



高等职业教育规划教材

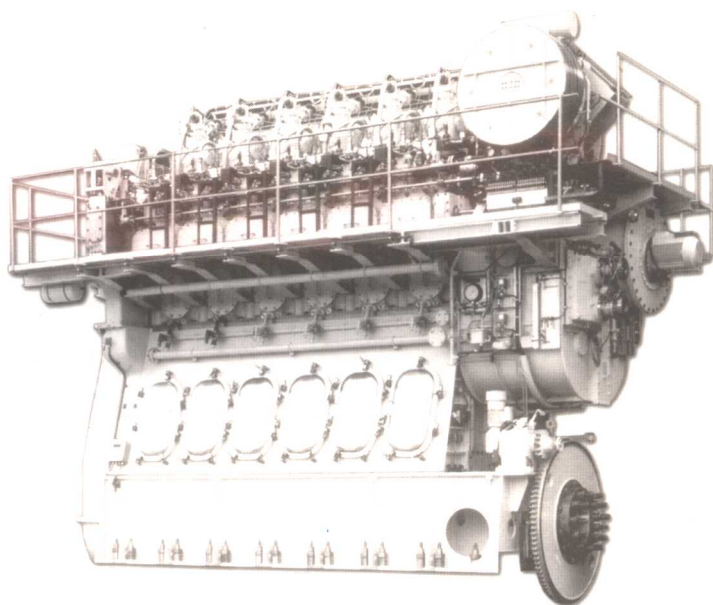
交通职业教育教学指导委员会推荐教材  
高等职业院校船舶技术类专业教学用书

# 船机专业英语

轮机工程技术（船舶动力机械与装置方向）专业

● 许宝森 主编 ● 吴中强 主审

Chuanji  
Zhuanye  
Yingyu



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## 内 容 提 要

本书是高等职业教育船舶技术类轮机工程技术(船舶动力机械与装置方向)专业交通职业教育教学指导委员会规划教材之一,按照《船机专业英语》教学大纲的要求而编写。

本书共有三部分内容:会话部分、阅读理解部分和专业英语写作部分。会话部分有15篇会话;阅读部分有25篇短文,均摘自专业英语书刊及工厂资料,内容涉及热工学、发动机、辅机、动力装置、管路系统、轮机自动化、劳埃德船级社规范等;专业英语写作部分有3篇短文,包括修理单、物料单和函电。

本书是针对三年制高等职业教育编写的,二年制的也可参考使用。同时,本书还适用于船员考证培训和船厂职工自学以及其他形式的职业教育。

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为深入贯彻《国务院关于大力发展职业教育的决定》，积极推进课程改革和教材建设，为职业教育教学和培训提供更加丰富、多样和实用的教材，更好地满足我国造船工业快速发展的需要，交通职业教育教学指导委员会航海类专业指导委员会委托交通职业教育研究会船舶技术专业委员会，联合组织全国开办有船舶技术类专业的职业院校及其骨干教师，编写了高等职业教育船舶工程技术专业、轮机工程技术（船舶动力机械与装置方向）专业和电气自动化技术（船舶电气方向）专业交通职业教育教学指导委员会规划教材。

本系列教材注重以就业为导向，以能力为本位，面向市场，面向社会，体现了职业教育的特色，满足了高素质的实用型、技能型船舶技术类专业高等职业人才培养的需要。本系列教材在组织编写过程中，形成了如下特色：

1. 认真总结了全国开办有船舶技术类专业的职业院校多年来的专业教学经验，并吸收了部分企业专家的意见，代表性强，适用性广；
2. 以职业岗位的需求为出发点，适当精简了教学内容，减少了理论描述，具有较强的针对性；
3. 教材编写时在每章前列出了知识目标和能力目标等学习目标要求，每章结尾处编制了大量思考与练习题，便于组织教学和学生学学习。

本系列教材是针对三年制高等职业教育编写的，二年制的也可参考使用。同时，本系列教材还适用于船员的考证培训和船厂职工的自学以及其他形式的职业教育。

《船机专业英语》是高等职业教育船舶技术类轮机工程技术（船舶动力机械与装置方向）专业交通职业教育教学指导委员会规划教材之一，按照《船机专业英语》教学大纲的要求和毕业生的从业岗位对英语能力的要求而编写。本书共有三部分内容：会话部分、阅读理解部分和专业英语写作部分。会话部分有15篇会话；阅读部分有25篇短文（其中，带“\*”为选学课文），均摘自专业英语书刊及工厂资料，内容涉及热工学、发动机、辅机、动力装置、管路系统、轮机自动化、劳埃德船级社规范等；专业英语写作部分有3篇短文，包括修理单、物料单和函电。旨在培养一定的专业英语会话能力、阅读与翻译专业书刊资料的能力和专业英语写作的能力。

参加本书编写工作的有：主编渤海船舶职业学院许宝森（编写第二部分），参编江苏海事职业技术学院吴雪花（编写第一、三部分）。

本书由武汉交通职业学院吴中强担任主审，在此表示感谢！

限于编者经历和水平，教材内容难以覆盖全国各地的实际情况，希望各教学单位在积极选用和推广本系列教材的同时，注重总结经验，及时提出修改意见和建议，以便再版修订时改正。

交通职业教育教学指导委员会航海类专业指导委员会

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## PART ONE CONVERSATIONS

### *Learning objectives*

#### **Objectives of the specific knowledge:**

Be familiar with the topics about the main engine, its engine parts and various systems, auxiliary machinery, installation and trials, repairs, ordering stores and spare parts, introduction of shipyard and so on.

#### **Objectives of the language competency:**

1. Be able to start a conversation and end a conversation properly;
2. Be able to properly conduct such speech acts as apologizing, thanking, invitation, request, compliment, complaining, giving different opinions and so on, so that we can communicate with native speakers correctly;
3. Be familiar with the key words, useful phrases and background knowledge in the topics;
4. Be able to read the passages correctly and work with your partners or group members in order to solve the problems.







## Lesson 1 Showing the Main Engine

The most important equipment on board is the main engine. It provides the ship with the driving power. It usually consists of cylinders, pistons, crankshafts, main bearings, connecting rods, cooling system, starting system, lubricating system and operating system. Now some students are visiting the engine room of MV “Dong Fang” and the Chief Engineer is showing them around the Main Engine.

C/E: Chief Engineer

S: Student

### Dialogue 1 General Introduction

S: How big the engine room is!

C/E: Yes. It is about 3-storey high. It contains a large number of equipment. It is the heart of the ship.

S: What's that giant machine?

C/E: It is the main engine. Our main engine has a capacity of over 12,000 horse power. It was made in Germany.

S: What kind of machine is it?

C/E: It is a two-stroke low speed diesel engine. It consists of six cylinders.

S: What parts does it comprise?

C/E: It comprises cylinder cover, cylinder block, frame, scavenging air box, bedplate, crankcase and so on.

S: Can you tell us how it works?

C/E: It's a complicate question. Anyway, I'll make it easier. The burning of fuel in the cylinder adds heat to the air charge in the cylinder, and causes it to expand. The expansion of air pushes the piston to do work on the crankshaft. And the crankshaft in turn drives the ship's propeller.

S: Thank you for your introduction.

C/E: You are welcome.

### Dialogue 2 Mountings on the Cylinder Cover

*Now students come down and are closer to the main engine.*





S: What's this? Mr. Chief?

C/E: This is the cylinder cover.

S: There are a lot of valves and pipes on it, aren't there?

C/E: Yes. The central one is the exhaust valve. The exhaust gas comes out from the main engine and enters the scavenging air trunk

S: What are these valves then?

C/E: They are fuel valves which are used to inject the fine spray of fuel into the cylinder at the right moment and in a suitable condition for combustion. Also there are cooling water inlet valves and outlet valves on the cylinder cover.

S: What are these pipes?

C/E: These are cooling water pipes.

S: I think the temperature in the cylinder must be very high.

C/E: Yes. That's why we have to apply cooling system to circulate the cooling liquid around the internal passages.

### Dialogue 3 Scavenging

S: Can you tell us what type of machine is this engine?

C/E: It is a type of internal combustion engine like the gasoline engine.

S: What do you mean by "internal combustion engine"?

C/E: It means that the fuel is injected into the hot high pressure air in a combustion chamber and then ignited. The burning of the fuel causes the air to expand and the piston is pushed down. It provides the ship with the driving power.

S: How can we charge the needed fresh air into the cylinder?

C/E: A charge of fresh air is drawn or pumped into the engine cylinder. But we usually have turbo-blowers to charge more air into the cylinder.

S: Why?

C/E: More air is charged into the cylinder, thus increasing the density of air. And more fuel will be burnt in the cylinder and we can obtain higher output.

S: How can we achieve that?

C/E: The exhaust gas from the main engine drives the turbines of the turbo-blower, and more air will be drawn into the cylinder. Usually air is cooled and pressurized to increase the density of the air charge.

S: Just now you mentioned the exhaust gas. How does it exhaust from the main engine?

C/E: We have three modes of scavenging: cross flow, uniflow and loop scavenging according to the arrangement of the scavenging valves or ports. Different mode of scavenging has its respective advantages and disadvantages.



## Dialogue 4 Introducing the Engine Control Room

C/E: Let me briefly introduce the Control Room equipment. This ship is a so-called MO ship. The main engine can be operated from three places: the bridge, here, in the Control Room, and operated locally.

S: What situations require the main engine to be operated from bridge or locally?

C/E: We usually operate the main engine from the bridge while at sea. We have to operate locally when the remote-control system breaks down. But special skills are required for that. We check and practice local operation before entering and leaving port. Will you be trained soon?

S: Yes, but I'm not sure about the schedule.

C/E: The main engine is a Hitachi B & W 8S80MCE. Its CSO is 18,071 kilowatts at 69.7 rpms. The diameter of the cylinders is 800 mm, and the piston stroke is 2,592 mm.

S: That's huge! A cylinder is big enough for an adult to work inside it.

C/E: Exactly. We can go and see a cylinder when we are changing an exhaust valve.

S: I'm looking forward to that.

C/E: The main engine and most auxiliary machines are operated and turned on and off here in the Control Room. We can check their condition, too.

S: Do you mean that no one needs to stay in the engine room?

C/E: Not exactly. As I said before, we use the MO system, so we don't need to check it while at sea. All of the engine room members engage in maintenance work. The engineer and the oiler assigned to an MO watch have to check and maintain the main engine and the equipment in the engine room. Whenever the MO system alarm rings, they have to respond to it.

### New Words

- |                             |             |
|-----------------------------|-------------|
| 1. drive [draiv]            | vi. 驱动      |
| 2. cylinder ['silində]      | n. 气缸       |
| 3. crankshaft [kræŋkʃɑ:ft]  | n. 曲轴       |
| 4. lubricate ['lu:brikeit]  | v. 润滑, 加润滑油 |
| 5. giant ['dʒaiənt]         | adj. 巨大的    |
| 6. capacity [kə'pæsiti]     | n. 容量, 功率   |
| 7. storey ['stɔ:ri]         | n. 楼层       |
| 8. complicate ['kɒmplikeit] | adj. 复杂的    |
| 9. expansion [iks'pænfən]   | n. 膨胀       |
| 10. mounting ['mauntiŋ]     | n. 附件       |
| 11. circulate ['sɜ:kjuleit] | v. 循环       |
| 12. reservoir ['rezəvwa:]   | n. 容器, 水库   |





- |                                |             |
|--------------------------------|-------------|
| 13. density [ 'densiti ]       | n. 密度       |
| 14. achieve [ ə 'tʃi:v ]       | v. 获得       |
| 15. turbine [ 'tə:bin, -bain ] | n. 涡轮, 叶片   |
| 16. mention [ 'menʃən ]        | n. 提及       |
| 17. scavenging [ 'skævindʒɪŋ ] | n. 扫气, 净化   |
| 18. assign [ ə 'sain ]         | v. 下达任务, 分配 |

### *Phrases and Expressions*

- |                                      |        |
|--------------------------------------|--------|
| 1. main engine                       | 主机     |
| 2. horse power                       | 马力     |
| 3. consist of                        | 由…… 组成 |
| 4. cylinder jacket                   | 气缸套    |
| 5. exhaust gas                       | 废气     |
| 6. internal passages                 | 内部通道   |
| 7. turbo-blower                      | 涡轮鼓风机  |
| 8. uniflow                           | 直流扫气   |
| 9. cross flow                        | 横流扫气   |
| 10. loop scavenging                  | 回流扫气   |
| 11. MO (man in machinery space zero) | 无人机舱   |
| 12. CSO (Continuous Service Output)  | 连续服务功率 |

### *Exercises*

1. Answer the following questions according to the dialogues:
  - 1) What kind of machine is the main engine?
  - 2) What is the working principle of a marine diesel engine?
  - 3) How do we get the driving power?
  - 4) What are the major parts of a main engine?
  - 5) What are the necessary systems for the operation of the main engine?
  - 6) What are there on the cylinder covers?
  - 7) What is the major meaning of internal combustion engine?
  - 8) How can we charge more air into the cylinder?
  - 9) Why do we usually cool the charge air?
  - 10) What role does the turbo-blower play?
  - 11) What are the three modes of scavenging?
  - 12) Can you tell us what are the advantages and disadvantages of each mode of scavenging after you acquire the specific knowledge?



13) What do you understand a MO ship?

14) When do we have to operate the main engine locally?

15) What do the engineers and motormen who are assigned to the UMS watch do during the watch?

2. Reading practice:

A two-stroke cycle is completed in two strokes of the piston, or one revolution of the engine, and begins with the piston coming up from the bottom of its stroke. The two strokes of the cycle are: the compression stroke and the expansion stroke, while a four-stroke cycle takes place in four strokes of the engine piston, or two revolutions of the engine. The four strokes of the cycle are: the suction stroke, the compression stroke, the expansion stroke, and the exhaust stroke. Among these strokes, the suction and expansion are the downward strokes. It means that in these strokes the piston moves downwards, while compression and exhaust are upward strokes. But it is only the expansion stroke that provides the power to drive the ship.

3. Group discussion:

The main engine.





## Lesson 2 Showing the Auxiliary Machinery

Auxiliary machinery does not only include the machineries in the Engine room rather than the main engine, but also includes some deck machinery. It comprises generators, boilers, fresh water generators, refrigerating plant, pumps, valves and also winches, windlass, capstan, and hydraulic hatch covers. Auxiliary machinery is indispensable for the operation of a ship. Now the students are talking about the boiler in the engine room.

C/E: Chief Engineer

S: Student

### Dialogue 1 Boilers

S: What's this, Mr. Chief? What is it used for on board your ship?

C/E: This is a boiler. It is used to provide steam for auxiliaries.

S: Can you make it more detailed?

C/E: All right. We have fire-tube boilers and water-tube boilers. Water-tube boilers are used to provide steam for main propulsion. Fire-tube boilers are used for auxiliary purposes. In addition, we have exhaust gas boiler. It is used to recover the heat carried in the exhaust gas from the M/E.

S: If we are in port, the main engine is stopped, where can we get steam?

C/E: You are a professional. A good question! We use an oil-firing boiler to provide steam.

S: You engineers are very skillful in dealing with these machines.

### Dialogue 2 Oil Separators

S: What's this? It looks like a bowl.

C/E: It's an oil separator.

S: What is its function?

C/E: It is used to separate water and solid impurities from fuel oil.

S: Why do we have to do so?

C/E: Water in the oil may cause emulsion and break up the oil. Solid impurities may act as abrasives and have much to do with the wear of the engine. So they require treatment before use.

S: How can water and impurities be separated out?

C/E: This oil separator is of the centrifugal type. It is the most widely used type. The centrifugal separators make use of the principle that different substances are subject to different



centrifugal force. Purifier is used to separate oil and water, and clarifier to remove the solid impurities together with small amount of water.

S: How do oil and water move in this bowl?

C/E: When the separator operates, the high moving water and impurities as a result of its higher density will move to the periphery of the bowl, and oil, because of its lower density, flows inwards and rises to the oil collecting space.

S: What are these?

C/E: This is the water outlet, and that is the oil outlet. When a clarifier is employed, only one oil outlet is needed.

S: Thank you for your explanation.

### Dialogue 3 Pumps

*Students see a lot of pumps in the E/R. They are very curious about them.*

S: Is this a pump?

C/E: Yes, it is. This is a sea water pump. It is used to draw water from the sea to the fresh water generator.

S: How many types of pumps are there?

C/E: There are mainly two categories: positive displacement pump and centrifugal pump.

S: What do you mean by "positive displacement pump"?

C/E: When working, the chamber volume of this kind of pump alternately increased to draw the liquid in and alternately decreased to the force the liquid out into the delivery pipe.

S: Can you give us some examples that are of positive displacement pumps?

C/E: All right. According to its working characteristics, it can also be further divided into reciprocating pump and rotary pump. With the former one, we have piston or plunger pumps. With the latter one, we have vane, screw, gear pumps.

S: Mr. Chief. Just now you said there was a pump called centrifugal pump. Can you say something about it?

C/E: Sure. The high rotating impeller does work on the liquid. It throws the liquid by centrifugal force from the center to the periphery of the impeller and discharges it through the delivery outlet.

S: What pump belongs to centrifugal pump?

C/E: The axial flow, volute, mixed flow pump belongs to this group.

S: Why do we sometimes say centrifugal pumps are very popular?

C/E: Because they are simple in construction and can produce smooth, constant, non-pulsating discharge. Most cooling water pumps, ballast pumps and fire pumps are of this type.

S: Thank you very much for telling us.





## New Words

- |                                   |                  |
|-----------------------------------|------------------|
| 1. generator [ˈdʒenəreɪtə]        | n. 发电机           |
| 2. winch [wɪntʃ]                  | n. 起货机           |
| 3. windlass [ˈwɪndləs]            | n. 起锚机           |
| 4. capstan [ˈkæpstən]             | n. 绞盘机           |
| 5. hydraulic [haɪˈdrɔːlɪk]        | adj. 液压的, 水力的    |
| 6. hatch [hætʃ]                   | n. 舱口,           |
| 7. indispensable [ˌɪndɪsˈpensəbl] | adj. 不可缺少的       |
| 8. recover [rɪˈkʌvə]              | v. 重新获得, 回收      |
| 9. professional [prəˈfeʃənəl]     | adj. 专业的         |
| 10. bowl [bəʊl]                   | n. 碗, 碗状物        |
| 11. impurity [ɪmˈpjʊəriti]        | n. 杂质            |
| 12. emulsion [ɪˈmʌlʃən]           | n. 乳化            |
| 13. abrasive [əˈbreɪsɪv]          | adj., n. 研磨的, 磨料 |
| 14. wear [weə]                    | v. 磨损, 用旧        |
| 15. centrifugal [senˈtrɪfʊɡəl]    | adj. 离心的         |
| 16. periphery [pəˈrɪfəri]         | n. 边缘            |
| 17. curious [ˈkjʊəriəs]           | adj. 好奇的         |
| 18. alternately [ɔːlˈtəːnətɪvli]  | adv. 交替地, 另外地    |
| 19. plunger [ˈplʌndʒə]            | n. 柱塞            |

## Phrases and Expressions

- |                               |       |
|-------------------------------|-------|
| 1. auxiliary machinery        | 辅机    |
| 2. deck machinery             | 甲板机械  |
| 3. fresh water generator      | 淡水造水机 |
| 4. fire-tube boiler           | 火管锅炉  |
| 5. water-tube boiler          | 水管锅炉  |
| 6. exhaust gas boiler         | 废气锅炉  |
| 7. oil separator              | 分油机   |
| 8. positive displacement pump | 容积泵   |
| 9. reciprocating pump         | 往复泵   |
| 10. rotary pump               | 回转泵   |





### *Exercises*

1. Discuss with your partners and try to answer the following questions orally according to the dialogues:

- 1) What machines belong to auxiliary machinery?
- 2) What is the use of a boiler on board?
- 3) What are the differences between a fire-tube boiler and a water-tube boiler?
- 4) What is an exhaust gas boiler?
- 5) What is an oil separator used for?
- 6) What is a purifier and what is a clarifier?
- 7) What are the differences between a clarifier and a purifier?
- 8) What are pumps classified into?
- 9) What is a positive displacement pump?
- 10) What is a centrifugal pump?
- 11) Why are centrifugal pumps popular?
- 12) What does a vane pump belong to?

2. Reading practice:

A pump is a machine used to raise liquids from a low point to high point. The pumping action can be achieved in various ways according to the type of the pump employed. A piping system will consist of suction piping, a pump and discharge piping. The system is arranged to provide a positive pressure at some point and discharge the liquid. The pump provides the energy to develop the pressure and overcome any losses in the system.

Usually there are many kinds of pumps, such as displacement, rotary, reciprocating, centrifugal, axial flow, gear, impeller, injector pumps and so on. But pumps for marine use are mainly three classes: reciprocating, rotary and centrifugal pumps.

3. Discuss the following topic with your group members and select one leader to present your ideas:

Auxiliary machinery.

