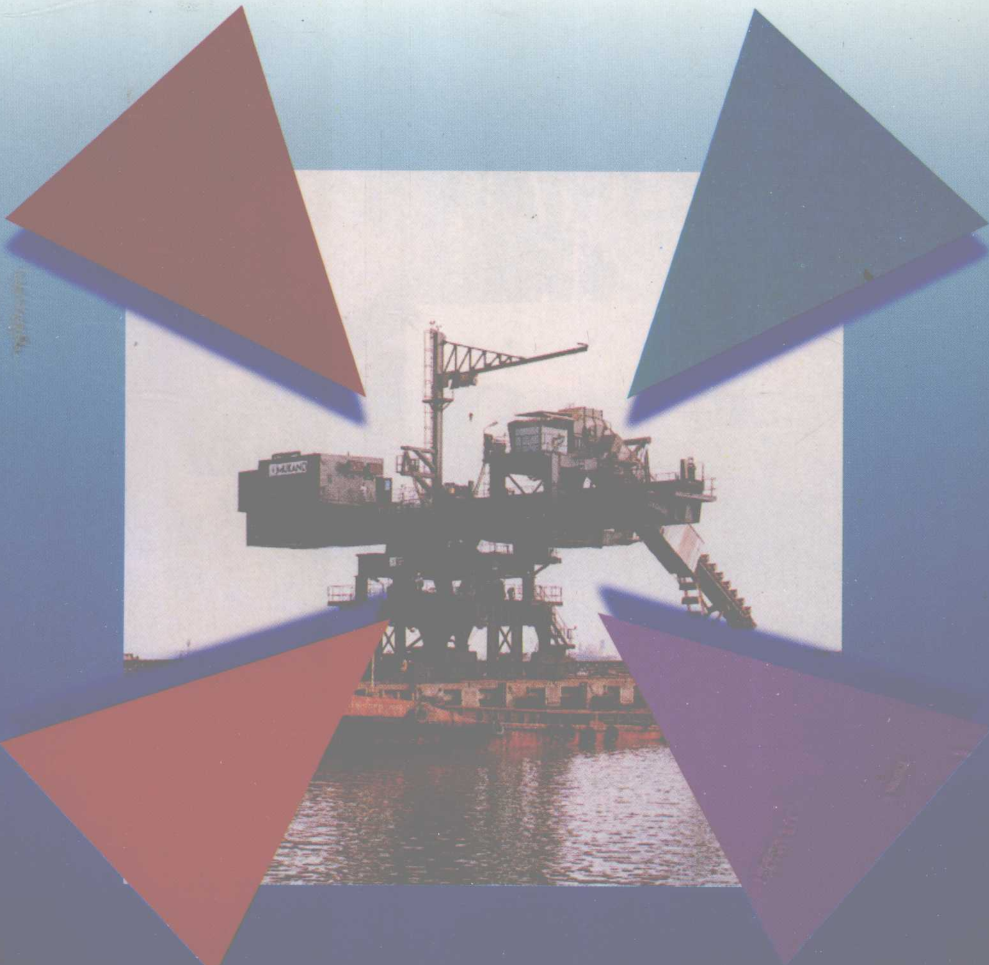
PORT MACHINERY ENGINEERING ENGLISH

港口机械专业英语

肖汉斌　主编
刘　刚　主审



大连海事大学出版社

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前　　言

本书为高等工科院校港口机械与设备管理、机械电子工程专业的本科及专科专业英语教材，也可作为相近专业工程技术人员的英语阅读自学用书。

依据国家对大专院校专业名称的规范化调整和新兴专业的发展，交通部港机类专业教材协作组考虑新形势的要求，提出需对原交通系统高等学校内部教材——专业英语进行重新编写。编写工作由武汉交通科技大学、上海海运学院和南京交通高等专科学校共同完成。

本教材共有45课，课文后附有必要的词汇、注释及练习（或语法知识），还有阅读材料可供阅读及翻译训练之用。本书内容安排的原则是先易后难，先专业基础读物，后专业性及实用性较强的读物。选材涉及面宽，主要包括工程力学、机械零件、起重机械、运输机械、搬运车辆、液体传动、内燃机、金属结构、故障诊断、维修与管理、电气控制等内容。

本书由肖汉斌组织编写工作，编写组成员具体分工如下：

南京交通高等专科学校章剑青编写 Text 1～Text 8 和 Text 27～Text 33。

武汉交通科技大学肖汉斌编写 Text 9～Text 16、Text 20～Text 22、Text 34、Text 35 及总词汇表。

武汉交通科技大学周强编写 Text 17～Text 19 和 Text 23～Text 26。

上海海运学院黄晓霞编写 Text 36～Text 45。

此外，总词汇表的排序整理和全书的统稿工作由肖汉斌完成。

武汉交通科技大学金属结构教研室刘刚副教授为本书的编写给予了具体指导并详细审阅了全书，在此表示由衷的感激。本书在编写过程中曾得到武汉交通科技大学徐祖兴和张小川两位老师的关心和帮助，特致谢意。

限于编者水平和经验，书中错误和不妥之处在所难免，敬请读者批评指正。

编者

1998年2月8日

CONTENTS

Text 1

Stress and Strain

When an external force is applied to a body, it causes the body to deform or change slightly in shape. It also causes internal forces (stresses) to act within the body. Mechanics of materials is the science that analyzes the stresses and strains (deformations) caused by the application of external forces.

The analysis and design of axially loaded members are covered in this chapter. Axial loading is encountered in a wide variety of practical applications in all engineering disciplines. Although the applications are of some interest, the concepts, definitions, and procedures are of particular significance. They form the foundation of future work, and are applied and extended to develop the theory and practice for other types of loading situations.

In the solution of all problems concerning the mechanics of materials, we should understand the physical actions taking place within the member. Therefore, it is important to be able to "visualize" the stress and strain occurring in a body. Very little formula memorization is necessary in the solution of these problems. However, the habit of making complete, carefully drawn diagrams of the members under load will aid tremendously in understanding the subject.

Stress is a function of the internal forces in a body that are caused by the application of external loads①. Mechanics of materials is a study of the magnitude and distribution of these internal forces. To get an understanding of the composition and distribution of the internal foces, consider a simple bar subjected to an axial force P at each end, as shown in Fig. 1-1. Assume that this bar is made up of a large number of fibers in parallel alignment. If a section is passed through the bar, a free body similar to that shown in Fig. 1-2 will be obtained.

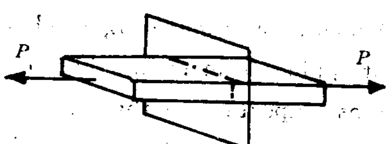

Fig. 1-1

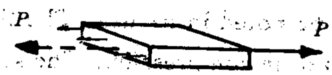

Fig. 1-2

A basic principle of statics is that if a structure is in equilibrium, any portion of the structure is in equilibrium. In the freebody diagram of Fig. 1-2 the applied external force is to the right. Since the body is in equilibrium, there must also be forces acting toward the left. There forces, which resist the applied load, are transmitted by the fibers of the bar. This is analogous to the case of the strands of a rope. When a rope carries a load, each individual strand supports a fraction of that load②. In a similar, though not as evident manner, each fiber of the bar transmits a portion of the load. The sum of the loads carried by all fibers is equal to the total applied load.

The total internal force in the bar is the resultant of all the forces in the fibers, and is equal to P N. It is not common, however, to speak of the total force in the bar, but rather of the intensity of force in the fibers. This intensity of force is called the stress, or unit stress. Unit stress is defined as the force per unit of area. Written in algebraic terms,

$$\sigma=\frac{P}{A}$$

Where

σ=unit stress in N/m^2,

P=applied load in N,

A= area over which the load acts in m^2,

In engineering practice, the term "stress" is sometimes loosely used to mean either the total internal force or unit stress®. The context of the discussion usually indicates the proper meaning of the term. In this text, however, the term "stress" will always mean unit stress.

In the English system the distinction between a pound-force and a pound-mass is often ambiguous since the word "pound" is used for both®. SI more clearly distinguishes between force and mass. The base SI units for solid mechanics are the meter (length), kilogram (mass), and second (time). The kilogram is a measure of mass, not force. The Newton is the measure of force. Stress in SI units is measured in Newtons per square meter (N/m^2). This is designated a pascal (Pa) and such small units that multiples of this unit are more convenient to use. Prefixes, symbolizing multiples of 10^3, are used as follows:

$$1kN=1\times10^3 N$$
$$1MN=1\times10^6 N$$
$$1kPa=1\times10^3Pa=1\times10^3N/m^2$$
$$1MPa=1\times10^6Pa=1\times10^6N/m^2$$

The procedure for calculating unit stress is, of course, the same regardless of the system of measurement.

The definition $\sigma=P/A$ is very important and useful in engineering mechanics. Two things should be noted in its use. The first is that it applies to members that are loaded either in tension or in compression. The second, and most important, is that the loads must be applied through the centroid of the cross section and coincident with the axis of the member®. If an axial load does not pass through the centroid of the cross section of the member, $\sigma=P/A$ does not apply directly.

Consider a bar subjected to an axial tensile force P, as shown in Fig. 1-3. When the force is applied, a unit stress is developed in the bar that is equal to $\sigma=P/A$. In addition, the bar elongates slightly due to the application of the load. In mechanics of materials, these changes in length (also referred to as deformations, elongations, or constractions) are known as strains. A strain is, therefore, the change in length of a member.

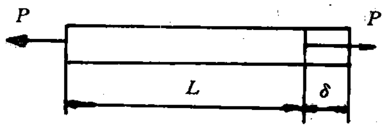

Fig. 1-3

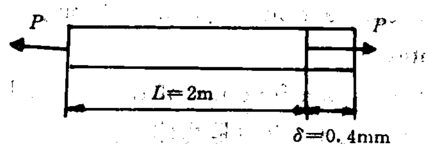

Fig. 1-4

The definitions of total strain and unit strain are necessary in the solution of many problems. The total strain is the total change of length of the member. It is the dimension δ (Greek letter delta) shown in Fig. 1-4. A method of computing total strain will be given in next section. Unit strain is defined as the change in length per unit of length, and is symbolized by the Greek letter ε (epsilon). Expressed algebraically, the unit strain is,

$$\varepsilon=\frac{\delta}{L}$$

Where

ε=unit strain in m/m,

δ=total strain (total change in length) in m,

L=original length in m.

The unit strain is a dimensionless quantity. Therefore, the numerical value of unit strain is the same, regardless of the system of units.

New Words and Expressions

1.	stress	[stres]	*n.*	应力
2.	strain	[strein]	*v.*	(使)变形;
			n.	应变
3.	deform	[di'fɔ:m]	*v.*	(使)变形,损坏……的形状
4.	axially	['æksiəli]	*ad.*	轴向地;与轴平行地
5.	member	['membə]	*n.*	杆件,构件
6.	visualize	['vizjuəlaiz]	*v.*	可视,把……可视化
7.	diagram	['daiəgræm]	*n.*	图,内力图,简图
8.	magnitude	['mægnitju:d]	*n.*	大小,量
9.	distribution	[distri'bjuʃən]	*n.*	分布
10.	fiber, fibre	['faibə]	*n.*	纤维板,纤维
11.	alignement	[ə'lainmənt]	*n.*	排列成行,成直线
12.	equilibrium	['i:kwi'libriəm]	*n.*	平衡
13.	strand	[strænd]	*n.*	(绳、线的)股,根,缕
14.	resultant	[ri'zʌltənt]	*a.*	合成的;
			n.	合力,合矢量
15.	algebraic	['ældʒibraic]	*a.*	代数的
16.	centroid	['sentrɔid]	*n.*	矩心,质心

17. elongate [ˈiːlɔŋgeit] *v.* 伸长

18. contraction [kənˈtrækʃən] *n.* 伸缩量，压缩

Notes

①Stress is a function of the internal forces in a body that are caused by the application of external loads. 应力是物体中内力的函数，内力是由外载荷作用而发生的。

②When a rope carries a load, each individual strand supports a fraction of that load. 当一条绳索承受某一载荷时，各个单股绳就承受着该载荷的一部分。

③In engineering practice, the term "stress" is sometimes loosely used to mean either the total internal force or unit stress. 在工程应用中，"应力"这个词有时不很严格地用来指总内力或单位应力。

④In the English system the distinction between a pound-force and a pound-mass is often ambiguous since the word "pound" is used for both. 英制单位中，一磅力和一磅质量之间的区别常常是含糊的，这是因为在描述力或质量时都用"磅"这个词。

⑤… the loads must be appried through the centroid of the cross section and coincident with the axis of the member. 所加的载荷必须通过截面形心且与杆轴线重合。

科技英语的翻译技巧(I)

翻译就是把一种语言文字的意义用另一种语言文字表达出来。机械工程英语的翻译就是将机械工程学科的英语著作转换成汉语译文，使人们能够借助汉语译文准确无误地了解英语机械工程著作所阐述的工程技术内容和科学理论的一项工作。

但是，英语和汉语两种语言之间不仅在语音和文字上，而且在用词习惯和修辞规则等方面都存在着差别；同时，由于使用这两种不同语言的人在思维方法上也有所不同，所以机械工程英语的翻译并不是一件容易的事。

机械工程英语翻译的困难主要存在于正确理解原文的含义和用确切的汉语文句准确表达原文的含义两个方面。在翻译中，要比较圆满地解决这两个问题，译者除必须具有较好的英语基础，较高的汉语修养，较为丰富的机械工程专业知识外，还必须懂得翻译的理论、技巧和方法。

要搞好科技英语的翻译，还必须了解英语和汉语的特点，这里，着重论述机械工程英语的特点。机械工程英语具有下列特点：

1. *陈述句型多*

由于所叙述的内容多数是涉及机械学和工程力学的理论和实践经验，而这些内容又往往是没有时间性或具有普遍意义的，因此，多采用陈述句句型，且句子的谓语动词多数采用一般现在时态。

The maximum stresses <u>occur</u> at the inner surface. 最大应力发生在内表面。(采用一般现在时陈述句叙述力学分析)

The total mass of the beam <u>is</u> pl, where p <u>is</u> the mass per unit length.

梁的全部质量是 pl，其中 p 是单位长度的质量。(一般现在时陈述句介绍公式)

2. *被动语态多*

由于机械工程英语著作所叙述的是客观事实，一般着重强调的是所涉及的事物，因此大量

采用以客观事物为主体的被动语态。

Here a tension load F is applied through pins at the ends of the bar.

此时，拉伸载荷 F 是通过杆件两端的销子施加的。（强调载荷的作用方式）

3. 简略表达多

为了减少或避免用复合句来叙述概念，缩短句子长度，机械工程英语著作中，常采用某些比较简略的表达形式。例如：在句子中采用名词词组或分词独立结构代替从句，或者在句子中省略了某些语法成分。

Use of the equation $\tau=\frac{F}{A}$ for a body, say a bolt, in shear assumes a uniform stress distribution too.

公式 $\tau=\frac{F}{A}$ 应用于承受剪切应力的物体（如螺栓）时，同样假定应力是均布的。（利用名词词组代替从句来表达概念）

In the above equations positive stresses indicated tension and negative stresses compression.

上述各个公式中，正应力表示拉应力，负应力表示压应力。（本例是并列复合句，第二个分句中，省略了谓语动词 indicate 和状语 in the above equations）

4. 复杂长句多

由于机械工程论著的科学性和技术性，要求叙述准确、推理严密。因此，为了表达时间、条件、原因、结果、目的和对比等关系，不得不在句子中采用各种各样的从句，或者大量运用介词短语和非限定动词短语，造成论著中常出现结构比较复杂的简单句或包含多个从句的复合句。这两种类型的句子一般又比较长，因此，复杂长句是机械工程英语的又一个特点。

The assumption of uniform stress means that if we cut the bar at section A-A, remote from the ends, and remove the lower half, we can replace its effect by applying a uniformly distributed force of magnitude σ_A to the cut end.

应力均布的假定意味着：如果我们在远离杆件两端的 A-A 截面处将杆切开并移去杆的下半部，那么，我们就可以在切断端用一个大小为 σ_A 的均匀分布的力代替杆的下半部的作用。（这是一个主从复合句，主句的主语是 assumption，谓语动词是 means；由 that 引出的是一个宾语从句，主语是 we，谓语动词是 can replace；在宾语从句中又叠套两个由 if 引出的状语从句表示条件，第一个状语从句的主谓结构是 we cut，第二个状语从句用 and 表示它与第一个状语并列，谓语动词是 remove，从句中省略了从属连词 if 和主语 we）

Reading Materials

Stress-Strain Diagram

When selecting a material for a building or a machine, we must have a knowledge of its properties as well as its ability to withstand stress. The various mechanical properties of a material are determined by a series of laboratory tests. At this point, however, we will give a general discussion of the results of the stress-strain diagrams obtained from tensile tests, because they explain some important definitions and properties of materials which are useful in the development of the subject.

Briefly, a tensile test for a material may be described as follows. A round bar of known diameter is placed in a testing machine. The testing machine exerts a force on the specimen which may be measured at any time during the test. An extensometer, which is an instrument for accurately measuring changes in length, is attached to the specimen. A slowly increasing tensile load is then applied to the specimen until fracture occurs. At intervals during the test, simultaneous measurments of load and elongation are made, and a stress versus strain diagram(graph) is plotted from these data.

In costructing this graph, we plot the values of unit stress (P/A) as the ordinates and the corresponding values of unit strains (δ/L) as the abscissas. The result, such as the typical graph for mild steel, is shown in Fig. 1-5. A careful analysis of this curve will illustrate several important definitions and properties that are important in the study of mechanics of materials.

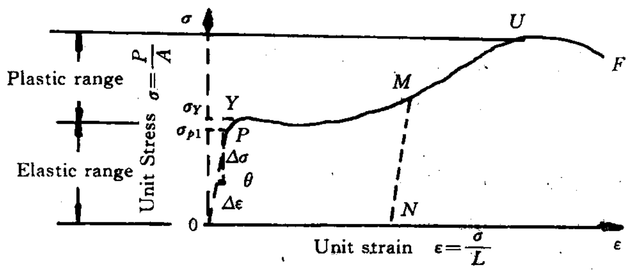

Fig. 1-5

The curve starts at the origin O and continues as a straight line until it reaches P. Just beyond this location is Y, where the curve flattens out (or it may actually dip slightly). After some distance, the curve again continues upward to U, and then tapers off to F, where fracture occurs.

Each of the various locations on the curve, or segments of the curve, is given a descriptive name. Point P is the proportional limit of the material. At stresses greater than the proportional limit stress (σ_{p1}), Hooke's Law no longer applies. It is also very important to note here that derived formulas in this text are valid only when the unit stress in the material is less than the stress at the proportional limit. In design, the stress in the material is limited to values smaller than the proportional limit. If the stresses exceed this value, stress is no longer proportional to strain, and the formulas are no longer valid.

Just beyond the proportional limit, the curve flattens out (Y) and the material elongates with little or no increase in load. The material yields or deforms plastically at this point. The stress at which this yielding starts is called the yield-point stress σ_y. It may be noted that the proportional limit and the yield point occur very close together. It is difficult to differentiate between the two points unless measurements and plots are made with extreme accuracy.

After some distance, the curve increases in slope and reaches a maximum value at U. The corresponding stress at this point (σ_u) is called the ultimate stress of the material. It is the maximum stress the material can withstand. The curve then drops to point F, where fracture occurs.

If the specimen being tested were observed carefully throughout the experiment, it would be noted that while the specimen was elongating its diameter was being reduced. The values of stress in the stress-strain diagram were obtained by using the original area of the specimen and not the actual area at the various times through the test. This is standard practice, and explains why the curve drops rather than rises from the ultimate stress to the breaking point. After the ultimate stress is reached, and just prior to fracture, the specimen "necks in" at the location of fracture. Therefore, the actual stress at this point is considerably higher than the computed value on the curve.

It is becoming increasingly more common to discuss stresses in the elastic range or in the plastic range with regard to different theories of design. The elastic range of a material is the range of stress within which the material remains elastic; that is, will return to its original shape after unloading. In the elastic range, stresses are less than the yield point. When stresses exceed the yield point, plastic flow takes place, and the material will never regain its original shape. This range of stresses is called the plastic range.

The stress-strain diagram also gives an indication of the stiffness of a material. Considering the straight-line portion of the curve (OP), we find that the slope of the line is equal to the change in unit stress divided by the changs in unit strain. The expression for the slope may be written as

$$\mathrm{tg}\theta = \frac{\text{Change in stress}}{\text{Change in strain}} = \frac{\Delta\sigma}{\Delta\varepsilon}$$

This is also the definition of the modulus of elasticity ($E = \sigma/\varepsilon$). An indication of the modulus of elasticity (or relative stiffness) of the material may be obtained by noting the slope of the initial portion of the curve. The steeper the slope of the curve, the greater the modulus of elasticty (or relative stiffness) of the material.

If the tensile specimen is loaded to a stress smaller than the proportional limit and then unloaded, coordinates plotted on the diagram during unloading will fall along the original line OP. However, if the specimen is loaded to a point beyond the proportional limit, such as point M in Fig. 1-5, and then unloaded, coordinates plotted on the diagram will fall along line MN. If the stress is reduced to zero, a permanent set ON will remain in the bar.

Text 2

Limits and Tolerances

Dimensioning

The design of a machine includes many factors other than those of determining the loads and stresses and selecting the proper materials. Before construction or manufacture can begin, it is necessary to have complete assembly and detail drawings to convey all necessary information to the shop men. The designer frequently is called upon to check the drawings before they are sent to the shop. Much experience and familiarity with manufacturing processes are needed before one can become conversant with all phases of production drawings①.

Drawings should be carefully checked to see that the dimensioning is done in a manner that will be most convenient and understandable to the production departments. It is obvious that a drawing should be made in such a way that it has one and only one interpretation. In particular, shop personnel should not be required to make trigonometric or other involved calculations before the production machines can be set up.

Dimensioning is an involved subject and long experience is required for its mastery②.

Tolerances must be placed on the dimensions of a drawing to limit the permissible variations in size because it is impossible to manufacture a part exactly to a given dimension. Although small tolerances give higher quality work and a better operating mechanism, the cost of manufacture increases rapidly as the tolerances are reduced, as indicated by the typical curve of Fig. 2-1. It is therefore important that the tolerances be specified at the largest valuse that the operating or functional considerations permit.

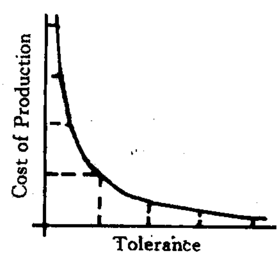

Fig. 2-1

Tolerances may be either unilateral or bilateral. In unilateral dimensioning, one tolerance is zero, and all the variations are given by the other tolerance. In bilateral dimensioning, a mean dimension is used which extends to the midpoint of the tolerance zone with equal plus and minus variations extending each way from this dimension.

The development of production processes for large-volume manufacture at low cost has been largly dependent upon interchangeability of component parts. Thus the designer must determine both the proper tolerances for the individual parts, and the correct amount of clearance or interference to permit assembly with the mating parts. The manner of placing tolerances on drawings depends somewhat on the kind of product or type of manufacturing process. If the tolerance on a dimension is not specifically stated, the drawing should contain a blanket note which gives the value of the tolerance for such dimensions[3]. However, some companies do not use blanket notes, on the supposition that if each dimension is considered individually, wider tolerances than those called for in the note could probably be specified[4]. In any event it is very important that a drawing be free from ambiguities and be subject only to a single interpretation.

Dimension and Tolerance

In dimensioning a drawing, the numbers placed in the dimension lines represent dimension that are only approximate and do not represent any degree of accuracy unless so stated by the designer[5]. To specify a degree of accuracy, it is necessary to add tolerance figures to the dimension. Tolerance is the amount of variation permitted in the part or the total variation allowed in a given dimension. A shaft might have a nominal size of $2\frac{1}{2}$ in. (63.5 mm), but for practical reasons this figure could not be maintained in manufacturing without great cost. Hence, a certain tolerance would be added and, if a variation of ± 0.003 in. (± 0.08 mm) could be permitted, the dimension would be stated 2.500 in$\pm$0.003 in(63.5mm$\pm$0.08mm).

Dimensions given close tolerances mean that the part must fit properly with some other part. Both must be given tolerances in keeping with the allowance desired, the manufacturing processes available, and the minimum cost of production and assembly that will maximize profit. Generally speaking, the cost of a part goes up as the tolerance is decreased. If a part has several or more surfaces to be machined, the cost can be excessive when little deviation is allowed from the nominal size.

Allowance, which is sometimes confused with tolerance, has an altogether different meaning[6]. It is the minimum clearance space intended between mating parts and represents the condition of tightest permissible fit. If a shaft, size $1.498^{+0.000}_{-0.003}$, is to fit a hole of size $1.500^{+0.003}_{-0.000}$, the minimum size hole is 1.500 and the maximum size shaft is 1.498. Thus the allowance is 0.002 and the maximum clearance is 0.008 as based on the minimum shaft size and maximum hole dimension.

Tolerances may be either unilateral or bilaterial. Unilateral tolerance means that any variation is made in only one direction from the nominal or basic dimension. Referring to the previous example, the hole is dimensioned $1.500^{+0.003}_{-0.000}$, which reprecents a unilateral tolerance. If the dimensions were given as 1.500$\pm$0.003, the tolerance would be bilateral; that is, it would vary both over and under the nominal dimension. The unilateral system permits changing the tolerance while still retaining the same allowance or type of fit. With the bilateral system, this is not possible without also changing the nominal size dimension of one or both of the two mating parts. In mass production, where mating parts must be interchangeable, unilateral tolerances are customary. To have an interference or force fit between mating parts, the tolerances must be such as to create a zero or negative allowance.

New Words and Expressions

1. conversant	[kən'vəːsənt]	*a.*	熟悉的,具有……知识的
2. personnel	[pəːsə'nel]	*n.*	(全体)人员
3. trigonometric	[trigənə'metrik]	*n.*	三角(学)的
4. tolerance	['tɔlərəns]	*a.*	公差,容限
5. variation	[veəri'eiʃən]	*n.*	偏差,误差;变化,变量
6. unilateral	[juːni'lætərəl]	*a.*	单向的,单边的
7. bilateral	[bai'lætərəl]	*a.*	双向的,双边的
8. zero	['ziərəu]	*n.*	零,零位
9. zone	[zəum]	*n.*	带,区域,范围
10. interchangeability	[intə'tʃeindʒəbiliti]	*n.*	互换性
11. clearance	['kliərəns]	*n.*	间隙,清除
12. interference	[intə'fiərəns]	*n.*	干涉;过盈
13. mate	[meit]	*v.*	配合
		n.	配合物
14. assembly drawing			总图,装配图
15. detail drawing			零件图,详图
16. conversant with			熟悉,具有……知识
17. tolerance zone			公差范围
18. large-volume manufacture			大量生产
19. mating part			配合件
20. on the supposition that			假定
21. nominal size			公称尺寸,名义尺寸
22. close tolerance			紧公差
23. interference fit			干涉配合,静配合
24. force fit			压入配合
25. zero allowance			零容差,无容差
26. negative allowance			负容差,过盈

Notes

①Much experience and familiarity with manufacturing processes are needed before one can become conversant with all phases of production drawings. 要熟悉生产图样的所有情况,需要对制造过程非常熟悉和具有很多经验。

②Dimensioning is an involved subject and long experience is required for its mastery. 尺寸标注是一项复杂的工作,要熟悉它需要长期的实践经验。

③If the tolerance on a dimension is not specifically stated; the drawing should contain a blanket note which gives the value of the tolerance for such dimensions. 如果尺寸公差没有特别注明,图样应该有一个给出这些尺寸的公差值的统一注释。

④… on the supposition that if each dimension is considered individually, wider tolerances than those called for in the note could probably be specified. 这是因为如果单独设计每个尺寸时可能会出现比统一注释中要求的更宽的公差。

call for —要求，请求。

⑤In dimensioning a drawing, the numbers placed in the dimension lines represent dimensions that are only approximate and do not represent any degree of accuracy unless so stated by the designer. 在图样标注时，若设计者不专门标明，则标在尺寸线上的数字只表明尺寸是近似的，且不代表任何等级的精度。

⑥Allowance, which is some times confused with tolerance, has an altogether different meaning. 允差有时会和公差混淆，其实两者具有完全不同的意义。

科技英语的翻译技巧(II)

由于机械工程著作所叙述的内容涉及自然规律和技术概念具有科学性、严密性等特点，因此，对于译文的质量，人们普遍认为应以"准确"、"通顺"、"简练"这三个方面作为衡量标准。

1. 准确

所谓"准确"，就是说译文要忠实于原著，要准确、明白地转达英语原著所阐述的技术内容、科学概念和自然规律。为此，必须正确理解原文的含义，科技用语必须符合我国科技界的习惯，规范或约定，译文叙述的内容不能含糊不清，译文的文句不能产生歧义。

On the other hand, a material which obeys Hooke's law is elastic.

反之，凡是符合虎克定律的材料就是弹性材料(不定冠词 a 在本例中含有"任何一种"的意义，因此，在译文中增译"凡是"一词；为使译文语言更符合汉语习惯，增译"材料"一词；另外，译句中增译"就"字，为了加强肯定语气)。

The importance of preloading of bolts cannot be overestimated.

错误译句：对螺栓预加载荷的重要性不能估计过高。

正确译句：对螺栓预加载荷的重要性无论怎样估计也不会过高。

2. 通顺

所谓"通顺"，就是指译文必须符合汉语的修辞规则和习惯。为此，在翻译的过程中，应注意下列问题：

(1)译文中词语的选择、组合、搭配要符合汉语的习惯和规范；

(2)译句中各语法成分的排列顺序和相互关系要符合汉语的习惯；

(3)整篇译文的各个译句之间，及译句中各子句之间，要有呼应和关联；

(4)译句要恰当地体现英语原句的时态、语态、情态和语气。

The assumption of a uniform distribution of stress is frequently made in design.

在设计中，常常采用应力均布的假定。(为符合汉语表述习惯，这里将 make 引伸译为"采用")

The constants are found by solving these two equations simultaneously.

将这两个方程联立求解，则可求出上述两个常数。(根据词的搭配习惯，将 find 译为"求出"；又根据叙述的内容，将 constants 译为具体的数量概念"两个"；根据定冠词的特指意义，将 constants 前的定冠词译为"上述"；另又根据语句前后呼应的需要，在译句中增译"则可"两