21世纪精品规划教材系列

土木工程英语

TU MU GONG CHENG YING YU

主编◎殷飞　胡宇祥

吉林大学出版社

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图书在版编目(CIP)数据

土木工程英语 / 殷飞，胡宇祥主编. —— 长春 ：吉林大学出版社，2015.6

ISBN 978-7-5677-3978-9

Ⅰ. ①土… Ⅱ. ①殷… ②胡… Ⅲ. ①土木工程-英语 Ⅳ. ①H31

中国版本图书馆 CIP 数据核字(2015)第 144920 号

书　　名：土木工程英语

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责任编辑：赵国复　责任校对：赵国复　　封面设计：可可工作室

吉林大学出版社出版、发行　　北京楠海印刷厂印刷

开本：787×1092 毫米　1/16　　2015 年 7 月 第 1 版

印张：18　字数：320 千字　　2015 年 7 月 第 1 次印刷

ISBN 978-7-5677-3978-9　　定价：38.00 元

社址：长春市明德路 501 号　邮编：130021

发行部电话：0431-89580028/29

网址：http://www.jlup.com.cn

E-mail：jlup@mail.jlu.edu.cn

前　言

《土木工程英语》是大学英语教学的一个重要组成部分，教育部颁布的《大学英语教学大纲》把专业英语列为必修课，目的是通过专业英语的学习，培养学生的阅读和翻译英文专业文献的能力，为学生参与国际市场的竞争和国际技术合作奠定良好的基础。为此，编者精选土木工程领域相关学科的研究内容和阅读材料，从而提高教材的针对性。

本书的主要特色有：

1. 编写本书课程的作者均由长期从事土木工程英语教学实践的教师担任，他们能够根据土木工程学科的最新发展趋势、最新研究成果，及时补充教学内容。

2. 本书选取的九个单元的文章内容，涉及建筑材料、结构分析、钢筋混凝土结构、钢结构、土木工程施工、招投标、土木工程管理、土木工程基础设施等九个方面的专业英语知识，在每篇内容后附有单词和常用的有用短语，同时每单元后面配有英文阅读文献以及中文翻译，以便学生自学需要。

本教材由吉林农业科技学院殷飞、胡宇祥担任主编，金世佳，刘派，梁丽青担任副主编。具体编写分工如下：殷飞（吉林农业科技学院）编写第一章、第二章、第三章；胡宇祥（吉林农业科技学院）编写第四章、第五章、第六章；金世佳（吉林农业科技学院）编写第七章；刘派（吉林农业科技学院）编写第八章；梁丽青（吉林农业科技学院）编写第九章。全书由殷飞完成大纲制定及统稿工作。

在编写过程中，特别要感谢北京青青翠竹图书中心的谢老师；同时还要感谢吉林大学出版社老师的大力支持，在此一并致谢！这里还需要说明的是书中的许多插图均来源于参考文献中的各位作者，但有些插图不能确定就是作者原图，特别是有些插图经多本书引用，但又没注明出处，我们又很难考证原图，因此本书中插图出处也只好空缺。如有插图原作者发现插图来源有误，请及时与我们联系，我们将在再版时予以更正，并表示歉意。由于编写时间有限以及编者水平有限，书中不足之处，恳请广大读者批评指正。

编者

2015 年 7 月

目 录

Chapter 1 Introduction to Civil Engineering

What is Civil Engineering

Civil engineering, the oldest of the engineering specialties, is the planning, design, construction and management of the built environment. This environment includes all structures built according to scientific principles, from irrigation and drainage systems to rocket-launching facilities.

Civil engineers build roads, bridges, tunnels, dams, harbors, power plants, water and sewage systems, hospitals, schools, mass transit, and other public facilities essential to modern society and large population concentrations. They also build privately owned facilities such as airports, railroads, pipelines, skyscrapers, and other large structures designed for industrial, commercial, or residential use. In addition, civil engineers plan, design, and build complete cities and towns, and more recently have been planning and designing space platforms to house self-contained communities.

The word civil derives from the Latin for citizen. In 1782, Englishman John Smeaton used the term to differentiate his nonmilitary engineering work from that of the military engineers who predominated at the time. Since then, the term civil engineering has often been used to refer to engineers who build public facilities, although the field is much broader.

Scope. Because it is so broad, civil engineering is subdivided into a number of technical specialties. Depending on the type of project, the skills of many kinds of civil engineer specialists may be needed. When a project begins, the site is surveyed and mapped by civil engineers who locate utility placement-water, sewer, and power lines. Geotechnical specialists perform soil experiments to determine if the earth can bear the weight of the project. Environmental specialists study the project's impact on the local area: the potential for air and groundwater pollution, the project's impact on local animal and plant life, and how the project can be designed to meet government requirements aimed at protecting the environment. Transportation specialists determine what kinds of facilities are needed to

ease the burden on local roads and other transportation networks that will result from the completed project. Meanwhile, structural specialists use preliminary data to make detailed designs, plans, and specifications for the project. Supervising and coordinating the work of these civil engineer specialists, from beginning to end of the project, are the construction management specialists. Based on information supplied by the other specialists, construction management civil engineers estimate quantities and costs of materials and labor, schedule all work, order materials and equipment for the job, hire contractors and subcontractors, and perform other supervisory work to ensure the project is completed on time and as specified.

Throughout any given project, civil engineers make extensive use of computers. Computers are used to design the project's various elements (computer-aided design, or CAD) and to manage it. Computers are a necessity for the modern civil engineer because they permit the engineer to efficiently handle the large quantities of data needed in determining the best way to construct a project.

Structural engineering. In this specialty, civil engineers plan and design structures of all types, including bridges, dams, power plants, supports for equipment, special structures for offshore projects, the United States space program, transmission towers, giant astronomical and radio telescopes, and many other kinds of projects. Using computers, structural engineers determine the forces a structure must resist: its own weight, wind and hurricane forces, temperature changes that expand or contract construction materials, and earthquakes. They also determine the combination of appropriate materials: steel, concrete, plastic, stone, asphalt, brick, aluminum, or other construction materials.

Water resources engineering. Civil engineers in this specialty deal with all aspects of the physical control of water. Their projects help prevent floods, supply water for cities and for irrigation, manage and control rivers and water runoff, and maintain beaches and other waterfront facilities. In addition, they design and maintain harbors, canals, and locks, build huge hydroelectric dams and smaller dams and water impoundments of all kinds, help design offshore structures, and determine the location of structures affecting navigation.

Geotechnical engineering. Civil engineers who specialize in this field analyze the properties of soils and rocks that support structures and affect structural behavior. They evaluate and work to minimize the potential settlement of buildings and other structures that stems from the pressure of their weight on the earth. These engineers also evaluate and determine how to strengthen the stability of slopes and fills and how to protect structures against earthquakes and the effects of groundwater.

Environmental engineering. In this branch of engineering, civil engineers design,

build, and supervise systems to provide safe drinking water and to prevent and control pollution of water supplies, both on the surface and underground. They also design, build, and supervise projects to control or eliminate pollution of the land and air. These engineers build water and wastewater treatment plants, and design air scrubbers and other devices to minimize or eliminate air pollution caused by industrial processes, incineration, or other smoke-producing activities. They also work to control toxic and hazardous wastes through the construction of special dump sites or the neutralizing of toxic and hazardous substances. In addition, the engineers design and manage sanitary landfills to prevent pollution of surrounding land.

Transportation engineering. Civil engineering in this specialty build facilities to ensure safe and efficient movement of both people and goods. They specialize in designing and maintaining all types of transportation facilities, highways and streets, mass transit systems, railroads and airfields, ports and harbors. Transportation engineers apply technological knowledge as well as consideration of the economic, political, and social factors in designing each project. They work closely with urban planners, since the quality of the community is directly related to the quality of the transportation system.

Pipeline engineering. In this branch of civil engineering, engineers build pipelines and related facilities which transport liquids, gases, or solids ranging from coal slurries(mixed coal and water)and semi-liquid wastes to water, oil, and various types of highly combustible and noncombustible gases. The engineers determine pipeline design, the economic and environmental impact of a project on regions it must traverse, the type of materials to be used-steel, concrete, plastic, or combinations of various materials-installation techniques, methods for testing pipeline strength, and controls for maintaining proper pressure and rate of flow of materials being transported. When hazardous materials are being carried, safety is a major consideration as well.

Construction engineering. Civil engineers in this field oversee the construction of a project from beginning to end. Sometimes called project engineers, they apply both technical and managerial skills, including knowledge of construction methods, planning, organizing, financing, and operating construction projects. They coordinate the activities of virtually everyone engaged in the work: the surveyors; workers who lay out and construct the temporary roads and ramps, excavate for the foundation, build the forms and pour the concrete; and workers who build the steel framework. These engineers also make regular progress reports to the owners of the structure.

Community and urban planning. Those engaged in this area of civil engineering may plan and develop communities within a city, or entire cities. Such planning involves far more than engineering consideration; environmental, social, and economic factors in the

use and development of land and natural resources are also key elements. These civil engineers coordinate planning of public works along with private development. They evaluate the kinds of facilities needed, including streets and highways, public transportation systems, airports, port facilities, water-supply and wastewater-disposal systems, public buildings, parks, and recreational and other facilities to ensure social and economic as well as environmental well-being.

Photogrametry, surveying, and mapping. The civil engineers in this specialty precisely measure the Earth's surface to obtain reliable information for locating and designing engineering projects. This practice often involves high-technology methods such as satellite and aerial surveying, and computer-processing of photographic imagery. Radio signals from satellites, scans by laser and sonic beams, are converted to maps to provide far more accurate measurements for boring tunnels, building highways and dams, plotting flood control and irrigation projects, locating subsurface geologic formations that may affect a construction project, and a host of other building uses.

Other specialties. Two additional civil engineering specialties that are not entirely within the scope of civil engineering but are essential to the discipline are engineering management and engineering teaching.

Engineering management. Many civil engineers choose careers that eventually lead to management. Others are able to start their careers in management positions. The civil engineer-manager combines technical knowledge with an ability to organize and coordinate worker power, materials, machinery, and money. These engineers may work in government-municipal, county, state, or federal; in the U. S. Army Corps of Engineers as military or civilian management engineers; or in semiautonomous regional or city authorities or similar organizations. They may also manage private engineering firms ranging in size from a few employees to hundreds.

Engineering teaching. The civil engineer who chooses a teaching career usually teaches both graduate and undergraduate students in technical specialties. Many teaching civil engineers engage in basic research that eventually leads to technical innovations in construction materials and methods. Many also serve as consultants on engineering projects, or on technical boards and commissions associated with major projects.

Words and Expressions

predominate v. 居支配地位,统治,(数量上)占优势
geotechnical adj. 岩土工程的
specification n. 载明,详述,技术要求,说明书,清单
supervise v. 监督,管理,控制

subcontractors n. 转包合同,转包工作(给第三者),承做(转包的工作)
hurricane n. 飓风,(感情等的)爆发
asphalt n. 沥青
aluminum n. 铝
runoff n. 雨量,流量,径流,决定性竞赛,决赛
lock n. 水闸,船闸
fill n. 充填,填方,装填物
scrubber n. 洗涤器,擦布,擦洗者
incineration n. 烧尽、焚化,火葬
toxic adj. 有毒性的,中毒的
combustible adj. 易燃的,可燃的,易激怒的
ramp n. 斜坡,斜面,滑台
excavate v. 挖掘,开挖,发掘
precisely adj. 精确的,刻板的,正好,恰恰
aerial adj. 空气的,大气的,航空的
sonic adj. 能发出声音的,声音的,音速的
plotting n. 测绘,标图,标航路
municipal adj. 市政的,市立的,地方性
commission n. 委任,委员会
drainage system 排水系统

Reading Material One

Introduction to Civil Engineering

Civil Engineering English is Civil Engineering, the literal translation is the civil engineering, it is constructed in various projects referred to. It refers to the construction of the object, that is built on the ground, underground, underwater engineering facilities, equipment and materials to use for the survey, design and construction, maintenance repair and other professional and technical.

Civil engineering with the progress of the human society, has been transformed into large comprehensive discipline, it has a number of branches, such as: Engineering, railway engineering, road engineering, bridge engineering, engineering structure, water supply and drainage engineering, port engineering, hydraulic engineering, environmental engineering disciplines. A total of six professional civil engineering: architecture, city plan-

ning, civil engineering, building environment and equipment engineering, water supply and drainage engineering and road bridge project. Civil engineering as a very important basic discipline has its important properties: comprehensive, sociality, practicality, unity. Civil engineering for the development of the national economy and the improvement of people's life provided important corporeal technology basis, the numerous industry revitalize played a role in promoting the construction of fixed assets, is the formation of the basic production process, therefore, the construction industry and real estate becomes a lot of countries and regions of the pillar of the economy.

The ancient civil engineering for a long time span, roughly from 500 BC Neolithic appearance of original civil engineering activities until the end of sixteenth Century the Renaissance in Italy, leading to civil engineering and embark on the path of rapid development, and has experienced more than two thousand years. During this time, as the development of scientific theory and its slow, civil engineering and also did not break the habit development. In ancient times, living and contacts, mankind began to dig into burrows, wood frame for the bridge of the original civil engineering activities, China the Yellow River basin up to Shao Wenhua and the site of Xi'an Banpo site have been found in shallow hole for living and a diameter of 5 — 6 meters of round house. Chinese ancient architecture with wooden structure, and gradually formed and the like to adapt to the style, in Fourteenth Century the construction of the Beijing the Imperial Palace is the world's largest and most complete ancient wood structure buildings, in Yingxian County palace, the tower is the world's tallest wooden building. At the same time, Europe to arch structure consisting mainly of ancient buildings has reached a very high level, Italy is the Cathedral of Pisa, France's Notre Dame de Paris, the Papal Basilica of Saint Peter in Rome are a reflection of Europe this period construction and structure of the highest achievements of. From Seventeenth Century began in nineteen forties page to Second World War until the end of the 300 years, foreign construction obtained great progress. Civil engineering into quantitative analysis stage. The development of some theories, the emergence of new material, new tools of the invention, the civil engineering science increasingly perfect and mature. In modern times, since the end of World War II, many countries take off the economy, modern science and progress, so as to further development provided a powerful driving force and material basis. Especially in our country, the civil engineering in this period of time, more make a spurt of progress, buildings, bridges, roads, tunnels, either in theory or in technology, foundation construction, gained huge success. Of people living standard rise ceaselessly, inevitable requirement more and more comfortable living environment, in this case, building development directly promote the development of civil engineering. In ancient times, people Chaojuxuechu, later stone appears, people started to use tools to

build simple housing, to the Ming and Qing Dynasties, Chinese wooden construction technology and scale reached its peak. After the liberation, with the state of infrastructure investment to increase ceaselessly, a tower like bamboo shoots after a spring rain as it appears in the land of china.

Construction is construction of housing planning, surveying, design, construction. Is intended for the production of human life and provides places. Housing consists of ten parts:

(1)Buried foundation and basement

(2)Bearing the external force and the force is transmitted to the foundation columns, floor slab, beam, frame wall, roof and support system

(3)Around the hungry maintenance structure and intermediate partition

(4)Inside and outside the housing decoration

(5)Control environment of the heating, ventilation, air conditioning, lighting, fire insulation system

(6)Staircases, elevators or escalators, vertical transmission system

(7)Closed-circuit television, telephone, computer network and communication system

(8)Power system

(9)Sanitation and water supply and drainage systems

(10)Waste disposal system.

Building materials in construction. Also play a decisive role. Building materials is with the human society productivity and the improvement of science and technology develops. The earliest human cave nest, almost no building materials concept into stone, ironage, began digging stone quarry for the hole, logging a bamboo shed, using the most primitive materials to build the most rudimentary housing. Later, made of baked clay brick, lime rock system, gypsum, building materials from natural to artificial stage, for the construction of the large houses to create the conditions. After Eighteenth Century, the development of science and technology makes the building material has entered a new development stage, iron and steel, cement, concrete and other materials have come out in succession, laid the foundation for modern buildings. After Twentieth Century, building materials and quality defects to improve, the increasing varieties, organic material consisting mainly of chemical building materials is a new force suddenly rises, some special features of the building materials such as insulation, sound absorption and insulation material, fireproof material, water-proof material, emerge as the times require explosion-proof radiation-proof materials, these materials for the building to provide a strong material security. Now the construction, engineering quality is usually associated with the material, the performance and the use of reasonable or not direct contact, meet the same technical indicators and qual-

ity requirements of the premise, the choice of different materials using different methods, to project cost has a direct effect on.

In the process of construction, building construction and building mechanics, building materials is also important. Construction is the designer's thoughts, intentions and ideas into reality in the process, from the ancient cave nest to the modern skyscrapers, from the rural country road to the city overhead road needs through the" construction" means to achieve. A construction project includes many types of engineering, such as excavation, pile foundation engineering, concrete engineering, steel structure engineering, structure hoisting project, waterproof engineering, various types of engineering has its own laws, all according to the different needs of the construction of the object and construction of environmental conditions by using the corresponding construction technology, the civil engineering construction at the same time, with the relevant water, warm wind and other equipment as a whole, each project between reasonable organization and coordination, improve the investment benefit. Civil engineering construction in the play of efficiency at the same time, and strictly in accordance with national issued by the relevant technical specification of construction, so as to further improve the construction level of our country, to ensure the construction quality, reduce project cost.

Any buildings are all built on the surface of the earth's formation; the building's weight would finally passed to the formation, a formation to bear. Support for the construction of strata is collectively referred to as the foundation, building on the ground and the upper structure of the self weight and bear load transfer to the ground component or components called foundation. Foundation, foundation and superstructure is building three integral part. Three different functions, but when under load, they are related to each other, is the joint effect of the whole. Foundations can be divided into the natural foundation and the artificial foundation, foundation according to the depth into the deep foundation and shallow foundation. Foundation and foundation, is to guarantee the quality safety of buildings and the normal use of the key, the foundation of the building on the building loads to maintain overall stability and foundation settlement in a building permit, and the foundation itself should have enough strength, stiffness and durability, while also considering the repair base the method and the necessary retaining soil and water and related measures.

As people living standard rise ceaselessly, people on the building space is not simply from the number of proposed higher requirements, but also from the quality also mention cars higher requirements, requirements of the environment is beautiful, there is a certain comfort. It is necessary to building the necessary renovation. If the main building engineering constitutes an architectural framework, then after decoration building became the

true to life organism, eventually to enrich, improve the face appears in front of people, the best construction should embody a variety of decorative materials related characteristics, combined with the existing construction technology, the most effective way to achieve conception, to express the effect. Building decoration to consider building space requirements, to protect the body from damage, allow people to enjoy beauty, meet the fire evacuation requirements, decorative materials and the rationality of scheme, construction technology and economic feasibility. Housing construction and development at the same time, like building as influences the life of people road, bridge, tunnel, also obtained great progress.

In general civil engineering is one of the oldest subjects, it has made great achievements,in the future, the civil engineering will be in people's life is more important. The Earth environment is deteriorating, the increase of population, people to strive for the survival, to strive for a more comfortable living environment, will pay more attention to civil engineering. In the near future, some major projects will be built, is inserted into the sky skyscrapers, bridges across the ocean, the more convenient traffic will not be a dream. The development of science and technology, as well as the worsening environment will promote civil engineering to the outer space and ocean development, provide more vast living space. In recent years, construction materials mainly steel, concrete, wood and brick, in the future, the traditional material will be change, some new and more suitable for building materials will be available, especially chemical synthesis material will promote the construction of higher point. At the same time, the accurate design method, design automation, information and intelligent speech technology comprehensive introduction, will people have a more comfortable living environment. In a word, theory development, the emergence of new materials, the application of computer, introduction of high technologies will make the civil engineering is a new leap forward.

土木工程概论

土木工程的英文是 Civil Engineering,直译是民用工程,它是各种建造工程的统称。它既指建设的对象,即建造在地上、地下、水中的工程设施,也指应用的材料设备和进行的勘测、设计施工、保养维修等专业技术。

土木工程随着人类社会的进步而发展,至今已经演变成为大型综合性的学科,它已经有许多分支,如:建筑工程,铁路工程,道路工程,桥梁工程,特种工程,给水排水工程,港口工程,水利工程,环境工程等学科。土木工程共有六个专业:建筑学,城市规划,土木工程,建筑环境与设备工程,给水排水工程和道路桥梁工程。

土木工程作为一个重要的基础学科,有其重要的属性:综合性,社会性,实践性,统一性。土木工程为国民经济的发展和人民生活的改善提供了重要的物质技术基础,对众多产业的振兴发挥了促进作用,土木工程建设是形成固定资产的基本生产过程,因此,建筑业和房地

产业成为许多国家和地区的经济支柱之一。

古代的土木工程有很长的时间跨度，大致从公元前500年新石器时代出现原始的土木工程活动到16世纪末意大利的文艺复兴，导致土木工程走上迅速发展的道路为止，前后经历了两千多年。在这段时间内，由于科学理论发展极其缓慢，土木工程也没有突破习惯的发展。在远古时代，由于居住和交往的需要，人类开始了掘土为穴，架木为桥的原始的土木工程活动，我国黄河流域的仰韶文化遗址和西安半坡遗址发现了有供居住的浅穴和直径为5～6米的圆形房屋。中国古代的建筑多采用木结构，并逐渐形成与此相适应的风格，公元14世纪建造的北京故宫是世界上最大的最完整的古代木结构宫殿建筑群，应县的木塔是世界上最高的木建筑。与此同时，欧洲的以石拱结构为主的古代房屋建筑也达到了很高的水平，意大利的比萨大教堂，法国的巴黎圣母院，罗马的圣彼得大教堂均反映了欧洲这一时期建筑施工和结构的最高成就。从17世纪中叶开始到20世纪40年代第二次世界大战结束为止的300年间，国外的建筑取得了长足的进步。土木工程进入了量化分析阶段。一些理论的发展，新材料的出现，新工具的发明，都使土木工程科学日渐完善和成熟。到了近代，二战结束之后，许多国家经济起飞，现代科学日益进步，从而为进一步发展提供了强大的动力和物质基础。尤其是我国，土木工程在这一段时间内，更是突飞猛进，建筑，桥梁，道路，隧道等，无论是在技术理论上，还是在基础建设上，都取得了巨大的成就。人们生活水平的不断提高，必然要求越来越舒适的居住环境，在这种情况下，建筑的发展直接推动了土木工程的发展。远古时代，人们巢居穴处，后来石器的出现，人们开始利用工具建造简单的住房，到明清时期，中国的木结构建筑技术和规模都达到了顶峰。解放后，随着国家对基础建设的投入的不断加大，一座座高楼像雨后春笋一样出现在中华大地。

建筑工程就是兴建房屋规划，勘测，设计，施工的总称。目的是为人类的生产和生活提供场所。房屋建筑一般包括十个部分：(1)埋在地下的基础和地下室；(2)承载外力并把力传到基础的柱子，楼板，梁，框架墙，屋盖及支撑体系；(3)四周的结构和中间的隔墙；(4)房屋内外的装饰；(5)控制环境的供暖，通风，空气调节，照明，防火隔声等系统；(6)楼梯间，电梯或自动扶梯等垂直传输系统；(7)闭路电视，电话，计算机网络等通讯系统；(8)电力系统；(9)卫生设备和给水排水系统；(10)垃圾处理系统。

建筑材料在建筑中也有着举足轻重的作用。建筑材料是随着人类社会生产力和科学技术的提高而逐步发展起来的。人类最早穴居巢处，几乎没有建筑材料的概念，后进入到石器铁器时代，开始掘土凿石为洞，伐木搭竹为棚，利用最原始的材料建造最简陋的房屋。后来，用黏土烧制砖瓦，用岩石制石灰，石膏，建筑材料从天然进入了人工阶段，为建造较大的房屋创造了条件。18世纪后，科学技术的发展促使建筑材料进入了一个新的发展阶段，钢铁，水泥，混凝土及其他材料的相继问世，为现代的建筑奠定了基础。20世纪后，建材性能和质量的缺陷改善，品种不断增加，以有机材料为主的化学建材异军突起，一些具有特殊功能的建材如绝热材料，吸声隔热材料，耐火防火材料，防水抗渗材料，防爆防辐射材料应运而生，这些材料为房屋建筑提供了强有力的物质保障。现在的建筑中，工程质量的优劣通常与所采用材料的优劣，性能及使用的合理与否有直接的联系，在满足相同技术指标和质量要求的前

提下，选择不同的材料不同的使用方法，都对工程的造价有直接的影响。

在建筑过程中，建筑工程施工是和与建筑力学，建筑材料同样重要的一个环节。建筑施工是将设计者的思想，意图及构思转化为现实的过程，从古代的穴居巢处到现在的摩天大楼，从农村的乡间小道到城市的高架道路都需要通过“施工”的手段来实现。一个工程的施工包括许多工种工程，诸如土方工程，桩基础工程，混凝土结构工程，钢机构工程，结构吊装工程，防水工程等，各个工种工程都有自己的规则体系，都需要根据不同的施工对象及施工环境条件采用相应的施工技术，在土建施工的同时，需要与有关的水电，风暖及其他设备组成一个整体，各工程之间合理地组织与协调，更好地发挥投资的效益。土木工程施工在发挥效益的同时，还要严格按照国家颁布的有关施工技术规范，从而进一步提高我国的施工水平，保证施工质量，降低工程成本。

任何建筑无不修建在地球表面的地层上，建筑的重量最后都会传给地层，有地层来承受。支撑建筑的地层被统称为地基，建筑物在地面以下并将上部结构的自重与所承担的载荷传递到地基上的构件或部分构件称为基础。地基，基础和上部结构是建筑物的三个不可分割的部分。三者功能不同，但在载荷的作用下，它们彼此相关，是共同作用的整体。地基可分为天然地基和人工地基，基础根据埋深分为深基础和浅基础。基础和地基的质量是保证建筑物的安全和正常使用的关键所在，建筑物的地基在建筑物的载荷作用下既要保持整体的稳定性又要使地基产生的沉降在建筑物许可范围内，而地基本身应有足够的强度、刚度和耐久性，同时还要考虑修基础的方法和必要的挡土挡水及相关措施。

随着人们生活的水平的不断提高，人们对自己所处的建筑空间已经不仅仅单纯从数量上提出更高的要求，而且从质量上也提出了更高的要求，要求环境美观，有一定的舒适度。这就需要对建筑进行必要的装修。如果说建筑主体工程构成了建筑的骨架，那么装饰后的建筑则成了有血有肉的有机体，最终以丰富的，完善的面貌出现在人们的面前，最佳的建筑应该充分体现各种装饰材料的有关特性，结合现有的施工技术，最有效的手法，来达到构思所要表达的效果。建筑装修要考虑建筑空间的使用要求，保护主体机构免受损害，给人以美的享受，满足消防疏散的要求，装饰材料和方案的合理性，施工技术和经济的可行性等。房屋建筑得到发展的同时，像房屋建筑一样影响着人们生活的道路、桥梁、隧道等也取得了长足的发展。

总地来说，土木工程是一门最古老的学科，它已经取得了巨大的成就，未来的土木工程将在人们的生活中占据更重要的地位。地球环境的日益恶化，人口的不断增加，人们为了争取生存，为了争取更舒适的生存环境，必将更加重视土木工程。在不久的将来，一些重大项目将会陆续兴建，插入云霄的摩天大楼，横跨大洋的桥梁，更加方便的交通将不是梦想。科技的发展，以及地球不断恶化的环境必将促使土木工程向外太空和海洋发展，为人类提供更广阔的生存空间。近年来，工程材料主要是钢筋、混凝土、木材和砖材，在未来，传统材料将得到改观，一些全新的更加适合建筑的材料将问世，尤其是化学合成材料将推动土木工程走向更高点。同时，设计方法的精确化，设计工作的自动化，信息和智能化技术的全面引入，将会使人们有一个更加舒适的居住环境。一句话，理论的发展，新材料的出现，计算机的应用，