



世纪中等职业教育系列教材
中等职业教育系列教材编委会专家审定

机电专业英语

主编 崔静波 周芳 施蓉

ENGLISH



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出版说明

当今,数控技术迅猛发展,数控技术产品广泛应用到各个领域,数控技术设备促进了工业生产技术水平的提高。企业迫切需要大量的机电复合型且具有综合职业能力的中等应用型人才。特别是我国加入 **WTO** 以来,在快速发展的数控技术领域,大量的原版英文技术资料和网络提供的最新的技术信息与动态,使得英语水平对于专业学习和提高有着举足轻重的作用。目前,公共英语教学已经有较完善成熟的教学体系和科学的考核手段,但行业应用英语的教学相对比较薄弱,各学校之间的教学差距也比较大。教材的统一性、适应性、通俗性是各学校选择教材最为棘手的问题。这本《机电专业英语》教材就是为解决问题而编写的。本教材编写本着先进、实用、够用的选材原则和简明、系统的组织标准,组织了多名具有多年英语教学经验和对本专业领域有一定造诣的专家编写团队,期间翻阅了大量的国内外专业资料,充分吸收和借鉴当今最新技术成果和教学成果,以提高学生专业英语的阅读能力,扩展和深化学生对本学科关键技术的认知。编者根据数控技术领域对人才的需求现状,从学生就业以后尽快适应岗位的需要来编写。学生在具备一定的数控技术专业的基础上,通过阅读大量的、通俗的、适用的行业科普读物以此提高专业英语阅读理解能力,使学生在未来需求多变的、竞争激烈的就业市场中多一份竞争的筹码。

本教材十个单元,每单元设两篇阅读课文,文后还编有阅读理解及词汇应用扩展练习,与课文内容紧密结合;图文并茂,使本书的使用者在提高专业英语阅读能力的同时,词汇和语法运用能力和口语会话能力方面也可得到相应提高。

本书内容大致包括四个主要方面。一、机械制造总体概念、常识、基本原理。从日常生活中用到的普通制造品、简单的制造加工工具和机械讲起,以便学习者

把自己从课堂上学到的机械制造知识与英语学习内容挂钩,加速知识技能迁移的过程;二、机械加工设备与加工方法基础。机械加工原理与方法是世界上最古老的技术学科之一,内容较多,是中等职业学校学生应掌握的核心知识的一部分;三、机械加工原理与方法的最新发展方向和趋势。从专业方向上讲,虽不要求中等职业学校学生掌握系统的机械加工原理和机械操作原理,但对自己所从事的专业技术发展的方向和趋势,仍然应当有一定了解;四、自动控制技术、数控理论、数控技术制造、数字化工厂发展趋势和加工原理、柔性制造原理和方法基础、计算机一体化制造等。这些是本专业发展趋势的代表。

本教材的适用对象是全国中等职业学校数控技术应用专业在校生及具有相应水平和学习要求的读者。通过64个学时的专业英语教学,要求学生掌握专业英语的基本知识和300~500个本专业领域的技术词汇;能借助词典正确阅读、理解和翻译一般性数控技术应用类专业英文资料,其中主要是科普杂志、机械设备操作说明书等。

本书由崔静波、周芳、施蓉主编,彭俊、王建红担任副主编。李丰华担任本书的主审。由于编者水平有限,加上时间紧迫,任务量大,书中难免有疏漏和错误之处,恳请各位读者批评指正,您的建议是我们不断提高的无限动力!

编者

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Unit 1 Fundamentals of Machine Manufacturing

Dialogue

Making Introductions

Mike: Hi, Tom. Who's the man outside?

Tom: He's my new colleague, Jack.

Mike: What's his job?

Tom: He is an engineer, and he is in charge of numerical control part programming. Come here, Jack. This is Mike.

Jack: How do you do, Mike?

Mike: How do you do, Jack? May I ask you a question?

Jack: Go ahead.

Mike: What's computer-aided manufacturing?

Jack: Computer-aided manufacturing can be defined as the use of computer systems to plan, manage, and control the operations of a manufacturing plant through either direct or indirect computer interface with the plant's production resources.

Mike: Thank you, Jack.

Jack: You are welcome.

Text 1

What Is Manufacturing?

Maybe you've never thought about it before, but it is all around you. It affects every part of your life. What is it? In this case, "it" is manufacturing. Actually "manufacturing" is not all around you. But manufactured products are. Look around you right now. Name some things you see that were manufactured. Chairs, notebooks, blue jeans, chalkboards, books, floortile, light bulbs, pencils, eyeglasses—nearly everything around you was manufactured. (See Fig. 1.1.)

Manufacturing affects our daily lives—what we wear (blue jeans), what we eat (breakfast cereal), what we watch (television), how we travel (cars), and many many other things. In this text, you will learn more about this process, this industry, called manufacturing.

Imagine your life without manufacturing. You would have no bicycle to ride, no television to watch, and no sneakers to wear. There would be no clothes, no furniture, no airplanes. Lifesaving devices such as artificial hearts could not even be imagined. Manufacturing is making products. And the products can be large or small, simple or complex.

Making parts and putting them together is manufacturing. If you make parts and put them together to make a product, you are manufacturing. But today, when most people think of manufacturing, they think of the manufacturing industry.

The manufacturing industry is important to our society and our economy. A piece of material is worth more after it's been changed into a useful product. That's value added. Value is increased by the manufacturing process.

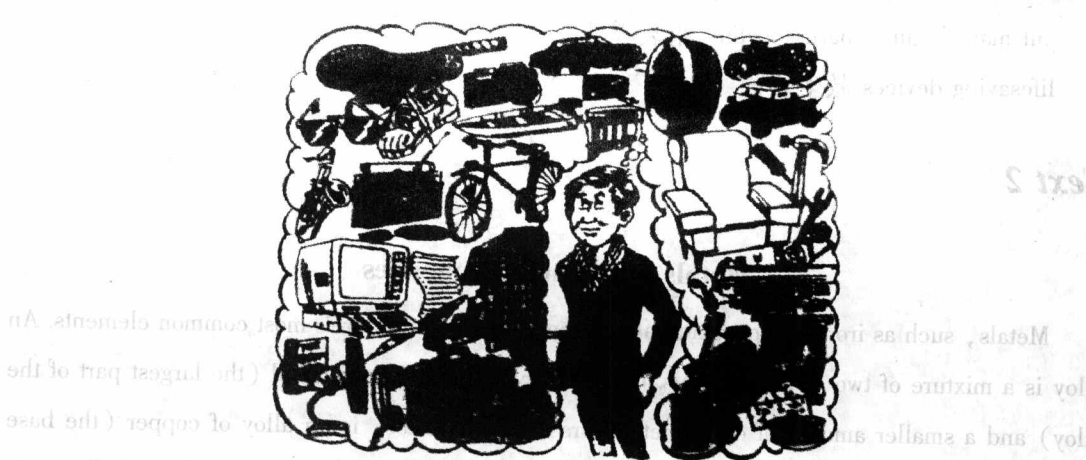


Fig. 1.1 Manufactured products are all around us

Words and Expressions

manufacturing[ˌmænjuˈfæktʃəriŋ] *n.* 制造业 *adj.* 制造业的

affect [ə'fekt] *vt.* 影响

actually['æktʃʊəli] *adv.* 实际上, 事实上, 竟然, 居然

jeans[dʒi:ns] *n.* 斜纹布裤, 牛仔裤

cereal[ˈsiəriəl] *n.* 谷类食品, 谷类 (单词)

process[prə'ses]*n.* 过程, 作用, 方法, 程序, 步骤, 进行 *vt.* 加工, 处理

industry['ɪndəstri] *n.* 工业, 产业, 行业

complex[ˈkɒmpleks] *adj.* 复杂的, 合成的, 综合的

device[di'vais]*n.* 装置, 设计, 设备

economy[*i'kɒnəmi*]*n.* 经济, 节约, 节约措施

material[mə'tiəriəl]*n.* 材料, 原料, 物资, 素材, 布料

value[ˈvæljuː,-ju] *n.* 价值, 估价, 价格, [数] 值 *vt.* 估价, 评价, 重视

in this case 在这种情况下

added value 附加值

manufacturing industry 制造业

manufacturing process 制造过程

put manufactured parts together 组装零件

lifesaving devices 救生装置

Text 2

Metals and Their Properties

Metals, such as iron, copper, and aluminium, are one of nature's most common elements. An alloy is a mixture of two or more metals. Usually it consists of a base metal (the largest part of the alloy) and a smaller amount of other metals. Brass, for instance, is an alloy of copper (the base metal) and zinc. Steel is an alloy of iron and carbon. In the machine shop, metals and alloys are usually called metals. Metals are divided into two groups, the ferrous, which contain a large percentage of iron, and the nonferrous, which contain no iron.¹

The most important characteristics of metal are its mechanical properties, magnetic properties, and chemical properties.

Mechanical properties are the characteristic responses of a material to applied forces. These properties fall into five broad categories: strength, hardness, elasticity, ductility, and toughness (韧性).

- (1) Strength is the ability of a material to resist applied forces
- (2) Hardness is the ability of a material to resist penetration and abrasion.
- (3) Elasticity is the ability to spring back to original shape.
- (4) Ductility is the ability to undergo permanent changes of shape without rupturing.
- (5) Toughness is the ability to absorb mechanically applied energy.

Magnetic properties of metal are those which have to do with reactions to magnetic forces.² Some metals are attracted by magnets, some are not.

Chemical properties of metal pertain to its resistance to corrosion and oxidation. The melting temperature of a metal also falls into this category. Chemical properties often determine a metal's suitability for a specific purpose.

Words and Expressions

metal['metl] *n.* 金属

iron['aiən] *n.* 铁, 熨斗

copper['kɒpə] *n.* 铜

aluminium[,æljʊ:'minjəm] *n.* 铝 *adj.* 铝的

common['kɒmən] *adj.* 共同的, 公共的, 公有的, 普通的

mixture['mɪkstʃə] *n.* 混合, 混合物, 混合剂

element['elɪmənt] *n.* 要素, 元素, 成分

zinc[zɪŋk] *n.* 锌

brass[brɑ:z] *n.* 黄铜, 黄铜制品

carbon['kɑ:bən] *n.* 碳

ferrous['ferəs] *adj.* 铁的, 含铁的

nonferrous['nɒn'ferəs] *adj.* 不含铁的, 非铁的

characteristic[,kærɪktə'ristɪk] *adj.* 特有的, 表示特性的, 典型的 *n.* 特性, 特征

magnetic[mæg'netɪk] *adj.* 磁的, 有磁性的, 有吸引力的

response[rɪs'pɒns] *n.* 回答, 响应, 反应

force[fɔ:s] *n.* 力, 力量, 力气

strength[streŋθ] *n.* 强度

category['kætɪgəri] *n.* 种类

elasticity[ɪləs'tɪsɪti] *n.* 弹力, 弹性

ductility[dʌk'tɪlɪti] *n.* 展延性

toughness['tʌfnɪs] *n.* 韧性, 坚韧, 刚性

rupture['rʌptʃə(r)] *n.* 破裂, 决裂

absorb[əb'sɔ:b] *vt.* 吸收, 吸引

melting['meltɪŋ] *adj.* 熔化的, 融化的, 溶解的, 混合的

temperature['temprɪtʃə(r)] *n.* 温度

suitability[su:tə'bɪləti] *n.* 合适, 适当, 相配, 适宜性

Exercises

purpose ['pə:pəs] *n.* 目的, 意图 *vt.* 打算, 企图, 决心

consist of 包括

for instance 例如

pertain to *v.* 属于, 关于, 有关

have to do with 与……有关, 涉及

fall into 分类

Notes

1. Metals are divided into two groups, the ferrous, which contain a large percentage of iron, and the nonferrous, which contain no iron.

金属可分为两大类——黑色金属和有色金属。黑色金属是含有铁的金属, 有色金属是不含铁的金属。

此句中有两个非限制性定语从句: 一是 which contain a large percentage of iron, 修饰 the ferrous; 另一个是 which contain no iron, 修饰 the nonferrous.

2. Magnetic properties of metal are those which have to do with reactions to magnetic forces.

金属的磁性是金属在磁力作用下所具有的性质。

those 是 that 的复数, 这里用来代替 properties, 以免重复。

Exercises

A) Answer the following questions according to text 1.

1. Can we live without manufacturing?

2. What is manufacturing?

B) Answer the following questions according to text 2.

1. What are mechanical properties of metals?

2. Can you name some mechanical properties according to the texts?

3. What makes a material either ferrous or nonferrous?

4. What are the most important characteristics of metal?

C) Match the following terms to appropriate definitions or expressions.

1. _____ strength

2. _____ ductility

3. _____ hardness

4. _____ toughness

5. _____ elasticity

a. the capability of a material to undergo permanent changes of shape

b. the resistance of a material to plastic deformation

c. the ability to absorb mechanically applied energy

d. the ability to spring back to original shape

e. the ability of a material to resist applied forces

D) Put the following into Chinese.

1. copper

2. brass

3. ferrous

4. steel

5. alloy

6. aluminium

7. iron

8. carbon

Grammar

Characteristics of Scientific English(I)

科技英语的特点(I)

科技文章与文艺小说,新闻报道等迥然不同。科技英语文章大量使用被动语态结构。因为:(1)被动结构比主动结构更缺少主观色彩,科技论著常常注重客观事实,正需要这种特性;(2)被动语态更能突出主要论证、说明对象,从此引人注目;(3)在很多情况下被动结构比主动结构更简短;(4)科技文体崇尚严谨周密,概念准确,逻辑性强,行文简练,重点突出,句式严整,少有变化,常用前置性陈述,即在句中将主要信息尽量前置,通过主语传递主要信息。科技文章文体的特点是:清晰、准确、精练、严密。那么,科技文章的语言结构特色在翻译过程中应如何处理,这是进行英汉科技翻译时常常需要探讨的问题。现分述如下:

一、大量使用名词及介词短语

为了达到“明确”和简练的要求,科技英语大量使用名词化结构(Nominalization)及介词短语,特别是名词化的动词。因为科技文体要求行文简洁、表达客观、内容确切、信息量大、强调存在的事实。而非某一行为。如:

Light as it comes from the sun is a mixture of light of many different colors. 太阳发出的光是多种色光的混合体。句中 mixture of light of many different colors 系名词化结构,一方面简化了同位语从句,另一方强调 mixture 这一事实。

The sun gives the solar cell its constant supply of energy. 太阳不断地给太阳能电池补充能量。(动作性名词“supply”用作直接宾语)试比较下面两句:

That building is under construction.

That building is being constructed.

第一句用“介词+行为名词”构成的短语来表示动作的状态,要比相应的动词来表示动作客观一些。

二、广泛使用被动语句

科技人员在研究和解决科技问题时重视事物本身的客观规律,重视事实和方法、性能和特征,强调客观准确性。第一、二人称使用过多,会给人造成主观臆断的印象。因此尽量使用第三人称叙述,采用被动语态,例如:

These units may be put together in any combination to satisfy specific production requirement. 可以把这些部件组装成各种组合形式,以适应特定的生产需要。

而很少说: You may put together these units in any combination to satisfy specific production requirement. 你们可以把这些部件组装成各种组合形式,以适应特定的生产需要。再如:

The element of helium was first found in the sun. 氦元素最初是在太阳里发现的。

Cars and lorries could be driven by electric motors if fuel cells, which convert fuel into electricity without burning it, can be made more efficient. 燃料电池可以将燃料不经燃烧直接转变为电能,如果燃料电池的效率可以提高一些,小汽车和卡车便可以靠电动机驱动。

结构分析:句子的框架是 Cars and lorries could be driven by electric motors if...。被动结构 be driven by 译成汉语的被动态“靠……驱动”。if 引件状语从句。此从句中套用一个关系代词 which 引导的定语从句修饰 fuel cells。定语从句中的 it 指代前面提到的 fuel。被动结构 be made more efficient 译成主动句,即“效率提高一些”。

三、非限定动词的运用

如前所述,科技文章要求行文简练,结构紧凑,为此,往往使用分词短语代替定语从句或状语从句;使用分词独立结构代替状语从句或并列分句;使用不定式短语代替各种从句;“介词+动名词短语”代替定语从句或状语从句。这样既可以缩短句子,又比较醒目。试比较下列各组句子。

The second step in minimizing costs of production is choosing the cheapest of the technical efficient alternatives. 降低生产成本的第二个措施是选用最合算、技术上有效的代替方法。

The components of sea water are of great use in chemistry owing to its being a mixture. 由于海水是混合物,它的各种成分在化学工业中大有用途。

Developing countries are countries to be developed. 发展中国家都是有待完成发展的国家。

So, what can be suggested to improve this situation? 那么如何才能改变这一现状呢?

四、大量使用后置定语

大量使用后置定语也是科技文章的特点之一。常见的结构有以下四大类:

1. 介词短语

CAD/CAM will provide the technology base for the computer-integrated factory of the future. 计算机辅助设计与制造将会为未来的计算机集成工厂提供技术基础。

As indicated by the definition, the applications of computer-aided manufacturing fall into two broad categories. 正如定义所表明的那样,CAM 应用程序可分为两大类。

2. 形容词及形容词短语

In this factory, the only fuel available is coal. 该厂惟一可用的燃料是煤。

The neutron has no charge, either positive or negative. 中子不带电荷,既不带正电也不带负电。

副词如 there, here, below, above, together, today, out, up, home, down, abroad 等作定语时通常后置。

The air outside pressed the side in. 外面的空气将桶壁压得凹进去了。

If this tool does not suit you, use that one instead. 如果这件工具不适用,就用那件吧。

单个分词作定语,但仍保持较强的动词意义。

The results obtained must be checked. 获得的结果必须加以校核。

The heat produced is equal to the electrical energy wasted. 产生的热量等于消耗了的电能。

3. 动词不定式

I have a lot of work to do today. 我今天有很多活要干。

An ohmmeter is a device to measure resistance. 电阻表是用来测量电阻的工具。

4. 定语从句

During construction, problems often arise which require design changes. 在施工过程中,常

会出现需要改变设计的问题。

The molecules exert forces upon each other, which depend upon the distance between them. 分子相互间都存在着力作用,该力的大小取决于它们之间的距离。

Very wonderful changes in matter take place before our eyes every day to which we pay little attention. (定语从句 to which we pay little attention 修饰的是 changes,这是一种分隔定语从句。)我们几乎没有注意的很奇异的物质变化每天都在眼前发生。

To make an atomic bomb we have to use uranium 235, in which all the atoms are available for fission. 制造原子弹,我们必须用铀 235,因为铀的所有原子都会裂变。

Reading Material

Mechanism

A mechanism has been defined (定义) as "a combination (组合体) of rigid (刚体) or resistant bodies so formed and connected that they move upon each other with definite (确定的) relative (相对的) motion (运动)."

Mechanisms form the basic geometrical (几何) elements (要素) of many mechanical devices including automatic packaging (包装) machinery, typewriters, mechanical toys, textile (纺织) machinery, and others. A mechanism typically designed to create a desired motion of a rigid body relative to a reference (参考) member. Kinematic design (运动设计) of mechanisms is often the first step in the design of a complete machine. When forces (力) are considered, the addition problems of dynamics (动力学), bearing loads (轴承载荷), stresses, lubrication, and the like are introduced, and the larger problem becomes one of machine design.

The function of a mechanism is to transmit (传递) or transform (转换) motion from one rigid body to another as part of the action of a machine. There are three types of common mechanical devices that can be used as basic elements of a mechanism: gear (齿轮) systems, cam (凸轮) systems, plane and spatial linkage (平面和空间连杆机构).