



“十三五”国家重点出版物出版规划项目
面向可持续发展的土建类工程教育丛书

SUSTAINABLE
DEVELOPMENT

工程管理 专业英语



◎ 主编 宁欣
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吴春林

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本书共分12章,用纯正的英语介绍了建设工程实践、建筑材料和建筑结构、建设工程造价和成本管理、建设工程质量管理、建设工程施工进度计划、建设工程合同管理、建设工程风险管理、建设工程项目评估、建设工程健康和安全管理、建设工程领导力与管理、建设工程管理中的先进技术、可持续建设工程管理。

本书内容新颖、层次清晰,基本涵盖了国际上工程管理领域的主要知识和技能。

本书可作为普通高等学校工程管理、管理科学与工程、工程造价、土木工程等专业本科及研究生教材,也可作为政府、企事业单位等各类工程管理人员开展涉外事务的业务参考用书。

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前 言

随着改革开放的持续推进和“一带一路”倡议的稳步实施，我国不仅建设了杰出的、规模庞大的基础设施，而且建设工程对外承包项目业务订单也持续增加。这些在给建筑企业带来前所未有机遇的同时，也对工程管理从业人员的英语水平和国际视野提出了更高的要求。为了避免巨额索赔和巨额亏损等负面事件的发生，必须提高国际工程项目的管理水平，增强风险防范意识，促进我国对外开放进程中全球软实力和话语权的提升。因此，亟须为工程管理从业人员和高等院校相关专业的学生提供一本深入讲解工程管理专业英语术语、表达方式和国际发展动态的教材，从而为我国工程管理领域提供更加优秀的外向型人才储备。

编写本书的目的，是帮助读者提升工程管理专业英语书面和口头表达的专业性与准确性，增强高校学生和从业人员的英语文献阅读和翻译能力，同时开阔其国际视野，在英文语境下扩展工程管理知识结构，从而为更好地从事相关理论研究和涉外实践奠定坚实基础。

与以往的专业英语教材相比，本书的特色主要体现在四个方面：

(1) 本书的编写素材并未局限于一本或少数几本国外英语书籍，而是博采众长，基于对发达国家高校工程管理专业课程的深入调研，系统地确定了工程管理专业的知识范畴，在工程管理的每一知识领域择优选取新颖度高，系统性和专业性强，能反映本领域最新动态和学术前沿的教材或专著，较多章节还参考了国际权威学术期刊中的文献，并在原始素材的基础上进行适度删减或补充，保证难度适中且简明扼要，提高了可阅读性和可理解性。

(2) 本书在讲解专业术语（正文中已突出显示）时，将工程管理专业词汇和一般性词汇明确区分开，其中 Construction Management Professional Terms 重在解释与工程管理相关的专业单词或词组（很多是工程项目管理领域的专属表达方式），而 Words and Phrases 则主要列举非工程管理专业，但同样重要或疑难的单词或短语。如此可显著增强本书的教育和指导意义，促使读者分门别类、有的放矢地掌握专业语言知识。

(3) 本书专门用一章（Chapter 11）来介绍先进的施工技术，包括大数据、人工智能、建筑信息模型、虚拟现实、物联网和传感技术，保障了本书的前沿性和前瞻性。

(4) 为拓展学生的专业视野，对课堂讲授内容进行补充和辅助，本书在每章最后的自主学习部分 Reading Material 中，编排了与工程管理实践和研究前沿贴合度非常高的阅读材料。除此之外，本书的附录详细阐释了学术论文的写作技巧，用以提升学生论文写作的实战经验。本书每章包含数节，每节首先安排一篇 Text 介绍相关专业知识，Text

之后依次是工程管理专业术语、一般性词汇和短语、重点疑难句讲解和节后思考题等模块，其中，重点疑难句讲解兼顾对重点语法和实际应用两方面的讲授，有助于对句子结构和表达的活学活用。

本书作者来自东北财经大学、北京航空航天大学、大连理工大学、华南理工大学、北京工业大学、合肥工业大学、浙江财经大学。具体的编写分工为：宁欣编写第1、11章，吴春林编写第7、9章，杜亚丽编写第3、8章，刘莎编写第5、12章，李弘扬编写第4、10章，黄春编写第2章，于竞宇编写第6章，彭毅编写附录。齐敬岩、刘彤、单欣、顾鑫炳参与了部分章节的资料整理工作。全书由宁欣、吴春林担任主编并进行统稿，由重庆大学申立银教授担任主审。

本书正文参考的主要书刊、论文等均标注于书后的参考文献列表中，在此向各参考文献的作者致以最诚挚的谢意！

限于编者水平，书中不妥之处在所难免，敬请广大读者批评指正。

编者

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Construction Practice

建设工程实践

1.1 Project Management Knowledge Areas 项目管理知识领域

1.1.1 Text

The project management knowledge areas are fields or areas of specialization that are commonly employed when managing project. A knowledge area is a set of processes associated with a particular topic in project management. The “Project Management Body of Knowledge (PMBOK)” teaches an approach towards project management that is recognized internationally. It can be applied to all types of projects, such as engineering, construction and software development. The PMBOK divides the knowledge into ten project management knowledge areas, an approach that considers work as if it were being accomplished by processes. The ten areas defined in the PMBOK are introduced as follows.

Project integration management includes the processes and activities to identify, define, combine, **unify**, and **coordinate** the various processes and project management activities within the project management process groups. In the project management context, integration includes characteristics of unification, **consolidation**, communication, and **interrelationship**. These actions should be applied from the start of the project through completion. Project integration management includes making choices about.

- (1) Resource allocation.
- (2) Balancing competing demands.
- (3) Examining any alternative approaches.
- (4) Tailoring the processes to meet the project objectives.
- (5) Managing the interdependencies among different project management knowledge areas.

Project scope management includes the processes required to ensure that the project includes all the work required, and only the work required, to complete the project successfully. Managing the project scope is primarily concerned with defining and controlling what is and is not included in the project.

The project scope management processes are:

(1) Plan scope management—the process of creating a scope management plan that documents how the project and product scope will be defined, validated, and controlled.

(2) Collect requirements—the process of determining, documenting, and managing stakeholder needs and requirements to meet project objectives.

(3) Define scope—the process of developing a detailed description of the project and product.

(4) Create work breakdown structure (WBS) —the process of subdividing project deliverables into smaller, more manageable activities.

(5) Validate scope—the process of formalizing acceptance of the completed project deliverables.

(6) Control scope—the process of monitoring the status of the project and product scope and managing changes against the scope baseline.

Project schedule management includes the processes required to manage timely completion of the project.

The project schedule management processes are:

(1) Plan schedule management—the process of establishing the policies, procedures, documentation for planning, developing, managing, executing, and controlling the project schedule.

(2) Define activities—the process of identifying and documenting the specific actions to be performed to produce the project deliverables.

(3) Sequence activities—the process of identifying and documenting relationships among the project activities.

(4) Estimate activity durations—the process of estimating the number of work periods needed to complete individual activities with the estimated resources.

(5) Develop schedule—the process of analysing activity sequences, durations, resource requirements, and schedule constraints to create the project schedule model for project executing, monitoring and controlling.

(6) Control schedule—the process of monitoring the status of the project to update the project schedule and manage changes to the schedule baseline.

Project cost management includes the processes involved in planning, estimating, budgeting, financing, funding, managing, and controlling costs so the project can be completed within the approved budget.

The project cost management processes are:

(1) Plan cost management—the process of defining how the project costs will be estimated, budgeted, managed, monitored, and controlled.

(2) Estimate costs—the process of developing an approximation of the monetary resources needed to complete project work.

(3) Determine budget—the process of aggregating the estimated costs of individual activities or work packages to establish an authorized cost baseline.

(4) Control costs—the process of monitoring the status of the project to update the project costs and manage changes to the cost baseline.

Project quality management includes the processes for incorporating the organization's quality policy regarding planning, managing, and controlling project and product quality requirements, in order to meet **stakeholders' expectations**. Project quality management also supports continuous process improvement activities as undertaken on behalf of the performing organization. The project quality management processes are:

(1) Plan quality management—the process of identifying quality requirements and/or standards for the project and its deliverables, and documenting how the project will demonstrate compliance with quality requirements and/or standards.

(2) Manage quality—the process of translating the quality management plan into executable quality activities that incorporate the organization's quality policies into the project.

(3) Control quality—the process of monitoring and recording the results of executing the quality management activities to assess performance and ensure the project outputs are complete, correct, and meet customer expectations.

Project resource management includes the processes to identify, acquire, and manage the resources needed for the successful completion of the project. These processes help ensure that the right resources will be available to the project manager and project team at the right time and place.

The project resource management processes are:

(1) Plan resource management—the process of defining how to estimate, acquire, manage, and utilize physical and team resources.

(2) Estimate activity resources—the process of estimating team resources and the types and quantities of material, equipment, and supplies necessary to perform project work.

(3) Acquire resources—the process of obtaining team members, facilities, equipment, materials, supplies, and other resources necessary to complete project work.

(4) Develop team—the process of improving competencies, team member interaction, and the overall team environment to enhance project performance.

(5) Manage team—the process of tracking team member performance, providing feedback, resolving issues, and managing team changes to optimize project performance.

(6) Control resources—the process of ensuring that the physical resources assigned and allocated to the project are available as planned, as well as monitoring the planned versus actual use of resources, and performing corrective actions as necessary.

Project communications management includes the processes required to ensure timely and appropriate planning, collection, creation, distribution, storage, **retrieval**, management, control, monitoring, and **ultimate disposition** of project information.

Project communications management is the process of developing an appropriate approach and plan for project communication activities based on the information needs of each stakeholder or group, available organizational assets, and the needs of the project. The key benefit of this process is a documented approach to effectively and efficiently engaging stakeholders by presenting relevant information in a timely manner. This process is performed periodically throughout the project as needed.

Project risk management includes the processes of **conducting** risk management planning, identification, analysis, **response planning**, **response implementation**, and monitoring risk on a project. The objectives of project risk management are to increase the probability and/or impact of positive risks and to decrease the probability and/or impact of negative risks, in order to optimize the chances of project success.

The project risk management processes are:

(1) Plan risk management—the process of defining how to conduct risk management activities for a project.

(2) Identify risks—the process of identifying individual project risks as well as sources of overall project risk, and documenting their characteristics.

(3) Perform qualitative risk analysis—the process of prioritizing individual project risks for further analysis or action by assessing their probability of occurrence and impact as well as other characteristics.

(4) Perform quantitative risk analysis—the process of numerically analysing the combined effect of identified individual project risks and other sources of uncertainty on overall project objectives.

(5) Plan risk responses—the process of developing options, selecting strategies, and agreeing on actions to address overall project risk exposure, as well as to treat individual project risks.

(6) Implement risk responses—the process of implementing agreed-upon risk response plans.

(7) Monitor risks—the process of monitoring the implementation of agreed-upon risk response plans, tracking identified risks, identifying and analysing new risks, and evaluating risk process effectiveness throughout the project.

Project procurement management includes the processes necessary to purchase or acquire products, services, or results needed from outside the project team. Project procurement management includes the management and control processes required to develop and administer agreements such as contracts, purchase orders, memoranda of agreements (MOAs), or internal service level agreements (SLAs). The personnel authorized to procure the goods and/or services required for the project may be members of the project team, management, or part of the organization's purchasing department if applicable.

Project procurement management processes include the following:

(1) Plan procurement management—the process of documenting project procurement decisions, specifying the approach, and identifying potential sellers.

(2) Conduct procurements—the process of obtaining seller responses, selecting a seller, and awarding a contract.

(3) Control procurements—the process of managing procurement relationships, monitoring contract performance, making changes and corrections as appropriate, and closing out contracts.

The procurement processes are presented as discrete processes with defined interfaces. In practice, procurement processes can be complex and can interact with each other and with processes in other knowledge areas in ways that cannot be completely detailed in the *PMBOK guide*. The processes described in this section are written from the viewpoint where goods or services are obtained from outside of the project.

Project stakeholder management includes the processes required to identify the people, groups, or organizations that could impact or be impacted by the project, to analyse stakeholder expectations and their impact on the project, and to develop appropriate management strategies for effectively engaging stakeholders in project decisions and execution. The processes support the work of the project team to analyse stakeholder expectations, assess the degree to which they impact or are impacted by the project, and develop strategies to effectively engage stakeholders in support of project decisions and the planning and execution of the project work.

The project stakeholder management processes are:

(1) Identify stakeholders—the process of identifying project stakeholders regularly and analysing and documenting relevant information regarding their interests, involvement, interdependencies, influence, and potential.

(2) Plan stakeholder engagement—the process of developing approaches to involve project stakeholders based on their needs, expectation, interests, and potential impact on the project.

(3) Manage stakeholder engagement—the process of communicating and working with stakeholders to meet their needs and expectations, address issues, and foster appropriate stakeholder engagement involvement.

(4) Monitor stakeholder engagement—the process of monitoring project stakeholder relationships and tailoring strategies for engaging stakeholders through the modification of engagement strategies and plans.

1.1.2 Construction Management Professional Terms

project integration management 项目集成（综合）管理

project scope management 项目范围管理

project schedule management 项目进度管理

project cost management 项目成本管理

project quality management 项目质量管理

project resource management 项目资源管理

project communications management 项目沟通管理

project risk management 项目风险管理
 (risk) response planning (风险) 应对计划
 (risk) response implementation (风险) 应对实施
 project procurement management 项目采购管理
 project stakeholder management 项目利益相关方管理

1.1.3 Words and Phrases

unify ['ju:nɪfaɪ] *vt.* 使联合; 使一致; 统一
 coordinate [kəu'ɔ:dɪneɪt] *vi.* 协调
 consolidation [kən'sɒlɪ'deɪʃn] *n.* 巩固; 联合; 合并
 interrelationship [ɪntəri'leɪʃnʃɪp] *n.* 相互关联
 timely completion 按时完成
 planning ['plæniŋ] *n.* 规划过程; 计划制订
 estimating ['estɪmeɪtɪŋ] *vt.* 评价; 评估; 估算 (estimate 的动名词[⊖])
 budgeting ['bʌdʒɪtɪŋ] *vt.* 编制预算 (budget 的动名词)
 financing [faɪ'nænsɪŋ] *vt.* 融资; 筹措资金 (finance 的动名词)
 funding ['fʌndɪŋ] *vt.* 筹资; 提供资金 (fund 的动名词)
 managing ['mæniʒɪŋ] *vt.* 管理 (manage 的动名词)
 controlling [kən'trəʊlɪŋ] *vt.* 控制; 管理 (control 的动名词)
 the approved budget 批准的预算
 stakeholders' expectations 利益相关方的期望
 retrieval [rɪ'tri:vəl] *n.* 检索; 恢复; 取回
 ultimate disposition 最终处置
 conducting [kən'dʌktɪŋ] *vt.* 实施; 指挥 (conduct 的动名词)

1.1.4 Sentences Illustration

1. The PMBOK divides the knowledge into ten project management knowledge areas, an approach that considers work as if it were being accomplished by processes.

PMBOK 将项目管理知识分为十个领域, 是一种认为项目工作是由 (多个) 过程完成的方法。

其中 divide into 意为“把……分成”, as if 意为“好像、就像、仿佛”, 此处的中文翻译为了避免冗余, as if 并未直译出, 读者可体味其在句子中的含义和作用。

divides 为谓语, 采用一般现在时, 因此该动词采用第三人称单数形式。

that 为关系代词, 引导定语从句。

considers 为谓语, 采用一般现在时, 因此该动词采用第三人称单数形式。

as if 引导方式状语从句。as if 与 as though 是一组同义词, 两者意思相同, 用法也基本相

⊖ 本书在“Words and Phrases”中对带有-ing 或-ed 后缀的单词进行释义时, 将还原为该词的原词性和词义进行注释。因这类单词通常为动名词或动词过去分词形式, 所以一般还原为动词。不过, 有些单词已经作为形容词广泛使用时, 不再采用上述处理方式。

同。在通常情况下，as if 和 as though 所引导的从句中谓语动词多用虚拟语气（采用过去时形式），表示所叙述的情况与事实相反。

were being 为系动词，因虚拟语气而采用过去时，accomplished 为谓语，采用被动语态。

the 为定冠词，an 为不定冠词。

work 和 job 都可以表示“工作”的意思。但 work 为不可数名词，泛指一切工作，而 job 为可数名词，指具体的一份工作。task 意为“（分派或指定的）任务，工作”。例如：

Their success was achieved by hard work. 他们的成功是靠辛勤劳动而获得的。

She hasn't found a job. 她还没找到（一份）工作。

The teacher faces a very difficult task dealing with this naughty student. 老师为对付这个淘气的学生而面临着一个很艰难的任务。

2. Project integration management includes the processes and activities to . . .

Project scope management includes the processes required to . . .

Project cost management includes the processes involved in . . .

Project quality management includes the processes for . . .

Project risk management includes the processes of . . .

上面的句型均可以表达某主语包括什么过程和活动，在英文书写中为了避免重复，可以采用上述不同的表达方式。但是要区分介词 to、in、for、of 后面动词的表达形式。在上述语法环境下，to 后面需要加动词原形，in、for、of 后面则加动名词。

1.1.5 Review Questions and Problems

Read through the *PMBOK Guide* (sixth edition) to understand the management processes for the ten project management knowledge areas mentioned above.

1.2 Construction Participants 项目参与者

1.2.1 Text

No description of the industry would be complete without including the other professions and interested parties who are part of the total industry.

1. Owners 业主

No construction would ever be **accomplished** without owners who must make the decision to build the facility, define the need, provide the financing, and manage the construction process. Owners can be public (government) or private. Besides providing the project funding, **the primary responsibility** of the owner is to define the scope of the work.

2. General Contractors 总承包商

Most contracts are awarded to a **general contractor (GC)** who manages the project and subcontracts portions of the work, such as the electrical and mechanical work, to subcontractors or specialty contractors. The primary job of the GC is to manage the job, keep it on schedule, control costs, and ensure the work is well coordinated and performed in a safe manner, and to coordinate with the owner on all matters since the GC is the only one of the project contractors holding a contract with the owner.

3. Subcontractors or Specialty Contractors 分包商或者专业承包商

These contractors make up the largest portion of the construction industry. They do the work. All subcontractors have a specialty such as electrical or mechanical engineering, **steel erection**, **drywall** and **painting**. The construction of a typical building may require as many as 10 to 15 subcontractors.

4. Designers—Architects and Engineers 设计师——建筑设计师和结构设计师

Project owners select an architect or engineer (A/E) to design their projects. The owner should select the A/E based on demonstrated ability to design the project, in the time frame available, and at a cost acceptable to the owner. The designer will prepare the construction documents for the project owner. Architects are the lead designers for buildings. They subcontract some of the work, such as the structural frame and mechanical systems, to engineers who specialize in such work. Engineers are normally the lead designers for heavy civil and highway projects. They may subcontract part of the work, such as train stations or office buildings, to an architect. Many residential projects use “**canned**” **designs**, and have no lead designer for the individual project.

The designer's involvement during construction will depend on the **project delivery method** used by the owner. In the case of a design-bid-build (DBB) project, the owner may employ the designer to oversee the work of the construction contractor. In such a capacity, the designer will assess the quality of the contractor's work and **approve progress payments**. If it is necessary to **issue** change orders to the contract, the designer will assist the owner in negotiating with the contractor **the magnitude of** the resulting cost and time adjustments.

5. Construction Managers 施工经理

During the 1970s the term construction manager became popular. Unfortunately, today “construction manager” has many different meanings. Some contractors now call themselves as construction managers. Usually they subcontract 100% of the project work and **prefer to** be involved in both the design and construction processes. They bring construction expertise to the design process. Some engineering and architectural firms offer construction management services, indicating usually that they represent the owner during construction. To make the definition even more difficult, there are some government agencies that have employees who are construction managers. Not all people who call themselves construction managers work for a construction contractor.

6. Insurance Companies and Banks 保险公司和银行

Contractors are required to provide **bid bonds** as a condition of being allowed to bid, and then they must provide insurance, **performance bonds and payment bonds prior to** award of the contract. Insurance companies provide bid bonds, performance and payment bonds, and they also service the **liability** and property insurance needs of contractors. Banks provide the working capital that contractors need to build the project. In some countries, a payment is made to the contractor at the time of the contract award to provide working capital.

7. Suppliers 供应商

Everything from concrete to paint comes from suppliers. Many suppliers assist the contractors in