

高等学校专业英语系列教材

土木工程专业英语

TUMU GONGCHENG ZHUANYE YINGYU

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知识产权出版社

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内容提要

本书是根据教育部办公厅关于印发《大学英语课程教学要求》的通知规定编写的。本书选材广泛,难易适中,涉及建筑材料、材料力学、结构力学、建筑施工、钢筋混凝土结构、钢结构、测量、土力学及地基基础、地震工程、桥梁工程及公路工程等内容。本书共有18课,每课均由课文(Text)、单词(New Words)、词组(Phrases and Expressions)、注解(Notes)、练习(Exercises)、阅读材料(Reading Material)和常用翻译技巧(Translation Skill)七大部分组成。

本书可作为高等学校土木工程类专业英语教材,也可作为土木工程专业技术人员提高专业英语的参考读物。

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前 言

本书结合我国高等教育发展的新趋势,按照2007年7月27日教育部办公厅关于印发《大学英语课程教学要求》的通知规定和要求编写。目前,我国在校大学生绝大部分在大学一、二年级通过了大学英语四级考试,有些还通过了大学英语六级考试,进入到大学三年级,所在学校就不再开设公共英语课程。有些高等院校在师资力量允许的情况下,会开设一学期或一学年的专业英语课程。然而,由于土木工程所含专业较多,与之相适应的专业英语教科书就更显得比较缺乏。编写本书的目的在于配合土木工程类以及相近专业的专业英语教学,使学生掌握一定数量的专业或与专业有关的常用单词和词组,培养和提高学生阅读和翻译专业英文文献的能力,能以英语为工具,获取专业所需的信息,进行有效的专业技术交流,并为进一步提高英语水平打下良好的基础。笔者认为,大学生在完成基础阶段的英语学习任务后,很有必要继续研修专业英语课程,而且,该英语课程应与所学专业密切相关,应为大学英语学习的应用和提高阶段,与专业课程相辅相成,相得益彰。

本书虽篇幅有限,但仍然尽量做到选材广泛,难易适中。涉及的专业知识包括:建筑材料、材料力学、结构力学、建筑施工、钢筋混凝土结构、钢结构、测量、土力学及地基基础、地震工程、桥梁工程及公路工程等。

本书共有18课,每课均由课文(Text)、单词(New Words)、词组(Phrases and Expressions)、注解(Notes)、练习(Exercises)、阅读材料(Reading Material)和常用翻译技巧

(Translation Skill) 七个部分组成。16 课后简明扼要地讲述了科技论文摘要的写作；17 和 18 课后分别为典型译文实例 (I) 和典型译文实例 (II)。

本书可作为高等学校土木工程类专业英语教材，也可作为土木工程专业人员提高专业英语的参考读物。

本书由长安大学建筑工程学院雷自学和袁卫宁共同编写。其中，第 1 ~ 12 课由雷自学编写，第 13 ~ 18 课由袁卫宁编写。全书由雷自学统稿。

由于编者水平所限，书中难免存在不妥之处，敬请读者批评指正。

编者

2010 年 4 月

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Lesson One Man-made Building Materials

Building material is any material which is used for a construction purpose. Many naturally occurring substances, such as clay, sand, wood and rocks, even twigs and leaves have been used to construct buildings. Apart from naturally occurring materials, many man-made products are in use, some more and some less synthetic^[1]. The manufacture of building materials is an established industry in many countries and the use of these materials is typically segmented into specific speciality trades, such as carpentry, plumbing, roofing and insulation work. This reference deals with habitats and structures including homes.

Brick and Block

A brick is a block made of kiln-fired material, usually clay or shale, but also maybe of lower quality mud, etc. Clay bricks are formed in a moulding (the soft mud method), or in commercial manufacture more frequently by extruding clay through a die and then wire-cutting them to the proper size (the stiff mud process)^[2].

Bricks were widely used as a building material in the 1700, 1800 and 1900s. This was probably due to the fact that it was much more flame retardant than wood in the ever crowding cities, and fairly cheap to produce.

Another type of block replaced clay bricks in the late 20th centu-

ry. It was the Cinder block, which is made mostly with concrete.

An important low-cost building material in developing countries is the Sandcrete block, which is weaker but cheaper than fired clay bricks.

Concrete

Concrete is a composite building material made from the combination of aggregate (composite) and a binder such as cement. The most common form of concrete is Portland cement concrete, which consists of mineral aggregate (generally gravel and sand), portland cement and water. After mixing, the cement hydrates and eventually hardens into a stone-like material. When used in the generic sense, this is the material referred to by the term concrete.

For a concrete construction of any size, as concrete has a rather low tensile strength, it is generally strengthened using steel rods or bars (known as rebars). This strengthened concrete is then referred to as reinforced concrete. In order to minimise any air bubbles that would weaken the structure, a vibrator is used to eliminate any air that has been entrained when the liquid concrete mix is poured around the ironwork^[3]. Concrete has been the predominant building material in this modern age.

Concrete comes cheap and will support structures (e. g. bridges) for a long amount of time.

Metal

Metal is used as structural framework for larger buildings such as

skyscrapers, or as an external surface covering. There are many types of metals used for building. Steel is a metal alloy whose major component is iron, and is the usual choice for metal structural building materials. It is strong, flexible, and if refined well and/or treated lasts a long time. Corrosion is metal's prime enemy when it comes to longevity.

The lower density and better corrosion resistance of aluminum alloys and tin sometimes overcome their greater cost. Brass was more common in the past, but is usually restricted to specific uses or specialty items today.

Metal figures quite prominently in prefabricated structures such as the Quonset hut, and can be seen used in most cosmopolitan cities. It requires a great deal of human labor to produce metal, especially in the large amounts needed for the building industries.

Other metals used include titanium, chrome, gold, silver. Titanium can be used for structural purposes, but it is much more expensive than steel. Chrome, gold, and silver are used as decoration, because these materials are expensive and lack structural qualities such as tensile strength or hardness.

Glass

Clear windows have been used since the invention of glass to cover small openings in a building. They provided humans with the ability to both let light into rooms while at the same time keeping inclement weather outside. Glass is generally made from mixtures of sand and silicates, and is very brittle.

Modern glass "curtain walls" can be used to cover the entire fa-

cade of a building. Glass can also be used to span over a wide roof structure in a “space frame”.

Ceramics

Ceramics are such things as tiles, fixtures, etc.. Ceramics are mostly used as fixtures or coverings in buildings. Many countries use ceramic roofing tiles to cover many buildings.

Ceramics used to be just a specialized form of clay-pottery firing in kilns, but it has evolved into more technical areas.

Plastics

The term plastics covers a range of synthetic or semi-synthetic organic condensation or polymerization products that can be molded or extruded into objects or films or fibers. Their name is derived from the fact that in their semi-liquid state they are malleable, or have the property of plasticity. Plastics vary immensely in heat tolerance, hardness, and resiliency. Combined with this adaptability, the general uniformity of composition and lightness of plastics ensures their use in almost all industrial applications today.

Fabric

The tent used to be the home of choice among nomadic groups. Two well known types include the conical teepee and the circular yurt. It has been revived as a major construction technique with the development of tensile architecture. Modern buildings can be made of flexi-

ble material such as fabric membranes, and supported by a system of steel cables or internal air pressure.

New Words

1. synthetic [sin'θetik] adj. 合成的, 人造的, 综合的
2. segment ['segmənt] n. 段, 节, 片断; v. 分割
3. speciality [ˌspeʃi'æliti] n. 特性, 专业
4. carpentry ['kɑ:pintrɪ] n. 木工工作
5. plumbing ['plʌmɪŋ] n. 管道设备, 水暖设备, 管道工行业
6. habitat ['hæbitæt] n. (动植物的) 生活环境, 产地, 栖息地
7. kiln [kiln, kil] n. (砖, 石灰等的) 窑; vt. 烧窑
8. die [daɪ] n. 骰子, 钢型, 硬模, 冲模
9. cinder ['sində] n. 煤渣, 灰烬
10. sandcrete [sændkri:t] n. 细骨料混凝土
11. hydrate ['haɪdreɪt] n. 氢氧化物; v. 水化
12. rebar [ri'ba:] n. 钢筋
13. framework ['freimwɜ:k] n. 构架, 框架
14. skyscraper ['skɪskreɪpə(r)] n. 摩天楼, 高耸的烟囱
15. Quonset ['kwɒnsɪt] n. 匡西特活动房屋 (一种用预制构件搭成的长拱形活动房屋)
16. cosmopolitan [ˌkɒzmə'pɒlɪtən] n. 四海为家的人, 世界主义者; adj. 世界性的, 全球 (各地) 的
17. titanium [taɪ'teɪniəm] n. 钛
18. chrome [krəʊm] n. 铬, 铬合金
19. inclement [ɪn'klemənt] adj. 险恶的, 严酷的, 严寒的, 狂风暴雨的

- 20. malleable [ˈmæliəbl] adj. 有延展性的, 可锻的
- 21. facade [fəˈsɑ:d] n. 正面
- 22. nomadic [nəuˈmædik] adj. 游牧的, 游牧生活的
- 23. teepee [ˈti:pi:] n. 美国印第安人的圆锥形帐篷
- 24. yurt [juət] n. 蒙古包, 毡包

Phrases and Expressions

- 1. kiln-fired material 窑烧制材料
- 2. Cinder block 煤渣砌块
- 3. Sandcrete block 细骨料混凝土砌块
- 4. reinforced concrete 钢筋混凝土
- 5. curtain wall 幕墙

Notes

1. Apart from naturally occurring materials, many man-made products are in use, some more and some less synthetic.

全句可译为: 除天然材料之外, 人们还采用许多人造材料, 它们或多或少地都是人工合成的。注意 Apart from 相当于 besides, 意为“除……之外, 还有……”。

2. Clay bricks are formed in a moulding (the soft mud method), or in commercial manufacture more frequently by extruding clay through a die and then wire-cutting them to the proper size (the stiff mud process).

全句可译为: 在软泥制作法中, 粘土砖是用模具成型; 而在商业化硬泥加工法中, 更多的是将粘土挤压过一个硬模, 然后用钢丝将其切成合适的尺寸。注意这里将括号中的内容灵活地译成

“在……法中”。

3. In order to minimise any air bubbles that would weaken the structure, a vibrator is used to eliminate any air that has been entrained when the liquid concrete mix is poured around the ironwork.

全句可译为：为了尽可能减少使混凝土结构性能降低的气泡，当将具有流动性的混凝土拌合料浇入钢模时，用振捣器将其排出。注意在定语从句 *that would weaken the structure* 中用了虚拟语气，表示现实中不会让气泡存在于混凝土中。

Exercises

1. Translate the following paragraph into Chinese

Sandcrete is a yellow-white building material made from Portland cement and sand in a ratio of circa 1 : 8. It is similar but weaker than mortar, for which the ratio is circa 1 : 5. It is the main building material for walls of single-storey buildings (such as houses and schools) in countries such as Ghana and Nigeria. Measured strengths of commercially available Sandcrete blocks in Nigeria were found to be between 0.5 and 1N/mm², which is well below the 3.5N/mm² that is legally required there. This may be due to the need of the manufacturers to keep the price low, and since the main cost-factor is the Portland cement, they reduce that, which results in a block that starts behaving more like loose sand.

2. Translate the following sentences into English

(1) 许多天然物质，如粘土、砂子和岩石，甚至树枝和树叶都已经用作建筑材料。

(2) 砖块是由窑中烧制材料作成的块体，通常由粘土或页岩制成，但也可由炉渣制成。

(3) 与水混合后，水泥便发生水化反应，并最终形成象石头一样的材料。

(4) 金属可用作大型结构的框架，也可用来装饰建筑物外表。

(5) 明亮的窗户不但能使光线进入建筑物，而且也能将恶劣气候隔绝于建筑物之外。

Reading Material Natural Building Materials

Natural materials

Mud, stone, and fibrous plants are the most basic building materials, aside from tents made of flexible as basic structural components in these buildings, while mud is used to fill in the space between, acting as a type of concrete and insulation.

Some examples are the wattle and daub mostly used as permanent housing in tropical countries or as summer structures by ancient northern peoples.

Mud and clay

The amount of each material used leads to different styles of buildings. The deciding factor is usually connected with the quality of

the soil being used. Larger amounts of clay usually mean using the cob/adobe style, while low clay soil is usually associated with sod house. The other main ingredients include more or less sand/gravel and straw/grasses. Rammed earth is both an old and newer take on creating house, but the heat/coolness stays longer.

Peoples build with mostly dirt and clay, such as cob, sod, and adobe, resulted in homes that have been built for centuries in western and northern Europe as well as the rest of the world, and continue to be built, though on a smaller scale. Some of these buildings have remained habitable for hundreds of years.

Rock

Rock structures have existed for as long as history can recall. It is the longest lasting building material available, and is usually readily available. There are many types of rock throughout the world all with differing attributes that make them better or worse for particular uses. Rock is a very dense material so it gives a lot of protection too, its main drawback as a material is its weight and awkwardness. Its energy density is also considered a big drawback, as stone is hard to keep warm without using large amounts of heating resources.

Dry-stone walls have been built for as long as humans have put one stone on top of another. Eventually different forms of mortar were used to hold the stones together, cement being the most commonplace now.

Thatch

Thatch is one of the oldest of building materials known; grass is a good insulator and easily harvested. Many African tribes have lived in homes made completely of grasses year round. In Europe, thatch roofs on homes were once prevalent but the material fell out of favour as industrialisation and improved transport improved the availability of other materials. Today, though, the practice is undergoing a revival. In the Netherlands, for instance, many of new buildings too have thatched roofs with special ridge tiles on top.

Wood

Wood is a product of trees, and sometimes other fibrous plants, used for construction purposes when cut or pressed into lumber and timber, such as boards, planks and similar materials. It is a generic building material and is used in building just about any type of structure in most climates. Wood can be very flexible under loads, keeping strength while bending, and is incredibly strong when compressed vertically. There are many differing qualities to the different types of wood, even among same tree species. This means specific species are better for various uses than others. And growing conditions are important for deciding quality.

Historically, wood for building large structures was used in its unprocessed form as logs. The trees were just cut to the needed length, sometimes stripped of bark, and then notched or lashed into place.