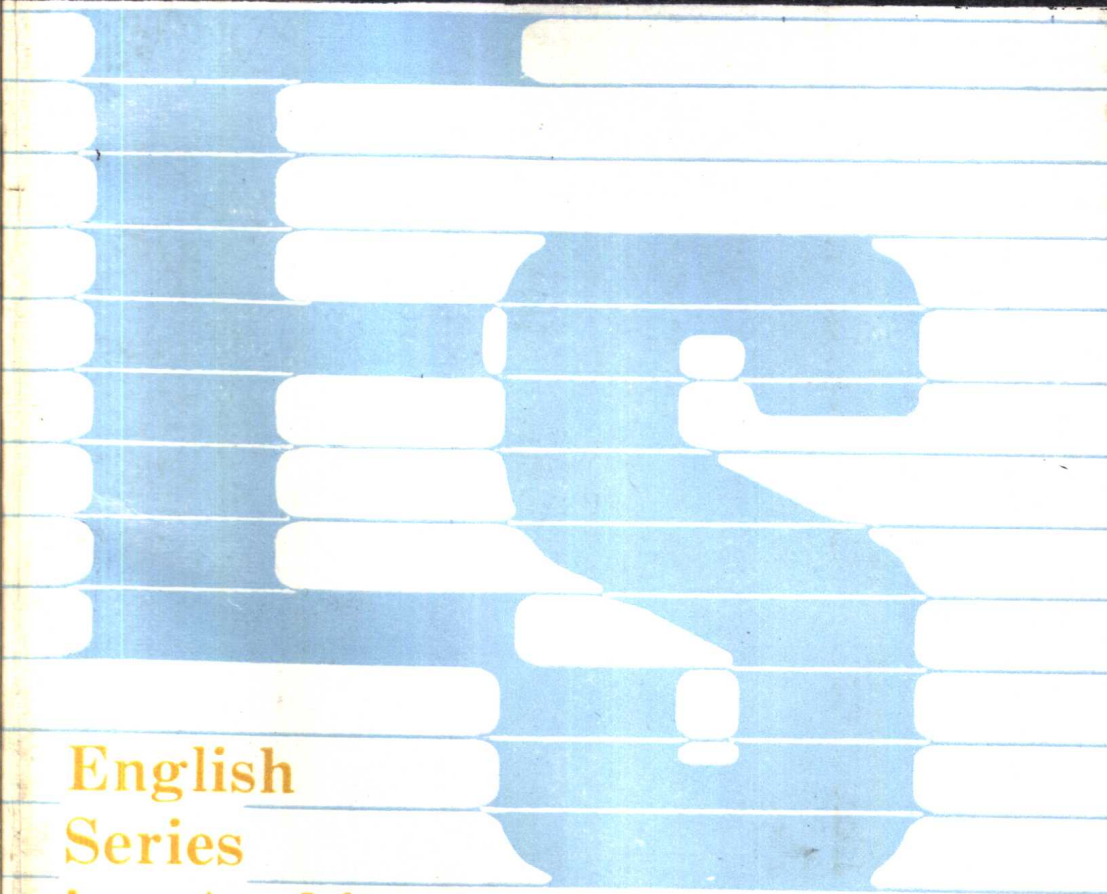
土木建筑系列英语

中国建筑工业出版社

第三级　工程机械



English Series in Architecture and Civil Engineering

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第三级 工程机械

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《土木建筑系列英语》 第三级　工程机械

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致读者

土木建筑行业是我国社会主义经济的重要支柱之一。土木建筑行业职工素质如何，对这个行业发展关系极大。全国土木建筑行业职工约2000万人，其中工程技术人员和管理人员约300万人。随着对外开放的不断扩大，我国同世界各国之间的人员往来、学术交流、信息传播、经济活动以及工程承包等业务日益频繁，土木建筑行业不同领域不同层次的读者，尤其是中青年知识分子，学习和进修英语的要求越来越迫切。奉献在读者面前的《土木建筑系列英语》读本，正是为满足这样的需要而编撰的。

《土木建筑系列英语》是一套结合土木建筑类各专业的英语分级读本，整个系列按文章难度分为四级。第一、二级不分专业，内容为土木建筑方面的浅显易懂的科学普及文章。第三级暂分八个专业，即建筑学与城市规划、工业与民用建筑、给水与排水、供热与通风、道路与桥梁、工程机械、管理工程、计算机与自动化，每个专业一册，其他专业视情况再行编撰；内容为各有关专业一般性的科学普及或科学技术文章。第四级内容选收专业性较强的科学技术文章；目前暂出版建筑学与城市规划，工业与民用建筑专业各一册，其他专业留待以后考虑。

我们在组织和编撰《土木建筑系列英语》时，力求使这套读本具有自己的特点。

首先，起点低。这套系列读本的起点为1000个单词。凡初中毕业或具有同等英语程度的读者，都可以从第一级开始自修或听课。这就大大地拓宽读者面，使土木建筑行业多数人员有条件有兴趣利

用这套读本来学习英语。

其次，便于自学。编撰的四级读本尽量保持一个较为平缓的"坡度"，全部课文均附参考译文，每个练习都有答案，争取使读者在普通英语的"浅基础"上，一步一步地学会阅读专业英语。通过学习第一、二级读本，可以掌握土建类科技英语最常用的2500个单词以及阅读科技英语书刊和有关资料所必需的基本语法知识。继之，通过学习第三级读本，可以累计掌握本专业最常用的3500个单词和比较系统的英语构词法知识，获得阅读本专业英语书刊和有关资料的能力。最后，通过学习第四级读本，可以累计掌握本专业4500个单词和比较全面的英译汉知识；这样，比较流利地阅读和翻译本专业英语书刊和有关资料，就有了比较牢固的语言基础。

这套系列英语读本第一、二级均配有录音磁带，由英、美文教专家朗诵，口音纯正，声质清晰，语调自然，使读者听来亲切、生动。

第三，适应性强。各级英语读本既彼此衔接，又相对独立，可以适应各种不同程度的读者的需要。一般读者如果从第一级学起，循序渐进，持之以恒，每周自修或听课3～4小时，经过一年半左右，便可学完前三级读本，为阅读本专业英语书刊和有关资料创造条件。有意深造的读者，再用半年左右，攻读第四级读本，就可以达到比较流利地阅读和翻译本专业英语书刊和有关资料的目的。对于英语基础较好的读者，如高等院校高年级学生，可把第一、二级读本作为泛读教材，第三、四级读本作为精读教材来学。对于硕士研究生或具有同等英语程度的工程技术人员，则可直接阅读第三、四级读本；在掌握英语构词法和英译汉技巧方面，这两级读本对他们会有所帮助。而广播电视大学、函大、夜大、职大、业大及有关中等专业学校的学生，也可依照自己的水平和需要，选学有关读本。

第四，语言规范可靠。这套系列读本的全部课文，均选自近年来面世的英语国家的出版物。但为了适应系统地学习英语的需要，编撰者对不少课文作了必要的删改和加工；而在删改和加工之后，

均送各校聘请的英、美文教专家审阅，使之保持规范的科普或科技文体的现代英语的特点。全部练习均由编撰者按统一要求编写，目的在于帮助读者更好地掌握课文中重要的语言材料。全部参考译文均由有关专业教师一一校阅，术语比较准确，行文比较通达。

《土木建筑系列英语》读本是集体智慧的结晶。十几所土木建筑高等院校的五十多位英语教师和专业教师参加了编撰、审订工作，其中某些分册还聘请校外的有关专家过目。哈尔滨建筑工程学院、重庆建筑工程学院、北京建筑工程学院、沈阳建筑工程学院、吉林建筑工程学院、南京建筑工程学院、山东建筑工程学院、西北建筑工程学院、苏州城市建设环境保护学院和河北建筑工程学院等，都对编撰、审订工作表示关怀和支持。

本书为工程机械专业读本，对于学习工程机械专业的大专院校学生、研究生以及从事该专业的工程技术人员都有很大的针对性和实用性，是他们获得专业英语阅读技能的重要读物。

目前，尚未见到紧密结合本学科、本专业编撰的系列英语分级读本，我们只是做了初步的尝试。万事开头难。尽管编撰、审订人员做了大量的细致的工作，但这套《土木建筑系列英语》读本还不是尽善尽美，毫无瑕疵的。我们期待着读者和同行们的批评和指正。

《土木建筑系列英语》编审委员会
中国建筑工业出版社编辑部
1988年3月18日

Contents

Lesson 1

Machines and Work

Defined in the simplest terms a machine is a device that uses force to accomplish something. More technically, it is a device that transmits and changes force or motion into work. This definition implies that a machine must have moving parts. A machine can be very simple, like a block and tackle to raise a heavy weight, or very complex, like a railroad locomotive or the mechanical systems used for industrial processes.

A machine receives input from an energy source and transforms it into output in the form of mechanical or electrical energy. Machines whose input is a natural source of energy are called prime movers. Natural sources of energy include wind, water, steam, and petroleum. Windmills and waterwheels are prime movers; so are the great turbines driven by water or steam that turn the generators that produce electricity; and so are internal combustion engines that use petroleum products as fuel.① Electric motors are not prime movers, since an alternating current of electricity which supplies most electrical energy does not exist in nature.

Terms like work, force, and power will be used frequently, so it is necessary to define them precisely. Force is an effort that results in motion or physical change. If you use your muscles to lift a box you are exerting force on that box. The water which strikes the blades of a turbine is exerting force on those blades, thereby setting them into motion.

Note these two kinds of motion: linear and rotary. Linear motion is movement in a straight line; the technical term for this

kind of motion is translation. Reciprocating motion is a linear motion that goes back and forth or up and down in the same path, like the movement of the pistons in a car. Rotary motion is movement in a circular path. To produce rotary motion it is necessary to have torque, a force that can cause a twisting motion called torsion.② Torque is the kind of effort that you exert to open a twist-off lid on a jar. In many machines the problem is to change one kind of motion to another. In a car, for example, the linear motion of the pistons must be converted into rotary motion to make the wheels turn.③

Power is another term used in a special technical sense in speaking of machines. It is the rate or speed at which work is performed. If you raise a tenpound weight a distance of twenty feet in two minutes, you are performing work at a rate of ten pounds × twenty feet × two minutes, or two hundred foot-pounds in two minutes. Since the rate is usually given in units of one minute, this is a rate of 100 foot-pounds in a minute.

In the metric system power is measured in terms of watts and kilowatts. The watt is the power to do one joule of work per second. The joule is a small unit of work, approximately three-quarters of a foot-pound. One horsepower is equal to 746 watts. The kilowatt, a more widely used term, equals a thousand watts or approximately 1⅓ horsepower in the English system. The newton is a unit equal to the force necessary to accelerate one kilogram one meter per second per second.④

New Words

1. define [di'fain] *v.* 为……下定义
2. accomplish [ə'kɔmpliʃ] *v.* 完成
3. imply [im'plai] *v.* 表明
4. locomotive [ˌləukə'məutiv] *n.* (牵引)机车
5. prime [praim] *a.* 最初的
   prime mover 原动机
6. windmill ['wind'mil] *n.* 风车
7. combustion [kəm'bʌstʃən] *n.* 燃烧
   internal combustion engine

内燃机

8. precisely [pri'saisli] *ad.* 精确地
9. alternate ['ɔ:ltə:neit] *v.* 交流，交替
   alternating current 交流电
10. blade [bleid] *n.* 叶片
11. thereby ['ðɛə'bai] *ad.* 因此，所以
12. linear ['liniə] *a.* 直线的，线性的
    linear motion 直线运动
13. rotary ['rəutəri] *a.* 旋转的
14. translation [træns'leiʃən] *n.* 平动，平移
15. reciprocate [ri'siprəkeit] *v.* 往复，来回
16. piston ['pistən] *n.* 活塞
17. circular ['sə:kjulə] *a.* 圆的，环形的
18. torque [tɔ:k] *n.* 扭(力)矩
19. twist [twist] *v.* 拧，扭
    twist motion 扭转运动
20. torsion ['tɔ:ʃən] *n.* 扭力，扭矩
21. lid [lid] *n.* 盖子
22. jar [jɑ:] *n.* 罐
23. metric ['metrik] *a.* 米制的
24. watt [wɔt] *n.* 瓦特
25. kilowatt ['kiləwɔt] *n.* 千瓦(特)
26. joule [dʒaul, dʒu:l] *n.* 焦耳(能量和功的单位)
27. approximately [ə'prɔksimitli] *ad.* 大约
28. newton ['nju:tn] *n.* 牛顿(力的单位)
29. accelerate [æk'seləreit] *v.* 加速

Phrases and Expressions

1. in the form of 以…形式，呈…状态
2. exert ... on 把…施加于
3. convert into 转变成，转换成
4. in a sense 在某种意义上
5. in terms of 依据，用…来表示
6. set ... into motion 使运转，开动

Notes

① **...; so are the great turbines ...; and so are internal combustion engines ....**

句中两个 so 均为副词，意思等于 also（也，同样），用在"助动词＋主语"或"be ＋主语"之前。so 只用于肯定句，否定句用 neither 或 nor.

② **..., a force that can cause a twisting motion called torsion.**

这里的 force 是其前面 torque 的同位语。

③ **... to make the wheels turn.**

这里的 make 是使役动词，要求复合宾语，turn 为不带 to 的动词不定式，作宾语补足语。

④... a unit equal to the force necessary to accelerate ...

句中 equal to ... 和 necessary to accelerate ... 是两个形容词短语，分别是 a unit 和 the force的定语。

Exercises

I. Comprehension

Circle the letter next to the best answer according to the text.

1) Which of the following best supports the ideas of Paragraph I ?
   A. It gives us a complex definition of a machine.
   B. It implies a more technical definition of a machine.
   C. Neither A nor B.
2) It can be concluded that _____.
   A. a prime mover is a machine whose input depends on a natural source of energy
   B. electric motors are prime movers, because they supply most electrical energy
   C. windmills and waterwheels are not prime movers
3) The example in Paragraph 3 says that when you lift a box, you are _____.
   A. exerting a force to push it forward.
   B. exerting an upward force on it
   C. pulling it with a great force
4) The main idea of Paragraph 5 is that _____.
   A. power is the rate at which work is done
   B. power is used in a special technical sense
   C. power can do work at a rate of 100 foot-pounds in a minute
5) It can be inferred that, in a car, in order to make the wheels turn, the linear motion of the pistons _____.
   A. must be changed into rotary motion
   B. must be changed into their rotary motion
   C. must not be converted into rotary motion

II. Vocabulary

A. Choose the word or phrase that has the same meaning as the italicized part in each of the following.

1) *Defined* in the simplest terms, a machine is a device that uses force to accomplish something.

A. Described B. Written C. Dictated

2) The definition *implies* that a machine must have moving parts.

A. applies B. supports C. suggests

3) It is necessary to define the terms like work, force, and power *precisely*.

A. eventually B. exactly C. clearly

4) The joule is a small unit of work, *approximately* three quarters of a foot-pound.

A. almost B. nearly C. roughly

5) The newton is a unit equal to the force necessary to *accelerate* one kilogram one meter per second per second.

A. speed up B. urge forward C. run over

B. Choose the correct word or phrase to complete each of the following sentences:

1) at a rate of at this rate

A. The car was going _____ 40 miles an hour.

B. If the waterwheel kept running _____ it would be out of order.

2) engine machine

A. You should teach us how to run the washing _____.

B. An electric spark ignites the petrol in a car _____.

3) sense manner

A. If you push a heavy box but fail to move it, you do no work in a scientific _____.

B. It is quite good, in a _____, but it is not the best machine tool.

4) in terms of in order to

A. We learn this passage _____ learn what the function of machines is.

B. Power is measured _____ watts and kilowatts.

5) device devise

A. A block and tackle is a _____ to raise a heavy weight.

B. The great turbines are _____ to turn the generators that produce

electricity.

III. Word-Building

Both prefixes and suffixes are syllables that are added to many English words to change their meanings:

de- is one of the prefixes which means "down, off" For example:

de + ice = deice

-ful is one of the suffixes which means "full of".

For example:

hand + ful = handful

Drill:

Both prefix de- and suffix: -ful have been added to the base words. Tell their Chinese meanings:

1) demagnetize	2) hopeful	3) degas
4) cupful	5) decolour	6) boxful
7) defrost	8) basketful	9) desalt
10) bagful		

Reading Material

Machines at the Construction Site

At the construction site of any new building, bridge, or road, the roar of powerful machinery is heard. Bulldozers are pushing over trees or shoving large piles of earth from place to place. Power shovels thrust their huge digging buckets into the ground, scooping up half a ton of earth and rock in one stroke. Dump trucks move up and down to carry away the dirt excavated by the shovels. Pile drivers hammer away at pilings (heavy steel pipes or huge logs that are driven deep into the ground for foundations). Tractors and cranes haul and lift the steel, stone, or concrete needed to erect the structure.

Construction work would be much more difficult than it is already without these machines and many others as well. Making an excavation, laying a foundation, and erecting a structure mean heavy labor.

For thousands of years the burden of such work was mostly on human shoulders.

The Egyptians and other ancient peoples did have animals to help with the heavy hauling.① Men learned long ago that animals could be trained to carry loads and perform other tasks. But animals could not be used for many tasks. Men still had to dig out earth and put it into carts, and they had to lift beams, stones, bricks, and mortar into place to erect buildings or bridges.

Machines eventually were devised for some heavy lifting jobs. Not until early in the 19th century was a device invented to ease the backbreaking work of excavation.② The invention was a scraper with steel blades, mounted on wheels and drawn by a team of horses.

A labor-saving machine such as the scraper was still not