面向21世纪全国高职高专汽车类规划教材

汽车英语

QICHE YINGYU

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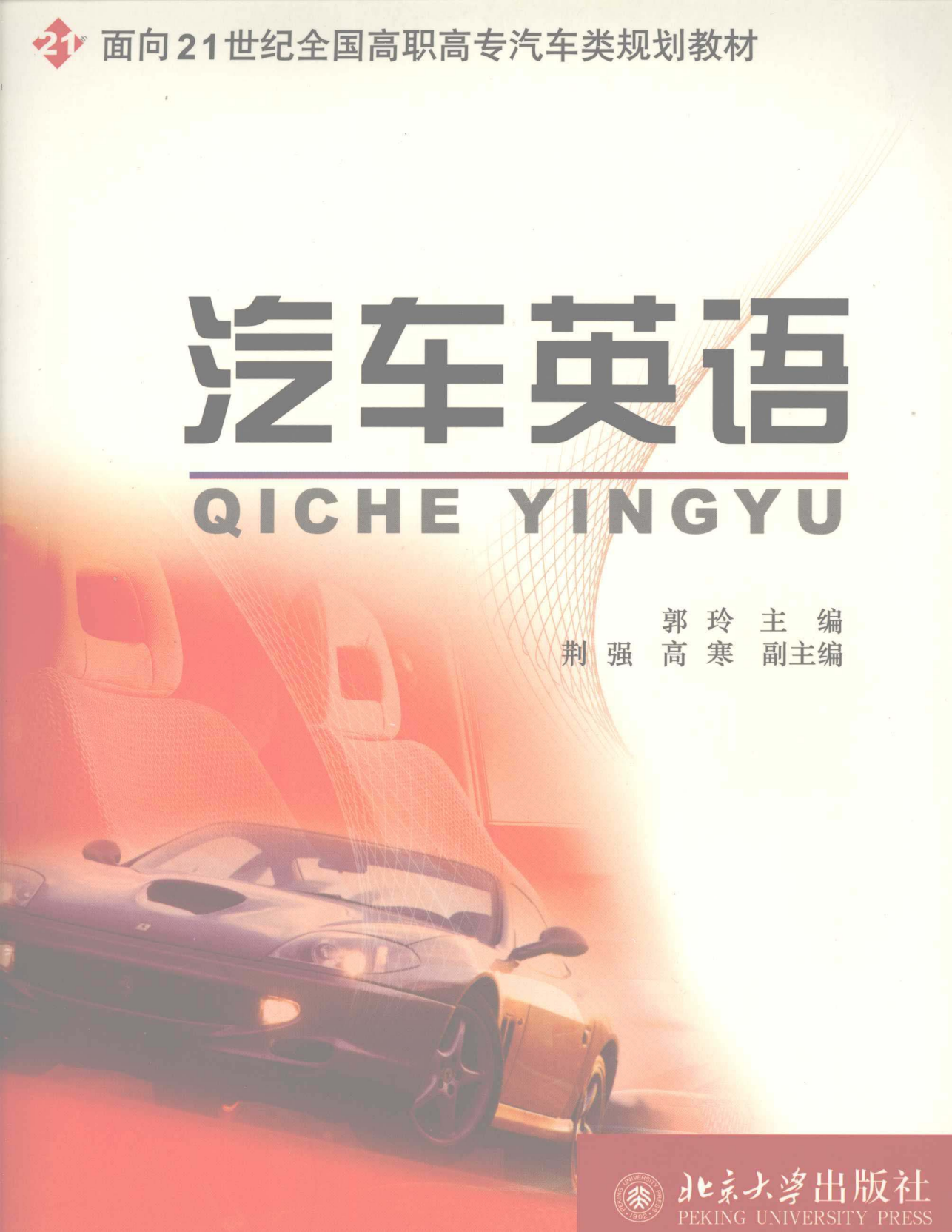

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内 容 简 介

本书分为20个单元，其中包括课文、词汇、注释、练习和阅读材料，共40篇文章。书后附有常用汽车英文缩略语。

全书内容分为3个部分。第1部分为汽车构造，共28篇文章，不但讲述了汽车各主要系统的构造和工作原理，而且添加了一些如汽车电子控制燃油喷射系统、自动变速器、防抱死制动系统、安全气囊等汽车新技术方面的知识。第2部分讲述了全球定位系统、智能运输系统和汽车检测的一些基本常识，共3篇文章。第3部分为电动汽车，共9篇文章，讲述了蓄电池电动汽车、混合动力电动汽车、燃料电池电动汽车的结构模型、工作原理、发展历史等知识。

本书可作为高职教育汽车专业的专业英语教材，也可供相关专业的工程技术人员和管理人员阅读。

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前　言

近年来，伴随着高等教育的跨越式发展，我国高等职业教育异军突起，规模迅速扩大，现在已名副其实地成为了我国高等教育的“半壁江山”，为国家的经济建设培养并输送了大批高技能人才。但目前教材建设却远远滞后于高等职业教育的发展，为此，我们编写了这本汽车专业英语教材。

本书从高职学生的实际情况出发，深入浅出地介绍了汽车各主要系统的构造和工作原理，并将一些汽车新技术融入其中，使学生能够比较系统地掌握汽车方面的英语知识，为他们以后阅读汽车英语资料和操作带有英文标识的汽车检测仪器打下一个坚实的基础。此外，我们还拿出一定的篇幅介绍了汽车的检测技术及电动汽车技术。并在书后附有常用汽车英文缩略语，方便读者学习和工作使用。

本书取材广泛，实用性强。在查阅了大量的国内与国外专业资料后，我们选取了这 40 篇有代表意义的文章，力争让读者能够在较短的时间内掌握较多切合汽车专业实际的专业词汇和内容。

本书由吉林交通职业技术学院郭玲主编，荆强、高寒为副主编。本书第 1 单元、第 2 单元、第 3 单元、第 4 单元、第 5 单元、第 10 单元、第 11 单元、第 18 单元、第 19 单元、第 20 单元由郭玲编写，第 8 单元、第 9 单元、第 14 单元、第 15 单元、第 16 单元、第 17 单元由荆强编写，第 6 单元、第 7 单元、第 12 单元由高寒编写，第 13 单元由徐静航编写。

由于编者水平有限，不足之处在所难免，恳请广大师生和读者批评指正。

编　者

2005 年 6 月

CONTENT

目　　录

Unit 1 Structure of Automobile

The car is one of the most fascinating devices that a person can own. Cars are also one of the most pervasive devices, with a typical American family owning two cars.

A car contains dozens of different technologies. Everything from the engine to the tires is its own special universe of design and engineering. But any automobiles are made up of four basic sections: engine, chassis, body and electrical system.

The automobile engine is an internal combustion engine which converts the heat energy of fuel into mechanical energy to make the car move. In the internal combustion engine, combustible mixture is compressed and then burned inside the engine cylinders. The burning of air-fuel mixture produces high pressure which forces piston to move downward. The movement is transmitted to the crankshaft by the connecting rod. The crankshaft is made to rotate then. The rotary motion is carried through the power train to the wheels so that they run and the car moves.

As the source of power, the engine requires a fuel system to supply with fuel or the mixture of air and fuel. It plays a vital role in the power-producing process. Suppose the engine is a gasoline engine, the fuel system pumps liquid gasoline from a tank into the carburetor where the gasoline can be mixed with air. The mixture is delivered to the engine where it is burned. If the engine is EFI engine, fuel is delivered from the tank to the injector by means of an electric fuel pump. The fuel injectors, which directly controls fuel metering to the intake manifold, is pulsed by the ECU. The ECU determines air/fuel ratio of the engine according to engine condition.

The engine also needs a cooling system, because the combustion of the air-fuel mixture in the engine creates a very high temperature (as high as 2000 to 2700℃). The cooling system takes heat away from the engine by either circulating liquid coolant (water mixed with antifreeze) between the engine and a radiator, or passing air through the radiator. Today, liquid-cooled engines are common. It cools off as it goes through the radiator. Thus, the coolant continually takes heat away from the engine, where it could do damage and delivers it to the radiator.

The engine also includes a lubricating system. The purpose of the lubricating system is to supply all moving parts inside the engine with lubricating oil; the oil keeps moving parts from wearing excessively.

The fourth is a starting system and its purpose is to change the electrical current into the mechanical energy to push the crankshaft around. By means of this, the engine can be started.

The way to produce heat energy is different between gasoline and diesel engines, there is only an ignition system in gasoline engine. The ignition system provides high-voltage electric sparks that set fire to the charges of air-fuel mixture in the engine combustion chambers. However, the heat energy for igniting the charges is created within the diesel engine by compressing pure air to a degree that will initiate combustion and then injecting the fuel at the right time in relation to the movement of the crankshaft.

A chassis which is considered as a support frame for an auto body is used to assemble all auto spare parts on it. In fact, when power from engine continues to be transmitted to chassis, it begins with power train, goes on to steering, wheel suspension, brakes and tires. These individual components interact with each other closely. Therefore, a chassis itself can be divided into the following systems.

Driving system connects the transmission with the driving axle. In effect, the driving system works by transmitting engine power to the driving wheels. The driving system consists of the clutch, transmission, universal joint, driving axle, etc.

Steering system is used to control the driving direction of an automobile. It is composed of the steering wheel, steering column, worm gear sector, steering drop arm and worm.

Brake system is a balanced set of mechanical and hydraulic devices used to retard the motion of the vehicle by means of friction. It consists of the drum or disc brake assembly, brake lever assembly, etc.

An Anti-lock Brake System (ABS) is a computer-controlled brake system that helps prevent wheel lockup during braking. ABS system can maintain control of the vehicle. It works by limiting the pressure to any wheel, which decelerates too rapidly. This allows maximum stopping force to be applied without brake lockup. ASR stands for Acceleration Slip Regulation and it is the way of guaranteeing that the wheels have equal traction when you need to accelerate quickly.

The automobile body which is regarded as the framework is seated on the chassis. Its function is obvious for occupants to provide comfort, protection and shelter. The automobile body is generally divided into four sections: the front, the upper or top, rear and the underbody. These sections are further divided into small units, such as the hood, the fenders, the roof panels, the door, the instrument panel, the bumpers and the luggage compartment.

The electrical system is considered an auto electric power source supplies lighting power for the automobile. The electrical system contains battery, lights, generator, engine ignition, lighting circuit, and various switches that control their use.

With the rapid development of automobile industry, the new models of automobiles are becoming better and better in design and performance. When automobiles are very popular with people, many negative problems corresponding to the facts have to be considered by scientists,

such as energy crisis, air pollution and traffic jam. So scientists and auto manufacturers are doing their best to improve fuel economy, control exhaust emissions; the governments are taking active measures to resolve traffic problems at the same time.

New Words

1. **fascinating** ['fæsineitiŋ] *adj.* 迷人的，吸引人的
2. **pervasive** [pə'veisiv] *adj.* 遍及的，弥漫的
3. **engine** ['endʒin] *n.* 发动机
4. **chassis** ['ʃæsi] *n.* 底盘
5. **body** ['bɔdi] *n.* 车身
6. **combustion** [kəm'bʌstʃən] *n.* 燃烧
7. **combustible** [kəm'bʌstəbl] *adj.* 易燃的，易激动的
8. **cylinder** ['silində] *n.* 汽缸
9. **piston** ['pistən] *n.* 活塞
10. **crankshaft** ['kræŋkʃɑ:ft] *n.* 曲轴
11. **rotate** [rəu'teit] *v.* 旋转
12. **vital** ['vaitl] *adj.* 至关重要的
13. **tank** [tæŋk] *n.* 油箱
14. **suppose** [sə'pəuz] *v.* 假定，推测
15. **pulse** [pʌls] *vt.* 用脉冲输送
16. **coolant** ['ku:lənt] *n.* 制冷剂，冷却液
17. **radiator** ['reidieitə] *n.* 散热器，水箱
18. **lubricate** ['lju:brikeit] *v.* 润滑
19. **wear** [wɛə] *v.* 磨损
20. **gasoline** ['gæsəli:n] *n.* 汽油
21. **diesel** ['di:zəl] *n.* 柴油机
22. **ignition** [ig'niʃən] *n.* 点火，着火
23. **voltage** ['vaultidʒ] *n.* 电压
24. **spark** [spa:k] *n.* 火花
25. **charge** [tʃa:dʒ] *n.* 填充物
26. **suspension** [səs'penʃən] *n.* 悬架
27. **brake** [breik] *n.* 制动器，刹车

28. **tire** ['taiə] *n.* 轮胎
29. **interact** [intə'rækt] *v.* 相互作用，相互影响
30. **transmission** [trænz'miʃən] *n.* 变速器
31. **clutch** [klʌtʃ] *n.* 离合器
32. **hydraulic** [hai'drɔ:lik] *adj.* 液压的
33. **drum** [drʌm] *n.* 鼓
34. **disc** [disk] *n.* 盘
35. **lockup** ['lɔkʌp] *n.* 锁定，锁住
36. **decelerate** [di:'seləreit] *v.* （使）减速
37. **guarantee** ['gærən'ti:] *v.* 保证，抵押，担保
38. **hood** [hud] *n.* 发动机罩
39. **fender** ['fendə] *n.* 挡泥板
40. **underbody** ['ʌndə,bɔdi] *n.* 底板
41. **bumper** ['bʌmpə] *n.* 保险杠
42. **luggage** ['lʌgidʒ] *n.* 行李
43. **battery** ['bætəri] *n.* 蓄电池
44. **generator** ['dʒenəreitə] *n.* 发电机

Phrases and Expressions

1. electrical system 电气系统
2. internal combustion engine 内燃机
3. combustible mixture 可燃混合物
4. connecting rod 连杆
5. EFI engine 电喷发动机
6. fuel injector 喷油器
7. intake manifold 进气歧管
8. ECU 电子控制单元
9. air/fuel ratio 空燃比
10. cooling system 制冷系统
11. lubricating system 润滑系统
12. lubricating oil 润滑油

13. electrical current 电流
14. starting system 起动系统
15. ignition system 点火系统
16. auto spare part 汽车零部件
17. power train 传动系统
18. driving system 传动系统
19. universal joint 万向节
20. driving axle 驱动桥，传动轴
21. steering system 转向系统
22. steering wheel 方向盘
23. steering column 转向柱
24. worm gear sector 扇形轮
25. steering drop arm 转向垂臂
26. brake lever assembly 制动杆总成
27. Anti-lock Brake System (ABS) 制动防抱系统
28. acceleration slip regulation(ASR) 驱动防滑转系统
29. roof panel （车身）顶板
30. lighting circuit 照明电路
31. traffic jam 交通堵塞
32. fuel economy 燃油经济性
33. exhaust emission 尾气排放污染物

Notes to Text

1. A car contains dozens of different technologies. Everything from the engine to the tires is its own special universe of design and engineering.
   一辆车包含了许多不同的技术。从发动机到轮胎，每一个零部件都有自己专门的设计和工程技术领域。
   dozens of 许多，几十
   例如：for dozens of years 许多年以来，好几十年以来。
2. Suppose the engine is a gasoline engine, the fuel system pumps liquid gasoline from a tank into the carburetor where the gasoline can be mixed with air.

假设发动机为汽油机，燃油供给系统会把油箱里的液态汽油泵到化油器，并在此处将汽油与空气混合。

3. The purposes of the lubricating system is to supply all moving parts inside the engine with lubricating oil; the oil keeps moving parts from wearing excessively.
润滑系统的作用是给发动机内部的运动部件提供润滑油；润滑油可使运动部件避免过度的磨损。
keep…from 阻止，使免于

4. The ignition system provides high-voltage electric sparks that set fire to the charges of air-fuel mixture in the engine combustion chambers.
点火系统产生高压电火花点燃发动机燃烧室内的可燃混合物。
set fire to 使燃烧；点燃，该短语中 to 的词性为介词，后面要跟名词。

5. However, the heat energy for igniting the charge is created within the diesel engine by compressing pure air to a degree that will initiate combustion and then injecting the fuel at the right time in relation to the movement of the crankshaft.
可是，在柴油发动机中，燃油点火的热量是靠将空气压缩到可以引燃的程度来产生的，并在对应于曲轴转动的恰当时刻喷入燃料。
that will initiate combustion 为定语从句，修饰 degree。

6. A chassis which is considered as a support frame for an auto body is used to assemble all auto spare parts on it.
底盘被用来总装汽车零部件，它被认为是车身的支架。

7. ASR stands for Acceleration Slip Regulation and it is the way of guaranteeing that the wheels have equal traction when you need to accelerate quickly.
ASR 代表驱动防滑转，它是当你要急加速时保证每个车轮有相等的地面附着力的措施。

Exercises

1. Questions to the text

（1）What is the function of the automobile engine?

（2）What is the steering system composed of?

（3）What do ABS and ASR mean?

（4）Is the way to produce the heat energy different between gasoline and diesel engines? Why?

（5）What disadvantages does the automobile bring us?

2. Translate the following into Chinese

（1）exhaust emission

（2）fuel economy

（3）roof panel

（4）combustible mixture

（5）universal joint

（6）ABS and ASR

3. Translate the following into English

（1）转向系统

（2）制动杆总成

（3）空燃比

（4）内燃机

（5）传动系统

（6）起动系统

4. Translate the following sentences into Chinese

（1）A car contains dozens of different technologies. Everything from the engine to the tires is its own special universe of design and engineering.

（2）The automobile engine is an internal combustion engine which converts the heat energy of fuel into mechanical energy to make the car move.

（3）The cooling system takes heat away from the engine by either circulating a liquid coolant (water mixed with antifreeze) between the engine and a radiator, or passing air through the radiator.

（4）The fourth is starting system and its purpose is to change the electrical current into the mechanical energy to push the crank-shaft around.

（5）In fact, when power from engine continues to be transmitted to chassis, it begins with power train, goes on to steering, wheel suspension, brakes and tires. These individual components interact with each other closely.

（6）An Anti-lock Brake System (ABS) is a computer-controlled brake system that helps prevent wheel lockup during braking.

Reading Material

The Future of Auto Development

The automotive industry has faced considerable challenges over the last couple of years such as overcapacity, ultra-competitive markets, fluctuating commodity price, rising pension cost. It's gotten to the point that some industry observers have dubbed the current situation the Perfect Storm.

To weather this storm, automakers will have to increase the innovation and reduce prices. So there will be significant change in the design content for automobiles over the next decade. The biggest change will be in electronics or "mechatronics" as it is known in the industry. Beginning in the 1990s, electronics in automobiles have increased steadily. This trend should continue, with electronics going from 22% of total car value in 2002 to a forecasted 35% by 2015. And growth in electronics should revolve around convenience, safety, and environmental requirements.

Similarly, software will play an expanding role in auto design, with the amount of money spent on software almost doubling between 2002 and 2015. The interior, power train, and chassis will contribute most to this growth in software value.

The introduction of software-controlled electronics will also spur the growth of in-vehicle networks and subsystem interdependencies. Furthermore, OEM will rely increasingly on suppliers such as Delphi and Bosch, whose share of product development is forecasted to increase to 70% by 2015.

Future Auto Development

PTC has conducted a joint study with the center for automotive research, which looks at product development in the auto industry. Although the final study won't be available until later this year, major conclusions are already known. For example:

Auto companies all over the world take roughly the same amount of time to develop a new platform, about 24 months. Innovation will increasingly come from suppliers. Math-based design, analysis, and CAD will become even more important. DFMA, along with design for durability and reliability, will remain the most important design criteria. With electronics, success depends on engineers and IT departments having a company-wide view and closer coordination on system components. Engineers will need to know the entire life cycle of a product, from planning to after market support and disposal.

An Example Of Complexity

Taking a look at the design and development of a wiring harness will demonstrate the complexity of such life-cycle approach across electronic, mechanical, and software design.

Systems definition: This includes translating vehicle electrical specifications into required connections in each system; breaking down the system logically by function; creating block diagrams of designs, and selecting the right components and connectors.

Topology development: This includes translating a conceptual model into an implemental topology, component placement in vehicle, partitioning the vehicle for the harness, and placing interconnects based on physical constraints and logical requirements.

Physical harness development: This includes translating topology into real-world connections, determining physical properties of the harness such as splices, wires, connectors, and other attached parts, performing electronic 3D routing, and developing 2D harness manufacturing drawings from 3D routings.

Schematic release: This is usually the final step and includes the merger of system design and harness documentation into a practical format for field use, developing engineering system views for troubleshooting, and providing service drawings.

As these steps show, even harness design requires interplay between electrical and mechanical engineering and consideration of the harness' entire life cycle.

It's important to realize that software design differs from mechanical and electronic design. The differences encompass culture, process, and tools. There is universal agreement that software development is often the least controlled of the design activities discussed thus far. Software revisions are increasing in number and are more loosely managed compared to those in other design domains. The frequent and long revision cycles for software are creating problems, including some downstream in configuration and connecting systems, subsystems, and components.

Auto companies need to get a much better handle on software. A tool that might help is the Unified Modeling Language (UML), which is becoming a de-facto method for communicating software capabilities to suppliers and other businesses.

Automakers also need tighter teamwork between mechanical, electrical, and software engineers. The major hurdle preventing better teamwork is the different culture, which includes different tools, practices, and rules for managing design and revisions, and lack of data-sharing standards preventing easy integration.

Auto companies must also have a product life cycle management (PLM) strategy that addresses all design disciplines. The strategy should include:

Product-data management gives engineers the right data at the right time. There should be a single source of product data that supports all design tools along with traceability.

Cross-discipline collaboration lets engineers identify and resolve issues across all CAD

domains.

Process management establishes consistent, repeatable development processes including revisions and new car introductions.

New Words

1. **overcapacity** [ˌəuvəkə'pæsiti] *n.* 生产能力过剩
2. **fluctuate** ['flʌktjueit] *vt.* 使动摇，使波动
   vi. 变动，波动，涨落
3. **pension** ['penʃən] *n.* 养老金，退休金
4. **tighten** ['taitən] *v.* 变紧，绷紧，拉紧
5. **observer** [əb'zə:və] *n.* 观察者
6. **dub** [dʌb] *vt.* 授予称号
7. **weather** ['weðə] *v.* 经受住
8. **innovation** [inəu'veiʃən] *n.* 创新，改革，新设施
9. **steadily** ['stedili] *adv.* 稳固地，稳步地
10. **spur** [spə:] *v.* 激励，鞭策
11. **subsystem** ['sʌbˌsistim] *n.* 次要系统，子系统
12. **roughly** ['rʌfli] *adv.* 大约地，粗略地
13. **platform** ['plætfɔ:m] *n.* 纲领，宣言
14. **durability** ['djuərə'biliti] *n.* 耐久性
15. **reliability** [rilaiə'biliti] *n.* 可靠性
16. **criteria** [krai'tiriə] *n.* 标准
17. **coordination** [kəuɔ:di'neiʃən] *n.* 协调，配合
18. **disposal** [dis'pəuzəl] *n.* 处置，对付
19. **complexity** [kəm'pleksiti] *n.* 复杂的事物，复杂性
20. **topology** [təu'pɔlədʒi] *n.* 拓扑学
21. **splice** [splais] *v.* *n.* 接合，衔接
22. **implemental** [ˌimpli'mentəl] *adj.* 工具的，起实施(或执行，完成)作用的
23. **schematic** [ski:'mætik] *adj.* 扼要的，图解的
24. **troubleshooting** *n.* 发现并修理故障，解决纷争
25. **encompass** [in'kʌmpəs] *v.* 包围，环绕
26. **de-facto** *adj.* 事实上的，实际的

27. **hurdle** ['hə:dl] *n.* 跳栏，障碍
28. **harness** ['ha:nis] *n.* 线束，电器配线，带状装置
29. **domain** [də'mein] *n.* 领土，领域

Phrases and Expressions

1. OEM 原始设备制造商
2. look at 考虑，着眼于
3. Design for Manufacturing and Assembly（DFMA）面向制造和装配的设计
4. life cycle 疲劳周期
5. wiring harness 电线，电线束
6. break down 分解
7. block diagram 结构图，简图
8. Unified Modeling Language (UML) 统一建模语言
9. Product Life cycle Management (PLM) 产品寿命周期管理

Notes to Text

1. The automotive industry has faced considerable challenges over the last couple of years such as overcapacity, ultra-competitive markets, fluctuating commodity price, rising pension cost.
   在最近的几年，汽车工业已经面临着相当大的挑战，诸如过剩的生产能力、竞争激烈的市场、波动的商品价格、增长的养老金。
2. Similarly, software will play an expanding role in auto design, with the amount of money spent on software almost doubling between 2002 and 2015.
   类似地，软件将在汽车的设计上起到扩展功能的作用，并且在 2002 年到 2015 年期间花在软件上的钱几乎将增加一倍。