Dr. Brown speaks.)

DR. BROWN: Good morning. Mr. Smith. Can I take your coat? Awful weather, isn't it? Do sit down, Cigarette?

DR. BROWN: Well, I've been looking into your enquiry about the corrosion trouble you've been getting in the control valve. I'm sorry you've had trouble—quite unexpected—but I think we have the answer. The most probable cause of corrosion at a metal-to-metal junction in an ionized fluid is electrolytic.

In this passage, Dr. Brown begins by talking informally to his visitor, but when he talks as an expert about his specialized subject—corrosion, his way of talking changes. His statements are impersonal, his style of speech is formal and he uses many technical terms.

Now here is an example of technical writing in English.

PRE-STRESSED CONCRETE

The concrete can be made stronger by pre-stressing. In the simplest type of prestress, the reinforcement is in the form of wires which are first tensioned by stretching them. Then concrete is cast round the wires in tension. When the concrete has set, the wires are cut. The contraction of the wires is resisted because they are held by the concrete. They therefore put the concrete into compression. When the beam comes under load this compression counteracts the

tensile forces.

Short beams pre-stressed in this way, can be manufactured in numbers in a factory and later taken to structure where they are needed.

The whole of this passage is in an impersonal, formal style with a very high concentration of technical terms and a number of mathematical symbols. Some of these characteristics of technical English are examined in the sections which follow.

IMPERSONAL OBJECTIVE STATEMENTS AND ATTITUDES

Scientists and engineers are interested in things and processes, in properties and characteristics. They are also trained to be objective. They endeavor to make statements or observations on which all observers would agree, and to make agreement easier, they express many of their observations in numbers or meter readings.

A non-scientist may be content to say that he can see a green light when he looks into an optical instrument. But 'green' is a subjective word and green is a colour given by different observers do not agree closely. So a scientist prefers to describe a colour by stating its wavelength, or its range of wavelengths and intensities can be read on the scales of suitable meters by anyone who is not blind. A scientist always invites others to verify his descriptions of what he observes. He accepts as facts only impersonal, objective statements about things which can be seen by any observers who choose to look.

This objective attitude is naturally reflected in the way scientists and engineers express themselves and particularly in the kinds of grammatical structures and sentence patterns which they prefer, although the sentence patterns which occur in technical English are also found in non-technical English.

New Words and Phrases

literature 文学, 文学作品, 文献, 著作
illustrate 说明; 举例
feature 特点, 性能, 优点
consultant 顾问, 咨询
enquiry 调查
corrosion 腐蚀
valve 阀门
junction 接合, 连接

ionize 电离
electrolytic 电解的
informal 非正式的, 日常的
impersonal 不具人格的, 与个人无关的
term 术语
pre-stress 预应力
reinforcement 加强, 加固, 钢筋
tension 拉紧, 拉力

cast 现浇, 浇注
set 凝固
contraction 收缩, 压缩
compression 压缩, 压力
counteract 阻碍, 反作用
tensile 拉力的, 受拉的

property 特性, 特质
endeavour 努力, 试图
meter readings 仪器读数
optical 光学的
wavelength 波长

Notes

1. The most probable cause of corrosion at a metal-to-metal junction in an ionized fluid is electrolytic.

电解很可能是导致电离液态中金属与金属间接合时产生腐蚀的因素。

2. They endeavour to make statements or observations on which all observers would agree, and to make agreement easier, they express many of their observations in numbers or meter readings.

他们试图对研究者都认可的观点进行论证, 为了使得认可的观点更加易懂, 他们用数字或仪器读数对此加以论述。

agree on: to have or share the same opinion, feeling, or purpose.

具有相同的观点、情感和目的, e.g.

1) The two countries agreed on the terms of peace.

两国同意了讲和的条件。

比较:

agree to: to accept an idea or an opinion, ... etc., esp after unwillingness or argument.

2) The committee has agreed to your request for resignation.

委员会已同意你的辞职请求。

3. He accepts as facts only impersonal, objective statements about things which can be seen by any observers who choose to look.

对于那些经选定的研究者观察到的可视东西, 其论述只要是非个人的, 客观的, 他都接受为事实。

这个句子由于宾语部分太长, 将其移后, 而将 as fact 这个补足语移前, 从而平衡了句子结构。

Exercise 1. Choose the best answer to each of the following questions.

1. Why, to a certain degree, is technical English more difficult than everyday English?

A. Because technical English is quite informal.

B. Because technical English has to be learned as a separate language.

- C. Because technical English is used in the specialized contexts.
 D. Because technical English is full of specialized terms.
2. Dr. Brown's conversation mentioned here
 A. is quite difficult to understand for it's full of technical terms.
 B. is informal at the beginning, but it becomes more and more formal, and at the end, his statements are impersonal and use many technical terms.
 C. is informal but mixed with technical English terms.
 D. is formal and all the way specialized in corrosion.
3. The concrete can be reinforced by
 A. pre-stressing.
 B. casting wires in it.
 C. adding compression.
 D. adding the tensile forces.
4. According to the author, in what aspect is technical English different from everyday English?
 A. Technical English is full of technical terms.
 B. Technical English is used by scientists and engineers.
 C. Technical English is concentrated of technical terms and mathematical symbols.
 D. The impersonal and objective attitude is used in technical English.
5. A scientist
 A. speaks technical English only.
 B. can see a green light when looks into an optical instrument.
 C. can see the wavelength and intensities of a color.
 D. is impersonal, objective about things which can be seen by any observers.

Exercise 2. Translate the following sentences into Chinese.

1. A scientist differs from an artist or a poet mainly in that a scientist not only interprets the outer world, but also tries to transform it into one favorable to mankind.
2. Scientists generally agree that science begins with necessity, curiosity, and questions about trifling, unexplained details in nature.
3. The prestressing of concrete naturally involves application of a compressive loading, prior to applying the anticipated design loads, so that tensile stresses that otherwise would occur are reduced or eliminated.
4. Prestressed concrete combines high-strength concrete with high-strength steel in an "active" manner.
5. The historical development of prestressed concrete actually started in a differ-

ent manner when prestressing was only intended to create permanent compression in concrete to improve its tensile strength.

6. Prestressing means the intentional creation of permanent stresses in a structure or assembly, for the purpose of improving its behavior and strength under various service conditions.

科技英语翻译基本技巧(一)

词义引申

词义引申是指改变原文字面意义的翻译方法。词义引申时，往往可以从词义转译、词义具体化、词义抽象化和词的搭配四个方面来考虑。

1. 词义转译翻译时，遇到一些无法直译或不宜直译的词或词组，应根据上下文和逻辑关系，引申转译。

Like any precision machine, the lathe requires careful treatment.

跟任何精密机床一样，车床也需要精心维护。(不译“待遇”)

Solar energy seems to offer more hope than any other source of energy.

太阳能似乎比其它能源更有前途。(不译“提供更多希望”)

2. 词义具体化

翻译时，根据汉语的表达习惯，把原文中某些词义较笼统的词引申为词义较具体的词。以动词 cut(切割)为例：

The purpose of a driller is to cut holes. 钻床的功能上钻孔。

A single-point cutting tool is used to cut threads on engine lathes.

普通车床是单刃刀具来车螺纹的。

3. 词义抽象化

把原文中词义较具体的词引申为词义较抽象的词，或把词义较形象的词引申为词义较一般的词。

The major contributors in component technology have been the semi-conductor components.

元件技术中起主要作用的是半导体元件。(不译“主要贡献者”)

There are three steps which must be taken before we graduate from the integrated circuit technology.

我们要完全掌握集成电路，还必须经过三个阶段。(不译“毕业于”)

4. 词的搭配

遇到动词、形容词与名词搭配时，应根据汉语的搭配习惯，而不应受原文字面意义的束缚。

The iron ore used to make steel comes from open-pit and underground mines.

炼钢用的铁矿石来自露天开采的矿山和地下矿井。(不译“制造钢”)

An insulator offers a very high resistance to the passage through which electric current goes.

绝缘体对电流通有很大阻力。(不译“高阻力”)

Exercise 3: 翻译下列各句，注意划线部分的译法:

1. Such particles are far too tiny to be seen with the strongest microscope.

2. The running of such automated establishments remains only a matter of reading various meters mounted on pannals.

3. If iron is kept moist, rusting is rapid, which might lead us to think that water was the influence causing the corrosion.

4. The shortest distance between raw material and a finished part is casting.

5. The increase in pressure with depth makes it difficult for a man to go very deep far below the water surface.

READING MATERIALS

TECHNICAL VOCABULARY

We have seen that technical English uses grammatical and syntactic forms and patterns which also occur regularly outside technical English. There are no new forms of patterns to be learned. However the vocabulary of any technical discussions or piece of writing may include words which are never used outside the subject of field in question. If you do not know the subject, you will not understand what is said or written, even if English is your mother tongue. This is not surprising. Specialized vocabulary are not confined to science and technology. There is a specialized vocabulary of ballet and a specialized vocabulary of cricket. You are unlikely to understand a conversation between ballet enthusiasts or cricket enthusiasts unless you know something about ballet or about cricket. But the vocabularies used in science and technology are very large, and in English they include many semi-technical or non-technical words which are used, unfamiliar ways so that their new meanings must be learned.

As the range of knowledge and achievement increases in any scientific or technological field, new terms are needed to define new phenomena and to explain new things and processes. Often suitable terms have to be invented. Scientists have been extending the vocabularies of their subjects for centuries and each subject has its own store of terms with precise, narrow meaning. Clearly it

is not necessary to know all the separate technical vocabularies in order to deal with even very difficult technical reports or publications in one particular field. A physiologist will want to know one set of terms, an electrical engineer another, moreover many of these highly technical terms are adopted internationally with only slight variations, usually to allow for differences in pronunciation or in word forms from one language to another.

There are of course many other technical words, particularly the well established names of substances, which differ from one language to another.

Many technical terms are made up from Latin and Greek roots, prefixes and suffixes which soon become familiar. Other technical terms may be made up from existing words whose meaning is well known and is not substantially altered in the technical compound word. Sometimes words which are invented for use in one field are later added to the vocabularies of other fields.

Although there are good technical dictionaries which will solve most problems of technical vocabulary, you will find in this book notes on the way in which many technical words are formed, and each chapter contains a number of technical terms related to its subject.

There are many words, whose use is not confined to scientific and technological contexts and which are an essential part of technical English. Some of these are formed from Greek or Latin roots, but they are not usually the same in all languages. They include the basic words of the older sciences such as mechanics, and they have usually been taken from everyday language and given a precise definition for scientific use. As a result, the meanings of these words in their technical use are likely to differ from their non-technical meanings. Moreover, they may have different precise meanings in different technical fields. Thus the word reaction might in an everyday context refer to a man's reaction to hearing of the death of his wife, while in chemistry it might be used to refer to the reaction of ammonia with carbon dioxide to form urea. In nuclear physics it might refer to a nuclear chain reaction and in civil engineering it might refer to the reaction of a beam against the weight of a load placed on the beam. The wide technical use of words like reaction has also led to the introduction of many related forms of a single word. Because these semi-technical words may present difficulties due to their several meanings and because many of them are general in their technical application, and therefore useful in a number of scientific and technological fields.

There remains a class of strictly no-technical words and expressions which are seldom found outside technical English. They have been incorporated in the precise, impersonal, formal English of scientists and engineers partly because they seem to avoid the ambiguity or imprecision of more commonly used words

with the same apparent meanings. Thus to determine is often used instead of to find out, to convert instead of to change, appreciable instead of a lot of. There are also expressions like to be under construction, to come under load, to come into operation, which are more common in technical English than in everyday English.

New Words and Phrases

syntactic 句法的

in question 有关的, 所涉及的, 谈到的

ballet 芭蕾舞

cricket 板球

enthusiast 热心人, 热衷者

substantially 实质性地

alter 改变

ammonia (pl) 铵

carbon dioxide 二氧化碳

urea 尿素

apparent 明显, 显然, 显著, 表面的

ambiguity 模糊

convert 转, 转换, 转变, 改造

Notes

1. Specialized vocabulary are not confined to science and technology.

专业词汇不限于科学和技术方面。

confine...to...(把...限制在...) e.g.

1) He confined his remarks to scientific management.

他的讲话限于科学管理问题。

2) Her illness confined her to bed.

疾病使他卧床不起。

2. A physiologist will want to know one set of terms, an electrical engineer another. Moreover, many of these highly technical terms are adopted internationally with only slight variations, usually to allow for differences in pronunciation or in word forms from one language to another.

生理学家需要了解一套术语, 电器工程师需要另一套, 另外, 许多高度技术化的术语只要对它们稍改造就在国际上采用, 这些变化通常体现在发音上, 或语言词语构成上的差异. ...an electrical engineer another... 为省略句, 全句应为:

An electrical engineer will want to know another set of terms.

3. Thus the word "reaction" might in an everyday context refer to a man's reaction to hearing of the death of his wife, while ... to form urea.

所以“反应”这个词在日常用语中可能指的是一个男人对他妻子之死的“反应”, 然而, 在化学里, 它则可能指的是二氧化碳与铵起“反应”, 产生尿素。

Exercise 4. Choose the word which has the closest meaning to the underlined word in each sentence.

1. The fundamental changes in machinery of war direction were more real than apparent.

A. clear B. vague C. superficial D. unexpected

2. There is a very simple technique for converting any decimal number to its binary equivalent.

A. altering B. forming C. constructing D. controlling

3. The technical standard was not substantially exceeded.

A. clearly B. vaguely C. superficially D. unexpectedly

4. Appreciable differences may occur, however, when small deformations considerably alter the loading condition.

A. understandable B. comprehensive C. apparent D. avoidable

5. Thus for energies in this range it is essential to use relativistic mechanics.

A. fundamental B. experimental C. considerate D. necessary

INTRODUCTION OF MECHANICS

The study of mechanics is a very old endeavor. Among the earliest students of mechanics was Archimedes (287–212 B.C.) to whom is attributed the discovery of how a lever works and also the discovery of the principle of buoyancy. Most of the principles of mechanics that we now study were formulated in the sixteenth, seventeenth, and eighteenth centuries by such scientists as Stevinus (1548–1620), Galileo (1564–1642), and Newton (1642–1727).

Mechanics may be defined as the science of predicting the conditions of rest or motion of bodies under the action of forces. There are two branches of mechanics that are concerned with rigid bodies exclusively. These two branches are statics, which deals with systems at rest, and dynamics, in which movement occurs in the system. In other words, the systems we will be studying are all completely stationary. Another branch of mechanics concerns the study of deformable bodies. This study is often referred to as the study of the mechanics of materials. Once we have learned to analyze systems at rest (i.e., the subject matter of statics), we will continue our investigations by considering some of the basic principles of the mechanics of materials. It is well to remember that the two branches—statics and the mechanics of materials—address different questions. The study of statics enables us to answer questions like: What forces are acting on a structure? Why doesn't a piece of machinery, or a complete