

土木建筑 系列英语

中国建筑工业出版社

第三级 道路与桥梁



English
Series
in Architecture
and Civil Engineering

土木建筑系列英语

English Series in Architecture
and Civil Engineering

第三级 道路与桥梁

中国建筑工业出版社

土 木 建 筑 系 列 英 语
English Series in Architecture
and Civil Engineering

第三级 道路与桥梁

李棣萼 主编

•
中国建筑工业出版社出版(北京西郊百万庄)
新华书店北京发行所发行 各地新华书店经售
中国建筑工业出版社印刷厂印刷(北京阜外南礼士路)

•
开本: 850×1168 毫米 1/32 印张: 10 $\frac{1}{2}$ 字数: 393 千字

1989年3月第一版 1989年3月第一次印刷

印数: 1—6,430册 定价: 7.30元

ISBN 7—112—00391—1/H·9

统一书号: 15040·5530

《土木建筑系列英语》编审委员会

主任委员：杨匡汉

委员：（以姓氏笔划为序）

王庆昌 史中庸

李伯珣 李棣萼

孙 典 陈伯初

陈素英 张新国

赵明瑜 贺善镛

顾惠民 薛 戈

《土木建筑系列英语》 第三级 道路与桥梁

审 稿 者：杨匡汉 赵长伟（主审）

贺善镛 顾惠民

责任编辑：张新国

致读者

土木建筑行业是我国社会主义经济的重要支柱之一。土木建筑行业职工素质如何,对这个行业发展关系极大。全国土木建筑行业职工约2000万人,其中工程技术人员和管理人员约300万人。随着对外开放的不断扩大,我国同世界各国之间的人员往来、学术交流、信息传播、经济活动以及工程承包等业务日益频繁,土木建筑行业不同领域不同层次的读者,尤其是中青年知识分子,学习和进修英语的要求越来越迫切。奉献在读者面前的《土木建筑系列英语》读本,正是为满足这样的需要而编撰的。

《土木建筑系列英语》是一套结合土木建筑类各专业的英语分级读本,整个系列按文章难度分为四级。第一、二级,不分专业,内容为土木建筑方面的浅显易懂的科学普及文章,第三级暂分八个专业,即:建筑学与城市规划、工业与民用建筑、给水与排水、供热与通风、道路与桥梁、工程机械、管理工程、计算机与自动化,每个专业一册,其他专业视情况再行编撰;内容为各有关专业一般性的科学普及或科学技术文章。第四级内容选收专业性较强的科学技术文章;目前暂出版建筑学与城市规划及工业与民用建筑专业各一册,其他专业留待以后考虑。

我们在组织和编撰《土木建筑系列英语》时,力求使这套读本具有自己的特点。

首先,起点低。这套系列读本的起点为1000个单词。凡初中毕业或具有同等英语程度的读者,都可以从第一级开始自修或听课。这就大大地拓宽读者面,使土木建筑行业多数人员有条件有兴趣利用这套读本来学习英语。

其次，便于自学。编撰的四级读本尽量保持一个较为平缓的“坡度”，全部课文均附参考译文，每个练习都有答案，争取使读者在普通英语的“浅基础”上，一步一步地学会阅读专业英语。通过学习第一、二级读本，可以掌握土建类科技英语最常用的2500个单词以及阅读科技英语书刊和有关资料所必需的基本语法知识。继之，通过学习第三级读本，可以累计掌握本专业最常用的3500个单词和比较系统的英语构词法知识，获得阅读本专业英语书刊和有关资料的能力。最后，通过学习第四级读本，可以累计掌握本专业4500个单词和比较全面的英译汉知识；这样，比较流利地阅读和翻译本专业英语书刊和有关资料，就有了比较牢固的语言基础。

这套系列英语读本第一、二级均配有录音磁带，由英、美文教专家朗诵，口音纯正，声质清晰，语调自然，使读者听来亲切、生动。

第三，适应性强。各级英语读本既彼此衔接，又相对独立，可以适应各种不同程度的读者的需要。一般读者如果从第一级学起，循序渐近，持之以恒，每周自修或听课3~4小时，经过一年半左右，便可学完前三级读本，为阅读本专业英语书刊和有关资料创造条件。有意深造的读者，再用半年左右，攻读第四级读本，就可以达到比较流利地阅读和翻译本专业英语书刊和有关资料的目的。对于英语基础较好的读者，如高等院校高年级学生，可把第一、二级读本作为泛读教材，第三、四级读本作为精读教材来学。对于硕士研究生或具有同等英语程度的工程技术人员，则可直接阅读第三、四级读本；在掌握英语构词法和英译汉技巧方面，这两级读本对他们会有所帮助。而广播电视大学、函大、夜大、职大、业大及有关中等专业学校的学生，也可依照自己的水平和需要，选学有关读本。

第四，语言规范可靠。这套系列读本的全部课文，均选自近年来面世的英语国家的出版物。但为了适应系统地学习英语的需要，编撰者对不少课文作了必要的删改和加工；而在删改和加工之后，均

送各校聘请的英、美文教专家审阅，使之保持规范的科普或科技文体的现代英语的特点。全部练习均由编撰者按统一要求编写，目的在于帮助读者更好地掌握课文中重要的语言材料。全部参考译文均由有关专业教师一一校阅，术语比较准确，行文比较通达。

本书是在研究道路与桥梁专业英语教学，以及为市政工程技术人员进行英语教学的基础上选材、编写的。所选内容，除一般道路与桥梁概述、分类、设计要点外，还有现代道路与桥梁设计、施工技术涉及的一些课题，诸如美学原则、照明、交通安全、换乘、车辆停驻、立交工程及国外有关道路与桥梁现代化研究等，基本上包括道路与桥梁设计、施工技术各个方面、各种文体及比较广泛的专业基础词汇。可供道路与桥梁专业的学生及市政工程技术人員阅读。

本书编写时，力求从不同角度重复、深化所选内容，以使读者掌握较多的词汇和一定的阅读技巧。如道路公路概述之后出现现代化公路建设，再渐次出现各种道路的设计及施工等。如安全问题选了设计与车速安全、现代化公路设计与安全、车行道设计与安全等。

本书练习形式大多以阅读能力的培养为依据，如构词练习，除与具体课文密切结合外，更注意到了随着构词知识的逐渐深入、扩大，使读者通过练习能基本掌握英语构词法而有助于在阅读过程中分析、记忆词汇。在构词练习及一些同义词、反义词练习中，要求译成汉语部分，答案中未注出，使读者养成推敲词意及查阅词典的习惯，以培养独立阅读能力。

本书所选课文及阅读材料的语言难度基本一致，但阅读材料的内容均与已出现的材料有关。所以读者在使用本书时，必须以课文为主精心细读，再做各项练习。确实掌握所学内容后再读阅读材料。阅读材料应先通读，必要时再查阅词汇表重读。参考译文及练习答案只是学习的辅助手段，故切勿对读、对答。

《土木建筑系列英语》读本是集集体智慧的结晶。十几所建筑工程和土木工程高等院校的五十多位英语教师和专业教师参加了编撰、

审订工作，其中某些分册还聘请校外的有关专家过目。哈尔滨建筑工程学院、重庆建筑工程学院、北京建筑工程学院、沈阳建筑工程学院、吉林建筑工程学院、南京建筑工程学院、山东建筑工程学院、西北建筑工程学院、苏州城市建设环境保护学院和河北建筑工程学院等，都对编撰、审订工作表示关怀和支持。各学院聘请的十多位英、美文教专家也提出过宝贵的意见。对此，我们表示深切的谢意。

目前，尚未见到紧密结合本学科、本专业编撰的系列英语分级读本，我们只是做了初步的尝试。万事开头难。尽管编撰、审订人员做了大量的细致的工作，但这套《土木建筑系列英语》读本还不是尽善尽美，毫无瑕疵的。我们期待着读者和同行们的批评和指正。

《土木建筑系列英语》编审委员会
中国建筑工业出版社编辑部

1987年8月

Contents

Lesson 1	The story of a Bridge Across the Firth of Tay (I) ...	1
	Reading Material: The story of a Bridge Across the Firth of Tay (II)	6
Lesson 2	The Great Bridges of Scotland (I)	8
	Reading Material: The Great Bridges of Scotland (II).....	13
Lesson 3	Roads and Highways	15
	Reading Material: Return of the Turnpikes	20
Lesson 4	Building Modern Roads.....	23
	Reading Material: Safety on Highways	28
Lesson 5	The History of Bridge	31
	Reading Material: Iron and Steel Bridge	37
Lesson 6	Bridge Structure	40
	Reading Material: Notable Bridges.....	45
Lesson 7	Speed Limits.....	49
	Reading Material: Road Safety	54
Lesson 8	Primitive Suspension Bridges in Western China ...	57
	Reading Material: The Art of Bridge Building.....	62
Lesson 9	Roadbuilding (I)	65
	Reading Material: Roadbuilding (II)	70
Lesson 10	Materials in Construction of Bridges	73
	Reading Material: Erection of Bridge	78
Lesson 11	Carriageway Construction	81
	Reading Material: Road Safety	87
Lesson 12	Lighting and Crash Barriers on Roads	90
	Reading Material: Information Given to the Driver	95
Lesson 13	Development of Bridge	98

Reading Material: Chinese Arch Bridges	104
Lesson 14 Choice of Bridge Type	107
Reading Material: The Three Types of Bridges	114
Lesson 15 T-beam Bridge	117
Reading Material: Balanced Cantilever Bridges	122
Lesson 16 Bow String Girder Bridge	126
Reading Material: Cable Stayed Bridges	132
Lesson 17 Movable Bridges	136
Reading Material: Aesthetics of Bridge Design	142
Lesson 18 Pre-tensioning	146
Reading Material: Pre-tensioned Prestressed Concrete Bridges	151
Lesson 19 Precautions to Be Observed by the Prestressed Concrete Bridge Engineer	154
Reading Material: Maintenance	160
Lesson 20 Shallow Foundations	164
Reading Material: Subsoil Exploration	169
Lesson 21 Edwards	173
Reading Material: John Loudon Macadam	179
Lesson 22 Specifications	182
Reading Material: Subsurface Explorations	187
Lesson 23 Future Developments in Highway Transportation...	190
Reading Material: Site Examination	197
Lesson 24 Uses of Aerial Surveys	200
Reading Material: Soil Stabilization	206
Lesson 25 Mechanical Stabilization	209
Reading Material: Usage of Lime and Lime-Fly Ash ...	215
Lesson 26 Flexible Pavement	218
Reading Material: Reinforcement in Concrete Road Slabs...	223
Lesson 27 Highway Speed, Delay and Volume Studies ...	226
Reading Material: Road Development and Organized Highway Research in the United States ...	233
Lesson 28 Parking	236
Reading Material: Accessibility and Congestion	241

Lesson 29 The Economics of Road Improvement	244
Reading Material: Park-and-Walk Park-and-Ride	249
Lesson 30 Interchanges (I).....	252
Reading Material: Interchanges (II)	258
Appendix I Key to the Exercises	261
Appendix II Translation for Reference	271
Appendix III Vocabulary.....	299
Appendix IV Phrases and Expressions	317

Lesson 1

The Story of a Bridge Across the Firth of Tay (I)

In the 1860s some of the Scotch engineers began to think very seriously about a bridge across the Firth of Tay. An engineer prepared a plan. 'There will be no problems,' he said, 'in spite of the great distance.' The Caledonian Railway company fought the plan—successfully at first, for its supporters persuaded the government to refuse approval.

But at last in 1870 the plan was approved, and eight years later the great new bridge, two miles long, was opened. The British people were very proud of the Tay Bridge. It had eighty-five spans and it was the longest bridge—of any kind—in the world. Once again the British had shown that their engineers were the best! But there were some British engineers who were worried about the Tay Bridge. They were doubtful about its strength. Right in the middle of the bridge^① the twelve great iron posts which supported the central spans rose a hundred feet above the water. The people of Perth had demanded this height, so that ocean-going ships could reach their port. But the westerly winds blew straight down the firth, and there was nothing between the mountains and bridge to break their force.

One Scottish engineer, John Fowler, thought that the Tay Bridge was not strong enough to stand up against the immense force of these winds. In fact he refused to allow any member of his family to travel across it.

John Fowler's fears were proved correct. On 28 December 1879 a great storm burst over Scotland. It was one of the worst storms of the century. The wind blew with such force that people could hardly stand up against it.² Trees were blown down. Roofs were torn off. Ships went hurriedly to port. It was on wild nights like these that travellers from Edinburgh to Dundee were thankful for the wonderful new bridge³. They could cross the stormy firth smoothly and safely in the warm comfort of a railway carriage—instead of rolling miserably in a cold and smelly ship.

But on this particular night at about seven o'clock—nobody knows the exact moment—the wind blew away every single one of the thirteen central spans of the bridge. It also tore away the twelve posts which supported them. In a few seconds it destroyed more than half a mile of the great bridge which had taken eight years to build. And in the darkness and noise of the storm nobody saw or heard it happen.

At seven-fifteen the mail train from Edinburgh reached the signal box at the southern end of the bridge. The train slowed down, as it always did, to three miles an hour, and the signalman climbed down onto the line to give the usual message to the engine driver. 'It is safe to cross the bridge,' he said. 'The signalman at the other end of the bridge is expecting you.' The engine driver waved goodbye. The train gathered speed and moved onto the single track of the bridge. The signalman climbed back into his box. He watched the red tail lamps of the last carriage grow smaller and smaller. Then suddenly he saw far out in the firth, a burst of light. It seemed to come from the sky like a falling star. After that darkness, complete darkness.⁴ The mail train from Edinburgh with its seventy-five passengers had disappeared for ever beneath the waves of the Firth of Tay.

New Words

- | | |
|--|--|
| <p>1. firth [fɜ:θ] Scot. = frith [friθ] <i>n.</i>
海湾, 海口, 河口</p> <p>2. Caledonian [ˌkæli'dəʊniən] <i>a.</i>
苏格兰的, 苏格兰人的〔地〕, 加里东的
<i>n.</i> 苏格兰人(古)</p> <p>3. approval [ə'pru:vəl] <i>n.</i> 赞成, 同意; 批准, 认可</p> <p>4. approve [ə'pru:v] <i>v.</i> 批准, 认可; 赞成</p> <p>5. westerly ['westəli] <i>a.</i> 从西面来的(风), 西风</p> <p>6. burst [bɜ:st] (burst; burst) <i>v.</i>
爆发出, 突然出现</p> <p>7. tear [teə] (tore [tɔ:] torn[tɔ:n])
<i>v.</i> 扯掉; 撕裂</p> <p>8. hurriedly ['hʌridli] <i>ad.</i> 慌忙地</p> <p>9. carriage ['kærɪdʒ] <i>n.</i> (火车)客
车车厢; (四轮)马车</p> <p>10. miserably ['mɪzəəbli] <i>ad.</i></p> | <p>不幸地, 可怜地</p> <p>11. smelly ['smeli] <i>a.</i> 有臭味的, 发臭的</p> <p>12. mail [meɪl] <i>n.</i> 邮政, 邮袋
mail train 邮(政列)车</p> <p>13. signalman ['signlmæn] <i>n.</i> 信
号手, 信号员</p> <p>14. beneath [bi'ni:θ] <i>prep.</i> 在……
之下
Firth of Tay 泰依湾
Perth [pɜ:θ] <i>n.</i> 珀斯
Scottish ['skɒtɪʃ] <i>a. n.</i> = Scotch
苏格兰(人、语)的
Edinburgh ['edɪnbərə] <i>n.</i> 爱丁
堡(英国城市)
Dundee [dan'di:, 'dandi:] <i>n.</i> 丹
地(苏格兰东部一海港)
John Fowler [dʒɒn 'faʊlə] 约
翰·福勒</p> |
|--|--|

Phrases and Expressions

- | | |
|---|--|
| <p>1. in spite of 不管</p> <p>2. be doubtful about 疑心, 怀疑</p> | <p>3. blow down 吹倒</p> <p>4. tear off 扯掉</p> |
|---|--|

Notes

- ① Right in the middle of the bridge ...
right 为副词, 意为“正好”“恰好”。

- ② The wind blew with such force that people could hardly stand up against it.
such force 后面 that 引导结果从句。
- ③ It was on wild nights like these that travellers from Edinburgh to Dundee were thankful for the wonderful new bridge.
此句为强调句，强调句子的状语成分 on wild nights.
- ④ After that darkness, complete darkness.
这句是一个单部句，只具有句子的主要成分(主语和谓语)中之———主语。
这种句子在描绘或叙述性文章中是常有的。

Exercises

I. Are these statements true or false according to the text ?

- 1) The Tay Bridge was opened in 1878.
- 2) It was a long bridge with 85 spans.
- 3) Nobody but John Fowler was doubtful about the strength of the bridge.
- 4) There was something between the mountains and the bridge to resist the force of strong winds.
- 5) A Scottish engineer thought that the Tay Bridge was not strong enough to resist the great wind force.
- 6) One year after the Tay Bridge was opened a great storm burst over Scotland.
- 7) The wind blew away thirteen central spans of the bridge, but the twelve posts supporting them were still standing there.

II. Translate the following phrases and expressions

- | | |
|-------------------------------|------------|
| 1) fight the plan | 6) 尽管，不顾 |
| 2) to refuse approval | 7) 以……而自豪 |
| 3) two miles long | 8) 再一次 |
| 4) right in the middle of ... | 9) 为……担忧 |
| 5) to break a force | 10) 代替，而不是 |

III. Choose the appropriate word to fill the blanks.

- 1) The people of Perth had demanded this height so that ocean-going ships _____ (reached, could reach) their port.
- 2) If Tay Bridge had been strong enough to resist the immense force of the winds, John Fowler _____ (have allowed, would have allowed) his

family members to travel across it.

- 3) Without this wonderful new bridge travellers from Edinburgh to Dundee _____ (could not cross, could not have crossed) the stormy firth smoothly and safely.
- 4) If the builders had taken special measures, the great bridge _____ (have not been destroyed, would not have been destroyed).

IV. Change the form of the words.

- 1) Write out the adverb form of the following adjectives.
serious, smooth, safe, absolute, certain, easy, essential, full
- 2) Write out the adjectives of the following verbs.
thank, wonder, doubt, use, care, help, harm
- 3) Write out the comparative and superlative degrees of the following adjectives.
long, good, bad, great, strong, warm, terrible, cheap, light, big

V. The suffix *-ly* when added to word often gives the meaning of "having the quality of" or "in the manner of". The suffix *-er* forms nouns and gives the meaning "one who denotes; that which produces; that which receives, and also the thing contained".

Decide which suffix (*-ly* or *-er*) goes with each word below, add the suffix and turn the words into Chinese:

engine, wester, contain, travel, smell, support, hurried, successful, build, clear

Reading Material

The Story of a Bridge Across the Firth of Tay (II)

Engineers all over the world took warning from the terrible lesson of the Tay Bridge accident. For the engineer who built the bridge admitted afterwards that he had taken no special measures to protect the bridge against exceptional wind pressures. He died a year later—of a broken heart.

John Fowler, of course, could have said, 'I told you so!' But the lessons which he learned from the destruction of the Tay Bridge had very important results indeed. For John Fowler helped to build what is still one of the greatest bridges in the world,^① the Forth Railway Bridge.

Fowler and his fellow engineers were determined that their bridge should be absolutely safe. So before they began to build it, they carried out tests of all kinds. They built small scale bridges in their workshops to find out the best way to guard against great wind pressures. They tested the wind pressures in the firth day after day for two years. And they discovered that in big storms the pressures sometimes rose to more than forty pounds to a square foot. Tests—carried out after the accident—had shown that the Tay Bridge was not really safe when the wind pressure passed the thirty pounds mark.^②

'The Tay Bridge,' said John Fowler, 'would not have fallen if the posts of the central spans had sloped. They should have looked like a man standing with his legs apart!' And that is how the three immense towers of the Forth Railway Bridge are built. They are 120 feet wide at the base and only 22 feet wide at the top. They and the spans between them are strong enough to stand up against a wind pressure of fifty-six pounds to the square