实用电力英语丛书

Practical English Series in Electric Power

水力发电分册

Power Supply and Utility

景志华
罗南华 主编
孙 石

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》、《水力发电分册》五册。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。

《水力发电分册》是本丛书之一，它主要包括国外文献中水力发电方面的文章，如电力生产简介、水文学、大坝、调压井和压力钢管、闸门与阀门、水电站、水轮机及辅助设备、水轮发电机及电气设备、抽水蓄能电站、潮汐电站等内容。

本丛书可供电力系统从事发电、输配电、供用电、电力经济及水力发电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》。

本丛书根据电力行业实际情况，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》、《水力发电分册》五册。本丛书内容简洁实用，着重从读、写、译等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、合同等一系列实用性极广的应用文写作的框架与范例，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。

《水力发电分册》是本丛书之一，它主要包括国外文献中

水力发电方面的文章，如电力生产简介、水文学、大坝、调压井和压力钢管、闸门与阀门、水电站、水轮机及辅助设备、水轮发电机及电气设备、抽水蓄能电站、潮汐电站等内容。

《水力发电分册》由长春工程学院教师编写。景志华、罗南华和孙石担任主编，其中景志华编写了全书的翻译部分及练习并负责统稿，罗南华负责全部阅读课文选材、编写了第2、3、7单元课文注释和课文翻译并编写了生词表，孙石负责全部课文译文校对并编写了第4、5、6单元课文注释和课文翻译。另外，杨晓菊编写了第1、8、9、10单元课文注释和课文翻译，孙立春编写了第1、2、3、4单元的写作部分及练习，迟宇峰编写了第5、6、7、8单元的写作部分及练习，于贺编写了第9、10单元的写作部分及练习。

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

目 录

Unit One

Power Industry

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 Power Generation

1. Pattern of demand

The ***demand*** for power fluctuates from minute to minute, day to day, season to season. To study the ***pattern***, the graph of load against time is plotted which is called a load curve.

需求量（负荷）

曲线

Figure 1.1 shows the load curve of a system for a particular day. Generally, the peak demand is expected between mid-morning to noon and then in the evening, with a nighttime low demand from, say midnight to early morning. The ***magnitude*** of the peaks and valleys depends upon the nature of the load connected, patterns of activities of the concerned population, the climate, etc. Generally, the demand at the

数量

weekends is less than the demand on weekdays. In colder countries, the winter demand is much more than the summer demand. If a curve is drawn of load ***expressed*** as percentage of maximum load against time, the basic shape of the curve does not change and then it forms a useful basis for comparison for different days in the system itself or for comparison with other systems[①]. Figure 1.2 shows a weekly load curve of network.

表示

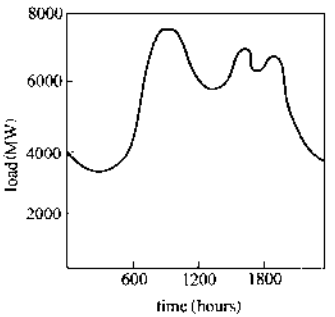

Fig. 1.1 Daily load curve

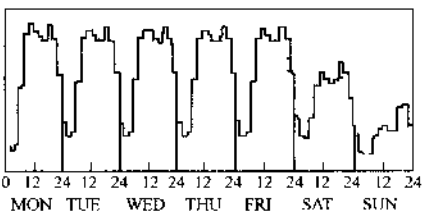

Fig. 1.2 Weekly operation of a power grid

The load ***duration*** curve (Figure 1.3) is the curve of load vs. the duration of the load equal to or above that particular value. This curve can be constructed from the load curve itself.

持续时间

The areas under the load curve and the load duration curve will be the same as they represent the total energy generated during the period. If we draw load duration curves for different quarters of a year, they may be as follows (Figure 1.4).

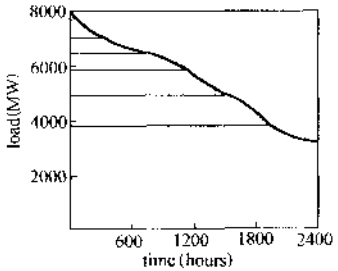

Fig. 1.3 Load duration curve

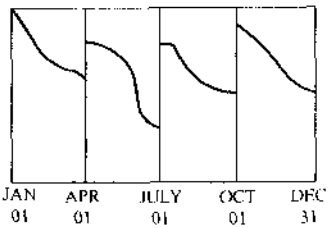

Fig. 1.4 Quarterly load duration curve

From the load curves, it is seen that the minimum demand may be 50% to 80% the maximum demand in a day. This proportion may be 30% to 50% over a period of one year. The problem of providing for daily or yearly maximum loads is one of the most important problems which the power generating industry has to deal with. To meet the daily peak would require generating plants to be kept ready for operation for a short period everyday and the heaviest yearly peaks may require some plants to operate for only a few hours or few days out of the whole year and ***expenditure*** on such plants, though ***essential***, earns very little ***revenue***[2]. It has, therefore, been the policy of electricity supply authorities throughout the world to encourage in all possible ways a leveling up of their system load curves in order to achieve more uniform and, therefore more economical, loading of the plant[3]. On the

花费/必需的
收入

commercial side, this problem has been tackled by selling power at a special low tariff for off-peak periods, and charging higher rates for peak power, resulting in the non-essential demand such as storage heating using high ***consumption*** domestic ***appliances*** etc, being shifted to off-peak periods[4]. In spite of these measures, variations still remain but with reduced magnitude.

商业的 消费 用具

2. *Categorization* of power stations

分类

To meet the varying power demands, different categories of power stations have to be provided to three categories: base load plants, medium load plants and peak load plants.

Base load plants must be very efficient plants with a low cost of power generation, though they may need heavy capital investment, which is economically ***justifiable***[5]. These plants have to run continuously and therefore, there is very little operational flexibility.

有理由的

Medium load plants are operated predominantly on weekdays. The cost of generation may be higher than base load plants. These plants may have some operational ***flexibility***.

机动性

The peak load plants—as these plants would be used for a short duration, the load factor being between 5% and 25%, investment in them can be comparatively less and corresponding reduction of ***efficiency*** is acceptable and economically justifiable[6].

效率

To date the main source of power generations for different categories of plants are as follows:

2.1 Base Load Plants

(1) Coal-based thermal plants consisting of high output steam turbines working with high pressure, high-temperature steam.

(2) Nuclear plants with high output steam turbines working with low-pressure steam.

(3) Hydroelectric plants of run of river type where storage is not possible because of other ***constraints***. 约束

2.2 Medium Load Plants

(1) Old base load steam plants.

(2) New simple steam plants with or without reheat.

(3) Steam/gas plants.

2.3 Peak Load Plants

(1) Diesel electric plants.

(2) Gas turbine plants.

(3) Old steam plants.

(4) Pumped storage plants.

(5) Compressed air storage plants.

(6) Conventional hydroelectric plants where ***discharges*** in the river can be controlled to generate power at the time of peak demand. 流量

To meet the ever-increasing demand, additional power generating capacity is being created which may be a ***judicious*** mix of thermal, nuclear and hydrogeneration, ***dictated*** by availability 明智的 命令,规定

of resources[7].

Hydropower potential is being ***harnessed*** on a large scale all over the world and detailed ***surveys*** are bringing to light additional hydropower resources[8].

利用 勘测

Notes to Passage A

① 此句中的 If... 引导条件状语从句。主句是 the basic shape of the curve... and then it forms... with other systems。全句译为：如果将所绘制的负荷曲线用最大负荷对时间的百分数来表示，那么曲线的基本形状不变，于是当系统本身各天负荷之间比较或该系统与其他系统的负荷进行比较时，它是非常有用的基本依据。

② 此句中的... and... 组成一个并列从句，..., though essential, ... 为插入语。全句译为：为了满足每天峰荷的需要，将要求发电厂每天要保持一段短期备用，而年最高峰荷可能只要求某些发电厂在全年中仅运行几个小时或几天，花费在上述电厂的费用获得的收益是非常小的，然而这种花费是必不可少的。

③ 此句中的... therefore... 组成一个并列从句，..., therefore more economical, ... 为插入语，leveling up 意为"平整"。全句译为：全世界供电管理当局的既定方针是鼓励政府采取各种方法来拉平系统的负荷曲线，以便使负荷曲线更加平缓，从而使电厂的出力更均衡、更经济。

④ 此句中的 resulting in the non-essential demand... 为现在分词短语作结果状语。全句译为：在商业方面，已经采用峰荷加价和低谷降价的办法售电来处理这一难题，采用峰荷加价和低谷降价的办法引导非重要用电户，如将储存热量的高耗能家用电器等改到低谷负荷时段用电。

⑤ 此句中的 though they may need... 为引导让步状语从句，they 指代 base load plants，从句 which is economically justifiable 中的 which 也指的是 base load plants。全句译为：基荷电厂必须是发电成本很低的高效电厂，虽然这种电厂也许需要大量的基建投资，但在经济上仍然是合算的。

⑥ 此句中的 the load factor being between 5% and 25% 为插入语。As 引导原因状语从句，此句的主干句是 investment can be less, reduction is acceptable and justifiable。全句译为：峰荷电厂——由于它们用于短时间发电，其负荷系数为 5% ~ 25%，相应地，峰荷电厂的资金投入也比较少，所以效益相应降低也是可以接受的，而且在经济上也是合理的。

⑦ 此句中的主干句是 additional power generating capacity is being created, dictated by availability of resources，翻译时应该注意。全句译为：为了满足日益增长的电力需求，人们正在根据可用能源的情况，审慎地混合使用热能、原子能和水能，建成了补充的发电资源。

⑧ 此句中的 is being harnessed on 的意思是“利用（河流、瀑布等）产生动力（尤指电力）”，are bringing to light 的意思是“发现”。全句译为：全世界也正在大规模地利用蕴藏的水力资源，同时经人们详细地勘测，发现了新的可用的水力资源。

Useful Expressions in Passage A

1) power generation	电力生产
2) pattern of demand (a load curve)	负荷曲线
3) the peak demand	峰荷
4) express as	表示成
5) be tackled by	解决

6) base load plant	基荷电厂
7) medium load plant	腰荷电厂
8) heavy capital investment	巨大的投资
9) to be very little operational flexibility	运行灵活性很少
10) steam turbine	汽轮机
11) power generating industry	电力工业
12) generating plant	发电厂
13) electricity supply authorities throughout the world	世界各地的电管部门
14) solar power, tidal power, wind power	太阳能、潮汐能、风能
15) geothermal power	地热发电
16) in a position to	能够
17) be bringing to light	发现
18) pumped storage plant	抽水蓄能电站
19) coal-based thermal plant	燃煤火电厂
20) nuclear plant	核电厂

Hydroelectric Stations In Power Industry

Today, power industry is mostly served by three types of power plant. One is fuel-fired (thermal) plants generating power by burning fossil fuel (coal, gas, oil, ***peat***, or ***combustible shale***); the other is nuclear power plants, which depend on the energy, released in nuclear ***fission***;

泥煤/易燃的/油页岩

裂变