高等学校试用教材

建筑类专业英语

给水排水与环境保护

（第一册）

English in Architecture and Construction

朱满才　王学玲　主编

中国建筑工业出版社

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本书是按国家教委颁布的《大学英语专业阅读阶段教学基本要求》规定编写的专业英语教材。本册包括给水历史、水的净化、环境工程、水与大气污染及水力学等方面内容。全书分 16 个单元，每单元除正课文外，还有两篇阅读材料，均配有必要的注释。正课文还配有词汇表和练习，书后附有总词汇表、参考译文和练习答案。供高等学校本专业学生三年级上学期使用，也可供有关人员自学。

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《建筑类专业英语》编审委员会

前　言

经过几十年的探索，外语教学界许多人认为，工科院校外语教学的主要目的应该是："使学生能够利用外语这个工具，通过阅读去获取国外的与本专业有关的科技信息。"这既是我们建设有中国特色的社会主义的客观需要，也是在当前条件下工科院校外语教学可能完成的最高目标。事实上，教学大纲规定要使学生具有"较强"的阅读能力，而对其他方面的能力只有"一般"要求，就是这个意思。

大学本科的一、二年级，为外语教学的基础阶段。就英语来说，这个阶段要求掌握的词汇量为2 400个（去掉遗忘，平均每个课时10个单词）。加上中学阶段已经学会的1 600个单词，基础阶段结束时应掌握的词汇量为4 000个。仅仅掌握4 000个单词，能否看懂专业英文书刊呢？还不能。据统计，掌握4 000个单词，阅读一般的英文科技文献，生词量仍将有6%左右，即平均每百词有六个生词，还不能自由阅读。国外的外语教学专家认为，生词量在3%以下，才能不借助词典，自由阅读。此时可以通过上下文的联系，把不认识的生词猜出来，那么，怎么样才能把6%的生词量降低到3%以下呢？自然，需要让学生增加一部分词汇积累。问题是，要增加多少单词？要增加哪一些单词？统计资料表明，在每一个专业的科技文献中，本专业最常用的科技术语大约只有几百个，而且它们在文献中重复出现的频率很高。因此，在已经掌握4 000个单词的基础上，在专业阅读阶段中，有针对性地通过大量阅读，扩充大约1 000个与本专业密切有关的科技词汇，便可以逐步达到自由阅读本专业科技文献的目的。

早在八十年代中期，建设部系统院校外语教学研究会就组织编写了一套《土木建筑系列英语》，分八个专业，共12册。每个专业可选读其中的3、4册。那套教材在有关院校相应的专业使用多年，学生和任课教师反映良好。但是，根据当时的情况，那套教材定的起点较低（1 000词起点），已不适合今天学生的情况。为此，在得到建设部人事教育劳动司的大力支持，并征得五个相关专业教学指导委员会同意之后，由建设部系统十几所院校一百余名外语教师和专业课教师按照统一的编写规划和要求，编写了这一套《建筑类专业英语》教材。

《建筑类专业英语》是根据国家教委颁发的《大学英语专业阅读阶段教学基本要求》编写的专业阅读教材，按照建筑类院校共同设置的五个较大的专业类别对口编写。五个专业类别为：建筑学与城市规划；建筑工程（即工业与民用建筑）；给水排水与环境保护；暖通、空调与燃气；建筑管理与财务会计。每个专业类别分别编写三册专业英语阅读教材，供该专业类别的学生在修完基础阶段英语后，在第五至第七学期专业阅读阶段使用，每学期一册。

上述五种专业英语教材语言规范，题材广泛，覆盖相关专业各自的主要内容：包括专业基础课、专业主干课及主要专业选修课，语言材料的难易度切合学生的实际水平；词汇

以大学英语“通用词汇表”的4 000个单词为起点，每个专业类别的三册书将增加1 000～1 200个阅读本专业必需掌握的词汇。本教材重视语言技能训练，突出对阅读、翻译和写作能力的培养，以求达到《大学英语专业阅读阶段教学基本要求》所提出的教学目标：“通过指导学生阅读有关专业的英语书刊和文献，使他们进一步提高阅读和翻译科技资料的能力，并能以英语为工具获取专业所需的信息。”

《建筑类专业英语》每册16个单元，每个单元一篇正课文（TEXT），两篇副课文（Reading Material A & B），每个单元平均2 000个词，三册48个单元，总共约有十万个词，相当于原版书三百多页。要培养较强的阅读能力，读十万个词的文献，是起码的要求。如果专业课教师在第六和第七学期，在学生通过学习本教材已经掌握了数百个专业科技词汇的基础上，配合专业课程的学习，再指定学生看一部分相应的专业英语科技文献，那将会既促进专业课的学习，又提高英语阅读能力，实为两得之举。

本教材不仅适用于在校学生，对于有志提高专业英语阅读能力的建筑行业广大在职工程技术人员，也是一套适用的自学教材。

建设部人事教育劳动司高教处和中国建设教育协会对这套教材的编写自始至终给予关注和支持；中国建筑工业出版社第五编辑室密切配合，参与从制定编写方案到审稿各个阶段的重要会议，给了我们很多帮助。在编写过程中，各参编学校相关专业的许多专家、教授对材料的选取、译文的审定都提出了许多宝贵意见。

本书为《建筑类专业英语》给水排水与环境保护专业第一册。本书在编写过程中随蒙刘绍根、汤利华、何开松等同志审阅了中文译文，谨此致谢。

《建筑类专业英语》是我们编写对口专业阅读教材的又一次尝试，由于编写者水平及经验有限，教材中不妥之处在所难免，敬请广大读者批评指正。

《建筑类专业英语》
编审委员会

Contents

UNIT ONE

Text History of Water Supply

[1] Man's search for pure water began in prehistoric times. Much of his earliest activity is subject to speculation. Some individuals might 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.

[2] Thousands of years must have 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. ① Our earliest archeological records of central water supply and wastewater disposal date back about 5000 years, to Nippur of Sumeria. ② In the ruins of Nippur there is an arched drain with the stones set in full "voussoir" position, each stone being a wedge tapering downward into place. ③ Water was drawn from wells and cisterns. An extensive system of drainage conveyed the wastes from the palaces and residential districts of the city.

[3] 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, exposing to sunlight, filtering through charcoal, and cooling in an earthen vessel.

[4] The earliest known apparatus for clarifying liquids was pictured on Egyptian walls in the fifteenth and thirteenth centuries B. C. The first picture represents the siphoning of either water or settled wine. A second picture shows the use of wick siphons in an Egyptian kitchen.

[5] 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. His writings were first translated into English by the noted hydraulic engineer Clemens Herschel in 1899.

[6] 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.

[7] The English philosopher Sir Francis Bacon wrote of his experiments on the purification of water by filtration, boiling, distillation and clarification by coagulation. This 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".

[8] 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 was the same as "by those who built the wells in the Palace of the Doges in Venice and in the palace of Cardinal Sachett, at Rome." ④

[9] The oldest known archeological examples of water filtration are in Venice and the colonies she 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 1300 years. Cisterns were built and many were connected with sand filters. The rainwater ran off the house tops to the streets, where it was collected in stone-grated catch basins and then filtered through sand into cisterns.

[10] 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 inches (in). Nearly all of this rainfall was collected in 177 public and 1900 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. These cisterns continued to be the principal water supply of Venice until about the sixteenth century.

[11] 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, in 1807 filtered water was piped to consumers.

[12] 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 introduced to increase their efficiency. These filters soon evolved to our present rapid sand filters with slight modification.

New Words and Expressions

speculation [spekju'leiʃən]	*n.*	推测
trench [trentʃ]	*n.*	沟，渠
voussoir [vu:swɑ:]	*n.*	（楔形）拱石，（拱）楔块
wedge [wedʒ]	*n.*	楔块，楔形物
taper * ['teipə]	*v.*	弄尖，（使）逐渐变细
cistern ['sistən]	*n.*	蓄水池，贮水器
drainage ['dreinidʒ]	*n.*	排水，排水设备；排出的水
Sanskrit ['sænskrit]	*n.* ; *a.*	梵文（的）
lore [lɔ:]	*n.*	（专门的）知识，（特殊的）学问
inscription [in'skripʃən]	*n.*	（铭）刻，碑文
foul * [faul]	*a.*	污浊的
earthen ['ə:θən]	*a.*	土制的

siphon [ˌsaifən]	*n.*；*v.*	虹吸（管）；用虹吸管输送
settle [ˌsetl]	*v.*	澄清，（使）沉淀
wick [wik]	*n.*	灯芯，（吸）油绳
aqueduct [ˌækwidʌkt]	*n.*	渡槽，沟渠
hydraulic * [haiˌdrɔ:lik]	*a.*	水力（学）的
alchemist [ˌɔlkəmist]	*n.*	炼金术士
treatise [ˌtri:tiz]	*n.*	（专题）论文
distillation [distiˌleiʃən]	*n.*	蒸馏（法）
still [stil]	*n.*	蒸馏（器）
filtration * [filˈtreiʃən]	*n.*	过滤
clarification [klærifiˈkeiʃən]	*n.*	澄清，净化
coagulation [kəuægjuˈleiʃən]	*n.*	絮凝，混凝
sanitation [sæniˈteiʃən]	*n.*	（环境）卫生
sedimentation [sedimənˈteiʃən]	*n.*	沉淀，沉积
ornate [ɔ:ˈneit]	*a.*	（装饰）华丽的
grate [greit]	*v.*	装格栅于
basin [ˈbeisn]	*n.*	水池，水槽
catch basin		集水池，沉水池
lagoon [ləˈgu:n]	*n.*	污水池
patent * [ˈpeitənt]	*vt.*；*n.*	为……取得专利；专利，专利品
anticipate [ænˈtisipeit]	*vt.*	促进
turbidity [tə:ˈbiditi]	*n.*	混浊（性），（混）浊度
coagulant [kəuˈægjulənt]	*n.*	絮凝剂，凝洁剂
modification * [mɔdifiˈkeiʃən]	*n.*	改变（进，良）

Notes

①名词 the convenience 后有两个介词短语并列作后置定语，由 and 连接，第二个短语前省略了 of。

②Nippur of Sumeria 古巴比伦南部地区的一个古城。

③set in…position 为过去分词短语，修饰 the stones；each stone being…into place 为分词的独立结构；tapering…为现在分词短语，作 a wedge 的后置定语。

④关系代词 as 引导定语从句，和 the same 连用；as 从句有省略现象，完整的句子可为 as was used by those …。

Exercises

Reading Comprehension

I. Say whether the following statements are True (T) or False (F) according to the text:

1. It is supposed that people in prehistoric times dug trenches to lead water where they wanted it. ( )
2. The central water supply and wastewater disposal systems found in the ruins of Nippur were probably the earliest built in human history. ( )
3. The pictures on Egyptian walls in the fifteenth and thirteenth centuries B. C. show the apparatus for filtering liquids. ( )
4. It is estimated that the use of siphons dates back about 1500 years. ( )
5. The famous hydraulic engineer Clemens Herschel produced two books on the water supply of Rome, in which he described a settling reservoir. ( )
6. In 1627, Sir Francis Bacon wrote of his experiments on the purification of water by distillation and illustrated various stills for water and other liquids. ( )
7. The earliest published work on mass sanitation written by Porzio described and illustrated the use of sand filters and sedimentation. ( )
8. The low consumption of water in Venice was due in part to the absence of sewers, the low levels of annual rainfall and the universal drinking of wine. ( )
9. Nenry Darcy's filters patented in 1856 were superior in all aspects except coagulation to those developed in America. ( )
10. Our present rapid sand filters are quite different from those developed in the late nineteenth century. ( )

II. Identify main ideas for each paragraph by matching the following ideas with their appropriate paragraph numbers:

A. Frontinus made the first engineering report on water supply and treatment in A. D. 98. (9)

B. A comprehensive article on the water supply of Venice appeared in the Practical Mechanics Journal in 1863. (2)

C. The earliest records of central water supply and wastewater disposal date back about 5 000 years, to Nippur of Sumeria. (8)

D. Hency Darcy's filters patented in 1856 anticipated all aspects of the American rapid sand filters except coagulation. (5)

E. An Italian physician published the first known illustrated description of sand filters in 1685. (10)

Vocabulary

Ⅰ. Fill in the blanks with the verbs given below, change the form if necessary:

store	apply	show	evolve	produce
describe	date	provide	conserve	settle

1. Water is a precious natural resource and one that should _____ but recycling is not just an environmental issue.
2. History _____ ample evidence of the potency of water-borne infection, with typhoid, cholera and dysentery as killer diseases.
3. In East Anglia a 16 Ha landfill _____ back to 1973 had seriously started to contaminate the underlying aquifer (含水层) and threaten local water supplies.
4. The wastewater treatment plant has proved highly effective in _____ water of the required specification and volume.
5. In the 1970s, the Chesapeake Bay _____ serious signs of illenss: algae blooms, low dissolved oxygen levels and loss of submerged aquatic vegetation.
6. Atlantic City _____ from a popular summer resort into a major east tourist and game center.
7. In agriculture throughout the developed world, it is normal management practice to _____ pesticides to protect crops against damage caused by pests, pathogens and weeds.
8. As common past practice, petroleum refinery waste _____ in open pits which now require remediation to meet current environmental regulations.
9. The consistency (稠度) of the sludge from the waste site can _____ as a viscous (粘稠的) semi-solid material, which varies from solid at some locations to a liquid at others.
10. One of the methods to remove solid wastes in water is sedimentation, in which wastes are allowed to _____ until they become solid or semisolid and can be removed.

Ⅱ. Complete each of the following statements with one of the four choices given below:

1. Virtually all establishments where food is cooked, prepared or processed discharge some grease into the _____ system in the form of fats or cooking oils.
   A. voussoir B. drainage C. cistern D. residential
2. Odour from sewerage, sewage treatment and trade effluents, can be _____ a great many substances.
   A. subject to B. due to C. based on D. exposed to
3. Surface waters usually must be treated by _____ and chlorination to make them suitable for human consumption.
   A. filtration B. sanitation C. modification D. purification
4. Rivers and streams have always been used to carry away domestic effluent——sewage——and before sewage systems and treatment works were constructed this prac-

tice made our rivers quite _____.

A. urgent B. ornate C. universal D. foul

5. Towards the end of the last century the relationship between polluted water _____ and disease became evident in UK and many other European countries.

A. disposal B. turbidity C. consumption D. coagulation

Reading Material A

Major Water Pollutants (I)

Water may be considered polluted because of an excess or burden of any gaseous, liquid, or solid constituent. The list of substances that may pollute water is almost endless, but the major pollutants are discussed here briefly.

Organic Wastes

Organic wastes are contributed by domestic sewage from both rural and urban areas and by industrial wastes of animal and plant origin. Although domestic sewage is the most widespread source of degradable organic wastes, industry contributes about an equal amount of such wastes. The greatest industrial generators of organic wastes are the food and pulp-and-paper industries, which have numerous plants, many of which discharge massive loads of organic wastes into waters. ① One sugar beet processing plant during its brief seasonal operation may produce organic wastes equivalent to the sewage flow of a city of half a million people.

The breakdown of organic wastes by bacteria removes oxygen from the water, producing a serious problem. Since fish and aquatic life depend on dissolved oxygen, oxygen-demanding organic wastes damage the aquatic environment. When such wastes consume oxygen excessively, conditions of gross septic pollution result.

Living Agents

Living agents that can pollute water include bacteria, viruses, and other microorganisms that can cause disease. These organisms may enter water through domestic sewage or through certain kinds of industrial wastes, especially those associated with the tanning industry or animal slaughter. Although the bacteria causing typhoid and cholera are effectively controlled in most developed countries of the world, they still present a danger in many underdeveloped areas. Harder-to-destroy viruses that may cause intestinal or other infections pose a continuing water pollution problem.

Plant Nutrients

Plant nutrients-substances that stimulate the growth of plants- are also major polluters of water. The two principal water polluting elements in plant nutrients are nitrogen and phosphorus, but trace amounts of other elements are also present. These elements are usually present in small amounts in natural waters, but much larger amounts are contributed by sewage, certain industrial wastes, and drainage from fertilized lands and underground materials high in nitrates. Biological waste treatment processes do not remove plant nutrients from water. In fact, such treatment makes them more usable by plant life.

When plant nutrients spill over in large amounts into water, they act as fertilizers, stimulating the intensive and extensive growth of water plants, such as algae and water weed. ② Such growth often causes unsightly conditions, interferes with water treatment processes, and creates unpleasant and disagreeable tastes and odors. When these plant growths die and decay, they not only produce a foul taste and odor but also cause secondary oxygen consumption, thus lowering the level of dissolved oxygen in the water. Such excessive development of plant life from surplus nutrients in surface streams, lakes, and ponds is known as eutrophication. ③

Oil

Water is polluted by oil discharge from barges and ships or from the accidental or careless handling of crude oil in transport, development, and drilling operations. It is estimated that 1.5 million tons of oil are spilled into the ocean each year. Oil-polluted water results in great damage to aquatic life and other wildlife. Waterfowl alighting on oil sump areas or oil covered waters usually become so oil soaked that they are unable to fly. Oil destroys much of the aquatic life of oceans, including the food for fishes and shellfish. There is little information on the toxicological effects of oil on man or other warmblooded animals. Experience along the Santa Barbara coast of California indicates that severe oil spills also result in substantial immediate economic losses to the nearby communities.

Notes

①最大的工业有机废物的制造者是食品和纸浆造纸工业，这些工业有众多生产厂家，其中许多厂家都将大量的有机废物排入水体。

②当植物营养素大量流入水中时，它们便作为肥料而促使水生植物（如藻类和水草），密集而又大范围地生长。

③在地表的河流、湖泊和池塘中，由于过剩的营养素而造成的这种植物的过分生长被称为富营养化。

Reading Material B

Major Water Pollutants (Ⅱ)

Synthetic Organic Chemicals

The steady output of new chemical compounds for a variety of purposes has produced new pollutants of increasing concern. New products are developed and old ones abandoned before their pollution significance can be determined. ① In many chemical industries, for example, a majority of sales are of products unknown only two or three years earlier. Included in this group are detergents and many other household cleaning products, new synthetic pesticides, synthetic industrial chemicals of a wide variety, and wastes from the manufacture of these products. ② In particular, pesticides, such as DDT, dieldrin, and chlordane, used to control insect pests in agricultural situations but eventually found in water, are of growing concern. ③ The synthetic organic chemicals or their residues are often toxic to fish and other aquatic life as well as detrimental to man. Their stability and persistence in the water environment produce new and complex problems in conventional water and waste treatment.

Inorganic Chemical and Mineral Substances

Inorganic chemicals and minerals may also pollute water-interfering with stream purification, destroying fish and aquatic life, causing excessive hardness of water supply, having corrosive effects on machinery, and, in general, adding to the cost of water treatment. Included in this group are a vast array of metals, metal salts, acids, solid particulate matter, and many other synthetic chemical compounds and their by-products and wastes.

Mercury pollution has just recently been recognized as a very serious and widespread danger in many waterways. Abnormal amounts of mercury have been found in water and in fish and game birds in more than half of the states. Mercury, even in very small amounts, can cause very serious physiological effects and in some cases death. It, like the pesticides, travels along the food chain-that is, is passed from organism to organism, such as from minute aquatic microorganisms to fish to game birds or to man. ④

Inorganic chemical pollutants are contributed to water through the wastes from mining and manufacturing processes, oil-field operation, agricultural practices, and natural sources. Irrigation, particularly in the western United States, leaches large amounts of mineral salts from the soil, adding substantially to the salt load of downstream water supplies. Natural salt and gypsum deposits in the southwest United States are particularly serious sources of pollution in that area, damaging or making unusable large quantities of ground, stream, and impounded

water. Oil-field brines compound the salt problem in that region. Acids of a wide variety are discharged as waste by industry, particularly from abandoned workings and tailing of acid mine operations. Acid mine drainage is a major problem in the Ohio, Delaware, and Susquehanna rivers and in certain tributaries of the Mississippi River.

Cold Water

Cold water can also be a water pollutant, harming the production of some agricultural crops. Cold water released from the deep layers of storage reservoirs into surface streams of irrigation canals can, for example, have undesirable physiological effects on crops, retarding germination and reducing yields. This has happened in rice-growing areas in the Sacramento Valley of California. Cold water is also undesirable from the standpoint of recreational use.

Notes

①新、老产品在其污染性尚未能确定之前，便被开发利用或遭淘汰。

②在这一类污染物中，包括洗涤剂和许多其它家用洗涤产品，新的合成农药，品种繁多的合成化工产品及制造这些产品所产生的各类废物。

③特别是在农业环境中为防治虫害而使用的杀虫剂如滴滴涕，狄氏剂和氯丹，它们最终都出现在水体中，越来越令人担忧。

④象农药一样，汞会沿食物链转移，即由一个生物传给另一个生物，如由微小的水生微生物传给鱼、狩猎野禽或人。