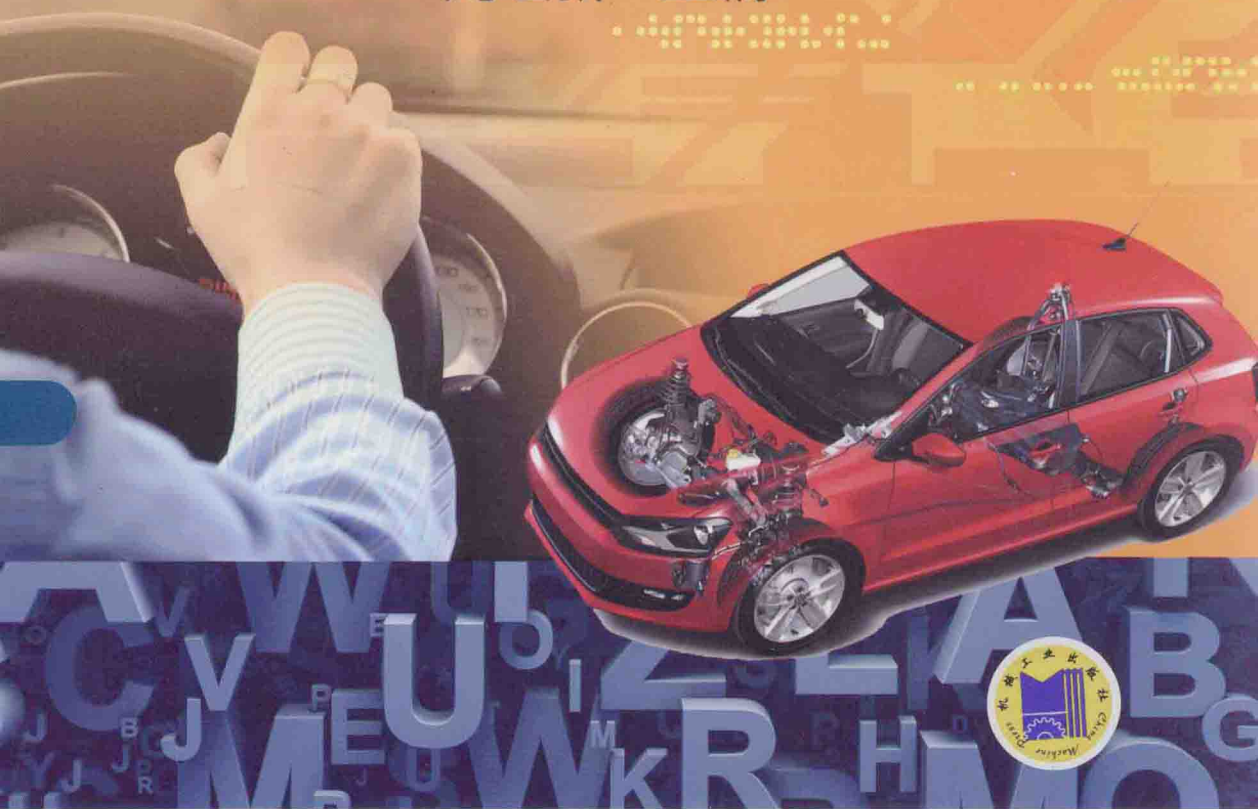


普通高等教育规划教材

车辆工程

专业英语

刘宏新 主编



机械工业出版社
CHINA MACHINE PRESS



普通高等教育规划教材

SPECIALTY ENGLISH OF VEHICLE ENGINEERING

车辆工程专业英语

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本书不仅仅是一本车辆工程专业技术的英文版教材，而且是一部规范的英语语言类书籍、一部车辆工程领域的百科全书。书中内容既对车辆工程专业的重要知识点有全面的覆盖，又进行了充分的拓展和延伸，在遵循与专业课程相对应的同时，注重相关知识体系的全面构建，保证结构的系统与严谨，又不失内容的丰富和新颖。书中设置了车辆工程基本知识、发展历程、汽车文化、车辆构造、保养与维修、市场与服务等6大部分，共计17章，书后配有专业词汇的缩略词表，可实现简称、全称及中文名称的对照查询。本书的撰写注重知识结构与综合素质兼顾，内容组织上由浅入深，灵活匹配章节内容，除了建立良好的专业素养外，又具备与其相适应的历史、文化、艺术等人文底蕴，章节设置与内容安排避免单一与枯燥，易于激发学生的学习热情，重点内容突出的同时又为学生提供了丰富的个性化选择。

本书可作为高等院校车辆工程相关专业的英语教材，也可作为科技人员的参考用书，具有一定英语水平的普通读者也可以把它作为了解汽车、丰富相关知识、提高外语水平的科普读物。

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SPECIALTY ENGLISH OF VEHICLE ENGINEERING

车辆工程专业英语

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前 言

汽车工业以及由汽车技术衍生的工程机械及拖拉机制造业（统称车辆工业）是现代社会的支柱产业之一，国际化特征显著。汽车技术起源于西方，英语是该行业中撰写国际化资料、行业标准以及产品说明书所采用的首要语种。因此，无论是从学习专业技术角度，还是为了了解汽车工业的历史与文化，车辆工程专业的学生掌握熟练的英语读写能力，尤其是系统地学习车辆工程专业英语都至关重要。同时，教育部颁布的《大学英语教学大纲》中明确规定：各高等学校应根据实际情况，按照课程要求和本校的大学英语教学目标，设计出各自的大学英语课程体系，将综合英语类、语言技能类、语言应用类、语言文化类和专业英语类等必修课程和选修课程有机结合，确保不同层次的学生在英语应用能力方面得到充分的训练和提高。

为此，我们组织了东北农业大学、武汉大学、西北农林科技大学、哈尔滨工业大学、西安交通大学、上海交通大学、苏州大学、吉林大学、北京理工大学等国内知名高校中既从事车辆工程相关教学和科研工作，又具有英语国家留学经历的人员，以及专业的英语教师组成编写委员会，以保证所撰写的图书不仅仅是一本车辆工程专业技术的英文版教材，又是一部规范的英语语言类书籍、一部车辆工程领域的百科全书。本书在内容上既对车辆工程专业重要知识点有全面的覆盖，又进行了拓展和延伸，在遵循与专业课程相对应的同时，注重相关知识体系的全面构建，保证知识结构的系统与严谨，又不失内容的丰富和新颖。撰写原则：一是知识结构与综合素质兼顾，对于大学阶段的学习，除了要具有良好的科学素养，还要具备与其相适应的历史、文化、艺术等人文底蕴；二是在内容组织上由浅入深，由汽车简介开始，讲述汽车的历史和文化，之后引入以汽车为主的车辆工程专业知识，避免单一与枯燥，易于激发学生的学习热情；三是灵活匹配章节内容，每章课后均提供本章中涉及的繁、难、关键词的中英文对照，典型句式有专门的注释与翻译，并配有难易适中的课后练习题，提供与文中内容联系紧密的阅读材料，做到重点内容突出的同时，又为学生提供了个性化的选择。

本书设置6大部分，共计17章，书后配有专业词汇的缩略词表，可实现简称、全称及中文名称的对照查询。第一部分为车辆工程基本知识，讲述了定义、基本组成、作用及分类；第二部分为车辆发展历程，讲述了历史、现状及未来；第三部分为汽车文化，讲述了车界名人、著名车辆工业集团、汽车时尚；第四部分为车辆构造，系统讲述了发动机、底盘、电气及各自子系统与零部件；第五部分为车辆保养与维修，讲述了车辆维护、汽车美容、故障诊断与排除；第六部分为汽车市场与服务，讲述了市场营销与后市场项目与服务。其中，刘宏新负责本书的总体组织工作及第1、2章的编写，范金霞承担了第3、4、8章的编写与统稿，秦丽元编写第6、7、16、17章，彭伟平负责第9章，陈军负责第5章，李跃峰负责第15章，张金钰负责第11章，苗玉彬负责第12章，钟博文负责第13章，谢飞负责第14章，薛正辉负责第10章。编委之外的刘伟杰、付露露、贾儒在资料搜集、图片处理与中英文校对方面做了大量辅助工作。

由于编者水平所限，在编写过程中虽认真谨慎，纰漏与不当之处仍在所难免，恳请读者能够谅解并予以指正。同时，也希望能与广大读者在车辆工程专业英语方面的教材建设与课堂讲授艺术方面进行广泛的交流与深入探讨。

车辆工程专业英语教材编写委员会

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Chapter 1 Introduction of Motor Vehicles

During the past half century and longer, motor vehicles have played an important role in human civilization. Then, what is motor vehicle? What does it consist of? How does it affect society? These questions will be answered in this chapter.

1.1 Definition of Motor Vehicles

A motor vehicle or road vehicle is a self-propelled wheeled vehicle that does not operate on rails, such as trains or trolleys. The vehicle propulsion is provided by an engine or motor, usually by an internal combustion engine, or an electric motor, or some combination of the two, such as hybrid electric vehicles and plug-in hybrids. For legal purposes motor vehicles are often identified within a number of vehicle classes including automobiles or cars, buses, motorcycles, off highway vehicles, light trucks or light duty trucks, and trucks or lorries. These classifications vary according to the legal codes of each country. ISO 3833: 1977 is the standard for the types, terms and definitions of motor vehicles. By definition, railway devices and spacecrafts have been excluded.

Today, a vehicle is mechanical as well as electronic. Failure of one computer-controlled system can affect the operation of a seemingly unrelated system. This makes a thorough understanding of the whole automobile and its major systems.

1.2 Parts and Systems of Motor Vehicles

1.2.1 Basic Parts and Systems

Today's ordinary car contains more than 15000 separate, individual parts that must work together. A part, sometimes called a component, is the smallest removable items on a car. An **assembly** is a set of fitted parts designed to complete a specific function. An automotive system is a group of related parts and assemblies that perform a specific job or task. Automobile parts and systems can be organized into ten major categories: **engine**, **body** and frame, computer system, fuel system, **electrical** system, cooling and lubrication systems, exhaust and emission control systems, drive train systems, suspension, steering, and brake systems, accessory and safety systems (Fig. 1-1).^①

The engine which is called the "heart" of a vehicle is used to supply power for a motor vehicle. The details of the engine will be introduced in chapter 8.

The automobile body is a **shell** with windows, doors, and a **hood**. It provides a protective covering for the engine, passengers and **cargo**. It can be made from steel, aluminium, fiberglass, plastic or composite. The vehicle frame is a high-strength structure used to support all other parts of the vehicle. The frame can be classified into **separate frame** and **unitized frame** (unibody) con-



Fig. 1-1 Layout of a passenger car

1-body 2-steering 3-engine 4-suspension 5-electrical equipment 6-power train 7-brakes

struction (Fig. 1-2). Separate frame construction has a separate body structure bolted to a thick steel framework. The engine and other major assemblies forming the chassis are mounted on the frame. Unitized frame construction is that frame and the body are welded together as one structure.

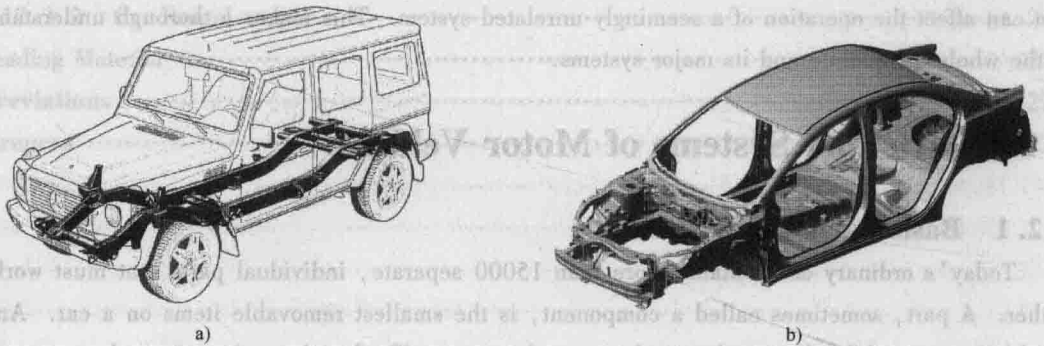


Fig. 1-2 Frame construction

a) Separate frame b) Unitized frame

The term **chassis** is often used when referring to a vehicle's frame and everything mounted to it except the body-tires, wheels, engine, transmission, drive axle assembly, and frame. The chassis is considered as an assembly of those systems that are the major operating part of a vehicle. In fact, when power from engine continues to be transmitted to chassis, it begins with **power train**, and goes on to **steering**, wheel **suspension**, **brakes** and tires. These individual components interact with each other closely. The chassis includes the **transmission**, suspension, steering, and brake systems. ②

The computer systems monitor and control electric/electronic **ciucuits** to increase the mechani-

cal and electrical efficiency and dependability of vehicles.

The fuel system provides a combustible air-fuel mixture to power the engine.

The electrical system generates and distributes the voltage and current needed to operate the vehicle's electrical and electronic components, such as ignition, **horn**, lights, heater and starter. The **electrical level** is maintained by a charging circuit. This circuit consists of a battery and an **alternator** (or **generator**).

Cooling and lubrication systems prevent engine damage and wear by regulating engine, operating temperature and reducing friction between internal moving parts.

Exhaust and emission control systems quiet engine noise and reduce toxic substances emitted during fuel evaporation and combustion.

Drive train systems transfer the power from the engine to the drive wheels.

The suspension, steering and brake systems support and control the vehicle. They control movement of the body and frame when the vehicle accelerates from a standstill, cruises at highway speeds, or slows to a stop.

The accessory and safety systems increase occupant comfort, safety, security and convenience.

1.2.2 Working Equipment

Working equipment that can be equipped with the vehicle plays an important role on working. Several kinds of work equipment of agricultural machinery and construction machinery were introduced below:

The work equipment of tractor

The tractor transmits power to the agricultural implements by the working equipment, thus constitutes the operating unit. The working equipments of farm tractors usually include the hydraulic suspension system, the drawbar system, power take-off shaft, and power take-off belt wheel (Fig. 1-3), and so on.

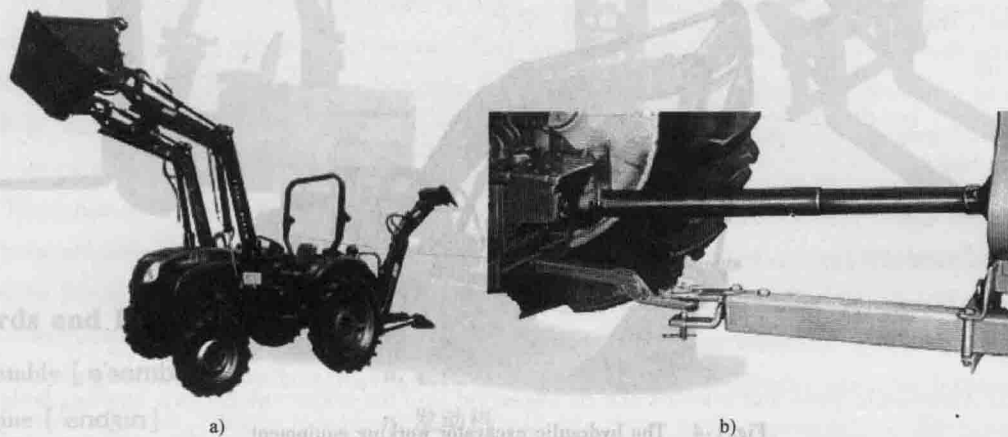


Fig. 1-3 The tractor working equipment

a) Hydraulic suspension system b) Drawbar and PTO shaft

The basic purpose of the tractors hydraulic systems is to use fluid dynamics to perform work

both on and off the tractor. Implements are the typical use of hydraulics off the tractor, and selective control valves control the volume of flow. Implements use hydraulic oil to perform a variety of functions such as raising and lowering parts as well as providing power to motors and other devices for mechanical movement.^③ Equipment attached to the three-point hitch can be raised or lowered hydraulically with a **control lever**. The equipment attached to the three-point **hitch** is usually completely supported by the tractor.

A **drawbar** is a **solid coupling** between a hauling vehicle and its hauled load. Agricultural equipment is hauled from a tractor mounted with a drawbar. Professional agricultural tools such as **ploughs** are attached to professional drawbars which have functions in addition to transmitting **tractive force**.

Modern tractors use a power take-off shaft to provide rotary power to machinery that may be **stationary** or pulled. The PTO shaft generally is at the rear of the tractor, and can be connected to an implement that is either towed by a drawbar or a three-point hitch.

The working equipment of excavator

The working equipment of excavator is composed of three parts; movable arm, arm and bucket hinge (Fig. 1-4). All of the movable arms go ups and downs, the length of arm and bucket rotating reciprocating of this kind of excavator is controlled by hydraulic cylinder. In order to meet the needs of various constructions, the hydraulic used excavators can be installed with a variety of working equipment, such as **mining**, **lifting**, **level off**, **clamp**, **loading**, **bulldozing**, **impact hammer**, and other operation equipment and so on.^④

A hydraulic excavator uses hydraulic pistons to extend, contract, raise, and lower its arm, as well as operate the **scoop** on the end of the arm. These pistons work based on oil pressure. There is a control pump that forces oil in and out of the pistons, causing them to extend and contract, which makes them act sort of like **muscles** to move the arm of the excavator.



Fig. 1-4 The hydraulic excavator working equipment

The working equipment of crane

The working equipment of crane is the lifting component which includes the boom, referred to as the upper (Fig. 1-5). These are mated together through a turntable, allowing the upper to swing

from side to side. These modern hydraulic truck cranes are usually single-engine machines, with the same engine powering the **undercarriage** and the crane. The upper is usually powered via hydraulics run through the turntable from the pump mounted on the lower.



Fig. 1-5 The crane working equipments

The working equipment of forklift truck

The working device of forklift truck is known as the lifting system on lift trucks includes chains attached to a hydraulic cylinder (Fig. 1-6). When the cylinder is filled with hydraulic fluid, it forces the piston to move upward. The upward movement of the piston and the chains lift the forks to the desired level. The lifting forks on your lift truck can be moved from side to side to adjust for different types of loads. While most lift trucks require that this be done by hand, some have special controls for adjusting the forks.



Fig. 1-6 The forklift truck working equipments

Words and Expressions

- | | |
|----------------------------|---------|
| assembly [ə'sembli] | n. 装配总成 |
| engine ['endʒɪn] | n. 发动机 |
| body ['bɒdi] | n. 车身 |
| electrical [ɪ'lektrɪk(ə)l] | adj. 电的 |
| shell [ʃel] | n. 外壳 |

hood [hʊd]	n. (发动机)罩
cargo ['kɑ:gəʊ]	n. 货物
separate frame	(分体)非承载式车身
unitized frame	承载式(车身)
chassis ['ʃæsi]	n. 底盘
power train	传动系
steering ['strɔ:ɪŋ]	n. 转向器
suspension [sə'spenʃ(ə)n]	n. 悬架
brake [breɪk]	n. 刹车、制动
transmission [trænz'mɪʃ(ə)n]	n. 传动装置
circuit ['sɜ:kɪt]	n. 电路
horn [hɔ:n]	n. 喇叭
electrical level	电平
alternator ['ɔ:ltəneɪtə]	n. 交流发电机
generator ['dʒenəreɪtə]	n. 发电机
control lever	操纵杆
hitch [hɪtʃ]	n. 钩
drawbar ['drɔ:bɔ:]	n. 牵引车的挂钩
solid coupling	刚性万向节
plough [plau]	n. 犁
tractive force	牵引力;驱动力
stationary ['steɪʃ(ə)n(ə)rɪ]	adj. 固定的;静止的
mining ['maɪnɪŋ]	n. 矿业;采矿
level off	把……弄平
bulldozing ['bul,dəʊzɪŋ]	n. 推土
impact hammer	冲击锤体
scoop [sku:p]	n. 勺;铲子
muscle ['mʌs(ə)l]	n. 肌肉;力量
undercarriage ['ʌndəkæərɪdʒ]	n. 着陆装置;底盘

Notes

① Automobile parts and systems can be organized into ten major categories: engine, body and frame, computer system, fuel system, electrical system, cooling and lubrication systems, exhaust and emission control systems, drive train systems, suspension, steering, and brake systems, accessory and safety systems.

汽车零部件和系统由 10 大种类组成: 发动机, 车身和车架, 计算机系统, 燃油系统,