

<<工程力学专业英语>>

图书基本信息

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<<工程力学专业英语>>

内容概要

《工程力学专业英语》选编了工程力学专业涉及的科技英文文章,包括理论力学、材料力学、弹性力学、结构力学、振动力学、塑性力学、实验力学、计算力学、疲劳与断裂、复合材料力学和流体力学等内容,并注意纳入相应课程的新概念,覆盖面广。

本书还分单元介绍了英文科技报告、学位论文、期刊论文写作技巧和英汉科技文章的翻译技巧,旨在培养学生科技论文写作和翻译的基本技能。

各单元课文正文适用于教师精讲,第一篇阅读材料适用于本科生自学,或在教师指导下学习,第二篇阅读材料内容相对较深,主要适用于研究生学习参考。

此外,每篇文章后面均列出了生词和短语,附录中列出了常用专业词汇和短语,便于读者查阅。

《工程力学专业英语》无论是在内容选材还是在内容编写上均具有特色,是一本适用于工程力学专业和力学类专业本科生的实用教材,也可供土木、机械、材料等相关工科专业的本科生、研究生及相关工程技术人员学习参考。

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Tension. Tension is the general name for a force that a rope, stick, etc., exerts when it is pulled on. Every piece of the rope feels a tension force in both directions, except the end point, which feels a tension on one side and a force on the other side from whatever object is attached to the end. In some cases, the tension may vary along the rope. The "Rope wrapped around a pole" example is a good illustration of this. In other cases, the tension must be the same everywhere. For example, in a hanging massless rope, or in a massless rope hanging over a frictionless pulley, the tension must be the same at all points, because otherwise there would be a net force on at least one tiny piece, and then $F=ma$ would yield an infinite acceleration for this tiny piece.

Normal force. This is the force perpendicular to a surface that the surface applies to an object. The total force applied by a surface is usually a combination of the normal force and the friction force. But for frictionless surface such as greasy ones or ice, only the normal force exists. The normal force comes about because the surface actually compresses a tiny bit and acts like a very rigid spring. The surface gets squashed until the restoring force equals the force the object applies.

Remarks: For the most part, the only difference between a "tension" and a "normal force" is the direction of the force. Both situations can be modeled by a spring. In the case of a tension, the spring (a rope, a stick, or whatever) is stretched, and the force on the given object is directed toward the spring. In the case of normal force, the spring is compressed, and the force on the given object is directed away from the spring. Things like sticks can provide both normal forces and tension. But a rope, for example, has a hard time providing a normal force. In practice, in the case of elongated objects such as stick, a compressive force is usually called a "compressive tension", or a negative tension, instead of a normal force. So by these definitions, a tension can point either way. At any rate, it's just semantics. If you use any of these descriptions for a compressed stick, people will know what you mean.

Friction. Friction is the force parallel to a surface that a surface applies to an object. Some surfaces, such as sandpaper, have a great deal of friction. Some, such as greasy ones, have essentially no friction. There are two types of friction, called "kinetic" friction and "static" friction. Kinetic friction deals with two objects moving relative to each other. It is usually a good approximation to say that the kinetic friction between two objects is proportional to the normal force between them. The constant of proportionality is called μ_k (the "coefficient of kinetic friction"), where μ_k depends on the two surfaces involved. Thus, $F = \mu_k N$, where N is the normal force. The direction of the force is opposite to the motion.

Static friction deals with two objects at rest relative to each other. In the static case, we have $F \leq \mu_s N$ (where μ_s is the "coefficient of static friction"). Note the inequality sign.

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