高职高专“十一五”规划教材

汽车类

汽车专业英语

QICHE

潘天堂 主编

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内 容 简 介

本书以英语原文为素材，加以精心选择、编辑，内容丰富，难度适中。全书分为 23 个单元，主要内容有：汽车文化、汽车生产、汽车机械构造、汽车电气与电子控制、汽车先进技术、汽车排故、汽车检测、汽车保险、汽车营销等。每个单元包括课文、词汇、复习提问和注释。课后新词均注有音标，便于学习；书后附有词汇表、汽车英文标牌，常用英文缩写等。

本书取材新颖，内容翔实，专业词汇丰富，文章表达方式多样。针对高职高专学生的英语学习特点，做到适用、够用。

本书实用性强，适合作为高职高专院校汽车检测、汽车电子、汽车服务与营销等相关专业的英语教材，也适合作为汽车专业技术人员的自学参考书。

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前　言

近年来，我国的汽车工业迅猛发展，汽车保有量飞速增加。世界各大品牌汽车不断涌入国内，汽车行业与国外的技术交流也日益频繁，大量的英文资料需要阅读，对汽车服务人员英文水平要求越来越高。为了适应形势的发展，并且配合基础英语的教学，作者编写了本书。

全书分为23个单元，主要内容有：汽车文化、汽车生产、汽车机械构造、汽车电气与电子控制、汽车先进技术、汽车排故、汽车检测、汽车保险、汽车营销等。每个单元包括课文、词汇、复习提问和注释，课后新词均注有音标，便于学习。书后附有词汇表、汽车英文标牌，常用英文缩写等。

本书在编写上突出了如下3个方面的特点：

(1) 题材广泛，内容丰富。大多同类教材内容过于偏重汽车机械结构，本书内容涉及汽车历史、汽车构造、汽车电器与电子控制技术、汽车服务、汽车营销等汽车相关各方面。使学生通过本书的学习掌握汽车各专业方面的英文表达方式，为以后的就业和择业拓宽知识面。

(2) 强调实用性和可操作性。文章内容选取难易适中，表达方式多样，既有专业文章的写作手法，也有新闻报道型的通俗写法，更有较口语化的表达方式。强调培养学生阅读能力的提高，强调学生具有活用词汇进行简单表达的能力培养。每单元后设有“简答题”，给教师的课堂教学和学生的思考留下更大的空间，体现了高职高专应用型人才的培养目标和职业定位。

(3) 内容突出前沿性和先进性。本书紧扣时代脉搏，介绍现代汽车新技术的应用。为学生后续职业生涯的发展奠定基础。

本书是面向所有汽车类高职高专的教学用书，涉及的内容较为全面，不同专业在使用时，可根据自身的特点和需要加以取舍。

该书的学习建议在基础英语之后开始。通过对本书的学习，可以进一步巩固学生已掌握的词汇和语法知识，扩大专业词汇量，熟悉专业英语的表达方式，掌握阅读专业英语的方法，为将来获取相关的专业信息打下良好的基础。

本书由潘天堂任主编，郑利锋、汤彩萍任副主编，涂杰、艾娜、汪晓辉、郑丽莉参加编写。

由于编者水平所限，书中如有不足之处敬请使用本书的师生与读者批评指正，以便修订时改进。如读者在使用本书的过程中有其他意见或建议，恳请向编者(bjzhangxf@126.com)踊跃提出宝贵意见。

编　者

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Unit 1 Automobile History

Development of the Automobile

The French engineer Nicolas Joseph Cugnot built the first self-propelled vehicle (Paris, 1789), a heavy, three-wheeled, steam-driven carriage with a boiler that projected in front; its speed was 3 mph (5 kph). In 1801 the British engineer Richard Trevithick also built a three-wheeled, steam-driven car; the engine drove the rear wheels. Development of the automobile was retarded for decades by over-regulation: speed was limited to 4 mph (6.4 kph) and until 1896 a person was required to walk in front of a self-propelled vehicle, carrying a red flag by day and a red lantern by night.

The development of the automobile was accelerated by the introduction of the internal-combustion engine. Probably the first vehicle of this type was the three-wheeled car built in 1885 by the engineer Karl Benz in Germany[1]. The Panhard car, introduced in France by the Daimler company in 1894, had many features of the modern car.

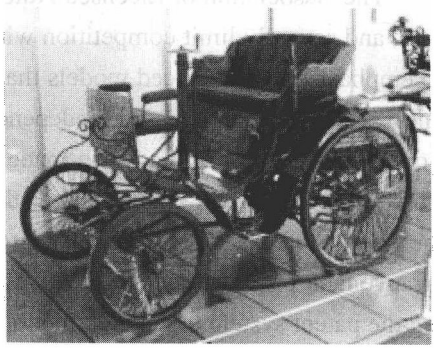

Figure 1-1 Picture of steam-driven carriage

The cars generally were open, accommodated two passengers, and were steered by a lever.

Between 1860 and 1890, German and French inventors were well ahead of their American counterparts by the 1890s in development of the gasoline-powered automobile. In Germany, Gottlieb Daimler and his assistant William Maybach had perfected a four-cycle internal-combustion engine by 1885 and had built four experimental vehicles by 1889. Karl Benz built his first car in 1886 and by 1891 had developed the automobile to the stage of commercial feasibility. In France, Emile Constant Levassor created the basic mechanical arrangement of the modern motorcar in 1891 by placing the engine in front of the chassis, making it possible to accommodate larger, more powerful engines.

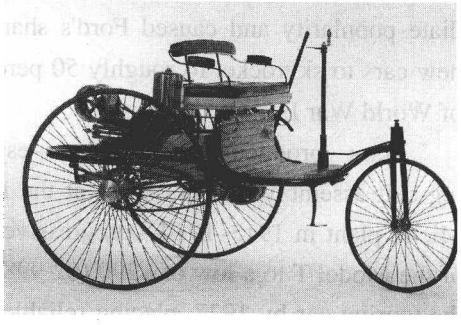

Figure 1-2 The first Benz model

The United States lagged well behind. A bicycle mechanics who built their first car in 1893 after reading a description of the Benz car in *Scientific American* in 1889. It is now known that several American inventors built experimental gasoline automobiles prior to the Duryeas, but it

was the Duryeas who initiated the manufacture of motor vehicles for a commercial market in the United States in 1896[2].

Because the automobile was a combination of relatively standard components already being produced for other uses—gasoline engines, and carriage bodies and wheels, for example—early automobile manufacturers merely assembled available components to supply finished cars. The small amount of capital and the slight technical and managerial expertise needed to enter automobile manufacturing were most commonly diverted from other closely related business activities—especially from machine shops and from the bicycle, carriage, and wagon trades[3]. Assemblers met their capital requirements mainly by shifting the burden to parts makers, distributors, and dealers. Manufacturers typically required 20 percent advance cash deposits on orders, with full payment upon delivery; and the assembly process took well less than the thirty-to ninety-day credit period that parts makers allowed.

The Association of Licensed Automobile Manufacturers (ALAM) attempted to restrict entry into, and severely limit competition within, the automobile industry[4]. The ALAM, which tended to emphasize higher-priced models that brought high unit profits, sued the Ford Motor Company and several other unlicensed "independents", who were more committed to the volume production of low-priced cars and who made and sold cars without paying royalties to the association. To avoid other patent controversies, the newly formed National Automobile Chamber of Commerce instituted a cross-licensing agreement among its members in 1914. This patent-sharing arrangement proved to be an effective antimonopoly measure and prevented companies from using the patent system to develop monopoly power within the industry.

The $600, four-cylinder Ford Model N (1906–1907) deserves credit as the first reliable, powerful, low-priced car. The rugged Ford Model T (1908–1927), remarkably adapted to the wretched rural roads of the day, gained almost immediate popularity and caused Ford's share of the market for new cars to skyrocket to roughly 50 percent by the outbreak of World War I.

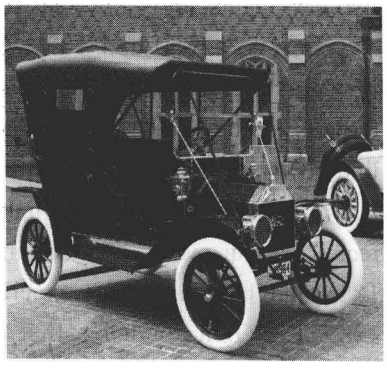

Figure 1-3 Ford T-model car

Mass production techniques—especially the moving-belt assembly line perfected at the Ford Highland Park, Mich., plant in 1913–1914—progressively reduced the price of the Model T to a low of $290 ($2 998 in 2002 dollars) for the touring car by 1927, placing reliable automobiles within reach of most middle-class Americans. Equally significantly, Ford production methods, when applied to the manufacture of many other items, spurred a shift from an economy of scarcity to one of affluence, created a new class of semiskilled industrial workers and opened new opportunities for remunerative industrial employment to unskilled workers. The five-dollar ($89.95 in 2002 dollars), eight-hour day instituted at Ford in 1914—which roughly doubled wages[5] for a shorter workday—dramatically suggested that mass production necessitated mass consumption

and mass leisure.

To compete with the Model T's progressively lower prices, the makers of moderately priced cars followed the lead of the piano industry and began extending installment credit to consumers, lowering a major bar to purchase. More than 110 automobile finance corporations existed by 1921, most notably the General Motors Acceptance Corporation, founded in 1919, and by 1926 time sales accounted for about three-fourths of all automobile sales.

The Post–World War Ⅱ Industry

Before the mid-1980s, the Post–World War Ⅱ American automobile industry could be considered a technologically stagnant industry, though it progressively refined its product and automated its assembly lines. Neither motorcars nor the methods of manufacturing them changed fundamentally over the next generation. Many of the most promising improvements in the internal-combustion engine were pioneered abroad, as were the first significant attempts to depart from traditional assembly-line production. Common Market and Japanese producers steadily encroached upon the dominant American manufacturers, who responded to foreign competition by cutting labor costs—heightening factory regimentation, automating assembly lines, and building overseas subsidiaries.

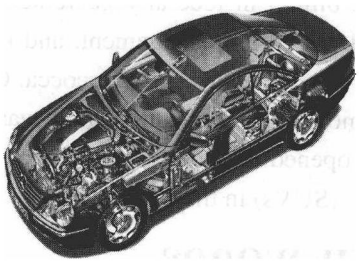

Figure 1-4 Picture of modern cars

Federal legislation affecting the automobile industry proliferated from the New Deal era on. The National Labor Relations Act of 1935 encouraged the unionization of automobile workers. The so-called Automobile Dealer's Day in Court Act (Public Law 1026) in 1956 attempted to correct long-standing complaints about the retail selling of automobiles. The Motor Vehicle Air Pollution Act of 1965 and the National Traffic and Motor Vehicle Safety Act of 1966 regulated automotive design; and the 1970 Clean Air Act set stringent anti-emission standards. In 1975 the Energy Policy and Conservation Act required automakers' product lines to meet a steadily rising average fuel economy, beginning with 18 mpg in 1978 and rising to 27.5 mpg (later reduced to 26 mpg) by 1985[6]. Progressive governmental regulation, however, was accompanied by the massive, indirect subsidization of the Interstate Highway Act of 1956, which committed the federal government to pay, from a Highway Trust Fund, 90 percent of the construction costs for 41 000 miles (later 42 500 miles) of mostly toll-free express highways.

Increasingly, in the 1960s, the automobile came to be recognized as a major social problem. Critics focused on its contributions to environmental pollution, urban sprawl, the rising cost of living, and accidental deaths and injuries. While the automobile industry provided one out of every six jobs in the United States, its hegemony had been severely undercut over the preceding decades by proliferation of the size, power, and importance of government, which provided one out of every five jobs by 1970.

The American auto industry was ill-prepared for the marked shift in consumer preference from large cars to smaller, more fuel-efficient alternatives, and, for the first quarter of 1974, Detroit's sales slipped drastically. Large cars piled up on storage lots and in dealers' showrooms, and massive layoffs accompanied the shifting of assembly lines to the production of smaller models.

By the mid-1980s, however, the American automotive industry had begun a remarkable comeback, although its successes grew from its traditional strengths—big cars and cheap energy—rather than from adapting to the new paradigm that appeared inevitable in the late 1970s[7]. Chrysler, on the verge of bankruptcy in 1979, led the turnaround. After securing a controversial $1.2 billion in federally guaranteed loans, the company promptly shed its overseas operations, modernized its management, and improved the quality of its product under the leadership of its new chief executive, Lee Iacocca. Chrysler's fuel-efficient K-car won awards, but in the long run its more successful innovation was the minivan, which found a highly profitable market niche and opened the door for the development of even larger and more-profitable "sport utility vehicles" (SUVs) in the 1990s.

NEW WORDS

vehicle	['vi:ikl]	*n.*	汽车
carriage	['kæridʒ]	*n.*	四轮马车
retard	[ri'tɑ:d]	*n.*	阻止
accelerate	[æk'seləreit]	*n.*	加速
combustion	['kəm'bʌstʃən]	*n.*	燃烧
marginal	['mɑ:dʒinəl]	*adj.*	边界的
steer	[stiə]	*v.*	转向
lever	['li:və, 'levə]	*n.*	杠杆
stubborn	['stʌbən]	*adj.*	固有的
assembly	[ə'sembli]	*n.*	组件，总成
smatter	['smætə]	*v.*	充内行
gasoline	['gæsəli:n]	*n.*	汽油
chassis	['ʃæsi]	*n.*	底盘
nascent	['næsnt]	*adj.*	初生的
encroache	[in'krəutʃmənt]	*v.*	侵占
unlicensed	['ʌn'laisənst]	*adj.*	没有执照的
antimonopoly	['ænti,mə'nɔpəli]	*n.*	反垄断
feasibility	[,fi:zə'bilət]	*n.*	可能性
stagnant	['stægnənt]	*adj.*	停滞的，迟钝的
expertise	[,ekspə'ti:z]	*n.*	专门技术
wagon	['wægən]	*n.*	四轮马车
controversy	['kɔntrəvə:si]	*n.*	论战
regimentation	[,redʒimen'teiʃən]	*n.*	管辖

proliferate	[prəu'lifəreit]	*v.*	增生扩散
reliance	[ri'laiəns]	*n.*	信任
emission	[i'miʃən]	*n.*	排放
hegemony	[hi(:)'geməni]	*n.*	霸权
paradigm	['pærədaim]	*n.*	范例

PHRASES

self-propelled vehicle	机动车
a smattering of	少数的
four-cycle internal-combustion engine	四冲程内燃机
take over	占据
gasoline-powered vehicle	汽油车

NOTES

1. The development of the automobile was accelerated by the introduction of the internal-combustion engine. Probably the first vehicle of this type was the three-wheeled car built in 1885 by the engineer Karl Benz in Germany.

汽车的发展因内燃机的发明而加速了，也许可以说第一辆这种汽车是德国工程师卡尔·本茨在 1885 年制造的内燃机三轮车。

2. It is now known that several American inventors built experimental gasoline automobiles prior to the Duryeas, but it was the Duryeas who initiated the manufacture of motor vehicles for a commercial market in the United States in 1896.

现在人们知道是几个美国发明者在 Duryeas 之前制造了实验性汽油汽车，但却是 Duryeas 在美国于 1896 年开创了汽车的商业性生产。

3. The small amount of capital and the slight technical and managerial expertise needed to enter automobile manufacturing were most commonly diverted from other closely related business activities—especially from machine shops and from the bicycle, carriage, and wagon trades.

小资本、小革新及管理技术需要进入汽车生产，这些通常取自于相近相关的经济活动——特别是来自于机械厂、自行车和四轮马车等交易领域。

4. The Association of Licensed Automobile Manufacturers (ALAM) attempted to restrict entry into, and severely limit competition within, the automobile industry.

汽车注册制造商协会试图限制(新公司)的进入，从而严格地限制汽车工业的竞争。

5. Equally significantly, Ford production methods, when applied to the manufacture of many other items, spurred a shift from an economy of scarcity to one of affluence, created a new class of semiskilled industrial workers and opened new opportunities for remunerative industrial employment to unskilled workers.

同样重要的是，当福特的生产方法应用到许多其他生产领域的时候，这种方法激起了经济从贫乏向繁荣转变，产生了一个新的工业技工阶层并给非技工阶层提供了新的获得报酬的机会。

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6. In 1975 the Energy Policy and Conservation Act required automakers' product lines to meet a steadily rising average fuel economy, beginning with 18 mpg in 1978 and rising to 27.5 mpg(later reduced to 26 mpg) by 1985.

1975 年能源保护法案要求汽车制造生产线要满足不断增加的燃油经济性要求，从 1978 年的每加仑 18 哩增加到 1985 年的 27.5 哩(后来减少到 26 哩)。

7. By the mid-1980s, however, the American automotive industry had begun a remarkable comeback, although its successes grew from its traditional strengths—big cars and cheap energy—rather than from adapting to the new paradigm that appeared inevitable in the late 1970s.

但 19 世纪 80 年代中期，美国汽车工业开始显著的恢复，尽管恢复是从其传统强项大型车和廉价能源开始，而不是像 70 年代后期那样采用必然带来汽车业繁荣的新模式。

REVIEW QUESTIONS

1. Introduce some features about the steam powered vehicles.
2. Why does the article say that the America auto industry lagged behind well compare to their European counterparts?
3. Which company did initiate the auto commercial use in the world and America?
4. Why did the ALAM restrict the companies' entry into auto industry?
5. Why does the writer pay high importance to the Ford mass production line?
6. By the mid-1980s, what kinds of method the USA had taken to make its auto industry comeback?

Unit 2 Automobile Mass Production Process

Background

In 1908 Henry Ford began production of the Model T automobile. Based on his original Model A design first manufactured in 1903, the Model T took five years to develop. Its creation inaugurated what we know today as the mass production assembly line. This revolutionary idea was based on the concept of simply assembling interchangeable component parts[1].

Figure 2-1 Moving production line

Ford's first venture into automobile assembly with the Model A involved setting up assembly stands on which the whole vehicle was built, usually by a single assembler who fit an entire section of the car together in one place. By the time the Model T was being developed Ford had decided to use multiple assembly stands with assemblers moving from stand to stand, each performing a specific function[2]. This process reduced the assembly time for each fitter from 8.5 hours to a mere 2.5 minutes by rendering each worker completely familiar with a specific task.

Ford soon recognized that walking from stand to stand wasted time and created jam-ups in the production process as faster workers overtook slower ones. In Detroit in 1913, he solved this problem by introducing the first moving assembly line, a conveyor that moved the vehicle past a stationary assembler[3]. Ford's mass production drove the automobile industry for nearly five decades and was eventually adopted by almost every other industrial manufacturer.

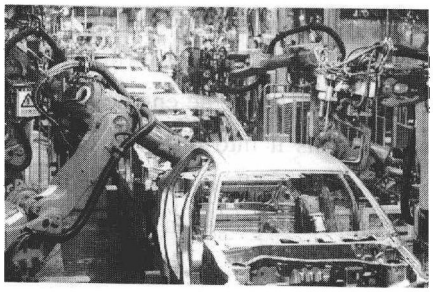

Figure 2-2 Robots on busy work

Raw Materials

Although the bulk of an automobile is virgin steel, petroleum-based products have come to represent an increasingly large percentage of automotive components. The light-weight materials derived from petroleum have helped to lighten some models by as much as thirty percent. As the price of fossil fuels continues to rise, the preference for lighter, more fuel efficient vehicles will become more pronounced.

Design

Introducing a new model of automobile generally takes three to five years from inception to assembly. Trying to predict what the public will want to drive in five years is no small feat, yet

automobile companies have successfully designed automobiles that fit public tastes. With the help of computer-aided design equipment, designers develop basic concept drawings that help them visualize the proposed vehicle's appearance. Based on this simulation, they then construct clay models that can be studied by styling experts familiar with what the public is likely to accept. Only after all models have been reviewed and accepted are tool designers permitted to begin building the tools that will manufacture the component parts of the new model.

The Manufacturing Process Components

The automobile assembly plant represents only the final phase in the process of manufacturing an automobile, for it is here that the components supplied by more than 4 000 outside suppliers, including company-owned parts suppliers, are brought together for assembly, usually by truck or railroad[4]. Those parts that will be used in the chassis are delivered to one area, while those that will comprise the body are unloaded at another.

Figure 2-3 Cars in production line

Chassis

The frame is placed on the assembly line and clamped to the conveyer to prevent shifting as it moves down the line. From here the automobile frame moves to component assembly areas where complete front and rear suspensions, gas tanks, rear axles and drive shafts, gear boxes, steering box components, wheel drums, and braking systems are sequentially installed.

An off-line operation at this stage of production mates the vehicle's engine with its transmission. Workers use robotic arms to install these heavy components inside the engine compartment of the frame. After the engine and transmission are installed, a worker attaches the radiator, and another bolts it into place. Because of the nature of these heavy component parts, articulating robots perform all of the lift and carry operations while assemblers using pneumatic wrenches bolt component pieces in place[5].

Body

Generally, the floor pan is the largest body component to which a multitude of panels and braces will subsequently be either welded or bolted. As it moves down the assembly line, held in place by clamping fixtures, the shell of the vehicle is built. First, the left and right quarter panels are robotically disengaged from pre-staged shipping containers and placed onto the floor pan, where they are stabilized with positioning fixtures and welded.

The front and rear door pillars, roof, and body side panels are assembled in the same fashion. The shell of the automobile assembled in this section of the process lends itself to the use of robots because articulating arms can easily introduce various component braces and panels to the floor pan and perform a high number of weld operations in a time frame and with a degree of accuracy no human workers could ever approach[6].

As the body moves from the isolated weld area of the assembly line, subsequent body com-

ponents including fully assembled doors, deck lids, hood panel, fenders, trunk lid, and bumper reinforcements are installed.

Paint

Prior to painting, the body must pass through a rigorous inspection process, the body in white operation. Under the lights, this oil allows inspectors to see any defects in the sheet metal body panels. Dings, dents, and any other defects are repaired right on the line by skilled body repairmen. After the shell has been fully inspected and repaired, the assembly conveyor carries it through a cleaning station where it is immersed and cleaned of all residual oil, dirt, and contaminants.

As the shell exits the cleaning station it goes through a drying booth and then through an undercoat dip—an electrostatically charged bath of undercoat paint (called the E-coat) that covers every nook and cranny of the body shell, both inside and out, with primer[7].

After the E-coat bath, the shell is again dried in a booth as it proceeds on to the final paint operation.

Interior Assembly

The painted shell proceeds through the interior assembly area where workers assemble all of the instrumentation and wiring systems, dash panels, interior lights, seats, door and trim panels, headliners, radios, speakers, all glass except the automobile windshield, steering column and wheel, body weather strips, vinyl tops, brake and gas pedals, carpeting, and front and rear bumper fascias.

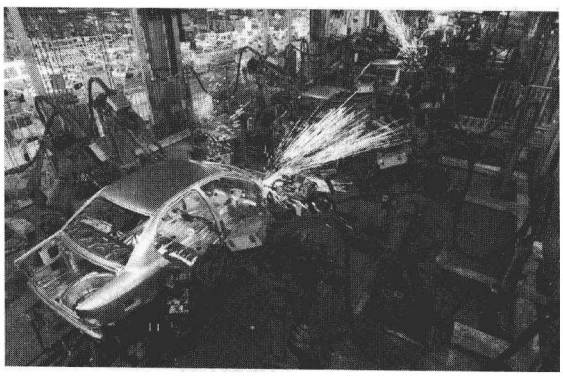

Figure 2-4 Robots installing chassis

Next, robots remove the windshield from a shipping container, apply a bead of urethane sealer to the perimeter of the glass, and then place it into the body windshield frame. Robots also pick seats and trim panels and transport them to the vehicle for the ease and efficiency of the assembly operator. After passing through this section the shell is given a water test to ensure the proper fit of door panels, glass, and weatherstripping. It is now ready to mate with the chassis.

Mate

The chassis assembly conveyor and the body shell conveyor meet at this stage of production. As the chassis passes the body conveyor the shell is robotically lifted from its conveyor fixtures and placed onto the car frame[8]. Assembly workers, some at ground level and some in work pits beneath the conveyor, bolt the car body to the frame. Once the mating takes place the automobile proceeds down the line to receive final trim components, battery, tires, anti-freeze, and gasoline.

The vehicle can now be started. From here it is driven to a checkpoint off the line, where its

engine is audited, its lights and horn checked, its tires balanced, and its charging system examined. Any defects discovered at this stage require that the car be taken to a central repair area, usually located near the end of the line. A crew of skilled trouble-shooters at this stage analyzes and repair all problems.

Quality Control

Once the component parts of the automobile begin to be assembled at the automotive factory, production control specialists can follow the progress of each embryonic automobile by means of its Vehicle Identification Number (VIN), assigned at the start of the production line. In many of the more advanced assembly plants a small radio frequency transponder is attached to the chassis and floor pan. This sending unit carries the VIN information and monitors its progress along the assembly process. Knowing what operations the vehicle has been through, where it is going, and when it should arrive at the next assembly station gives production management personnel the ability to electronically control the manufacturing sequence.

Formerly, quality control was seen as a final inspection process that sought to discover defects only after the vehicle was built. In contrast, today quality is seen as a process built right into the design of the vehicle as well as the assembly process[9]. Vehicle recalls are costly and manufacturers do everything possible to ensure the integrity of their product before it is shipped to the customer.

NEW WORDS

inaugurate	[i'nɔ:gjureit]	*vt.*	举行就职典礼，开辟
mass	[mæs]	*n.*	批量
interchangeable	[intə'tʃeindʒəb(ə)l]	*adj*	可交换的
render	['rendə]	*vt.*	致使
venture	['ventʃə]	*n.*	车间，工厂
stationary	['steiʃ(ə)nəri]	*adj.*	静止的
stand	[stænd]	*n.*	工位
conveyor	['kən'və]	*n.*	皮带运输机
strip	[strip]	*n.*	带子
vinyl	['vinil]	*n.*	乙烯基
petroleum	[pi'trəuliəm]	*n.*	汽油
fossil	['fɔsl]	*n.*	化石
fuel	[fjuəl]	*n.*	燃料
inception	[in'sepʃən]	*n.*	起初
parameter	[pə'ræmitə]	*n.*	参数
feasibility	[ˌfi:zə'bɪləti]	*n.*	可行性，可能性
supplier	[sə'plaiə]	*n.*	供应商
pillar	['pilə]	*n.*	柱
shell	[ʃel]	*n.*	轿体

bumper	['bʌmpə]	*n.*	缓冲器
paint	[peint]	*n.*	油漆
residual	[ri'zidjuəl]	*adj.*	剩余的，残留的
cranny	['kræni]	*n.*	裂缝，裂隙
container	[kən'teinə]	*n.*	集装箱
transponder	[træn'spɔndə(r)]	*n.*	异频雷达收发机
audit	['ɔ:dit]	*n.*	审计，稽核，查账

PHRASES

base on	根据
virgin steel	生铁
mass production assembly line	批量生产组装线
prior to	在……之前

NOTES

1. Its creation inaugurated what we know today as the mass production assembly line. This revolutionary idea was based on the concept of simply assembling interchangeable component parts.

这个创意开创了我们现在所知道的批量生产线，这个革命性创意是来自于可互换部件的简单装配的想法。

2. By the time the Model T was being developed Ford had decided to use multiple assembly stands with assemblers moving from stand to stand, each performing a specific function.

这时，福特正在研制 T 型车，他决定使用多工位装配线，每个装配线在工位间移动，各司其职。

3. In Detroit in 1913, he solved this problem by introducing the first moving assembly line, a conveyor that moved the vehicle past a stationary assembler.

1913 年在底特律，他通过引入第一移动装配线解决了这个问题，这种装配线是一种移动车辆通过固定装配器的传送带。

4. The automobile assembly plant represents only the final phase in the process of manufacturing an automobile, for it is here that the components supplied by more than 4 000 outside suppliers, including company-owned parts suppliers, are brought together for assembly, usually by truck or railroad.

汽车组装厂只代表了汽车生产的最后环节，配件是由外面超过 4 000 个供应商通过公路或铁路运输提供的，还包括公司自己的零件供应，在这里一起进行组装。

5. Because of the nature of these heavy component parts, articulating robots perform all of the lift and carry operations while assemblers using pneumatic wrenches bolt component pieces in place.

因为这些零件重量大，所以由关节机器人完成所有的起重与搬运工作，并用气动扳手组装元件。

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