21世纪高等教育给水排水工程系列规划教材

给水排水工程与环境工程专业英语

杨 维 主编

免费电子课件

机械工业出版社
CHINA MACHINE PRESS

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本书共有5部分内容：概述、给水与废水收集系统、水处理、废水处理和环境管理。每部分为4个单元，每单元一篇课文，两篇阅读材料，并附有难点注释、词汇表和练习题。附录包括词汇汇总表、课文译文和科技英语语法特点等。本书既注重学生专业英语学习，又考虑拓宽相关专业知识面，能使读者在较短时期内掌握给水排水工程与环境工程专业常用词汇。本书特点之一是语言的文体广泛，难易程度循序渐进；特点之二是兼顾专业性与学术性；特点之三是突出对阅读和翻译能力的培养。

本书可以作为给水排水工程与环境工程专业英语教材，亦可作为与之相关专业的工作者、教师和工程技术人员自学专业英语的读本。

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图书在版编目（CIP）数据

给水排水工程与环境工程专业英语/杨维主编. —北京：机械工业出版社，2009.8

（21世纪高等教育给水排水工程系列规划教材）

ISBN 978-7-111-27681-4

Ⅰ. 给… Ⅱ. 杨… Ⅲ. ①给水工程—高等学校—教材②排水工程—高等学校—教材③环境工程—英语—高等学校—教材 Ⅳ. H31

中国版本图书馆CIP数据核字（2009）第117811号

机械工业出版社（北京市百万庄大街22号 邮政编码 100037）
策划编辑：刘 涛 责任编辑：刘 涛
版式设计：霍永明 封面设计：王伟光
责任印制：洪汉军
北京瑞德印刷有限公司印刷（三河市胜利装订厂装订）
2009年9月第1版第1次印刷
169mm×239mm · 17.25印张 · 334千字
0001-2000册
标准书号：ISBN 978-7-111-27681-4
定价：28.00元

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机械工业出版社（北京市百万庄大街22号　邮政编码　100037）
策划编辑：刘　涛　责任编辑：刘　涛
版式设计：霍永明　封面设计：王伟光
责任印制：洪汉军
北京瑞德印刷有限公司印刷（三河市胜利装订厂装订）
2009年9月第1版第1次印刷
169mm×239mm・17.25印张・334千字
0001-2000册
标准书号：ISBN 978-7-111-27681-4
定价：28.00元

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前　言

编者在从事20多年专业英语教学实践的基础之上，编写出了此本《给水排水工程与环境工程专业英语》。编写本书旨在提高给水排水工程与环境工程专业和相关专业人员的专业英语水平，使在校大学生和专业工程技术人员的专业英语水平能够达到国家教育部颁布的《大学英语专业阅读阶段教学基本要求》，适应国际化的新形势。本书分为5部分内容：概述、给水与废水收集系统、水处理、废水处理和环境管理。本书特点之一是语言的文体广泛，难易程度循序渐进。所收入的文章选材较广，不仅包括英文教科书，还包括英文期刊及专著。在保持规范的现代英语语言特点的前提下，结合大学生实际掌握英语语言的水平，同时考虑到使本书更具系统性，对所收入的每篇文章的原文均进行了必要的加工和删改。特点之二是兼顾专业性与学术性。编撰过程中，在紧密结合专业的同时，每部分的内容安排上均注重吸收专业的新理论，体现新技术。学生学习后不但能掌握专业英语的基础词汇和最新词汇，而且能了解本专业发展的新信息，促进专业课的学习。本书的特点之三是突出对阅读和翻译能力的培养。全书共分为20个单元，每单元一篇课文，两篇阅读材料，并附有难点注释、词汇表、练习题，课文配有译文，以求达到通过阅读去获取国外的与本专业有关的科技信息的教学目的。

本书由沈阳建筑大学杨维教授主编，沈阳建筑大学李家坤、沈阳大学吴昊分别编写了部分课文、阅读材料、习题、译文和附录，河北工程大学蓝梅、河南城建学院毛艳丽也为本书提供了一些资料。全书由杨维教授统稿。本书在编选过程中，得到北京工业大学周玉文教授的悉心指导和审阅，在此一并表示衷心的感谢！敬请读者对本教材存在的缺点和错误提出批评与指正。

编　者

CONTENTS

Part One Introduction

Unit 1

Introduction of Water Supply

The human search for pure water supplies must have begun in prehistoric times. Much of that earliest activity **is subject to** speculation. Some individuals may have led water where they wanted it through trenches dug in the earth. Later a hollow log was perhaps used as the first water pipe.

Thousands of years probably passed before our more recent ancestors learned to build cities and enjoy the convenience of water piped to the home and **drains** for water-carried wastes. Archaeological evidence shows the existence of **latrines** and drains in **Neolithic** dwellings and the Minoan civilization in Crete 2000 years B. C. [1] had **clay** water and **sewage** pipes with **flushing** toilets in the houses. The Romans had highly developed water supply and **drainage** systems and their cities used large amounts of water with continuously operating **fountains** being a major source of supply for the majority of the population although wealthy families had their own piped supplies. Large **aqueducts**, some of which still remain, were constructed over distances up to 80km to bring adequate supplies of good-quality water into the cities. Stone **sewers** in the streets removed surface water and collected the discharges from latrines for **conveyance** beyond the city limits. With the demise of the Roman Empire most of their public works installations fell into disuse and for centuries water supply and **sanitation** provisions were virtually non-existent. In the Middle Ages, towns started to develop at important crossing points on rivers and these rivers usually provided a convenient source of water and an apparently convenient means of waste **disposal.** Although sewers were built in the large towns, they were intended solely for the removal of surface water and in the UK the discharge of foul sewage to the sewers was forbidden by law until 1815. **Sanitary** provisions were usually minimal: in 1579 one street in London with sixty houses had three communal latrines. Discharges of liquid and solid wastes from windows into the street were common and it is not surprising that life expectancy was less than half the current figure in the developed world. In an attempt to improve matters a law was passed in 1847 which made it **obligatory** in London for **cesspit** and latrine wastes to be discharged to the sewers. [2] London's sewers drained to the Thames, from which much of the city's water was obtained, and in addition the poor state of repair of many of the sewers allowed the contents to leak into the **aquifer** which was the other main source of water. The inevitable consequences of this state of affairs were that water sources became increasingly **contaminated** by sewage, the Thames became **objectionable** to both sight and smell, and most seriously, **waterborne** diseases became rampant in the city. In 1854, Dr. John Snow, a public-health worker in London, noted a high correlation between **cholera** cases and consumption of water from a well on Broad Street. Not only was cholera running rampant in the neighborhood around the well, but outbreak of the disease in other parts of the city could be traced to individuals who had occasion to drink from the Broad Street well, which caused 10,000 deaths and provided the evidence for him to demonstrate the connection between sewage pollution of water and **enteric** diseases like cholera and **typhoid.** Public outcry resulted in the **commissioning** of the first major public health engineering works of modern times. **Thus** by 1870 waterborne outbreaks had been largely brought under control in the UK and similar developments were taking place in Western Europe and the cities of the USA. The Industrial Revolution greatly increased the urban water demand and the late nineteenth century saw the construction of major water-supply schemes.

Only by continual and costly attention to water quality control has it been possible to virtually eradicate waterborne diseases from developed countries. Such achievements must not, however, be allowed to mask the appalling situation regarding water supply and sanitation in much of the developing world. The growth of population in developing countries, due to the high birth rate, is such that unless **strenuous** efforts to increase water supply and sanitation facilities are made, the percentage of the world's population with satisfactory facilities would actually decrease in the future. In developed countries, demands for water are now fairly static and basic waste quality-control measures are well established. However, many of the existing water-supply and sewage schemes are now relatively old so that their reconstruction will pose problems in the future. As knowledge of the effects of all forms of environmental pollution increases so new potential hazards appear, for example, there is current concern about the possible **carcinogenic** hazards arising from the presence of minute concentrations of some **organic** compounds in water. **Anthropogenic**, or human-**induced**, **pollutants** have overloaded our environment.

Today the enormous demands being placed on water supply and **wastewater** disposal facilities have necessitated the development and implementation of far broader concepts in environmental engineering than those **envisioned** only a few years ago. The standards for water quality have significantly increased **concurrent with** a marked decrease in raw-water quality. [3] The lesson is that populations increase, but water and land resources do not. Consequently, the use and control of these resources must be nearly perfect to maintain our way of life. Exercising this control will require the skillful **blending of state-of-the-art** technology **with** a host of political, social, legal, economic, and organizational elements. It is the technology of water supply and pollution control that is the main concern of this book.

New Words and Expressions

drain *v.* 排水 *n.* 排水（管）
latrine *n.* 公共厕所
Neolithic *a.* 新石器时代的
clay *n.* 粘［泥，白］土
sewage *n.* 污水（常指生活污水）
flush *v.* 冲洗
drainage *n.* 排水（工程）；排水区域，流域
fountain *n.* （人造）喷泉，泉水
aqueduct *n.* 沟渠，渡槽，导水管
sewer *n.* 污水管，下水道，阴沟
conveyance *n.* 输［送］水，运输
sanitation *n.* 公共［环境］卫生，卫生设备（尤指排水设备）
sanitary *a.* （环境）卫生的
obligatory *a.* 强制性的，义务的；专性的
cesspit *n.* 污水坑［池］，粪坑
aquifer *n.* 含水层
contaminate *vt.* 污染
objectionable *a.* 令人讨厌的，不好的
waterborne *a.* 水媒的，水传播的
cholera *n.* 霍乱
enteric *a.* 肠的
typhoid *n.* 伤寒
commission *vt.* 委任，（交付）使用，投产 *n.* 委任［托］，任务
strenuous *a.* 用力的，费劲的；紧张的
carcinogenic *a.* 致癌的
organic *a.* 有机（物，体）的
disposal *n.* 处置，处理，清除
anthropogenic *a.* 源于人类活动的，人为的

pollutant *n.* 污染物
envision *vt.* 预见，展望，想象
wastewater *v.* 废水，污水
state-of-the-art *a.* 现代化的
be subject to 易遭（受），易发生
fall into 陷入，开始；分成
bring under control 把……控制起来
(be) concurrent with 与……一致
blending of ... with... ……与……混合［结合］

Notes

(1) the Minoan civilization in Crete 2000 years B. C. 指公元前2000年古希腊克里特岛米诺安文明。

(2) 由 which 引导的定语从句，割裂修饰主语 a law；made 之后为复合宾语，形式宾语 it 代替后面作为真正宾语的不定式复合结构。

(3) concurrent with... 引导的形容词短语作后置定语，修饰句中主语。

Exercises

1. Answer the following questions in English according to the text:

(1) Name the correlation between human health and water quality.

(2) How did the Romans get the domestic water and drain the sewage?

2. Use the following 5 words/expressions to make up 5 sentences, respectively:

(1) sanitation

(2) waterborne

(3) sewage

(4) aqueduct

(5) objectionable

3. Translate the following English into Chinese:

(1) The engineering decisions of major importance in the design of water supply schemes are those relating to: ① the design period, which is the number of years during which the project will be expected to meet the community' s requirements; ② the estimates of the population and of the types and magnitudes of commercial, industrial, agricultural undertakings to be served during the design period; ③ the level of service, in terms of the rate of supply, reliability of supply and quality of water to be provided during the design period; ④ the selection of supply source; ⑤ the fixing of the capacities and operating levels of the engineering works for the storage, treatment, transportation and distribution of the water, including provisions for supply and demand and fluc-

tuations.

(2) As pollutants enter water, air, or soil, natural **processes** such as **dilution** (稀释), biological conversions, and chemical reactions convert waste material to more acceptable forms and disperse (分散) them through a large volume. Yet those natural processes can no longer perform the cleanup alone. The treatment facilities designed by the environmental engineers are based on the principles of self-cleansing (自净的) observed in nature, but the engineered (设计的) processes amplify and optimize the operations observed in nature to handle larger volumes of pollutants and to treat them more rapidly.

4. Translate the following Chinese into English:

(1) 源于人类活动的有机污染物

(2) 污水处理设施

(3) 需水量

(4) 地表水是城市主要供水水源。

(5) 给水排水系统设计是本节关注的主要问题。

Reading Material A

Environmental/Sanitary Engineering

Environmental/sanitary engineering is concerned with providing clean, safe water-supply systems for towns, cities, and rural areas. It is also concerned with disposing of excess water and waste materials by means of sewer systems. Many aspects of environmental/sanitary engineering are directly related to **hydraulic** engineering; indeed, some of the projects that we discussed are parts of water-supply systems. The Hoover Dam, for example, supplies water to the city of Los Angeles, with which it is connected by a series of canals, tunnels, and aqueducts across the deserts and **mountains of** the southwestern United States. [1]

Los Angeles is located in an area of low rainfall. When the population of the city began to grow rapidly, water was brought in from the Colorado River, more than 350 kilometers away. The Colorado River Aqueduct, supplying water to Los Angeles and other southern California communities, is 1,081 kilometers long. An even more ambitious project now under construction will **divert** from rainy northern California to the drier central and southern portions of the state. The Oroville Dam, a great earth-fill **embankment** dam, is part of the overall California State Water Project. [2] When the project is completed, it will deliver water for both irrigation systems and town and city systems from San Francisco and Sacramento in the central part of the state to Los Angeles and areas even farther south. The main aqueduct and its principal branches will be several hundred kilometers long, some of it in concrete **lined** canals and some of it in pipes and tunnels. High-capacity pumping stations will raise the water over intervening mountain ranges.

In addition to transporting water over long distances, modern water-supply systems also use several techniques for **purification.** One of them is ***filtration.*** The water is passed through a filter that consists of a bed of sand or **gravel**, which removes a large proportion of the solids that might otherwise contaminate the supply. Another process is ***aeration.*** Sprays of water are shot into the air, where sunlight and oxygen help kill bacteria and also remove gases with an unpleasant odor or taste; or air is bubbled into or through the water. A third method involves treatment with chemicals, usually **chlorine**, to kill harmful bacteria. The process is known as **chlorination.**

Part of providing a safe water supply is disposing of liquid and solid wastes. This problem has become acute in recent years not only because of world-wide population growth, but also because of the vast amount of waste created by industrial processes and by the great mountains of trash that are the **by-product** of increased consumption. A large number of modern drainage systems use the same sewers to dispose of domestic wastes and **runoff** water from storms. Many of these systems were designed to **empty into** streams or other bodies of water where nature itself purified the water over a period of time. Now, however, the amount of waste has become so great that many streams and lakes and even the seas have become polluted. More and more treatment plants are being built to purify water before it is released back into the environment. Therefore, the modern trend is to build **separate drainage systems** for storm runoff and domestic wastes so that the treatment plants do not have to process the runoff water, which is relatively unpolluted.

There are a number of different methods by which solid wastes can be removed or **rendered** harmless. Several of them are ordinarily used in combination in treatment plants. One of the processes is filtration. Another is ***sedimentation***, in which wastes are allowed to settle until they become solid or semisolid and can be removed. There are also techniques in which water can be treated by biological means, by using some kinds of bacteria to kill other kinds, or by chemical means, as in chlorination. One of the most successful methods is called the ***activated-sludge process.*** It involves using compressed air to increase and control the rate of biological reactions that purify the

wastes. **In effect**, treatment plants speed up natural purification processes so that the water that is finally released from them is essentially harmless. Present-day concern over environmental pollution has increased the demand that waste water should be treated to the fullest degree possible before it is returned to the environment. [3]

Vast amounts of *trash* have also posed problems in disposal. Much of it has been used as ***landfill*** by dumping in **swampy** areas or in shallow water so that the area can be made useful. A great deal of it has also been burned in ***incinerators***, huge furnaces that reduce the wastes to ash. [4] Incinerators, however, are **out of fashion** today because they release harmful **fumes** into the air. Many of them are being redesigned to control these **emissions** more effectively; at the same time other solutions are being sought.

One modern method of disposing of trash and domestic wastes is **recycling**, which simply means using the waste material again. The wastes from treatment plants, for example, can be used as fertilizer. It can be used as fuel. In fact, some treatment plants fill their own energy needs by burning their waste products to provide steam for generating electricity. Similarly, some kinds of trash can be collected separately—glass, newspapers, and **aluminum** cans, for example. All of these materials can be processed for reuse. In some cases, trash has also been **compacted** to serve as fuel.

The concern for a cleaner environment together with the need to conserve and reuse our resources has created a **challenge** for which sanitary engineers, working with environmentalists, will be called upon to find new solutions over the next few years.

New Words and Expressions

hydraulic *a.* 水力（学）的
embankment *n.* 堤，筑堤工程
intervene *vi.* 插入，居中
divert *v.* 引水，分水，使转向［移］
lined *a.* 有衬砌的
filtration *n.* 过滤（作用）
filter *v.* 过滤 *n.* 过滤池［器，层］
purification *n.* 净化，洗净
gravel *n.* 砾石，砂砾
process *vt.* 加工，处理 *n.* 方法，过程；工艺；作用
aeration *n.* 充［通］气，曝气
chlorine *n.* 氯
chlorination *n.* 氯化处理，加氯（作用），用氯消毒
by-product *n.* 副产品
render *v.* 使变得
sedimentation *n.* 沉淀
activated *a.* 活性的
sludge *n.* 污泥
landfill *n.* 填埋，掩埋（场）
swampy *a.* 沼泽的
incinerator *n.* 焚化炉
fume *n.* 烟；蒸汽

emission *n.* 排出物，散发
compact *vt.* 压缩
challenge *n.* （复杂的）任务，挑战
recycling *n.* 回收，再循环
aluminum *n.* 铝
a mountain of 大量的，很多的
empty into 流入，注入
separate drainage system 分流制
in effect 实际上
out of fashion 不流行了

Notes

（1） with which it is... 是一个非限制性定语从句，which 代替 Los Angeles，with 是从句谓语所要求的，it 是指 Hoover Dam。

此句可译为：例如，胡佛坝蓄存的水供给洛杉矶市，是通过跨过美国西南部沙漠和山区的一系列水渠、隧道和输水管线与洛杉矶市相连。

（2） 奥罗维尔坝是一个巨大的土筑堤坝，它是加利福尼亚州整个供水工程的一部分。

（3） 此句中，that 引出名词 demand 的同位语从句，说明其内容。

此句可译为：目前，人们对环境污染的关注越来越强烈要求在废水排回至环境之前应当处理到尽可能完善的程度。

（4） 代词 it 指 trash；由 that 引导的定语从句修饰作 incinerators 同位语的名词短语 huge furnaces。

此句可译为：大量的垃圾也可在焚烧炉中焚烧掉，焚烧炉是一个巨型炉，可将垃圾还原成灰。

Reading Material B

Hydrological Cycle

The hydrological cycle is the process whereby water is converted from its liquid or solid state into its vapor state. [1] As a vapor the water is capable of traveling considerable distances from its source prior to **recondensing** and returning to earth as **precipitation.** Thus the hydrological cycle is a complex, **interrelated** system involving the movement of atmospheric surface (marine and fresh), and groundwater throughout various regions of the world. It is the hydrological cycle that **is** solely **responsible for** the world's precipitation. [2] And it is this precipitation, falling on the **terrestrial** and surface freshwater environments, that is the sole source of the earth's supply of fresh water.

The hydrological cycle may consist of either a long or various short cycles. In the *short cycles*, water may evaporate from either marine or freshwater systems, condense almost immediately, and return as precipitation to the same system. Another variation of a short cycle is the precipitation and subsequent evaporation of water from land surfaces, **followed by** its condensation and return as precipitation to the land, followed by reevaporation, and so on. In the *long cycle* the major source of water vapor is the world's oceans, which contain 97.3% of the earth's waters. In this cycle a portion of the water evaporates and forms clouds that move inland. The water vapor then cools and returns to earth as precipitation. It is estimated that only 0.007% of the oceanic water is distributed to terrestrial areas annually.[3] This water will ultimately return to the oceans through river and groundwater flow. Since precipitation may occur close to the source of initial evaporation or thousands of miles away, the water may remain in the vapor state for variable times (a few hours to a few weeks). The average **residence** time for water to remain in the atmosphere is considered to be 10 days.

Because water is absolutely necessary for sustaining life and is of great importance in industry, men have tried in many ways to control the hydrological cycle **to their own advantage.** An obvious example is the storage of water behind dams in reservoirs, in climates where there are excesses and deficits of precipitation (**with respect to** water needs) at different times in the year. Another method is the attempt to increase or decrease natural precipitation by injecting particles of dry ice or silver **iodide** into clouds. This kind of weather modification has had limited success thus far. But many **meteorologists** believe that a significant control of precipitation can be achieved in the future. Other attempts to influence the hydrological cycle include the **contour** plowing of sloping farmlands to slow down runoff and permit more water to **percolate** into the ground, the construction of dikes to prevent floods and so on.

The four processes with which the **hydrologist** is mainly concerned are precipitation, evaporation and transpiration, surface runoff or stream flow, and groundwater flow.[4] He needs to be able to **interpret** data about these processes and to predict from his studies the most likely quantities involved in the extreme cases of flood and drought. He must be able also to express an opinion about the likely frequency with which such events will occur, since it is on the frequency of certain values of extreme events that much hydraulic engineering design is based.

New Words and Expressions

recondense *v.* 再［重新］凝结

precipitation *n.* 降水［雨］；沉淀