



普通高等教育“十一五”国家级规划教材

高等职业教育规划教材

汽车专业英语

QICHE ZHUANYE YINGYU

边浩毅 主编

韩建保 [北京理工大学] 主审



人民交通出版社
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内 容 提 要

本教材主要内容包括四冲程发动机基础知识介绍、发动机构造认识、发动机燃油供给系认识、冷却系和润滑系认识、点火系和起动系认识、底盘构造认识、汽车检测设备认识、2ZZ-GE 发动机模拟器认识、汽车市场调查分析、进出口交易的一般流程、来人来电购车接待、汽车产品配置介绍、汽车保险办理、汽车维修接待、汽车产品售后服务及出国手续办理等,并在每个任务后提供了相关的习题。

本教材适合于高等职业技术学院汽车运用技术、汽车检测与维修、汽车技术服务与营销专业师生使用,也可作为汽车销售公司营销经理及中层领导干部的培训教材。

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前 言

高等职业教育的目标是培养面向生产、建设、服务、管理第一线的高技能人才。为了适应并推动高等职业教育的发展,落实教育部《关于以就业为导向深化高等职业教育改革的若干意见》(教高[2004]1号)及《关于全面提高高等职业教育教学质量的若干意见》(教高[2006]16号)精神,探索工学结合、任务驱动要求下的教学模式改革,我们组织了教学一线的优秀教师编写了此教材,2007年,人民交通出版社申报本教材为普通高等教育“十一五”国家级教材并顺利获得批准。本教材为高职教育汽车运用技术、汽车检测与维修、汽车技术服务与营销等相关专业的专业英语教材,也可供相关专业工程技术人员、营销人员阅读。

本教材由浙江交通职业技术学院边浩毅副教授担任主编,并负责编写其中的任务二、十、十一、十四、十五;浙江交通职业技术学院马林才副教授负责编写任务一、三、四、五、七、八;浙江交通职业技术学院孟亚娟讲师负责编写任务九、十三;浙江交通职业技术学院金初云讲师负责编写任务十六;杭州金丰丰田汽车销售有限公司钱前总经理负责编写任务六、十二。北京理工大学的韩建保教授作为本教材的主审,对全书进行了认真审阅,提出了许多宝贵的修改意见,在此,我们向韩教授表示衷心的感谢。

由于编写时间紧迫,经验不足,水平有限,缺点错误在所难免,恳请广大师生和读者批评指正。

编 者

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任务一 四冲程发动机基础知识介绍

学习目标

1. 掌握与发动机四个行程的工作过程、发动机分类相关的专业术语、词汇。
2. 能对发动机四个行程工作过程的相关内容进行中英文互译。
3. 能对相关内容进行阅读和翻译。
4. 能对汽车实物上英文单词或词汇进行辨认。
5. 正确完成课后练习。



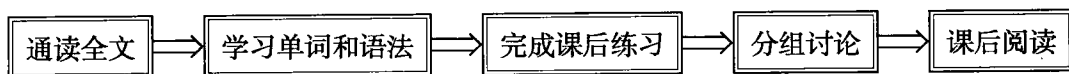
任务描述

以四冲程发动机为例，介绍发动机四个行程的工作过程、发动机分类等相关专业术语和词汇。通过这部分的学习，能阅读关于发动机工作过程的英文文章，并掌握简单的翻译技巧。



学习引导

本部分的学习可以采用以下顺序：



Task 1 Introduction to the Elementary Knowledge of the Four-stroke Engine

Internal Combustion Engine

The vehicle engine is a self-contained power unit which converts the heat energy of fuel into mechanical energy for moving the vehicle. ^[1] Because fuel is burned within the engine, it is known as an internal combustion engine. In the internal combustion engine, air/fuel mixture is introduced into a closed cylinder where it is compressed and then ignited. The burning



of the fuel causes a rapid rise in cylinder pressure which is converted to useful mechanical energy by the piston and crankshaft. The most common engine is the four-stroke engine. These four strokes are intake stroke, compression stroke, power stroke and exhaust stroke (shown as Fig. 1-1) .

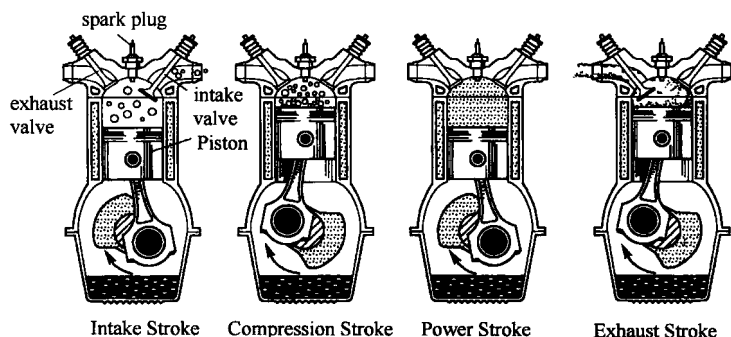


Fig. 1-1 The Four-strokes of Gasoline Engine

Intake Stroke

The intake stroke of a four-stroke engine begins with the piston at top dead center (TDC) . The starter causes the crankshaft to rotate in a clockwise direction. The crankshaft forces the piston to move downward through the connecting rod. This downward movement of the piston creates a vacuum, a pressure difference between TDC and bottom dead center (BDC) in the space above the piston. The engine manufacturer times the intake valve action so that it opens automatically at or slightly before the piston starts down. Therefore, a mixture of gasoline and air, pushed by the atmospheric pressure outside the engine, rushes through the intake manifold and into the engine cylinder. At the same time, the exhaust valve remains closed. This valve closure prevents the entering air/fuel charge from escaping through the exhaust port. After the piston reaches the bottom of its first stroke, the cylinder is practically full of an air/fuel charge. The drawing of an air/fuel charge into the cylinder in this manner, during the downward movement of the piston, constitutes the intake stroke of the piston. ^[2]

Compression Stroke

After the piston reaches bottom dead center, it moves upward again as the starter continues to turn the crankshaft in a clockwise direction. As the piston is beginning to move upward, the intake valve closes, and the exhaust valve remains closed. Since both valves are closed, the piston compresses the air/fuel mixture in the small space between the top of the piston and the cylinder head. As the piston reaches TDC again during its upward travel, the compression stroke of the piston is over. The air/fuel charge is now under compression so that it will produce a great deal of power when the spark plug ignites it.

Power Stroke

Just as or slightly before the piston reaches TDC on the compression stroke with the air/

fuel mixture fully compressed, a timed electrical spark appears at the spark plug. This spark ignites the compressed air/fuel mixture. The burning mixture begins to expand; the pressure in the combustion chamber above the piston immediately increases. This results in a high pressure applied to the top of the piston. Now, both valves remain closed during the power stroke. This assures that the total force of the expanding gas applies itself to the head of the piston. This tremendous force pushes the piston downward on the power stroke, causing the connecting rod to rotate the crankshaft. ^[3] In other words, the force resulting from the expansion of the burning air/fuel mixture is turning the crankshaft.

Exhaust Stroke

Near the end of the downward movement of the piston on the power stroke, the camshaft opens the exhaust valve, but the intake valve remains closed. Although much of the gas pressure has expended itself driving the piston downward, some pressure still remains when the exhaust valve opens. This remaining pressurized gas flows comparatively freely from the cylinder through the passage (port) opened by the exhaust valve. ^[4] Then, as the piston again moves up in the cylinder, it drives any remaining gases out of the cylinder past the open exhaust valve. As the piston travels through the TDC position and starts downward again in the cylinder, a new operating cycle begins. The four strokes are continuously repeated in every cylinder as long as the engine remains running.

Flywheel

The engine cycle has only one power stroke where the piston is actually driving the crankshaft. During the other three strokes, the rotating crankshaft is moving the piston up or down in its cylinder. Thus, during the power stroke, the crankshaft tends to speed up; during the other three strokes, it tends to slow down. To keep the crankshaft turning smoothly between two power strokes, a flywheel is attached to the end of the crankshaft. ^[5] This wheel resists any effort to change its speed of rotation. When the crankshaft tends to speed up or slow down, the flywheel inertia resists it.

Multiple-Cylinder Engines

The single-cylinder engine just described as above provides only one power stroke during every two crankshaft revolutions or delivers power only one-fourth of the time. To provide a more even and continuous flow of power, vehicles have engines with four, six, or eight cylinders.

Engine Classification

For identification purposes, manufacturers classify automobile engines by their cylinder arrangement, valve arrangement, and type of the system used to cool the engine. ^[6]

Engine manufacturers basically use three distinct ways to arrange the cylinders in an engine: in-line, V-shape, or opposed (shown as Fig. 1-2).

Automobile engines have their valves arranged in one of three ways. In an L-head engine, the valves are in the block, sitting side by side, adjacent to the cylinder. This engine



design was at one time very common, but because of its limited compression ratio, the usage now has been confined. The F-type engine has one valve in the cylinder head and one in the engine block. Modern automotive engines utilize the third type of valve arrangement, with both valves in the cylinder head.

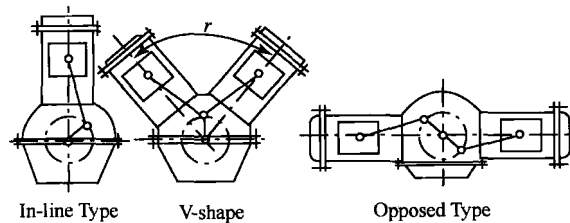


Fig. 1-2 Engine Arrangement

Manufacturers also classify engines as being either air-cooled or water-cooled (shown as Fig. 1-3). In these air-cooled engines, the cylinders are cooled by the air flowing around. A liquid-cooled engine uses a liquid coolant as the medium to remove heat from the engine. With this system, the engine has the water jackets in the block and head, which surround the cylinders and combustion chambers and through which coolant circulates freely.^[7] This coolant enters the engine from the bottom of the radiator and circulates throughout the engine, where it absorbs heat. Then it exits from the upper water jackets and pours into the upper portion of the radiator. As the coolant passes through the radiator, it picks up the heat contained in the coolant and passes this heat to the air flowing around the radiator passages or tubes. Thus, the coolant leaving the lower tank is cool ready to flow through the engine again.

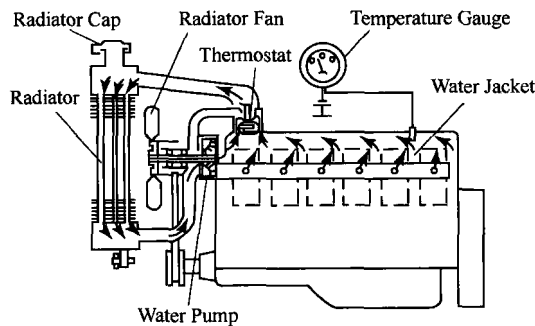


Fig. 1-3 Water-cooled Engine

Word List

- | | |
|----------------------------------|-------------------|
| 1. introduction[ɪntrə'dʌkʃ(ə)n] | n. 介绍, 导言, 绪论, 入门 |
| 2. unit['ju:nɪt] | n. 元件, 部件, 零件, 装置 |
| 3. vehicle['vɪ:ɪk(ə)l] | n. 车辆交通工具 |
| 4. engine['endʒɪn] | n. 发动机 |

5. cylinder['sɪlɪndə(r)]
6. combustion[kəm'bəʊstʃ(ə)n]
7. burn[bə:n]
8. convert[kən'veɪt]
9. piston['pɪst(ə)n]
10. crankshaft['kræŋkʃɑ:ft]
11. ignition[ɪg'niʃ(ə)n]
12. intake['ɪntek]
13. starter['stɑ:tə(r)]
14. clockwise['klɒkwaɪz]
15. movement['mu:vmənt]
16. vacuum['vækjuəm]
17. gasoline['gæsəli:n]
18. manifold['mænfəʊld]
19. stroke[strəʊk]
20. remain[ri'meɪn]
21. charge[tʃɑ:dʒ]
22. draw[drɔ:]
23. constitute['kɒnstɪtju:t]
24. compress[kəm'pres]
25. travel['træv(ə)l]
26. power['paʊə(r)]
27. ignite[ɪg'nait]
28. spark[spɑ:k]
29. revolution[revə'lu:ʃ(ə)n]
30. expand[ɪk'spænd]
31. expend[ɪk'spend]
32. passage['pæsiɪdʒ]
33. port[pɔ:t]
34. continuously[kən'tɪnjuəsli]
35. attach[ə'tætʃ]
36. resist[ri'zɪst]
37. inertia[ɪ'nə:ʃə]
38. even['i:v(ə)n]
39. automobile['ɔ:təməbrɪ:l]
40. arrange[ə'reɪndʒ]
41. flywheel['flaɪwɪ:l]
42. arrangement[ə'reɪndʒmənt]

- n.* 汽缸, 圆筒, 圆柱体
- n.* 燃烧
- vi. / vt.* 燃烧
- vt.* 使转变, 转换...
- n.* 活塞
- n.* 曲轴
- n.* 点火, 点燃
- n.* 进气, 入口, 进口
- n.* 起动机
- adj.* 顺时针方向的; *adv.* 顺时针方向地
- n.* 运动, 动作, 运转
- n.* 真空; *adj.* 真空的
- n.* 汽油
- n.* 进、排气歧管
- n.* 冲程, 行程
- vi.* 保持, 逗留, 剩余
- n.* 充气, 装料
- vt.* 吸引, 吸入
- vt.* 组成, 构成
- vt.* 压缩, 浓缩
- v.* 旅行, 传播, 行进
- n.* 能量, 动力
- v.* 点火, 点燃
- n.* 火花
- n.* 转数, 旋转一周
- vt.* 使膨胀, 详述, 扩张
- vt.* 消耗, 花费, 支出
- n.* 通道, 通路
- n.* 通道, 港口, 端口
- adv.* 不断地, 连续地
- vt.* 安装上, 系上, 贴上
- vt.* 抵抗, 反抗, 抗, 忍得住
- n.* 惯性, 惯量
- adj.* 平滑的, 偶数的, 平均的
- n.* 汽车
- v.* 排列, 安排
- n.* 飞轮
- n.* 排列, 安排



- | | |
|-----------------------------|---------------|
| 43. adjacent[ə'dʒeɪsənt] | adj. 邻近的, 接近的 |
| 44. coolant['ku:lənt] | n. 冷却液 |
| 45. medium['mi:diəm] | n. 媒体, 媒介, 介质 |
| 46. radiator['reɪdɪeɪtə(r)] | n. 散热器 |
| 47. tank[tæŋk] | n. 油箱 |
| 48. camshaft['kæmʃɑ:ft] | n. 凸轮轴 |

Proper Names

- | | |
|-------------------------------|-----------------|
| 1. self-contained | 自备的 |
| 2. internal combustion engine | 内燃机 |
| 3. heat energy | 热能 |
| 4. mechanical energy | 机械能 |
| 5. air/fuel mixture | 空气燃油混合物 (可燃混合气) |
| 6. intake stroke | 进气行程 |
| 7. compression stroke | 压缩行程 |
| 8. power stroke | 作功行程 |
| 9. exhaust stroke | 排气行程 |
| 10. top dead center (TDC) | 上止点 |
| 11. connecting rod | 连杆 |
| 12. intake valve | 进气门 |
| 13. atmospheric pressure | 大气压力 |
| 14. intake manifold | 进气歧管 |
| 15. exhaust valve | 排气门 |
| 16. bottom dead center (BDC) | 下止点 |
| 17. spark plug | 火花塞 |
| 18. combustion chamber | 燃烧室 |
| 19. compression ratio | 压缩比 |
| 20. cylinder head | 汽缸盖 |
| 21. engine block | 发动机汽缸体 |
| 22. water jacket | 水套 |

Useful Expressions

- | | |
|---------------------|---------|
| 1. so that | 所以, 因此 |
| 2. at the same time | 同时, 但是 |
| 3. because of | 因为 |
| 4. speed up | 加速 |
| 5. slow down | (使) 慢下来 |

6. result in
7. side by side

导致
并排，并肩

Key Vocabulary

1. expand

vt. 使膨胀，详述，扩张，扩大

The business has expanded from having one office to having twelve. 这个公司已从拥有一个分公司发展到拥有 12 个分公司了。

vi. 张开，发展

expand on 详述

expand to 扩大为

2. arrange

vt. 排列，整理

He arranged the books on the shelf. 他把书架上的书整理了一下。

vt. 安排，准备

We have arranged a party. 我们准备了一个晚会。

vi. 商定

Arranged with her to meet at 8. 和她商定 8 点钟见面。

arrange for 安排

Notes

[1] The vehicle engine is a self-contained power unit which converts the heat energy of fuel into mechanical energy for moving the vehicle.

翻译：车用发动机是一种自备动力型装置，该装置可将燃料的热能转换成机械能，用于推动车辆运动。

语法：which converts...引导定语从句。

[2] The drawing of an air/fuel charge into the cylinder in this manner, during the downward movement of the piston, constitutes the intake stroke of the piston.

翻译：在活塞向下运动时，可燃混合气以这种方式被吸入汽缸，该过程就是进气行程。

语法：during the downward movement of the piston 作时间状语从句。

[3] This tremendous force pushes the piston downward on the power stroke, causing the connecting rod to rotate the crankshaft.

翻译：在作功行程期间，巨大的气体压力推动着活塞向下运动，带动连杆转动曲轴。

语法：causing the connecting rod to rotate the crankshaft 是现在分词作结果状语从句。

[4] This remaining pressurized gas flows comparatively freely from the cylinder through the passage (port) opened by the exhaust valve.

翻译：剩余的被压缩气体从已被排气门开启的排气道中较为顺畅地排出。



[5] To keep the crankshaft turning smoothly between two power strokes, a flywheel is attached to the end of the crankshaft.

翻译：为了使曲轴在两个相邻的做功行程间平稳地转动，在曲轴的后端安装了飞轮。

[6] For identification purposes, manufacturers classify automobile engines by their cylinder arrangement, valve arrangement, and type of the system used to cool the engine.

翻译：为了便于识别，发动机制造商按汽缸排列、气门布置以及冷却系统的类型对发动机进行分类。

语法：for identification purposes 作目的状语。

[7] With this system, the engine has the water jackets in the block and head, which surround the cylinders and combustion chambers and through which coolant circulates freely.

翻译：在水冷式发动机上，发动机汽缸体和汽缸盖内均有水套，水套包围着汽缸和燃烧室，水套内部有自由循环流动的冷却液。

语法：which 引导的定语从句修饰 the water jackets。

Exercises

1. Choose the best answer from the following choices according to the text.

1) In the internal combustion engine, air/fuel mixture is introduced into a closed _____ where it is compressed and then ignited.

- A. tank B. spark C. cylinder D. flywheel

2) The air/fuel charge is now under _____ so that it will produce a great deal of power when the spark plug ignites it.

- A. compression B. inflation C. vacuum D. ignition

3) Thus, the coolant leaving the lower tank is _____ ready to flow through the engine again.

- A. hot B. cool C. cold D. warm

2. Translate the following into Chinese.

- | | | |
|-------------------------------|----------------------|-------------------------|
| 1) internal combustion engine | 2) vehicle | 3) power stroke |
| 4) exhaust valve | 5) gasoline | 6) liquid-cooled engine |
| 7) flywheel | 8) air-cooled engine | 9) crankshaft |

3. Translate the following into English.

- | | | |
|-----------|---------|---------|
| 1) 四冲程发动机 | 2) 进气行程 | 3) 排气行程 |
| 4) 燃烧室 | 5) 汽缸 | 6) 活塞 |
| 7) 可燃混合气 | 8) 火花塞 | 9) 连杆 |

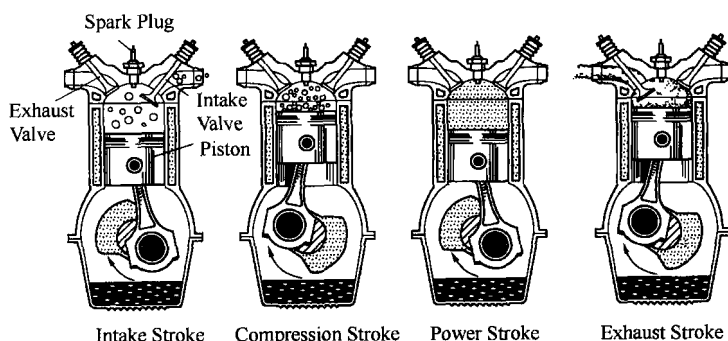
4. Translate the following sentences into Chinese.

1) In the internal combustion engine, air-fuel mixture is introduced into a closed cylinder where it is compressed and then ignited.

2) The intake stroke of a four-stroke engine begins with the piston at top dead center (TDC).

3) After the piston reaches bottom dead center (BDC), it moves upward again as the starter continues to turn the crankshaft in a clockwise direction.

5. Translate the words or phrases in the following figure into Chinese.



Practical Reading

2ZZ-GE ENGINE

Description

The 2ZZ-GE engine is an in-line, 4-cylinder, 1.8-liter, 16-valve DOHC engine.^[1] This engine meets the European STEP III regulations.

The VVTL-i system (Variable Valve Timing and Lift-intelligent) system, the DIS (Direct Ignition System), and an Air Injection system have been adopted on this engine in order to improve performance, fuel economy and reduce exhaust emissions.^[2]

Layout of Main Engine Components (Shown as Fig. 1-4)

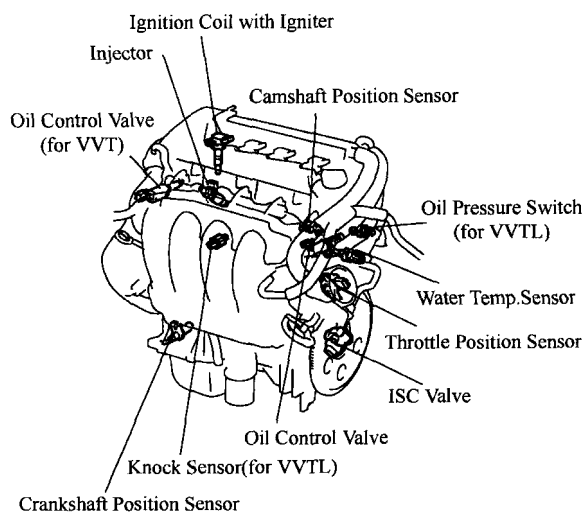


Fig. 1-4 Layout of Main Engine Components



Word List

- | | |
|-------------------------------|------------------------|
| 1. regulation[reɡju'leɪʃ(ə)n] | <i>n.</i> 规则, 规章 |
| 2. layout['leɪaʊt] | <i>n.</i> 设计, 布置, 版面安排 |
| 3. component[kəm'pəʊnənt] | <i>n.</i> 元件, 组件, 部件 |

Proper Names

engine component 发动机零部件

Notes

[1] The 2ZZ-GE engine is an in-line, 4-cylinder, 1.8-liter, 16-valve DOHC engine.

翻译: 2ZZ-GE 发动机是一款直列 4 缸、1.8L 排量、16 气门、双顶置凸轮轴发动机。

[2] The VVTL-i system (Variable Valve Timing and Lift-intelligent system), the DIS (Direct Ignition System), and an Air Injection system have been adopted on this engine in order to improve performance, fuel economy and reduce exhaust emissions.

翻译: 为提高发动机动力性、燃油经济性及降低废气排放, 本发动机采用了 VVTL-i (可变气门正时—智能气门升程系统)、DIS (直接点火系统) 和空气喷射系统。



学习资源

相关链接及网址

1. <http://65.201.178.38>
2. <http://www.a-car.com>

推荐书目

1. 王怡民. 汽车专业英语 [M]. 北京: 人民交通出版社, 2003.
2. 马林才. 汽车实用英语 (下) [M]. 北京: 人民交通出版社, 2005.
3. William K. Toboldt, & Larry Johnson. Automotive Encyclopedia [M]. South Holland, Illinois: The Goodheart-willcox Company, Inc. 1983.

任务二 发动机构造认识

学习目标

1. 掌握关于发动机构造相关的专业术语、单词和词汇。
2. 掌握发动机中零部件的固定表达方法。
3. 能对发动机上各大总成进行中英互译。
4. 能对与发动机构造相关的英文资料进行阅读和翻译。
5. 能对汽车实物上英文单词或词汇进行辨认。



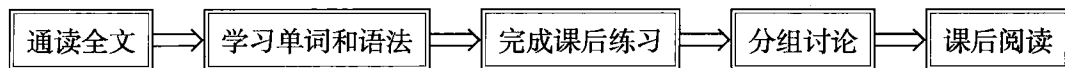
任务描述

以四冲程发动机为例，介绍发动机的构造，如汽缸体、汽缸盖、活塞、连杆、曲轴、配气机构以及飞轮等。通过这部分的学习，能阅读关于发动机构造及其零部件的英文文章，并掌握相应内容的翻译技巧。



学习引导

本部分的学习可以采用以下顺序：



Task 2 Engine Structure Understanding

Engine Block

The engine block forms the main framework, or foundation, of the engine (shown as Fig. 2-1).^[1] The block is cast mainly from gray iron or iron alloyed with other metals such as nickel or chromium. However, some blocks have been made from aluminum. In any case, the block itself has many components.

The cylinders are cast into the block. The cylinders are circular, tubelike openings in the block, which act as guides for the pistons as they move up and down. In aluminum blocks,