

# 实用电力英语丛书

Practical English Series  
in Electric Power

主 编 景志华 孙 石

## 发电分册

Power Generation



中国电力出版社

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## 内 容 提 要

为满足电力国际交流和对外合作的需要,特组织专家编写了《实用电力英语丛书》,分为《发电分册》、《输配电分册》、《供用电分册》、《电力经济与管理分册》四册。本丛书内容简洁实用,旨在从读、写、译等三方面提高在职技术人员和工人的英语阅读、翻译和日常电力应用文的写作能力。本丛书特点为:①根据电力实际需要进行分册,便于相关专业人员按需选择,针对性较强;②收录的文章均选自英语原文资料,文后附有译文、翻译技巧、注释和应用练习;③为了增强实用性,还专门设计了求职信、(商业)信函、产品说明、标书、合同等一系列应用极广的实用文写作实例和练习。

《发电分册》是本丛书之一,它主要包括国外文献中与发电方面有关的文章,如燃煤电厂、水电站、核电站与电站设计、电厂建设与运行、锅炉、汽轮机、燃气轮机、发电机、锅炉和汽机控制、电厂化学和环境保护等内容。

本丛书可供电力系统从事发电、输配电、用电及电力经济的技术人员及管理人员的在职培训和继续教育之用,也可作为他们日常自学教材,并可作为各大中专院校的专业教材。

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# 前言

我国加入 WTO 后, 中外合作的机会越来越多, 尤其是随着我国电力事业突飞猛进地发展, 对实用电力英语的需求更加迫切。因此, 我们特组织专家编写了《实用电力英语丛书》。

本丛书根据电力实际情况, 分为《发电分册》、《输配电分册》、《供用电分册》、《电力经济与管理分册》四册。本丛书内容简洁实用, 着重从读、写、译等三方面提高在职技术人员和工人的阅读、翻译和日常电力应用文的写作能力。在本书编写过程中, 为给读者提供原汁原味的英文, 编者翻阅了大量国外资料, 从中选取与各专业相关的短文, 以期给读者看到地道的英文表述方式。本丛书每一分册均分为十个单元, 每一单元都设有阅读理解、翻译技巧、应用练习三部分, 并在每一单元后给出本单元短文译文和练习答案。为了增强实用性, 本书给出短文注释和实用短语, 并在应用练习中设计了求职信、(商业) 信函、产品说明、标书、合同等一系列实用极广的应用文写作的框架与实例, 便于大家快速掌握写作技巧, 并熟练应用。另外, 本丛书文后还列出了一些重点词汇的词性、词义和出处, 便于大家查阅。

《发电分册》是本丛书之一, 它主要包括国外文献中与发

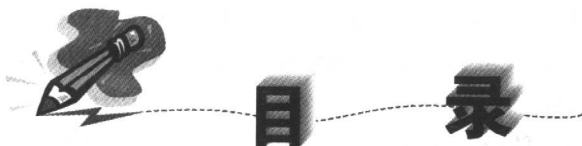
电方面有关的文章,如燃煤电厂、水电站、核电站与电站设计、电厂建设与运行、锅炉、汽轮机、燃气轮机、发电机、锅炉和汽机控制、电厂化学和环境保护等内容。

《发电分册》由景志华、孙石主编。景志华编写了翻译部分。孙石编写了1单元、3~7单元的正文部分及5~7单元的写作部分。杨晓菊编写了2、8单元。曾燕编写了9、10单元。孙立春编写了1~4单元、8~10单元的写作部分。由于翻译技巧部分有一定的通用性,故本套丛书翻译技巧部分的讲解内容大致相同,并由景志华编写。本套丛书均由张春江教授主审。

由于本丛书是一次新的尝试,对一些专用术语的理解恐有不妥及疏漏之处,衷心希望广大读者批评指正,请读者在使用过程中将意见反馈给我们,以便及时进行修改。

**编 者**

2004年1月



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# Unit One

## Coal-Fired Power Plants

### Part I Reading Comprehension



*In this part, you will read two passages. The purpose of this part is to increase your reading ability. After each passage, you will find some useful expressions. Try to remember these phrases which can add up your English vocabulary of electric power. Now begin your reading.*

#### Passage A

#### Introduction to Coal-Fired Power Plants (1)

Coal-fired plants make up slightly over one-half of the electric power generation in the United States and in most other parts of the world.

Coals are generally classified by geological age, beginning with **peat**, then lignite, **subbituminous**, 泥煤/次烟煤  
**bituminous**, **semianthracite**, and **anthracite**. 烟煤/半无烟

The percentage of oxygen and **volatile** matter are 煤/无烟煤/  
greatest in peat and lignite, and decrease through 挥发份  
subbituminous, to the lowest percentage in anthracite.  
Conversely, the percentage of fixed carbon is greatest  
in anthracite and decreases through the bituminous  
grades to the lowest percentage in lignite and peat.

Coal is usually **hauled** from the mines to the 拖运、运输  
power plant by railroad. In some cases the coal may



be shipped partly by river **barge** or ocean ship. If 驳船  
shipped by rail, each rail car will contain up to 100  
tons, which will fuel a 220 MW plant at full load for  
approximately one hour<sup>①</sup>.

Coal is usually prepared for **shipment** in one of 运输  
several ways, such as by reducing the lump size to  
a maximum of approximately 1.25 inches. At the  
plant site, the coal is further crushed to approxi-  
mately a 3/4 inch maximum. In some cases the coal  
is washed at the mine site to reduce **pyrites** and 黄铁矿  
**sulphur**. 硫

Rail cars may be unloaded at the plant, either  
by opening doors at the bottom of the cars,  
dumping into a hopper, or the cars may be turned  
upside-down in a rotary **trunnion** over the **hopper**. In 耳轴、轴颈  
some cases a mechanical shaking device must be / 仓  
applied to the car to facilitate the removal of coal  
from the bottom hopper doors<sup>②</sup>. In colder climates  
**thawing** facilities must be provided if the coal is 使融化、解  
frozen in the cars. 冻

From the unloading hopper the coal is conveyed  
by moving inclined rubber belts mounted on steel-  
frame galleries to a crusher tower and to the storage  
yard or to the **elevated** coal **bunkers**, or **silos**, above 高架/煤斗  
the **pulverizer** mills. / 煤仓/磨煤

Deciding on the location of the plant site also 机  
requires a comprehensive engineering study<sup>③</sup>. The  
site should be large enough for sufficient coal  
storage and should be **accessible** to coal delivery. It 可进出的



should also be suitable for **condenser** cooling water, 凝汽器 either from river, or water body, or by cooling towers.

The plant should be supplied with an elevated coal bunker above each pulverizer mill, each sized for several hours of storage. Coal will flow by gravity to the coal feeders at each mill. A pulverizer mill has a grinding capacity of up to 60 tons of coal per hour. An extra or spare mill is usually supplied with each boiler unit.

Coal “**grindability**” is an important factor in 可磨性 selecting coal for a plant, and also for selecting and sizing pulverizer mills.

Steam generators designed to burn coal must be “**tailored**” for the specific coal analysis<sup>④</sup>. The 定做的、定 amount of ash and the analysis of the ash are very 制的 important. The softening temperature of the ash determines its tendency to **slag** (deposit on metal 结渣 surfaces). Softening temperatures of 2600 F or above are more suitable for “**dry-bottom**” **furnaces** in 固态排渣/ which the large ash particles drop to the bottom of 炉膛 the furnace in a solid form (approximately 15% ~ 20% of the total ash) and the smaller particles are carried out in the combustion gases in dry form called “fly-ash” (approximately 80% ~ 85%)<sup>⑤</sup>. Coals with ash-softening temperatures of less than 2500 F may be more suitable for “**wet-bottom**” 液态排渣 furnaces or “**cyclone**” furnaces. The chemical 旋风 composition of the ash is also very important. The



corrosive qualities of the ash have caused boiler designers and operators many problems.

The suitable coals are usually selected by the utility company. However, the suitable coals may be more expensive and may require greater hauling distance. In most cases all local coal available in the required quantities should be used even if some coal qualities are objectionable<sup>①</sup>.

The boiler designer can, to some extent, **compensate** for undesirable coal qualities. The geometry 补偿 of the furnace and the size and **placement** of coal 布置 burners should be such as to prevent flame **impingement** on furnace walls<sup>②</sup>. **Superheater** tubes 冲击/过热 near the top of the furnace section should be at a 器 suitable distance above the **topmost** coal burners. 最顶端的/ Superheater and **reheater** tube sections should have 再热器 adequate free spacing for gas passage so that slag will not be trapped between the tubes.

### Notes to Passage A

- ① If shipped by rail, each rail car will contain up to 100 tons, which will fuel a 220 MW plant at full load for approximately one hour.

本句中 fuel 为动词,词义为“提供燃料、加燃料”。

全句译为:如果采用铁路运输煤,每节车厢可装 100t 煤。每节车厢的煤可供一个 220MW 的电厂在满负荷情况下运行大约一个小时。

- ② In some cases a mechanical shaking device must be applied to the car to facilitate the removal of coal from the



bottom hopper doors.

本句中 shaking device 指振动装置, facilitate 词义为“促进、帮助、便于”, bottom hopper doors 译为“底部仓门”。

全句译为:有些时候,需要为车厢配备机械振动装置以帮助从底部仓门处卸煤。

- ③ Deciding on the location of the plant site also requires a comprehensive engineering study.

本句的谓语动词是 requires, 前面的动名词短语为主语。

全句译为:确定电厂的位置也需要对工程进行全面研究。

- ④ Steam generators designed to burn coal must be “tailored” for the specific coal analysis.

句中 tailored 的原形为 tailor, 原意是“缝制、裁剪”。这里的含义是“根据需要加工定做”, 比喻制造锅炉和人定做衣服一样, 要根据具体需要来制作。

全句译为:设计燃煤的锅炉必须要根据特定的煤质分析来定做。

- ⑤ Softening temperatures of 2600F or above are more suitable for “dry-bottom” furnaces in which the large ash particles drop to the bottom of the furnace in a solid form (approximately 15% ~20% of the total ash) and the smaller particles are carried out in the combustion gases in dry form called “fly-ash” (approximately 80% ~85%).

本句的主语是 Softening temperatures, 在翻译时增加一个字“煤”。谓语是 are suitable. furnaces 后面是由 in which 引导出的非常长的修饰固态排渣炉特点的定语从句。尽管这是一个限定性定语从句, 但因句子结构过长, 在翻译时不能把定语从句放在被修饰词的前面, 而是放在后面, 把从句译成并列句。

全句译为:软化温度在 2600 华氏度或以上的煤种很适合



于固态排渣炉。在这种炉中,大的灰粒以固态形式落到炉膛的底部(这部分占总灰份的 15% ~20%),而那些小灰粒在燃烧烟气中以固态形式被带走,这部分灰份被称为飞灰(约占总灰份的 80% ~85%)。

- ⑥ In most cases all local coal available in the required quantities should be used even if some coal qualities are objectionable.

该句中 qualities 是 quality 的复数形式。quality 的通常含义是“质量、品质”,但在这里的含义是“参数、参量”。

全句译为:在大多数情况下,即使煤的一些参数令人不够满意,也应该使用当地提供的满足需要量的煤。

- ⑦ The geometry of the furnace and the size and placement of coal burners should be such as to prevent flame impingement on furnace walls.

本句中 such as 不是一个词组,such 是指示代词,作表语,as 是关系代词,引导一个定语从句,从句中使用了省略形式,省略了句中的谓语“are selected”,后面的不定式短语是目的状语。全句译为:炉膛的几何形状、大小以及燃烧器的布置应该保证避免火焰冲击炉墙。

### Useful Expressions

1) coal-fired plants	燃煤电厂
2) fixed carbon	固定碳
3) full load	满负荷
4) mechanical shaking device	机械振动装置
5) pulverizer	磨煤机
6) condenser	凝汽器
7) cooling tower	冷却塔
8) coal feeder	给煤机

9) softening temperature	软化温度
10) dry – bottom	固态排渣
11) wet – bottom	液态排渣
12) combustion gases	烟气
13) cyclone furnace	旋风炉
14) utility company	公用事业(电厂常使用该词组表示)
15) furnace wall	炉墙
16) thermal power plant	火电厂
17) main plant building	主厂房
18) installed capacity	装机容量
19) pulverizing system	制粉系统
20) coal – conveying system	输煤系统

**Passage B****Introduction to Coal-Fired Power Plants (2)**

The generous application of *soot blowers* will 灰/吹灰器 help to remove the *fouling* of slag, which inevitably 污垢 will occur. Soot blowers consist of jets of high-pressure air or steam, which is intended *literally* to 严格地 blow the molten slag off the tubes and wall surfaces.

After the combustion gases pass through all the heat transfer surfaces, they must be passed through dust *precipitators*, and then possibly through 除尘器 “*scrubbers*” to remove sulphur compounds before the 清洁剂 gas is discharged into the atmosphere. The *dust*





**collector** consists of **electrostatically** charged plates or 除尘器/有  
wires installed in a large **boxlike** structure. 静电地/箱

Waste disposal is a major concern in coal-fired 子状的  
generating plants. Coal fly ash must be collected in  
electrostatic precipitators. Fly ash is ash that is  
carried in the combustion gases. Heavier ash will fall  
to the bottom of the boiler furnace, where it is  
collected in a hopper. Facilities must be provided to  
remove the dry fly ash from the precipitator hoppers,  
and the bottom ash from the boiler bottom hopper.

The fly ash is usually removed by **pneumatic conveyors** 气动的/运  
to a storage silo system, from which it may be 送装置  
trucked away<sup>①</sup>. In many cases the dry ash may be  
used in concrete construction. The boiler bottom ash  
may be water sluiced to a storage area, or the  
**dewatering** facility, from which it may be **trucked** to a 脱水/用卡  
**landfill** area<sup>②</sup>. 车运/填坑

Steam turbines for power generation have grown  
significantly in size in the last 30 years. At the  
present time the maximum capability that can be  
developed on a single **shaft** (**tandem-compound**) is 轴/串联  
approximately 1,100,000kw. This is achieved by  
using three double-flow exhaust sections, each with  
maximum length last-row blades, a separate casing  
for the reheated steam intermediate-pressure section,  
and a separate casing for the high-pressure steam<sup>③</sup>.  
**Cross-compound** (two shafts) turbine units have been 并联  
employed occasionally to achieve greater capability  
and higher efficiency. Maximum capabilities have