火力发电厂专业英语

——Modern Power Plant Engineering

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PREFACE（前言）

电力生产是当代先进科学技术应用最为广泛的一个行业，电力生产的从业人员迫切需要学习和掌握国际上的先进技术和经验，从而需要有扎实的外语（尤其是英语）阅读和理解基本功底。为此编著了《火力发电厂专业英语——Modern Power Plant Engineering》一书。

在本书的编写过程中，笔者试图做到：

（1）内容应有较宽的涉及面。火力发电是一个庞大的系统工程，每一个系统既有独立性，相互间又有联系；系统有大有小，有繁有简；有反映计算机先进技术的控制系统，也有代表环保趋势的烟气脱硫系统；既有与工质有关的汽水系统，又有与燃料有关的燃烧系统；每一个系统中的每一个设备按其作用和地位的不同，还有主要设备和辅助设备之分。为此在原文取舍方面，虽然不能做到包含火电厂生产过程的全部内容，但在篇幅允许的范围内，尽量选取火电厂生产过程的主要内容，以便掌握较多的专业词汇以及它们的用法。

（2）内容不要过深过难。火力发电生产过程专业性很强，概念较多，但鉴于专业英语的读者大都具有一定的专业基础知识和专业知识，本书力图通过以英语介绍火力发电厂的生产过程，引出基本的、常用的专业英语词汇，而不是拘泥于以英语进行理论推导、公式证明或分析计算，从而达

到易于理解、易于记忆的目的。

（3）内容要有助于教学。一方面原文的语言现象规范，易于阅读和理解能力的提高，专业词汇使用准确；另一方面在每一章中，词汇选取量较大，并且结合专业、结合原文内容给出相应的中文翻译，尽量符合电力行业的规范；有重点地选择一些关键词汇进行中英文对照解释；对原文中的难句、长句和复合句进行分析并给出参考翻译。

在本书的编写过程中，施义贵同志对书稿进行了认真的审校，笔者在此表示诚挚的感谢。尽管笔者在编写过程中尽了最大的努力，但由于个人水平有限，书中难免有疏漏和不足之处，敬请提出宝贵意见。

笔　者

于南京

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1 MODERN ELECTRIC GENERATING STATIONS

1.1 How Power Is Generated

Virtually all the electric power in the United States today is generated by one of the methods depicted schematically in Fig. 1.1. Approximately 90% of the electric power are generated by what is called the thermal-mechanical generation concept. In this concept, heat energy is converted into mechanical energy which powers an electric generator. Most of these power plants use the Rankine[1] cycle for conversion of heat energy to mechanical power.

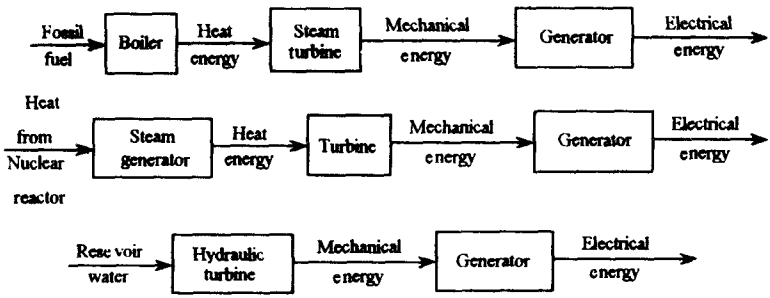


Figure 1.1 Modern methods of electric energy production

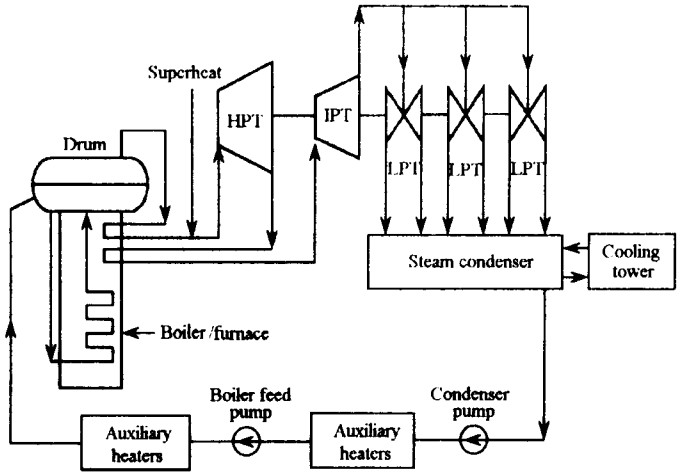
Fossil-fuel plants represent the most common application of

the thermal-mechanical concept. Coal, gas, or a petroleum fraction is mixed with air and injected into a boiler where combustion takes place. In most plants, heat from combustion is used to convert water to steam. This steam, in turn, flows through large pipes to a multistage turbine. In some plants fired by petroleum or gas, the combustion products flow directly to the turbine. As the steam or hot gas passes through the turbine, energy is extracted from the vapor to run the turbine. The turbine is mechanically connected to the generator, and it drives or rotates the generator, allowing the production of electrical energy.

1.2 Steam Power Plants

The most widely used fossil systems burn coal or a heavy petroleum fraction to supply the thermal energy, and employ a steam turbine to power the electric generator. A typical heat cycle for a modern coal plant utilizing the Rankine cycle is shown schematically in Fig. 1.2.

Coal has been, and for at the next decade or so will continue to be, the largest source of fuel for electrical generating stations in the United States. As early as 1925, coal generated 57% of this country's electrical power. Coal generated an average of 52% of the electrical power during the period from 1925 to 1970. Utilities burn about 65% of all the coal mined in the United States. In 1985 it is projected that coal will



Key:

HPT = high-pressure turbine

LPT = low-pressure turbine

IPT = intermediate-pressure turbine

Figure 1.2 Heat cycle for a coal-fired boiler

generate approximately 47% of the electrical power, and 875 million tons of coal will be consumed.

U. S. policy is to move away from the use of petroleum for electric power generation. This de-emphasis on petroleum use for electric power generation will take years to have a substantial effect. Power generation by petroleum dropped slightly in 1974-1975 as a result of the original oil embargo, but in 1976 the use of petroleum rose to an all-time high of 556 million barrels for the generation of 320 billion kilowatt-hours. It has