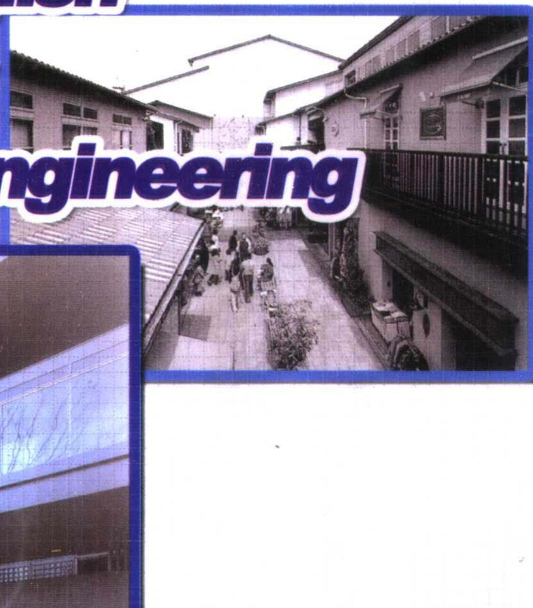
建筑与土木工程专业英语系列丛书

JIANZHU YU TUMU GONGCHENG ZHUANYE YINGYU XILIE CONGSHU

给水排水工程专业英语

主编/王春丽 米海蓉

Professional English on Water Supply and Sewerage Engineering



哈尔滨工程大学出版社

给水排水工程专业英语

Professional English on Water Supply and Sewerage Engineering

王春丽　米海蓉　主　编

哈尔滨工程大学出版社

图书在版编目(CIP)数据

给水排水工程专业英语/王春丽,米海蓉主编.—哈尔滨:哈尔滨工程大学出版社,2005
ISBN 7-81073-698-1

Ⅰ.给… Ⅱ.①王…②米… Ⅲ.①给水工程-专业英语②排水工程-专业英语 Ⅳ.H31

中国版本图书馆 CIP 数据核字(2005)第 067795 号

内 容 简 介

本书共分十个单元,英语内容题材广泛,覆盖了本专业的主要内容,对于建筑给水排水、市政给水排水、给水处理、污水处理等均有介绍。

哈尔滨工程大学出版社出版发行
哈尔滨市东大直街 124 号
发行部电话:(0451)82519328 邮编:150001
新华书店经销
哈尔滨工业大学印刷厂印刷
*
开本 787mm×960mm 1/16 印张 13.75 字数 250 千字
2006 年 1 月第 1 版 2006 年 1 月第 1 次印刷
印数:1—1 000 册
定价:15.00 元

总　　序

按照国家教育部1999年9月颁发的《大学英语教学大纲》(修订本)的规定，大学英语教学分为基础阶段和应用提高阶段。基础阶段的教学主要是公共英语，分为大学英语一至六级。应用提高阶段的教学要求包括专业英语和高级英语两部分。非英语专业的学生在完成基础阶段的学习任务，即通过国家四级、六级考试后，必须学习专业英语。《大学英语教学大纲》不仅强调学习专业英语的重要性，同时对专业英语的词汇和听、说、读、写、译的能力做出了明确的说明。

专业英语与公共英语有着相同的语言系统和语法规则，但也存在很大差别。在专业英语文章中不仅有大量专业词汇和专业术语，还有许多合成新词和缩略词，但两者的主要区别在于文体差异。专业英语主要是对客观事实和客观真理进行论述，逻辑性强，条理规范。另外专业英语的语法结构也有其自身的特性，如长句多、被动语态、非限定动词或非限定定语从句使用频率高等。由于专业英语与专业内容紧密配合，相互一致，懂专业的人用起来得心应手，不懂专业的人用起来则困难重重。因而必须具有一定的相关专业知识基础，才能正确地理解和运用专业英语。

本套建筑与土木工程专业英语系列丛书包括:《建筑工程力学专业英语》、《土木工程专业英语》、《建筑环境与设备工程专业英语》、《给水排水工程专业英语》、《建筑学专业英语》。在选材上按照《大学英语教学大纲》要求，注重专业英语的文体特性，在强调专业性的同时，尽量保持内容的基础性和通用性，避免涉及过于深奥的专业理论，同时也不使其成为简单科普书籍。本套丛书80%左右为专业基本内容，20%左右为专业前沿性文献，基本上出自英语原文。通过学习，学生能够系统地掌握专业英语的文体特征和专业文献的阅读方法，熟练地进行英语资料的阅读、翻译以及英文摘要的写作。

谢礼立

2004年8月

谢礼立，1994年中国工程院首批院士，中国地震局工程力学研究所名誉所长，研究员；现任中国地震局科技委员会副主任，《中国地震学会》副理事长。

前 言

PREFACE

本书共分十个单元,英语内容题材广泛,覆盖了本专业的主要内容,对于建筑给水排水、市政给水排水、给水处理、污水处理等均有介绍。本书选文力求内容精练,专业词汇涉及广泛,为帮助读者对书中内容的理解,每个单元后面都附有词汇表和整篇译文。本书重视语言技能训练,突出对阅读和翻译能力的培养。

本书不仅适用于在校学生,对于有志于提高专业英语阅读能力的业内人士也是一套适用的自学教材。

本书由哈尔滨工程大学王春丽和米海蓉合作主编。其中第一、二、八、九、十单元由王春丽编写,第三、四、五、六、七单元由米海蓉编写。感谢哈尔滨工程大学刘慧、孙勇、贺征,黑龙江省城市规划勘测规划设计研究院崔海等参与本书的编写、修改工作。在本书编写过程中,参考了大量的相关书籍,在此对其作者表示衷心感谢。由于作者水平有限,疏漏及不妥之处在所难免,敬请读者批评指正。

编　者

2005 年 4 月

目 录

CONTENTS

目 录

CONTENTS

目 录

CONTENTS

Unit One

Part Ⅰ The Histories of Water Supply and Sewerage Engineering

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. Our earliest archeological records of central water supply and wastewater disposal date back about 5,000 years, to Nippur of Sumeria. In the ruins of Nippur there is an arched drain with each stone being a wedge tapering downward into place. Water was drawn from wells and cisterns. An extensive system of drainage conveyed the wastes from the palaces and residential districts of the city.

The earliest recorded knowledge of water treatment is in the Sanskrit medical lore and Egyptian wall inscriptions. Sanskrit writings dating about 2000 B. C. tell how to purify foul water by boiling in copper vessels, exposure to sunlight, filtering through charcoal, and cooling in an earthen vessel.

The earliest known apparatus for clarifying liquids was pictured on Egyptian walls in the fifteenth and thirteenth centuries B. C. The first picture, in a tomb of the reign of Amenhotep Ⅱ (1447—1420 B. C.), represents the siphoning of either water or settled wine. A second picture, in the tomb of Rameses Ⅱ (1300—1223 B. C.), shows the use of wick siphons in an Egyptian kitchen.

The first engineering report on water supply and treatment was made in A. D. 98 by Sextus Julius Frontinus, water commissioner of Rome. He produced two books on the water supply of Rome. In these he described a settling reservoir at the head of one of the aqueducts and pebble catchers built into most of the aqueducts. His writings were first translated into English by the noted hydraulic engineer Clemens Herschel, in 1899.

In the eighth century A. D., an Arabian alchemist, Geber, wrote a rather specialized treatise on distillation that included various stills for water and other liquids.

The English philosopher Sir Francis Bacon wrote of his experiments on the purification of water by filtration, boiling, distillation, and clarification by coagulation. This work was published in 1627, one year after his death. Bacon also noted that clarifying water tends to improve health and increase the "pleasure of the eye".

The first known illustrated description of sand filters was published in 1685 by Luc Antonio Porzio, an Italian physician. He wrote a book on conserving the health of soldiers in camps, based on his experience in the Austro-Turkish War. This was probably the earliest published work on mass sanitation. He described and illustrated the use of sand filters and sedimentation. Porzio also stated that his filtration method was the same as that of "those who built the wells in the Palace of the Doges in Venice and in the Palace of Cardinal Sachett at Rome".

The oldest known archeological examples of water filtration are in Venice and the colonies it occupied. The ornate heads on the cisterns bear dates, but it is not known when the filters were placed. Venice, built on a series of islands, depended on catching and storing rainwater for its principal freshwater supply for over 1,300 years. Cisterns were built, and many were connected with sand filters. The rainwater ran off the housetops to the streets, where it was collected in stone-grated catch basins and then filtered through sand into cisterns.

A comprehensive article on the water supply of Venice appeared in the Practical Mechanics Journal in 1863. The land area of Venice was 12.85 acres and the average yearly rainfall was 32 in. Nearly all of this rainfall was collected in 177 public and 1,900 private cisterns. These cisterns provided a daily average supply of about 4.2 gallons per capita per day (gpcd). This low consumption was due in part to the absence of sewers, the practice of washing clothes in the lagoon, and the universal drinking of wine. The article explained in detail the construction of the cisterns. The cisterns were usually 10 ~ 12 ft deep. The earth was first excavated to the shape of a truncated inverted pyramid. Well-puddled clay was placed against the sides of the pit. A flat stone was placed in the bottom and a cylindrical wall was built from brick laid with open joints. The space between the clay walls and the central brick cylinder was filled with sand. The stone surfaces of the courtyards were sloped toward the cistern, where perforated stone blocks collected the water at the lowest point and discharged it to the filter sand. This water was always fresh and cool, with a temperature of about 52 °F. These cisterns continued to be the principal water supply of Venice until about the sixteenth century.

Many experiments were conducted in the eighteenth and nineteenth centuries in England, France, Germany, and Russia. Henry Darcy patented filters in France and England in 1856 and anticipated all aspects of the American rapid-sand filter except coagulation. He appears to be the first to apply the laws of hydraulics to filter design. The first filter to supply water to a whole town was completed at Paisley, Scotland in 1804, but this water was carted to consumers. In Glasgow, Scotland, filtered water was piped to consumers in 1807.

In the United States little attention was given to water treatment until after the Civil War. Turbidity was not as urgent a problem as in Europe. The first filters were of the slow-sand type, similar to British design. About 1890 rapid-sand filters were developed in the United States, and coagulants were later introduced to increase their efficiency. These filters soon evolved to our present rapid-sand filters.

The drains and sewers of Nippur and Rome are among the great structures of antiquity. These drains were intended primarily to carry away runoff from storms and for the flushing of streets. There are specific instances where direct connections were made to private homes and palaces, but these were the exceptions, for most of the houses did not have such connections. The need for regular cleansing of the city and flushing of the sewers was well recognized by Commissioner Frontinus of Rome, as indicated in his statement, "I desire that nobody shall conduct away any excess water without having received my permission or that of my representatives, for it is necessary that a part of the supply flowing from the water-castles shall be utilized not only for cleaning our city, but also for flushing the sewers."

It is astonishing to note that from the days of Frontinus to the middle of the nineteenth century there was no marked progress in sewerage. In 1842, after a fire destroyed the old section of the city of Hamburg, Germany, it was decided to rebuild this section of the city according to modern ideas of convenience. The work was entrusted to an English engineer, W. Lindley, who was far ahead of his time. He designed an excellent collection system that included many of the ideas now used. Unfortunately, the ideas of Lindley and their influence on public health were not recognized.

The history of the progress of sanitation in London probably affords a more typical picture of what took place in the middle of the nineteenth century. In 1847, following an outbreak of cholera in India that had begun to work westward, a royal commission was appointed to look into the sanitary conditions of London. This royal commission found that one of the major obstacles was the political structure, especially the lack of a central authority. The city of London was only a small part of the metropolitan area, comprising approximately 9.5% of the land area and less than 6% of the total population of approximately 2.5

million. This lack of a central authority made the execution of sewerage works all but impossible. The existing sewers were at different elevations, and in some instances the wastes would have had to flow uphill. In 1848 Parliament followed the advice of this commission and created the Metropolitan Commission of Sewers. That body and its successors produced reports that clearly showed the need for extensive sewerage works and other sanitary conditions. Cholera appeared in London during the summer of 1848, and 14,600 deaths were recorded during 1849. In 1854 cholera claimed a mortality of 10,675 people in London. The connection was established between a contaminated water supply and spread of the disease, and it was determined that the absence of effective sewerage was a major hindrance in combating the problem.

In 1855 Parliament passed an act "for the better local management of the metropolis", thereby providing the basis for the subsequent work of the Metropolitan Commission of Sewers, which soon after undertook the development of an adequate sewerage system. It will be noted that the sewerage system of London came as a result of the cholera epidemic, as was true of Paris.

The remedy for these foul conditions was to discharge human excrement into the existing storm sewers and add additional collection systems. This suggestion created the combined sewers of many older metropolitan areas. These storm drains had been constructed to discharge into the nearest watercourse. The addition of wastes to the small streams overtaxed the receiving capacities of the waters, and many of them were covered and converted into sewers. Much of the material was carried away from the point of entry into the drains, which in turn overtaxed the receiving waters. First the smaller and then the larger bodies of water began to ferment, creating a general health problem, especially during dry, hot weather. The solution has been the varying degrees of treatment currently practiced according to the capabilities of the receiving stream or lake to take the load.

The work on storm drainage in the United States closely paralleled that in Europe, especially England. Some difficulty was experienced because of the difference in the rainfall patterns in America from those of England. English rains are more frequent but less intense. In the United States storm drains must usually be larger for the same topographical conditions.

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.

Evidence of water supply contamination by toxic and hazardous materials has become common, and concern about broad water-related environmental issues has heightened. As populations throughout the world multiply at an alarming rate, environmental control becomes a critical factor. Land and water management become increasingly important. Many European and Asian nations have reached the maximum populations that their land areas can bear comfortably. They are faced with the problem of providing for more people than their lands can conveniently support. The lesson is that population's 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.

词　汇

prehistoric	*a*.史前的;陈旧的
speculation	*n*.沉思,思考,思索
trench	*n*.沟渠,堑壕,管沟
log	*n*.木头,原木
water-carried	*a*.水携带的,水载的
archeological	*a*.考古学的
Nippur	尼普尔　位于幼发拉底河上巴比伦东南的巴比伦人的古城市,是苏美尔人时期的一个重要宗教中心
Sumeria	苏美尔　一个古代民族,很可能是非闪米特的起源,在公元前 4 000 年期间在苏美尔建立了一个城邦国家,这是已知最早的具有重大历史意义的文明之一
arched	*a*.拱形的,半圆形的
wedge	*n*.楔子;楔形物
tapering	*n*.锥形,锥体;渐尖,渐细
cistern	*n*.蓄水池,水塔,贮水器;槽
Sanskrit	*n*.梵文　一种古印度语,为印度及吠陀经(印度最古的宗教文献和文学作品的总称)所用文字,也是印度的古典文学语言。
lore	*n*.(特殊的)学问,(专门的)知识

inscription	n.题名,题字;碑文;铭刻
foul	a.污秽的,肮脏的
charcoal	n.炭,木炭,活性炭
earthen	a.土制的,陶制的
apparatus	n.设备;装置;仪器
Amenhotep Ⅱ	阿蒙霍特普二世(公元前16至14世纪,古埃及四法老中的任何一个)(1447—1420 B.C.)
siphoning	n.虹吸作用
Rameses Ⅱ	拉美西斯二世(1300—1223 B.C.)
commissioner	n.专员;委员;(政府部门的)长官
reservoir	n.水库;蓄水池
aqueduct	n.渠道;渡槽,导水管
pebble	n.小圆石,小鹅卵石
alchemist	n.炼丹术士
treatise	n.论文;论述
distillation	n.蒸馏;蒸馏法
philosopher	n.哲学家,哲人
Sir Francis Bacon	培根(1561—1626),英国散文作家、哲学家、政治家,古典经验论的始祖。
Palace of the Doges	道奇宫　意大利威尼斯公爵(总督)宫9世纪时拜占庭式建筑
Cardinal	n.红衣主教
colony	n.殖民地;侨民
ornate	a.装饰的,华丽的
freshwater	a.淡水的;河水的
per capita	按人口平均计算
gpcd	num.每日每人加仑数
excavate	vt.挖掘,开凿,挖出,挖空
truncated	a.切去顶端的;缩短了的,被删节的
pyramid	n.棱锥体
pit	n.坑;地坑
cylindrical	a.圆柱体的,圆筒形的
perforated	a.有孔的或多孔的

Paisley	佩斯利　苏格兰西南部的一个自治区,在格拉斯哥的西部
Glasgow	格拉斯哥　苏格兰西南部克莱德河上的一个城市
turbidity	*n*.浊度
urgent	*a*.紧迫的;非常重要的
coagulant	*n*.混凝剂
antiquity	*n*.古代,古老;古代的遗物
runoff	*n*.径流
castle	*n*.城堡
Hamburg	汉堡　德国北部一座城市,位于不莱梅东北部易北河岸
entrust	*n*.委托,交托
cholera	*n*.霍乱
metropolitan	*a*.大城市的,大都会的;宗主国的
Parliament	*n*.国会,议会
successor	*n*.继承人,继任者;接班人
mortality	*n*.死亡人数;死亡率
hindrance	*n*.妨碍,障碍
metropolis	*n*.主要都市;首府
epidemic	*n*.流行病,时疫
excrement	*n*.排泄物;粪便
overtax	*vt*.课税过重,使负担过度
ferment	*vi*.发酵
topographical	*a*.地形学的
necessitate	*vt*.使需要,使成为必需
envision	*vt*.想像,预想
toxic	*a*.有毒的;中毒的
hazardous	*a*.危险的;冒险的;危害的
blending	*n*.混合,混成;混合物
state-of-the-art	*n*.艺术级的

Part Ⅱ　Role of The Technician and Technologist

The engineering team includes technicians and technologists, as well as engineers. It is important for students to have a clear understanding of their future role on this team and to be aware of the educational requirements necessary to begin a career in the field of civil-environmental engineering or technology. It is also helpful for students to be aware of the wide variety of employment opportunities and job responsibilities that exist, as they relate to the different levels of education and training.

Education

There are no less than six different levels of education at which a person can begin a career in the field of civil-environmental engineering or technology. As would be expected, a higher level of education requires a greater investment of time and stronger academic abilities than does a lower level of education. These educational levels include the following:

Engineering	Technology	Certification
Doctorate degree	Bachelor's degree	Various levels
Master's degree	Associate degree	
Bachelor's degree		

The basic difference between bachelor's degree programs in engineering and in technology is in the sequence and level of technical courses in the curriculum. Engineering programs place much more emphasis on math, science, and general analytical abilities than do the technology programs. Specific engineering courses are taken by the student in the junior and senior years of college, after a solid foundation in theoretical principles has been established in the freshman and sophomore years. Most engineering courses rely on a thorough knowledge of calculus.

Engineering is often defined as the application of science and math to solving problems for the benefit of people. Technology, on the other hand, can be defined as the application of engineering principles for the benefit of people. There is less emphasis on math and theory in the technology programs. Instead, practical applications and hands-on skills are stressed. Technology courses usually require knowledge of algebra and trigonometry, but do not rely on calculus, particularly in the freshman and sophomore years. And specific technical subjects may be studied in the freshman year of a technology curriculum.

Generally, a minimum of 7 years of full-time university study is required for the doctorate degree (Ph.D.), 5 years are needed for the master's degree (M.S.), and 4 years are needed for the bachelor's degree in engineering (B.S. or B.E.). A minimum of 4 years is required for the bachelor's degree in technology, and 2 years are needed for the associate degree in technology (A.A.S.). Some schools offer a master's degree in technology, but this is not very common.

Certification as an operator of a public water supply or sewerage system requires a high school diploma and the passing of a written exam; in many states, several years of operating experience are also required. The levels of certification depend on the type and size of the water or sewerage facility being operated.

Graduates of the bachelor's degree program in engineering technology are called technologists, whereas graduates of the associate degree program are called technicians. Many employers, however, do not make a distinction between the technologist and the bachelor's degree level engineer; some technologists are hired with a job title that includes the word engineer. Most states allow technologists to take the professional engineering (P.E.) licensing exam, but the requirements for years of experience vary. In general, the role of the technician and technologist is that of a liaison between the engineer and builder.

Employment

For the purpose of discussion, employment opportunities can be categorized into eight different types of activities:

1. Research and development: conducting laboratory and theoretical investigations to further the understanding of environmental processes and to develop new applications and environmental control equipment.

2. Teaching: instructing and guiding engineering and technology students, developing educational curricula and new courses, writing textbooks, and preparing other instructional material.

3. Project planning and management: conducting technical, economic, and environmental feasibility, and impact studies evaluating project alternatives, overseeing the progress of engineering studies and design projects.

4. Project design: conducting design computations and preparing detailed plan drawings and specifications to guide the construction of the project.

5. Construction management: estimating construction costs; scheduling equipment, material delivery, and labor; supervising and coordinating field activities, construction inspection, material testing, and quality and safety control.

6. Facility operation and maintenance: conducting daily process evaluations and control, water and wastewater testing, supervising maintenance and repair activities.

7. Regulation and enforcement: monitoring environmental quality, enforcing