



教育部职业教育与成人教育司推荐教材  
五年制高等职业教育数控技术应用专业教学用书

技能型紧缺人才培养培训系列教材

# 数控技术应用 专业英语

刘小芹 主编



高等教育出版社  
HIGHER EDUCATION PRESS

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李鹏飞 陈吉红 Mr. Bruce Skewes 王 军 主审

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## 内容提要

本书一方面向读者介绍了大量数控技术方面的英语专业词汇及其用法,另一方面全面系统地介绍了国内外数控技术的最新成果与实践。主要包括数控技术的起源与发展、数控原理及系统、数控机床结构及工艺、数控编程与加工、数控机床电气控制及其与现代制造工艺的关系等方面的内容。全书共有6个单元,每单元有4篇课文。同时,每单元附有与课文内容相关的阅读材料。本书还附有专业词汇表、常用专业技术缩略词汇表及参考译文。

本书可作为五年制职业院校数控技术应用以及机械工程类专业的英语教学用书,也可作为相关工程技术人员的英汉对照参考用书。

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# 出版说明

2003年12月教育部、劳动和社会保障部、国防科工委、信息产业部、交通部、卫生部联合印发了《教育部等六部门关于实施职业院校制造业和现代服务业技能紧缺人才培养培训工程的通知》。为了配合该项工程的实施,高等教育出版社开发编写了数控技术应用专业领域技能型紧缺人才培养培训系列教材。该系列教材已纳入教育部职业教育与成人教育司发布实施的《2004—2007年职业教育教材开发编写计划》,并经全国中等职业教育教材审定委员会审定,作为教育部推荐教材出版。

高等教育出版社出版的教育部推荐数控技术应用专业领域技能型紧缺人才培养培训系列教材(以下简称推荐系列教材),是根据教育部办公厅、国防科工委办公厅、中国机械工业联合会最新颁布的《中等职业学校数控技术应用专业领域技能型紧缺人才培养培训指导方案》编写的。推荐系列教材力图体现:以培养综合素质为基础,以能力为本位,把提高学生的职业能力放在突出的位置,加强实践性教学环节,使学生成为企业生产服务一线迫切需要的高素质劳动者;职业教育以企业需求为基本依据,办成以就业为导向的教育,既增强针对性,又兼顾适应性;课程设置和教学内容适应企业技术发展,突出数控技术应用专业领域的新知识、新技术、新工艺和新方法,具有一定的先进性和前瞻性;教学组织以学生为主体,提供选择和创新的空間,构建开放的课程体系,适应学生个性化发展的需要。推荐系列教材在理论体系、组织结构和阐述方法等方面均作了一些新尝试。主要特色有:

1. 以就业为导向,定位准确,全程设计,整体优化。
2. 借鉴国内外职业教育先进教学模式,突出项目教学,顺应现代职业教育教学制度的改革趋势,适应学分制。
3. 理论基础知识教材以职业技能所依托的理论知识为主线,综合了多门传统的专业基础课程的理论知识。知识点以必需、够用为度。
4. 理论实践一体化教材缩短了理论与实践教学之间的距离,内在联系有效,衔接与呼应合理,强化了知识性和实践性的统一。
5. 操作训练和实训指导教材参照国家职业资格认证标准,成系列按课题展开,考评标准具体明确,直观、实用,可操作性强。

推荐系列教材既注重了内在的相互衔接,又强化了相互支持,并将根据教学需

求不断完善和提高。

查阅推荐系列教材的相关信息,请登录高等教育出版社“中等职业教育教学资源网”(网址:<http://sv.hep.com.cn>)。

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2004年12月

# 前 言

本书所选素材均来自国内外数控技术工程资料和相关教材,紧密结合数控技术应用知识和技能,按专业内容循序渐进,删繁就简,目的是让学生在较短时间内积累一定数量的专业词汇,熟悉专业文章、工程资料和操作手册的英文表达,培养阅读和应用数控技术原文资料的能力。本书既反映了数控技术的常规专业知识,又介绍了数控新技术及其发展趋势,可作为各类职业技术学院(校)数控技术应用专业及现代制造技术专业的专业英语教学用书,也可作为从事数控技术、模具设计与制造技术、机电一体化技术等方面技术工作的工程技术人员自学或参考用书。

全书分6个单元,共24课,参考学时数为60学时。每课包括课文、专业词汇表、注解和练习。学习重点放在阅读理解、专业词汇积累和书面翻译上。同时,根据语言学习的特点,兼顾专业听、说能力的培养和提高,以加强对课文内容的理解和记忆,并为对外业务交流打下一定的基础。为巩固和拓宽学习内容,每单元都附有阅读材料,可让学生课外阅读、翻译,也可作为测试选题。为了便于学生自学,所有课文都附有参考译文,同时还配有由来自英语国家的外籍教师录制的录音带,供学生练习口语和正音。

本书由刘小芹任主编,薛恩任副主编,王珏、谢德荣、徐建春、肖龙、游煌煌等参编,由 Mr. Bruce Skewes、王军担任主审。

在本书的编写过程中,我们曾得到了宁顺清、李望云、应文豹、詹华西、张幼华、卢锋等老师及学生的帮助,在这里一并表示感谢!

作为教育部职业教育与成人教育司推荐教材,教育部聘请华中科技大学机械学院国家数控工程中心陈吉红和北京理工大学李鹏飞审阅了本书。两位审者以严谨的科学态度和高度负责的精神认真审阅了书稿,提出了很多宝贵意见,在此表示衷心的感谢。

由于编者水平有限,加上时间仓促,书中难免有疏忽和错误之处,敬请读者批评指正。

编 者

2004年8月于武汉

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# Unit One

## Fundamentals of Mechanical Engineering

### **| Text 1    Engineering Drafting**

Engineering drafting is a very important means, which is used for engineering designs and engineering communications. We will introduce some key engineering drawing views as following:

#### 1. Normal views

A normal view is a perpendicular projection onto a viewing plane parallel to the line. In the normal view, all points of the line are equidistant from the observer. Therefore, the true length of a line is viewed and can be measured. And the true size and shape of any figure in the plane can be determined.

#### 2. Principal(orthographic) views

In a principal view( also known as a planar view) , one of the sets of projections is normal to the view. That is, one of the planes of the object is seen in a normal view. The other two sets of projections are orthogonal and are usually oriented horizontally and vertically on the paper. Because background details of an object may not be visible in a principal view, it is necessary to have at least three principal views to completely illustrate a symmetrical object. At most, six principal views will be needed to illustrate complex objects.

The relative positions of the six views have been standardized and are showed in Fig. 1 – 1, which also defines the width( also known as depth) , height and length of the object. The views that are not needed to illustrate features or provide dimension can be omitted. The usual combination selected consists of the top, front, and left side views.

#### 3. Auxiliary(orthographic) views

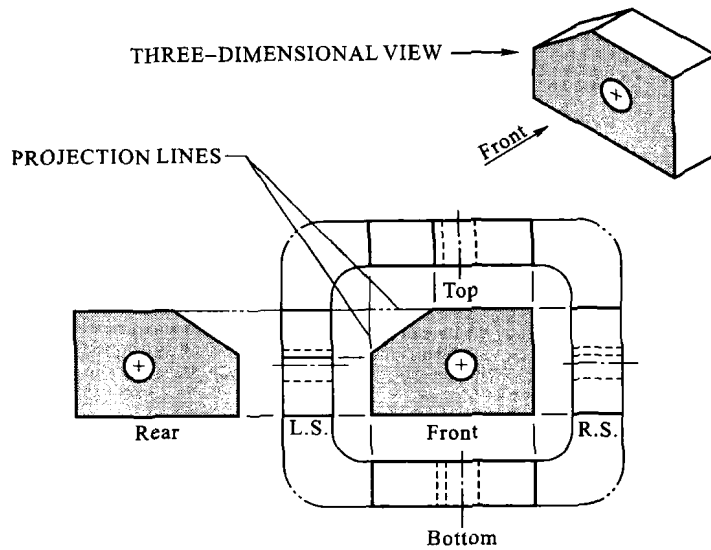


Fig. 1 - 1 Positions of Standard Orthographic Views

An auxiliary view is needed when an object has an inclined plane or curved feature or when there are more details than can be shown in the six principal views. The auxiliary view (Fig. 1 - 2) is a normal (face-on) view of the inclined plane.

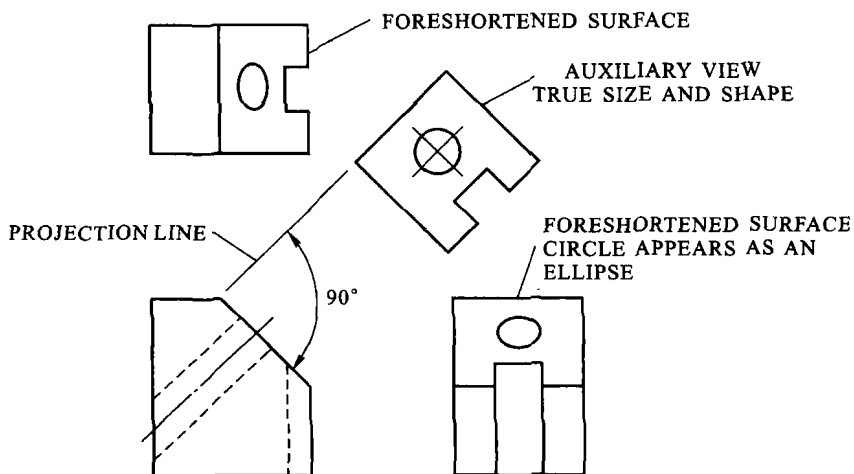


Fig. 1 - 2 Auxiliary View

The projectors in an auxiliary view are perpendicular to only of the direction in which a principle view is observed. Accordingly, only one of the three dimensions of width, height, and depth can be measured.

#### 4. Sections

The term section is an imaginary cut taken through an object to reveal the shape or

interior construction. Fig. 1 – 3 illustrates the standard symbol for a sectioning cut and the resulting sectional view. Section arrows are perpendicular to the cutting plane and indicate the viewing direction.

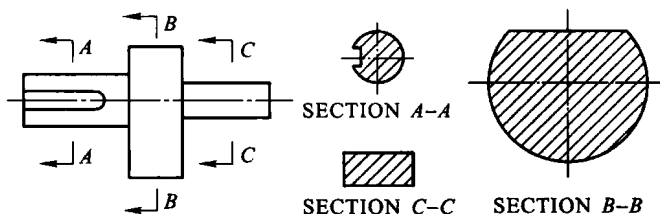


Fig. 1 – 3 Sectioning Cut Symbol and Sectional View

## New Words and Phrases

auxiliary( orthographic) view[ ɔ:g 'ziljəri][ ,ɔ:θə 'græfik][ vju:] 辅助( 正交) 视图

dimension[ di 'menʃən] n. 尺寸, 尺寸标注, 维( 数), 度( 数)

drawing[ 'drɔ:ɪŋ] n. 图纸, 草图, 手绘图

elevation[ ,eli 'veɪʃən] n. 标高, 仰角, 提高

engineering drafting[ ,endʒi 'niəriŋ][ 'dra:ftɪŋ] 工程制图, 工程图纸

equidistant[ ,i:kwi 'distənt] a. 等距离的

figure[ 'fɪɡə] n. 图形, 形状, 数字 vt. 表示, 描绘

horizontal[ ,hɒri 'zɒntl] n. 水平, 水平线, 水平面 a. 水平的, 横的

illustrate[ 'ɪləstreɪt] vt. 图解, ( 用图或例子) 说明

inclined plane[ in 'klaɪnd][ pleɪn] 斜面

interior construction[ in 'tɪəriə][ kən 'strʌkfən] 内部结构

measure[ 'meʒə] n. 测量, 度量标准 vt. 测量

mechanical engineering[ mi 'kænikl][ ,endʒi 'niəriŋ] 机械工程

normal view[ 'nɔ:məl][ vju:] 正视图

orthographic[ ,ɔ:θə 'græfik] a. 面图投影的, 正交射影的, 直角的

parallel[ 'pærəlel] a. 平行的 vt. 与……平行

perpendicular projection[ ,pə:pən 'dɪkjʊlə][ prə 'dʒekʃən] 垂直投影

principle( orthographic) view[ 'prɪnsəpl][ ,ɔ:θə 'græfik][ vju:] 基本( 正交) 视图, 主视图

section[ 'sekʃən] n. 横截面, 断面

symmetrical object[ si 'metrɪkəl][ 'ɒbdʒɪkt] 对称物体

top, front, and left side views[ tɒp][ frʌnt][ left][ saɪd][ vju:z] 俯视, 主视和左视图

vertical[ˈvɜ:tɪkəl] a. 垂直的, 直立的

view[ˈvju:] n. 视图, 风景, 观点, 观察, 意见 vt. 观看, 观察

---

## Notes

### 1. means n. 手段, 方法

means 是以字母“s”结尾的单复数同形的名词。它前面或后面的谓语动词单复数形式取决于这些名词是用作单数还是用作复数。

例句: The only means to achieve success is to appeal to arms(诉诸武力)。

取得胜利的唯一办法就是诉诸武力。

例句: All means have been tried out to increase production.

为了增产已试尽了一切办法。

例句: Engineering drafting is a very important means that is used for engineering designs and engineering communications.

工程图纸是工程设计和交流中采用的一种非常重要的工具。

### 2. by means of 用, 依靠

例句: Lift the load by means of a crane.

用吊车提起重物。

例句: The lathe may feed the cutter by hand or may make it be fed automatically by means of special gears.

车床的刀具可用手工进给或用挂轮自动进给。

### 3. orient v. 使朝向

orient...to/towards 以……为方向, 以……为目的

例句: The other two sets of projections are orthogonal and are usually oriented horizontally and vertically on the paper.

另外两组投影垂直正交, 在图纸上通常沿水平或垂直方向投影。

例句: The course was orientated towards foreign students.

这个课程是意欲为外国学生开设的。

### 4. consist of 由……组成或构成

例句: The usual combination selected consists of the top, front, and left side views.

通常选择的组合是俯视、主视和左视图。

例句: The committee consists of ten members.

这个委员会由 10 人组成。

5. section n. 横截面, 断面

例句: The term section is an imaginary cut taken through an object to reveal the shape or interior construction.

术语“截面”是剖切物体的一个假想的切面, 以揭示物体的形状和内部结构。

这里 section 是 term 的同位语, 用于补充说明 term。

## Exercises

### I. Write True or False beside the following statements about the text.

1. \_\_\_\_\_ A normal view of a line is a perpendicular projection of the line.
2. \_\_\_\_\_ In a normal view, all points of the line are equidistant.
3. \_\_\_\_\_ A line will be viewed from an oblique position and will appear longer than it actually is.
4. \_\_\_\_\_ In a normal view of a plane, the true size and shape of any figure can be determined.
5. \_\_\_\_\_ Generally, the three principal views are orthogonal with each other.
6. \_\_\_\_\_ At most, five principal views will be needed to illustrate complex objects.
7. \_\_\_\_\_ The auxiliary view is perpendicular to the inclined plane.
8. \_\_\_\_\_ The section is an imaginary view which can be taken through an object.

### II. Multiple Choices

1. In a normal view of line, the A length of a line B measured.  
A. a. shorter                      b. longer                      c. equal                      d. truth  
B. a. should be                      b. can be                      c. is                      d. was
2. It is common to A the front, side, and back views B elevations and to the C views as D views.  
A. a. refer to                      b. as                      c. was                      d. should  
B. a. is                      b. as                      c. was                      d. should  
C. a. right and left                      b. top and bottom                      c. front and back  
D. a. normal                      b. principal                      c. plane                      d. elevations
3. A normal view of a line is a A projection of the line onto a viewing plane B to the line.  
A. a. vertical                      b. sloping                      c. inclined                      d. horizontal  
B. a. cross                      b. parallel                      c. level                      d. perpendicular
4. A, only B of the three dimensions of width, height and depth can be

measured.

- A. a. Generally                      b. So that                      c. Therefore                      d. So  
B. a. one                              b. two                              c. three                              d. zero

5. In the horizontal auxiliary view( auxiliary elevation) ,the   A   of an object can be measured. In a   B   auxiliary view, the object's depth can be measured.

- A. a. length                              b. width                              c. height                              d. depth  
B. a. top                                      b. bottom                              c. back                                      d. front

### III. Fill in the missing words according to the text.

1. Therefore, the true length of a line can be viewed and \_\_\_\_\_.
2. All points of the plane are \_\_\_\_\_ from the observer. Therefore, the true \_\_\_\_\_ and \_\_\_\_\_ of any figure in the plane can be determined.
3. The other two sets of \_\_\_\_\_ are orthogonal and are usually oriented \_\_\_\_\_ and vertically on the paper.
4. The usual combination selected \_\_\_\_\_ of the top, front and right side views.
5. When an object has an inclined plane or curved feature, \_\_\_\_\_ is needed.

## **|Text 2    Engineering Materials**

Engineering materials are those used in manufacturing and become parts of products. Engineering materials may be further subdivided into metals, polymers, ceramics and composites. The composites are made up of two or more materials from the engineering materials. Each of the materials in a composite retains its original characteristics. Examples of composites include wood, concrete, glass reinforced polyester and graphite polymer advanced composites.

Common engineering materials are metals. Pure metals are seldom used in common industrial products. Pure copper is used in electrical applications, automotive radiators and gaskets. Pure aluminum has applications in the chemical and electrical industries. However, most metals are alloys( combinations of two or more elements). There are over 2500 different iron-carbon alloys( steels) and over 200 standard copper alloys including a number of brasses, bronzes, and nickel silvers. Each of these alloys is identified by a code number.

Steel is an alloy of iron and carbon with other elements added to produce specific properties. The various types of steel can be grouped under two major headings:



## 1. Carbon steel

The main alloying element is carbon in steel. Carbon steel is further divided into three groups.

(1) Low carbon steel. This steel has a carbon content of less than 0.30 percent. It is the most common type and is often called mild steel. It is relatively inexpensive, ductile, soft, and is easily machined and forged. Mild steel cannot be heat-treated (hardened). Low carbon steel is general-purpose steel.

(2) Medium carbon steel. This steel has a carbon content between 0.30 percent and 0.80 percent. Harder and stronger than mild steel, it can be hardened by heat-treating. Medium carbon steel is most commonly used for forgings, castings, and machined parts for automobiles, agricultural equipment, machines and aircraft.

(3) High carbon steel. This type of steel is easily heat-treated to produce a strong and tough part. The material has a carbon content above 0.80 percent. It finds wide use in hand tools, cutting tools, springs and piano wires.

## 2. High alloy steel

These steels contain significant amounts of other elements in addition to carbon. The common high alloy steels are:

(1) Stainless steel is produced by using chromium as a significant alloying element along with nickel and other metals. The result is a tough, hard, corrosion resistant metal.

(2) Tool steel is a special group of high carbon steel produced in small quantities to high quality specifications. Tool steels are used for a wide range of cutting tools and forming dies.

(3) Manganese steel is an alloy containing 12 percent carbon. This metal is used in mining and railroad equipment because of its high tensile strength.

## New Words and Phrases

aircraft[ 'ækra:ft ] n. 飞机, 飞行器

alloy[ 'ælɔɪ ] n. 合金

aluminum[ ə 'ljʊ:mɪnəm ] n. 铝, 铝元素

automotive radiator[ ɔ:tə 'məutiv ] [ 'reɪdiəɪtə ] 汽车散热器

brass[ brɑ:s ] n. 黄铜

bronze[ brɒnz ] n. 青铜