



Knowledge for Creating
and Sustaining
the Built Environment

CONSTRUCTION DOCUMENTS TECHNOLOGIST PROGRAM

FALL 2009 CDT EXAMINATION STUDY GUIDE

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CONSTRUCTION DOCUMENTS TECHNOLOGIST EXAMINATION STUDY GUIDE

(For use in preparation for exams to be administered September 2009 or thereafter)

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PROGRAM OVERVIEW

Congratulations on taking the career-enhancing step of studying for the Construction Documents Technologist (CDT) examination! The Construction Specifications Institute (CSI) sincerely hopes that you will be among the candidates who successfully demonstrate their knowledge of the construction process by achieving a passing score on the exam.

Objective

This program was developed for those who prepare, interpret, enforce, or manage construction documents.

The objective of the CDT Program is to improve construction documentation and to accomplish the following:

1. Allow individuals to demonstrate through examination their knowledge of CSI's recommended practices in:
 - a. Construction process
 - b. Contractual relationships
 - c. Relationship and organization of construction documents
2. Encourage individuals to become familiar with the fundamental principles of specification writing and construction document organization as recommended by CSI.

Definition of a Construction Documents Technologist

A CDT is a person who has demonstrated basic knowledge of fundamentals and formats of construction documents as prescribed by CSI and the general conditions of the contract for construction.

Qualifications of a Construction Documents Technologist

1. Fulfill application requirements:
 - a. Submit written application for examination.
 - b. Pay examination fee.
2. Pass the CDT examination with a score of 75 or higher.
3. A **renewal is not required** to maintain the CDT designation.

There are no prerequisites to qualify to take the exam. Membership in CSI is not required.

ABOUT THE NEW CDT EXAM

The CDT exam has been substantially modified for fall 2009 and succeeding administrations to reflect the results of a professional Body of Knowledge Analysis (BOKA) which has been conducted to determine the subject matter areas (knowledge domains) that are important for a Construction Documents Technologist to master. The purpose of the BOKA was to thoroughly review and update the definition of the subject matter to be tested on the CDT exam, so that it reflects the current state of the industry and evolving trends in project delivery, design, construction documentation, construction contract administration, and facility management.

As a result of the intensive work of CSI's CDT BOKA team and its professional consultants, the new CDT exam includes content not reflected in previous exams. Among the major innovations in the new CDT are:

- Sustainability, as reflected in green building, is a critical imperative driving design and construction in the 21st century. The BOKA recognized the need for CDT holders to have a basic grasp of sustainability concepts.
- New technologies and methods hold the promise of transforming design and construction. These developments include building information modeling (BIM) and integrated project delivery (IPD).
- The BOKA identified a need for the CDT to emphasize deeper knowledge of the activities and documents associated with the construction stage of a project, along with more exposure to the considerations that go into design, to give CDT holders a better grounding in the day-to-day realities of project development.

The CDT now tests mastery of a series of knowledge domains, which do not always follow the linear sequence in which material is presented in the PRM. As a result, the PRM sections relevant to a particular topic in this study guide may be drawn from several different chapters of the PRM, and selections from source materials may not follow a regular sequence. *This study guide serves as the candidate's "road map" to the specific source material that is relevant to each subject matter area.* Candidates will need to pay close attention to the study guide's study checklists in preparing for the examination.

The new CDT based on the BOKA represents a significant commitment by CSI to stay on the cutting edge of developments that affect construction documents and project delivery. The new CDT creates a foundation for future updates in the advanced certification programs as well. Congratulations to all who are participating in this new direction for the CDT program.

EXAMINATION OVERVIEW

Exam Structure

The exam includes 100 multiple-choice questions, each worth 1 point for a total of 100 points. The passing score on the exam is 75 correct answers. Candidates have two hours to complete the exam.

Some additional questions may be included in each exam for statistical validation purposes, and extra time will be allowed to answer them. These additional questions are not counted in scoring the exam.

Exam Content Summary

The proportion of the exam dedicated to each subject matter area is as follows:

Subject Matter Area No. 1: FUNDAMENTALS	8%
Subject Matter Area No. 2: PLANNING AND PRE-DESIGN	20%
Subject Matter Area No. 3: DESIGN	37%
Subject Matter Area No. 4: PROCUREMENT	10%
Subject Matter Area No. 5: CONSTRUCTION	20%
Subject Matter Area No. 6: POST-CONSTRUCTION	5%

This subject matter area breakdown, and the weighting of each area, resulted from the CDT BOKA process. It is significantly different from the subject matter classifications and weighting used in previous CDT exams. Candidates should focus their studying accordingly.

SOURCE MATERIALS

The examination is based solely on the following documents and this study guide:

CSI Documents

- *Project Resource Manual - CSI Manual of Practice* (PRM)
- *MasterFormat* (2004 Edition)
- *UniFormat* (1998 Edition)
- *SectionFormat* (2007 Edition)
- *PageFormat* (2007 Edition)
- *GreenFormat* (2008 Edition)

These materials are available from:

The Construction Specifications Institute
99 Canal Center Plaza, Suite 300
Alexandria, VA 22314
Ph: (800) 689-2900;
Fax: (703) 684-0465
Email: csi@csinet.org
www.csinet.org (click on The CSI Store)

Many of the CSI documents have been updated in recent years. Candidates are cautioned that older versions, such as MasterFormat 1995, are no longer supported by CSI and should not be relied upon in preparing for the exam.

Conditions of the Contract

The general conditions of the contract and contract forms **common** to the following documents, available through the organizations listed:

AIA Document A201 – 2007
American Institute of Architects
1735 New York Avenue, NW
Washington, DC 20006-5292
Ph: (800) 242-3837
Fax: (202) 626-7547
www.aia.org

- OR - EJCDC C-700 – 2007
National Society of Professional Engineers
1420 King Street
Alexandria, VA 22314-2794
Ph: (703) 684-2800
Fax: (703) 836-4875
www.nspe.org

Sustainability/Green Building

U.S. Environmental Protection Agency (EPA)
www.epa.gov/greenbuilding/pubs/greenbuilding_strategy_nov08.pdf

GreenFormat:
www.greenformat.com/about

The exam tests *basic, general* material at these web pages and in Section 4.3 of the PRM.

Integrated Project Delivery / Building Information Modeling

AIA IPD Guide

Integrated Project Delivery: A Guide, issued November 5, 2007

www.aia.org/about/initiatives/AIAS076700

This AIA guide provides an overview of integrated project delivery (IPD). Candidates are expected to have a *basic* understanding of integrated project delivery concepts and issues as described in Section 3, "Principles of Integrated Project Delivery" (pages 5-6).

GSA BIM Guide

U.S. GSA Building Information Modeling Guide Series 01 – Overview, version 0.60

www.gsa.gov/bim , select "3D-4D-BIM Overview"

This guide by the U.S. General Services Administration provides a general overview of the nature, promise, and uses of building information modeling (BIM). Candidates are expected to have a *basic* understanding of the material in the Section 1 introductory text and in Section 1.1, "What Are 3D, 4D, and BIM?" (pages 2-5).

Study Guide Addendum

Addendum to the CSI Examination Study Guides, September 1, 2008

Important Note on Source Materials

The Project Resource Manual – CSI Manual of Practice (PRM) has not yet been updated to reflect the 2007 editions of SectionFormat, PageFormat, and the AIA and EJCDC contract documents. While a brief summary of the changes in the 2007 documents is available in the study guide Addendum listed above, it is recommended that candidates obtain and study the 2007 editions of the source documents and not rely solely on the PRM or on older versions of the documents.

The PRM also does not incorporate all of the material on sustainability, integrated project delivery, and building information modeling that candidates are expected to know. Candidates are directed to the sources indicated above in order to perform well on those subjects in the exam.

And finally, the PRM does not reflect the changes resulting from the CDT BOKA. *The organization of material as presented in this study guide differs significantly from the sequence of material in the PRM.* Candidates will need to rely upon this study guide to guide them to appropriate material in the PRM for each knowledge domain that will be tested on the exam.

One particular change resulting from the BOKA that is not consistent with the presentation in the PRM is the treatment of the phases of design. The PRM treats the design stage of a project as consisting of two phases: conceptual design and design development. The third step, construction documents, is presented by the PRM as a separate activity occurring after design is completed. One key result of the BOKA is an abandonment of this separation between design and construction documents. This reflects the realities of modern architectural and engineering practice and the continuing evolution of design paradigms. For example, in integrated project delivery using a BIM model, the distinctions between conceptual design, design development, and construction documents become blurred, if not lost altogether.

Therefore, *the new CDT treats all three activities – conceptual design, design development, and construction documents – as part of "design."* Candidates should **disregard** elements of the PRM that contradict this approach.

PREPARING FOR THE EXAM

Performing a Self-Evaluation

The following questions will help you decide if you are ready to prepare for taking the examination:

1. Do you have access to the *Project Resource Manual – CSI Manual of Practice* (PRM) and the current editions of other CSI publications relevant to the exam? Do you thoroughly understand them?
2. Do you use, or are you thoroughly familiar with, listed current editions of either the AIA or EJCDC General Conditions of the Contract?
3. If the answer to question 1 or 2 is “No,” are you willing to study the required reference materials in a disciplined manner over several months?
4. Are you willing to attend a series of CSI chapter-sponsored study groups extending over several weeks, if available in your area?

Using the Study Guide

A thorough reading, study, and understanding of the referenced source materials is necessary to achieve a passing score. A candidate whose study efforts thoroughly cover the source materials listed in each subject matter area will not encounter subjects on the exam that were not covered in the material.

Please use this study guide to help you through the source materials, and call upon the local CSI chapter representatives for assistance as you continue in your quest for knowledge of the construction process. Note that successful candidates prepare for the exam well ahead of the test date. Best wishes for a successful result.

Utilizing Study Tools Not Included in This Guide

Study Groups

Many local CSI chapters offer group independent-study sessions for this exam. Exam candidates are not required to enroll in study sessions. The discipline of these structured classes and the interaction with fellow candidates, however, has proven helpful to most candidates. Most chapter study groups are coordinated through the Certification and Education Committees. They are generally led by group leaders who have passed the CDT and/or certification examinations. Contact your local CSI chapter for more information.

Passing the Exam

Candidates may have been away from an academic, test-taking environment for many years. We offer the following suggestions:

1. Preparation should start as soon as possible. Putting off study until the last minute so that information is fresh in your mind is a faulty concept. Cramming the night before or the morning of the examination is also discouraged.
2. Practice answering test questions. A small sample of the types of questions on the examination is included in this study guide. Remember, in multiple-choice questions, usually one or two answers are definitely incorrect. Two answers may seem correct, but only one is

right based on the reference materials. Note: None of the questions in this study guide will be used on the actual examination.

3. This can be a difficult examination for the unprepared candidate. The exam thoroughly tests the candidate's knowledge and comprehension of the PRM and other relevant CSI publications and the general conditions in common use (AIA Document A201 and EJCDC C-700), as well as the additional sources identified above.
4. Before the day of the examination, candidates should obtain directions to the test site and, if driving, find out where to park. Allow ample time. Dress comfortably. A good night's sleep and a relaxed attitude are more important than trying to "learn one more thing."
5. Remember that the exam is based on CSI's recommended practices as stated in the PRM and supplemental resources. Departures from these principles as practiced by individual offices must be disregarded to succeed on this examination.

STUDY GUIDE ORGANIZATION

The study guide is organized by the “Subject Matter Areas” (knowledge domains) of the exam. It generally follows the chronological order of the facility life cycle. The subject matter areas in this guide are intended to serve as a “road map” for study of the source materials, but do not necessarily follow the order of the Project Resource Manual.

Subject Matter Area Organization

Each subject matter area is organized as follows:

Weight of the Subject Matter Area on the Examination

The PRM is a comprehensive document. It serves as the primary source for the CDT examination as well as the advanced certification exams. The purpose of the CDT exam is to test basic knowledge of the processes and documents involved in the facility life cycle. Units that cover the basic topics are therefore weighted more heavily than those that deal with more specialized areas of expertise. Make sure to budget your study time accordingly.

Examination Objectives

Each subject matter area has a statement summarizing the basic knowledge and comprehension expected of a successful CDT candidate.

Source Materials

Questions included on the examination are carefully referenced to specific statements in the source materials. Some subject matter areas call for basic knowledge of the source materials, while others require a more detailed knowledge of source materials. This section will provide guidance as to the level of knowledge and comprehension that is required.

Study Checklist

This section outlines the specific elements of information that the candidate should study, and the primary location in the source materials where the information can be found. The information locations may move around in the source materials, so follow the roadmap carefully. A prepared candidate should be able to check off every item in the checklist as studied and understood from the source materials.

Additional Study Materials Included in the Study Guide

The study guide also includes additional information to assist in preparing for the examination.

Sample Questions

The sample questions are designed to serve only as practice in selecting correct answers from among several alternatives. These questions will not appear on the exam as presented and are NOT a comprehensive summary of tested material.

Summaries of AIA and EJCDC Documents

The CDT examination includes questions that are sourced directly from American Institute of Architects (AIA) Document A201, General Conditions of the Contract for Construction, or from Engineers Joint Contract Documents Committee (EJCDC) C-700, Standard General Conditions of the Construction Contract. Note that answers to questions on the exam can

be found in either of the two documents. Thorough knowledge of one of these documents is required to pass the exam.

Candidates are reminded that these documents were updated in 2007 and must be studied separately, not merely by reference to the PRM. A brief summary of the changes in the 2007 editions is provided in the Addendum to this study guide.

ABBREVIATIONS/ACRONYMS

A/E	Architect/Engineer
AIA	American Institute of Architects
BIM	Building Information Modeling
CADD	Computer-Aided Design and Drafting
CDT	Construction Documents Technologist
CSI	Construction Specifications Institute
DBIA	Design Build Institute of America
EJCDC	Engineers Joint Contract Documents Committee
EPA	U.S. Environmental Protection Agency
GMP	Guaranteed Maximum Price
GSA	U.S. General Services Administration
IPD	Integrated Project Delivery
O&M	Operations and Maintenance
PPD	Preliminary Project Description
PRM	Project Resource Manual - CSI Manual of Practice
UCC	Uniform Commercial Code

Subject Matter Area No. 1 - Fundamentals

Weight on Examination: 8%

Approximately 8 questions from material referenced in the source materials for this subject matter area will appear on the exam.

Examination Objectives

Measure knowledge and comprehension of concepts applicable to the basic understanding of the construction documentation process. This includes participants, relationships, formats, facility and project life-cycles, and document types.

Source Materials

PRM Module 1 – Introduction

The introduction to the PRM provides an overview of the main stages of a typical construction project cycle, the types of documents produced in each project phase, and the relationships among the project participants. A thorough understanding of this module will provide a basis for understanding material included in the rest of the exam.

PRM Module 4 - Design

Successful candidates will demonstrate understanding of the process of converting the owner's program into written and graphic documents to define the activities relating to the project.

PRM Module 5 - Construction Documents

Successful candidates will understand the basic concepts of OmniClass™ as a classification system for the construction industry; the basic concept of MasterFormat™, its history, development, and applications for organizing specifications, data filing, and cost classifications; the concept of UniFormat™ as a uniform classification of construction elements or systems and as a system for organizing preliminary construction information into a standard order or sequence; and the “four Cs” of communication.

EPA – Sustainability/Green Building

Successful candidates will have a *basic* understanding of the environmental impact of buildings and what green building is.

GreenFormat™

Candidates are expected to know the purpose and function of GreenFormat™.

AIA IPD Guide

Candidates are expected to have a *basic* understanding of integrated project delivery concepts.

GSA BIM Guide

Candidates are expected to have a *basic* understanding of the nature of BIM.

Study Checklist

- A. Job roles and responsibilities of the four project teams (PRM Modules 1.2 and 1.3; AIA IPD Guide)

Understand the composition and responsibilities of each of the four basic project teams who come together in a project: the owner team, design team, contractor team, and supplier team. Pay careful attention to Figure 1.2-A, as it will help in learning which participants belong to each team. Participants are defined by their roles on the project. Understand the basic responsibilities of each project participant.

- . Factors that contribute to an effective team (PRM Module 1.4; AIA IPD Guide)

Proactive cooperation during execution of a project ensures its success. Understand the factors that contribute to successful cooperation on a project.

- C. Stages of facility life cycle with associated activities and documents (PRM Module 1.5)

Nearly all facilities will undergo similar stages in evolution from idea to tangible result. After completion, the facility will eventually reach the end of its useful life, and a new facility life cycle will begin. The key to earning a CDT designation is demonstrating knowledge of the definitions of the stages of the life cycle of a facility, the activities and documents produced during each stage, and the team member responsible for each as defined by CSI's PRM. This section provides a thorough overview of these concepts and serves as a summary of much of the material covered in subsequent study. It therefore warrants special attention.

- D. Project stages with associated activities and documents (PRM Modules 1.1, 4.2, 5.1; AIA IPD Guide; GSA BIM Guide)

The project is the process for completing a facility, which is a constructed entity or space designed to perform a certain function. Understand the factors that make each project unique, the attributes that the documents used for projects describe, and the basic costs that projects include.

All projects proceed through multiple stages of design, with variations depending on the nature of the work and needs of the owner. The labels and definitions also vary somewhat between industry associations. For the purposes of this exam, design is defined as having three phases: schematic design, design development, and construction documents. Understand the activities associated with each of these phases, as well as the roles of the participants and the documents produced.

Integrated project delivery (IPD) and building information modeling (BIM) are relevant to all stages of project development. They can transform the design process in particular into a more collaborative, effective, and productive team effort. Their usefulness can extend backward into planning and pre-design, where BIM techniques using GIS data can help guide site selection and project analysis, and forward into facility management, where a BIM can be the primary repository of information needed by the facility manager. Know the basic concepts and issues associated with IPD and BIM as described in the source materials.

E. OmniClass™ (PRM Module 5.5)

The entire realm of concepts and information related to the built environment can be classified in the system known as OmniClass™. OmniClass™ is a series of tables which organize information from different conceptual viewpoints. Have a basic understanding of what Omniclass™ covers and how it relates to formats used in construction documents.

F. Uniformat™ (PRM Module 5.5)

Uniformat™ is based on one table from OmniClass and constitutes a classification system based on the systems and assemblies that make up a facility. It is useful for organizing preliminary project descriptions and preliminary cost estimates. Know the basic structure of Uniformat™ and the primary ways in which it is used in construction documents.

G. MasterFormat™ (PRM Module 5.5)

MasterFormat™ classifies facilities in terms of work results: the results of labor applied to products and materials. In construction documents, MasterFormat™ is used to organize specifications and other documents in project manuals; to organize product information; and to organize cost information. Know the basic structure of MasterFormat™ into groups, subgroups, and divisions. Also know its general history and how it relates to OmniClass™.

H. Four Cs of communication: clear, concise, correct, complete (PRM Module 5.8)

The foundation of a successful project is a set of construction documents which communicate the intended results precisely without ambiguity, error, omission, or irrelevancy. The four Cs for effective communication are: clear, concise, correct, and complete. Know the four Cs and how correct writing contributes to effective specifications.

I. Legal interpretations and/or conflicts of contract documents (PRM Module 5.11, 4.9.4)

The contract documents have to be taken as a whole when interpreting what they mean. It is important that the contract documents complement and not contradict one another. Understand what coordination means in the context of construction documents, and why "Say it once and in the right place" is important. Know the general principles underlying interpretation of the contract documents and how conflicting information is resolved.

J. GreenFormat™ (GreenFormat™)

GreenFormat™ is a system for presenting sustainability (green) information about products in a consistent and rigorous format. It is intended to help specifiers and design professionals easily find and use reliable information. Know *basically* how GreenFormat works and what kinds of information it uses.

K. Sustainability/Green Building (EPA)

Sustainability in the context of the built environment has many definitions. At minimum, it means reducing the environmental impacts of building projects. In a broader view, it means meeting the facilities needs of the current generation without

compromising the ability of future generations to meet their needs. A sustainable approach to facility design and construction involves considering the big picture of human impact on, and the future of, the planet when making project-specific decisions. It is therefore fundamental to responsible practice.

Know, in general terms, how buildings affect the environment and what green building is as defined by the EPA.

Subject Matter Area No. 2 – Planning and Pre-Design

Weight on Examination: 20%

Approximately 20 questions from material referenced in the source materials for this subject matter area will appear on the exam.

Examination Objectives

Measure knowledge and comprehension of activities and documents related to project conception and project delivery.

- A. Project Conception: Prerequisites to the design process including budgeting, scheduling, programming, and site investigation.
- B. Project Delivery: Decisions and factors affecting services and documentation required including contract types, delivery methods, team selection, and commissioning.

Source Materials

PRM Module 2 - Project Conception

Project conception is the stage in the facility life cycle in which activities related to identifying requirements, performing initial studies, selecting a site, and establishing a preliminary budget are performed. Activities in this phase provide a foundation for successful progression through subsequent project stages. Successful candidates will demonstrate a *basic* knowledge of concepts included in this module.

PRM Module 3 – Project Delivery

Project delivery refers to the contractual relationships between the project teams. Successful candidates will understand the methods of contractor selection as related to the number of contracts and the various contract types. They will also demonstrate knowledge of the differences in relationships among the parties of the construction contract.

Study Checklist

- A. Project Conception
 - 1. Programming, planning, and pre-design (PRM Modules 2.1, 2.2, and 2.7)

Some of the activities in the project conception stage are programming, planning, and pre-design. Be able to define these activities and understand which participants are responsible for each activity.

Identifying goals, collecting and analyzing facts, identifying and testing concepts, prioritizing, determining feasibility, preparing program statements, and commissioning are all activities related to defining a project. Understand the *basic* components of these activities, why they are performed, and who is responsible for completing them.

Performance criteria help the A/E in creating a building design. Know the basic factors affecting built element performance.

2. Feasibility and impact studies and facility evaluations (PRM Module 2.3)

Determining the viability of a project is the responsibility of the owner. Preliminary studies may include feasibility studies, impact studies, physical facilities evaluations, site studies, and studies of other issues that may influence a project. Be familiar with the definitions and purposes of each of these activities.

3. Site selection activities and purposes (PRM Module 2.4)

The A/E may assist the owner in site selection and acquisition. Understand the basic purposes of site selection activities. Focus on the timing and the roles of the participants in this process.

4. Project budget (PRM Module 2.5)

The project budget includes costs for the entire project. Understand the difference between the project budget and construction budget. Also be familiar with basic budget considerations and the influence of timing on the ability of participants to make changes to the budget.

5. Project scheduling (PRM Module 2.6)

Understand the reasons why a well-prepared project schedule is important to a project's success.

B. Project Delivery

1. Design and construction services and documentation required (PRM Module 3.2)

Although each project requires unique services to develop a design and construct a facility, these services are basic variations of design and construction services. Understand the basic types of services and the recommended documentation for each.

2. Tripartite relationships among owner, contractor, and A/E (PRM Module 3.2)

Be familiar with the tripartite relationship among owner, contractor, and A/E for a traditional bid or negotiated contract as illustrated in Figure 3.2-A.

3. Factors affecting project delivery (e.g., extent, time, cost) (PRM Module 3.3)

Extent, time, and cost are the primary factors that establish the quality of a project and its component parts. Understand these factors. Know the definitions of terms relating to extent, time, and cost and the basic considerations that go into the decision making process relating to each. Also understand the effects of decisions on the documentation process.

4. Contract types (PRM Module 3.3)

Know the definitions of and the differences between single-prime and multiple-prime contracts, and when each is typically used.

5. Delivery methods (PRM Module 3.4)

Decisions about the project delivery method affect the relationships between participants on the project team and how the participants will work together to design and construct a facility. Understand the differences between each of the following delivery methods:

- Design-Bid-Build
- Design-Negotiate-Build
- Construction Management
- Design-Build
- Owner-Build

Have a basic understanding of the benefits and limitations of each method and a thorough understanding of the contractual relationships between each of the participants. Pay careful attention to the relationships as described in the text and illustrated in Figures 3.4-A through 3.4-F.

6. Team selection process (PRM Module 3.5)

Selecting the right team members is important to project success. Understand the basics of selecting team members and the documents used to evaluate qualifications.

7. Commissioning process (PRM Modules 2.2 and 3.5.7)

Commissioning is a process intended to ensure that the completed facility will meet the owner's original objectives for the project. It involves defining the owner's objectives in specific, measurable terms and systematically following through during design and construction to see that they are realized. Understand the scope of total project commissioning and how it is carried out.

Subject Matter Area No. 3 – Design

Weight on the Examination: 37%

Approximately 37 questions from material referenced in the source materials for this subject matter area will appear on the exam.

Examination Objectives

Measure knowledge and comprehension of activities and documents related to the process of converting an owner's program into written and graphic documents.

- A. Schematic Design and Design Development: Activities and documents associated with schematic design and design development.
- B. Construction Documents: Elements of the construction documents, the project manual concept and structure, the uses and characteristics of different types of drawings, and the importance of and proper methods for coordinating drawings and specifications.

Source Materials

PRM Module 4 - Design

Successful candidates will demonstrate understanding of the process of converting the owner's program into written and graphic documents to define the activities relating to the project. Note that some sections may not have direct questions on the exam. However, a basic understanding of the concepts may be necessary for demonstrating knowledge on other topic areas that are included on the exam.

PRM Module 5 - Construction Documents

Successful candidates will understand the elements of the construction documents; the project manual concept and arrangement of elements in a project manual; the uses and characteristics of different types of drawings, and the importance and proper methods for coordinating drawings and specifications; the components and purposes of the General Requirements; the components and uses of the Contracting Requirements; and the components and uses of the Procurement Requirements.

This subject matter area includes the most heavily tested subject material on the exam. Candidates will do well to focus extra time on this subject matter area to ensure thorough knowledge of its concepts and definitions.

AIA Document A201 – General Conditions of the Contract for Construction
or
EJCDC C-700 – Standard General Conditions of the Construction Contract

Some exam questions are sourced directly from AIA or EJCDC material. Note that questions will address material common to BOTH documents. Knowledge of the material in one of these documents will be sufficient to correctly answer examination questions.

Study Checklist

A. Design

1. Schematic design documentation (PRM Modules 4.8, 5.10)

Schematic design focuses on preliminary design concepts, and the documents produced are not fully developed. Schematic design drawings may include sketches, renderings, and conceptual diagrams; understand how these differ from construction drawings.

Both the AIA and EJCDC standard forms of agreement require the A/E to furnish the owner with a report as part of schematic design documentation. The report should include a preliminary project description (PPD). Understand the information included in the PPD, the format, and the methods of specifying used. Specifically, understand the difference between performance and descriptive specifying.

2. Design development documentation (PRM Modules 4.9, 5.10)

Design development turns the schematic design concepts into more detailed descriptions and illustrations. Design development drawings become more detailed and realistic, but not complete; understand the types of drawings produced and the aesthetic focus of design development drawings. Also know the purpose and use of outline specifications, their organization, and their content.

Be familiar with the three components of project design team coordination: organization, execution, and quality assurance. Be familiar with possible problems resulting from incomplete coordination. Understand the organization, timing, and process for coordination of drawings with outline specifications. Also be familiar with how cost estimates may be organized at this stage.

3. Quality assurance / quality control requirements (PRM Module 4.5)

The quality of a project is the result of a process that is continuously defined throughout the life cycle of the project from conception through facility management. Understand the terms quality, quality assurance, and quality control and the activities related to each. Also understand how to establish quality, how participants affect quality, and the concurrent quality assurance and quality control processes.

4. Procedures to control project variables (PRM Module 4.6)

Project variables are aspects of the project that cannot be fully known in advance of pricing and/or construction. The A/E must consider project variables and implement procedures for controlling them through the use of allowances, alternates, and unit prices. Understand the definitions and types of each and in what circumstances each is used. Also be familiar with the advantages and disadvantages of using these methods to control variables.

5. Cost estimates and estimating techniques used during design phase (PRM Module 4.7)

The A/E normally provides cost estimates at the conclusion of each design phase. This is a critical function, as staying within the owner's budget is one of the fundamental aspects of project success. Understand the basic types of estimates and the estimating techniques used by the A/E during design.

6. Life cycle costs and value analysis (PRM Module 4.)

A key principle of sound design is that project decisions should not be based solely on initial cost. Life cycle costs take into consideration the entire life cycle of the product, system, or facility, including resource extraction, manufacturing, on-site construction, occupancy/maintenance/demolition, and recycling/reuse/disposal. Understand what is included in life cycle costs and how the concept is applied in evaluating design choices.

Value analysis, also known as value engineering, is review of a design to improve dollar value. Understand its potential benefits and its possible drawbacks as practiced. Know the types of recommendations that may result from value analysis.

7. Documentation of decision-making process (PRM Module 5.9)

Design involves a series of decisions, initially broader and successively more focused as design progresses. The A/E's evolving decisions about the project need to be well documented for reference by the design team and for communication to others. In addition to the drawings, preliminary project description, and outline specifications, methods of documenting design decisions include design memoranda, product notebooks, and checklists. Understand the advantages these offer and how they are used.

8. Design considerations (PRM Module 4.3)

Among the many factors to be considered by the A/E in developing a successful design are the following. Be familiar with these factors as described in the PRM.

- a. Aesthetics: Beauty or artistic quality.
- b. Regulatory requirements: The many laws and regulations governing design and construction, particularly building codes.
- c. Functional requirements: How well the facility meets the owner's functional needs and the functional requirements of codes.
- d. Sustainability: Sustainable design concepts, principles, tools, and assessment approaches.
- e. Constructability: Whether the design is practical and economical to build in the field.
- f. Budget: The economic constraints established by the owner.

9. Product evaluation and selection (PRM Module 4.4; GreenFormat™)

As the project progresses from schematic design to design development and construction documents, the design team, led by the A/E, must select products that will fulfill the project criteria. Be familiar with the product selection process. Know the different types of products including commodities, standard products, custom products, and proprietary products and systems. Also understand considerations necessary in selecting each product type. Be familiar with the considerations involved in specifying performance. Also know the services that product representatives provide to the design team.

B. Construction Documents (PRM Module 5.1)

Effective communication of the project requirements depends largely on having complete and coordinated construction documents. Understand how the construction documents define the rights of, responsibilities of, and relationships between the parties. Understand the benefits of the standard documents created by the AIA, EJCDC, and DBIA.

Have a *thorough* understanding of the definitions, purposes, and content of each of the procurement and contract documents. Figure 5.1-A provides a summary list of documents and illustrates their grouping into procurement and contract documents. Be very familiar with this organization and know which documents are included in the project manual. The subject material in this section provides source material for a significant number of test questions.

1. Elements of construction documents (PRM Module 5.1)

Construction documents are all of the key documents related to construction, as illustrated in Figure 5.1-A.

2. Elements of procurement documents (PRM Module 5.1)

Procurement documents are those provided to prospective contractors, upon which they base their bids or proposals. As shown in Figure 5.1-A, the procurement documents include most, but not all, construction documents.

3. Elements of contract documents (PRM Module 5.1)

Contract documents form the contract between owner and contractor. They include the components shown in Figure 5.1-A.

4. Elements of project manual (PRM Modules 5.1, 5.5, 5.6, 5.9)

The project manual contains the procurement requirements, the contracting requirements, the specifications, and addenda, as shown in Figure 5.1-A.

The project manual concept provides an organizational format and standards for the various construction documents involved. Understand the recommended order of information and documents in a project manual.

5. Procurement requirements (PRM Module 5.2)

Procurement requirements are the procedures for soliciting pricing for the work of a project. Be familiar with the types of documents and the definitions of terms including types of bids and proposals. Understand the procurement requirements for bidding and the types of information included in an invitation to bid and advertisement to bid. Know the basic information included in the instructions to bidders. Understand the procurement requirements for proposals and the differences between this process and the bidding process.

a. Solicitation

The solicitation for procurement, also known as an invitation to bid, is a brief document providing specific information to attract the attention of prospective contractors. Understand its purpose and content.

b. Instructions for procurement

Instructions for procurement, also known as instructions to bidders or instructions to proposers, advise prospective contractors as to how and when to submit bids or proposals, the required content of bids or proposals, and other matters important to the procurement process. Know generally what should be covered in the instructions.

c. Available information

Certain information is made available to bidders for their information but does not become part of the contract documents. This includes resource documents, as illustrated in PRM Figure 5.1-A, and other materials. Understand why these materials are not included in the contract documents.

d. Procurement forms

Procurement forms, also known as bid forms or proposal forms, are the means by which the prospective contractor submits his bid or proposal and certifies compliance with procurement requirements. Know the typical types of procurement forms and what they contain.

6. Contracting requirements (PRM Modules 5.1, 5.3, 5.4; either AIA A201 or EJCDC C-700)

a. Contracting forms (PRM Module 5.3)

The contracting form is the construction agreement between the owner and contractor. The agreement is the document that legally obligates the signing parties. It is only one of the various documents that make up the contract documents. Understand which pieces of information are included in the agreement, how the agreement defines relationships and obligations between the signers, and how it binds together the other documents that make up the contract documents, as shown in PRM Figure 5.3-A.. Know which documents make up the contract documents. Understand how the concepts of project delivery and basis of payment relate to various standard agreement forms.

b. Project forms (PRM Module 5.3)

Project forms such as bonds and certificates are almost always necessary. Know what forms are common and generally what they cover.

c. Conditions of the contract (PRM Module 5.4; either AIA A201 or EJCDC C-700)

Conditions of the contract define the basic rights, responsibilities, and relationships of the parties involved in the performance of the contract. Understand the purpose and content of the general conditions and supplementary conditions. Be familiar with the standard documents available from professional associations such as the AIA, EJCDC, and DBIA. When coordinating study between the PRM and AIA201 or EJCDC C-700, focus on the information that the PRM notes as concepts that both the AIA and EJCDC define and on definitions and statements that the PRM notes are common to the two documents. Focus specifically on understanding the concepts common between the documents relating to the work, contract documents, payments, terminations, claims, and disputes.

Understand the purpose and process for making modifications, deletions, and expansions of articles in the general conditions through the use of supplementary conditions.

d. Revisions and clarifications (PRM Module 5.1)

The contract documents can be revised before adoption through addenda, and revised or clarified after adoption by several means. These are covered more thoroughly below.

7. Specifications (PRM Modules 5.5, 5.6, 5.9; MasterFormat™)

Specifications are an important component of the project manual. Understand the basic ways specifications can be produced. Also be familiar with the basic steps in developing specifications including gathering information and selecting products. Understand the types of decisions required to organize and prepare specifications including procedural decisions, format, method, and language of specifications. Know the terms related to specifying workmanship, quality assurance, and quality control. Understand the considerations the A/E must keep in mind related to level of requirements, extent, cost, and schedule of a project during development of specifications.

a. Division 01, General Requirements Subgroup (PRM Module 5.6)

The sections in Division 01 are referred to as the General Requirements. Understand what information is included in the General Requirements, how it is organized, and how SectionFormat™ is used to lay out a consistent and logical organization of titles. Know how Division 01 relates to other documents including the procurement requirements, contracting requirements, specifications, and contract drawings. Be familiar with the commonly used Division 01 sections.

- b. Divisions 02-19, Facility Construction Subgroup (PRM Module 5.5; MasterFormat™)

Divisions 02-19 generally contains the work results that make up the structure and surface finishes of the facility. Candidates are expected to know the division names and numbers in this subgroup.

- c. Division 20-29 Facility Services Subgroup (PRM Module 5.5; MasterFormat™)

The Facility Services Subgroup of the specifications covers utility-type services within the building or facility itself. Know what belongs in this subgroup.

- d. Division 30-39 Site and Infrastructure Subgroup (PRM Module 5.5; MasterFormat™)

Divisions 30 to 39 address site work, site utilities, and infrastructure improvements. Know what belongs in this subgroup and how to differentiate between this subgroup and the Facility Services Subgroup.

- e. Division 40-49 Process Equipment Subgroup (PRM Module 5.5; MasterFormat™)

Understand what is considered process equipment.

8. Contract Drawings (PRM Module 5.10)

- a. Role and function

A variety of drawing types and views are used to convey comprehensive information about a project. Be familiar with the definitions of the types and categories of drawings, when and how they are used, and who uses the drawings during each stage of the project. Be familiar with the concept of the U.S. National CAD Standard.

- b. Categories

Understand what is meant by a view; know the difference between scaled and nonscaled views; and be able to recognize plans, sections, and elevations.

- c. Features

Be familiar with drawing features such as the drawing identification cover sheet, drawing blocks, special line types, shading, dimensions, symbols, and abbreviations. Also be familiar with how drawing sets are organized.

- d. Formats

Be familiar with the concept of the U.S. National CAD Standard; its two components, the CAD Layer Guidelines and the CSI Uniform

Drawing System; and generally what each of them addresses. Candidates should also be aware that there is a National BIM Standard.

e. Trends

Building information modeling and integrated project delivery are transforming the process of facility planning and design as well as the production of construction documents. Candidates should review the material in the PRM on this point as well as the AIA IPD Guide and the GSA BIM Guide to gain an overall perspective of what these developments mean. Candidates should also understand the concept of interoperability and the critical role it plays in the future of the construction industry.

9. Resource drawings (PRM Module 5.10)

Drawings that are in some way relevant to the project but are not part of the contract documents are known as resource drawings. Know generally what kinds of drawings these might be.

10. Modifications (PRM Module 5.12)

Procurement and contract document modifications provide methods for the A/E, owner, and contractor to deal with situational changes during the project life cycle. The method of changing the documents varies based on the stage of the project and the type of change. Have a thorough understanding of the following instruments of change and when each is used:

- Addenda
- Change orders
- AIA Architect's Supplemental Instructions or EJCDC Field Orders
- AIA Construction Change Directive or EJCDC Work Change Directive

Understand which of these include changes in contract sum or contract time and who is responsible for producing and/or signing the documentation.

11. Coordination between graphic and written documents (PRM Module 5.11)

The drawings and specifications are complementary and both are needed to fully describe a construction project. Know which information should be conveyed in drawings, and which information should be conveyed in specifications. Understand the concept of schedules. Also be familiar with the process of coordinating information between drawings and specifications.

12. Methods of specifying (PRM Module 5.7)

There are four methods of specifying: descriptive, performance, reference standard, and proprietary. Understand the definition and purpose of each method, what factors to consider when selecting a method, and the possible benefits and liabilities of each method. Understand the attributes of proper specifications.

13. Specification language (PRM Module 5.8)

The four Cs for effective communication are: clear, concise, correct, and complete. Be familiar with the four Cs and how writing style, vocabulary, spelling, and sentence structure contribute to well written specifications. Also know the correct standards to be used in specifications for abbreviations, symbols, capitalization, punctuation, and grammar. Know to whom the specifications should be directed and what level of detail should be included in the specifications.

14. Hierarchy of general, administrative, and procedural requirements (PRM Module 5.6)

Understand the hierarchy of general and procedural requirements based on the General Conditions, Division 01—General Requirements, and Part 1—General.

15. SectionFormat™ (PRM Module 5.5)

Formats provide a standardized means of organizing, storing, and retrieving information. Understand why, when, and how SectionFormat™ is used and organized.

16. PageFormat™ (PRM Module 5.5)

Formats provide a standardized means of organizing, storing and retrieving information. Understand why, when, and how PageFormat™ is used and organized.

17. Warranties (PRM Module 5.18)

There are different types of implied and express warranties. Understand the definition and general purpose of the various types of warranties and the role of the UCC in governing warranties. Understand the implications of specifying warranties.

18. Insurance (PRM Module 5.20)

The kinds of insurance necessary for most projects include general liability insurance, owner's protective liability, builders risk insurance, and various typical coverages such as workers' compensation and automobile insurance. Candidates should know generally what these various types of insurance cover, who is protected, and who obtains the insurance.

Subject Matter Area No. 4 – Procurement

Weight on the Examination: 10%

Approximately 10 questions from material directly referenced in the source materials for this subject matter area will appear on the exam.

Examination Objective

- Measure knowledge and comprehension of process of bidding, negotiating, and contracting to purchase the Work.

Source Materials

PRM Module 6 – Bidding/Negotiating/Purchasing

Successful candidates will understand, on a **basic** level, the concepts of pricing; pricing considerations for the various project delivery methods; the bidding, negotiating, and subcontracting processes; the participants and the processes for purchasing of goods; and the effect of funding sources on the project delivery method. They will also understand the role of the A/E and contractor in interpreting the construction documents during the procurement process.

PRM Module 5 – Construction Documents
and

AIA Document A201 – General Conditions of the Contract for Construction
or

EJCDC C-700 – Standard General Conditions of the Construction Contract

Successful candidates will have a thorough understanding of when and how addenda are used during procurement and how substitutions are handled at this stage.

Study Checklist

A. Procurement process (PRM Module 6.1)

The transition from the design stage to the construction stage of a project is the bidding/negotiating/purchasing stage, collectively known as procurement. Understand the basic activities in this stage.

B. Pricing and purchasing terminology (PRM Module 6.1)

The owner's chosen method of pricing the work may be a stipulated sum (lump sum); cost plus a fee, with or without a guaranteed maximum price; time and material, with an estimate of probable cost; or unit price. Understand how these differ and the pros and cons of using each.

C. Pricing considerations (PRM Module 6.2)

Pricing is a complex process that includes a comprehensive cost analysis of project requirements, based on the information contained in the procurement documents and other information. Understand the general types of costs involved and basic approaches to cost analysis. Also have an understanding of how the delivery method affects the pricing process.

D. Distribution and control of project information (PRM Module 6.3)

Pricing activities require written and graphic project information . Know who needs to have access to this information, methods of distribution of the information (such as plan houses and websites), and procedures for controlling the information.

E. Execution of agreement (PRM Module 6.9)

The form of agreement to be used for a project is identified in the procurement requirements. Understand who is responsible for filling in all necessary information and signing the document. Be familiar with the concept of standard forms published by professional associations.

F. Substitution requests during bidding (PRM Modules 6.4, 5.7)

When substitutions are allowed, most commonly they are controlled substitutions as defined in the PRM. Controlled substitutions require approval by the A/E before the end of bidding and issuance of an addendum ahead of the bid date. Less common are proposed substitutions as defined in the PRM, where contractors are free to propose substitutions with their bids and prepare their bids on the basis of the proposed substitutions. Understand how these approaches work and the advantages and drawbacks of each.

G. Addenda (PRM Module 5.12)

Addenda are used to modify the procurement documents prior to execution of the agreement, usually prior to opening of bids or proposals. Understand the purpose of addenda, when they are used, procedures for issuing addenda, and the correct format and content for an addendum. Have a clear grasp of the difference between addenda and change orders.

Subject Matter Area No. 5 – Construction

Weight on the Examination: 20%

Approximately 20 questions from material referenced in the source materials for this subject matter area will appear on the exam.

Examination Objectives

Measure knowledge and comprehension of activities and procedures related to the administration of the contract.

Source Materials

PRM Module 7 – Construction
and
AIA Document A201 – General Conditions of the Contract for Construction
or
EJCDC C-700 – Standard General Conditions of the Construction Contract

Successful candidates will demonstrate knowledge of the roles of the A/E, owner, and contractor during construction; the application and certification/recommendation for the payment process; the source of expectations by each party to the contract; and the expectations of the A/E, owner, and contractor by others in the construction contract administration process.

They will also understand the contractor's role in interpreting the construction documents to prepare submittals, such as shop drawings, product data, and samples, and the A/E's role in interpreting the construction documents when serving in the role of construction observer.

Study Checklist

A. Submittals (PRM Module 7.5; AIA IPD Guide)

During the construction of a project the contractor is usually required by the contract to submit items such as product data, shop drawings, and samples for the A/E to review. A variety of other submittals are required both before and during construction. Understand the role of these documents as they relate to the contract documents and the information that should be contained in the documents. Know the names and definitions of the various types of documents, who is responsible for completing them, who is responsible for reviewing them and approving them, and the appropriate timing of each.

B. Communication identified in the general conditions (PRM Module 7.2; AIA A201 or EJCDC C-700; AIA IPD Guide)

Be familiar with the basic lines of communication as identified in the AIA and EJCDC general conditions and understand the implications of oral and written communication. Know how interpretations of the contract documents are requested and provided.

C. Contract modifications (PRM Module 5.12)

Have a thorough understanding of the following instruments of change and when each is used:

- Change orders
- AIA Construction Change Directive or EJCDC Work Change Directive
- AIA Architect's Supplemental Instructions or EJCDC Field Orders

Understand which of these include changes in contract sum or contract time and who is responsible for producing and/or signing the documentation.

D. Substitutions during construction (PRM Module 7.8; AIA IPD Guide)

Be familiar with the drawbacks associated with substitutions during construction as described in the PRM. Know the general considerations related to substitutions and the process for making and responding to substitution requests.

E. Site visits, observations, meetings, and inspections (PRM Modules 7.2, 7.4, 7.6; AIA A201 or EJCDC C-700)

During construction, the A/E makes site visits to observe the progress of the work, and makes certain inspections at key points. Understand clearly the difference between these, the A/E's obligations in each case, and what happens as a result. Also generally understand the roles and responsibilities of the contractor and owner in relation to site observation and inspection.

Many types of meetings are necessary for effective management of a construction project and administration of the construction contract. Have a basic grasp of the requirements for effective meetings and the types of meetings typically held.

F. Roles and responsibilities (PRM Modules 7.1, 7.2; AIA A201 or EJCDC C-700)

Construction is the execution of the work as required by the contract documents. Understand the roles of the participants and their basic responsibilities, including the owner, contractor, A/E, product representative, and subcontractor. Be familiar with activities related to construction contract administration and contractor project management. Understand the importance of working as a team and how the relationships between team members, contract administration, and contractor project management vary between delivery methods.

Construction contract administration and contractor project management involve the activities necessary to fulfill contract requirements. Each participant has certain rights and responsibilities under the contract. Understand the rights and responsibilities of each of the participants including the following:

- Owner
- A/E
- Contractor
- Subcontractor
- Supplier
- Consultants
- Authorities having jurisdiction
- Testing agency inspectors
- Commissioning agent

- Product representatives

When studying AIA Document A201 or EJCDC C-700, focus on the rights and responsibilities of the parties that are common to both documents. Also, focus study on the paragraphs listed in the study outlines for these documents.

- G. Construction by owner or by separate contract (PRM Module 7.2; AIA A201 or EJCDC C-700)

The owner may have separate construction underway at the project site, either by his own forces or by separate contract with another contractor(s). Know who is responsible for coordinating between the owner's efforts and the work under the contract.

- H. Contract time (PRM Module 7.3; AIA A201 or EJCDC C-700)

Contract time is handled somewhat differently under AIA and EJCDC conditions of the contract. Understand what contract time is, when it starts, what it measures, and where key dates are identified.

- I. Quality assurance/quality control implementation (PRM Module 7.7)

Understand how construction-stage quality assurance and quality control relate to one another; the roles of the participants in ensuring quality; typical types of QA/QC procedures; how contract document provisions relate to quality requirements; and the importance of a team approach.

- J. Payments and completion (PRM Modules 7.11, 7.12)

1. Progress payments (PRM Module 7.11)

Know what establishes the dates for progress payments; the A/E's role in the payment process; the purpose of the schedule of values; the payment application and review process; and the significance of progress payments with regard to acceptance of the work.

2. Substantial completion (PRM Modules 7.11, 7.12)

Know what constitutes substantial completion; how the date of substantial completion is determined; the types of documentation associated with it; and how substantial completion relates to occupancy and acceptance of the work.

3. Final completion (PRM Modules 7.11, 7.12)

Know what is meant by final completion; the general types of activities required for project closeout; the types of documentation associated with final completion; and how final completion relates to occupancy and acceptance of the work.

4. Final payment (PRM Modules 7.11, 7.12)

Understand the process leading to final payment; the types of documentation involved; how retainage, withholds, liquidated damages, and penalty/bonus clauses affect final payment; and what is covered by the final change order.

K. Protection of persons and property (PRM Module 7.9)

The contractor has a responsibility to protect installed work, completed work, workers, and the public. Be familiar with typical ways in which this is accomplished.

L. Uncovering and correction of work (PRM Module 7.6)

Know the basic rights and obligations of the contractor, A/E, and owner with regard to uncovering and correcting defective work, accepting defective work, and stopping the work.

M. Termination or suspension of the contract (PRM Module 7.6; AIA 201 or EJCDC C-700)

Both the owner and the contractor have a right to stop work or terminate the contract for cause. The owner also has a right to terminate for convenience. Understand the conditions under which these rights come into play.

N. Claims and disputes (7.10; AIA A201 or EJCDC C-700; AIA IPD Guide)

Understand what a claim is; who may file a claim, and typically for what reasons; how claims are submitted and reviewed; the concept of entitlement; how claims are resolved; and how claims may be avoided.

Disputes, or unresolved claims, are disruptive to the project. Candidates are directed to AIA A201 or EJCDC C-700 regarding methods for resolving disputes, as these provisions changed in the 2007 editions of the contract documents.

O. Performance and payment bonds (PRM Module 5.19, AIA A201 or EJCDC C-700)

There are three basic types of bonds used in construction projects: bid bonds, performance bonds, and payment bonds. Understand the basic definition and purpose of each type, and what happens if it is necessary to proceed under a bond.

Subject Matter Area No. 6 – Post-Construction

Weight on the Examination: 5%

Approximately 5 questions from material referenced in the source materials for this subject matter area will appear on the exam.

Examination Objective

Measure knowledge and comprehension of activities and documents related to transition from construction to ongoing facility management.

Source Materials

PRM Module 8 – Facility Management

Successful candidates will understand the basic concept of facility management, the facility manager's role in project closeout, and the construction contract administrator's role in this process. Questions from this module are general in nature and focus on the roles and responsibilities of the participants as well as how documents prepared during the previous stages of a facility's life cycle are used during facility management.

Study Checklist

- A. Role and responsibilities of facility manager during project closeout (PRM Module 8.2; AIA IPD Guide)

The facility manager is responsible for allocation of resources for the ongoing operation of the facility. The facility manager is involved in project closeout to assist in the successful transfer of the completed facility for the owner's use. Understand the facility manager's role in this process. Also understand the role of other participants in creating and submitting operations and maintenance data, performing demonstrations and training, and creating punch lists. Be familiar with the documents used by the facility manager including project record documents.

- B. Correction period (PRM Module 8.2)

Know what the correction period is, how long it lasts, and the responsibilities of the facility manager during this period.

- C. Operations and maintenance (PRM Module 8.3)

Operations and maintenance include management of day-to-day functions of a facility and its systems. Understand the basic types of maintenance and the documents associated with operations and maintenance.

- D. Resource materials (PRM Module 8.4)

The facility manager requires resource materials, such as record documents, to ensure efficient and effective operations and maintenance (O&M). Know the basic types of record documents and their intended use.

E. Facility evaluations (PRM Module 8.5)

The facility manager develops and maintains an ongoing evaluation program. Be familiar with when this process begins and the definitions of the basic components.

F. Commissioning activities (PRM Module 7.12)

Commissioning is a key component of project closeout and, in full project commissioning, extends into the post-occupancy period. Understand the difference between total project commissioning and systems and equipment commissioning. Know the purpose of commissioning; the general kinds of activities involved; and how commissioning relates to the ongoing quality of the facility's performance throughout its useful life.

Synopsis – AIA Document A201 - 2007

Questions on the examination may be sourced directly from AIA Document A201, 2007 version. General knowledge of the document is helpful in achieving a passing score on the exam. This synopsis uses the titles and numbering sequence of the articles of AIA Document A201 to help focus study of the document on sections applicable to actual questions on the exam. Use it in conjunction with the actual document and with CSI's PRM.

1. GENERAL PROVISIONS

- 1.1 Basic Definitions
 - 1.1.1 The Contract Documents
 - 1.1.2 The Contract
 - 1.1.3 The Work
 - 1.1.4 The Project
 - 1.1.5 The Drawings
 - 1.1.6 The Specifications
 - 1.1.7 The Instruments of Service
 - 1.1.8 Initial Decision Maker
- 1.2 Correlation and Intent of the Contract Documents
- 1.3 Capitalization
- 1.4 Interpretation
- 1.5 Ownership and Use of Drawings, Specifications and Other Instruments of Service
- 1.6 Transmission of Data in Digital Form

2. OWNER

- 2.1 General
- 2.2 Information and Services Required of the Owner
- 2.3 Owner's Right to Stop the Work
- 2.4 Owner's Right to Carry Out the Work

3. CONTRACTOR

- 3.1 General
- 3.2 Review of Contract Documents and Field Conditions by Contractor
- 3.3 Supervision and Construction Procedures
- 3.4 Labor and Materials
- 3.5 Warranty
- 3.6 Taxes
- 3.7 Permits, Fees, Notices, and Compliance with Laws
- 3.8 Allowances
- 3.9 Superintendent
- 3.10 Contractor's Construction Schedules
- 3.11 Documents and Samples at the Site
- 3.12 Shop Drawings, Product Data and Samples
- 3.13 Use of Site
- 3.14 Cutting and Patching
- 3.15 Cleaning Up
- 3.16 Access to Work
- 3.17 Royalties, Patents and Copyrights
- 3.18 Indemnification

4. ADMINISTRATION OF THE CONTRACT

- 4.1 General
- 4.2 Administration of the Contract
 - 4.2.4 Communications Facilitating Contract Administration

- 5. SUBCONTRACTORS**
 - 5.1 Definitions
 - 5.2 Award of Subcontracts and Other Contracts for Portions of the Work
 - 5.3 Subcontractual Relations
 - 5.4 Contingent Assignment of Subcontracts

- 6. CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS**
 - 6.1 Owner's Right to Perform Construction and to Award Separate Contracts
 - 6.2 Mutual Responsibility
 - 6.3 Owner's Right to Clean Up

- 7. CHANGES IN THE WORK**
 - 7.1 General
 - 7.2 Change Orders
 - 7.3 Construction Change Directives
 - 7.4 Minor Changes in the Work

- 8. TIME**
 - 8.1 Definitions
 - 8.2 Progress and Completion
 - 8.3 Delays and Extensions of Time

- 9. PAYMENTS AND COMPLETION**
 - 9.1 Contract Sum
 - 9.2 Schedule of Values
 - 9.3 Applications for Payment
 - 9.4 Certificates for Payment
 - 9.5 Decisions to Withhold Certification
 - 9.6 Progress Payments
 - 9.7 Failure of Payment
 - 9.8 Substantial Completion
 - 9.9 Partial Occupancy or Use
 - 9.10 Final Completion and Final Payment

- 10. PROTECTION OF PERSONS AND PROPERTY**
 - 10.1 Safety Precautions and Programs
 - 10.2 Safety of Persons and Property
 - 10.2.8 Injury or Damage to Person or Property
 - 10.3 Hazardous Materials
 - 10.4 Emergencies

- 11. INSURANCE AND BONDS**
 - 11.1 Contractor's Liability Insurance
 - 11.2 Owner's Liability Insurance
 - 11.3 Property Insurance
 - 11.3.2 Boiler and Machinery Insurance
 - 11.3.3 Loss of Use Insurance
 - 11.3.7 Waivers of Subrogation
 - 11.4 Performance Bond and Payment Bond

- 12. UNCOVERING AND CORRECTION OF WORK**
 - 12.1 Uncovering of Work
 - 12.2 Correction of Work
 - 12.2.1 Before or After Substantial Completion
 - 12.2.2 After Substantial Completion
 - 12.3 Acceptance of Nonconforming Work

13. MISCELLANEOUS PROVISIONS

- 13.1 Governing Law
- 13.2 Successors and Assigns
- 13.3 Written Notice
- 13.4 Rights and Remedies
- 13.5 Tests and Inspections
- 13.6 Interest
- 13.7 Time Limits on Claims

14. TERMINATION OR SUSPENSION OF THE CONTRACT

- 14.1 Termination by the Contractor
- 14.2 Termination by the Owner for Cause
- 14.3 Suspension by the Owner for Convenience
- 14.4 Termination by the Owner for Convenience

15 CLAIMS AND DISPUTES

- 15.1 Claims
 - 15.1.1 Definition
 - 15.1.2 Notice of Claims
 - 15.1.3 Continuing Contract Performance
 - 15.1.4 Claims for Additional Cost
 - 15.1.5 Claims for Additional Time
 - 15.1.6 Claims for Consequential Damages
- 15.2 Initial Decision
- 15.3 Mediation
- 15.4 Arbitration
 - 15.4.4 Consolidation or Joinder

Synopsis – EJCDC Document C-700 - 2007

Questions on the examination may be sourced directly from EJCDC Document C-700, 2007 version. General knowledge of the document is helpful in achieving a passing score on the exam. This synopsis uses the titles and numbering sequence of EJCDC Document C-700 to help focus study of this document on sections applicable to actual questions on the exam. Use it in conjunction with the actual document and with CSI's PRM.

Article 1 – Definitions and Terminology

- 1.01 Defined Terms
- 1.02 Terminology

Article 2 – Preliminary Matters

- 2.01 Delivery of Bonds and Evidence of Insurance
- 2.02 Copies of Documents
- 2.03 Commencement of Contract Times; Notice to Proceed
- 2.04 Starting the Work
- 2.05 Before Starting Construction
- 2.06 Preconstruction Conference; Designation of Authorized Representatives
- 2.07 Initial Acceptance of Schedules

Article 3 – Contract Documents: Intent, Amending, Reuse

- 3.01 Intent
- 3.02 Reference Standards
- 3.03 Reporting and Resolving Discrepancies
- 3.04 Amending and Supplementing Contract Documents
- 3.05 Reuse of Documents
- 3.06 Electronic Data

Article 4 – Availability of Lands; Subsurface and Physical Conditions; Hazardous Environmental Conditions; Reference Points

- 4.01 Availability of Lands
- 4.02 Subsurface and Physical Conditions
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- 4.05 Reference Points
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Article 5 – Bonds and Insurance

- 5.01 Performance, Payment, and Other Bonds
- 5.02 Licensed Sureties and Insurers
- 5.03 Certificates of Insurance
- 5.04 Contractor's Insurance
- 5.05 Owner's Liability Insurance
- 5.06 Property Insurance
- 5.07 Waiver of Rights
- 5.08 Receipt and Application of Insurance Proceeds
- 5.09 Acceptance of Bonds and Insurance; Option to Replace
- 5.10 Partial Utilization, Acknowledgment of Property Insurer

Article 6 – Contractor's Responsibilities

- 6.01 Supervision and Superintendence
- 6.02 Labor; Working Hours
- 6.03 Services, Materials, and Equipment

- 6.04 Progress Schedule
- 6.05 Substitutes and “Or-Equals”
- 6.06 Concerning Subcontractors, Suppliers, and Others
- 6.07 Patent Fees and Royalties
- 6.08 Permits
- 6.09 Laws and Regulations
- 6.10 Taxes
- 6.11 Use of Site and Other Areas
- 6.12 Record Documents
- 6.13 Safety and Protection
- 6.14 Safety Representative
- 6.15 Hazard Communication Programs
- 6.16 Emergencies
- 6.17 Shop Drawings and Samples
- 6.18 Continuing the Work
- 6.19 Contractor’s General Warranty and Guarantee
- 6.20 Indemnification
- 6.21 Delegation of Professional Design Services

Article 7 – Other Work at the Site

- 7.01 Related Work at Site
- 7.02 Coordination
- 7.03 Legal Relationships

Article 8 – Owner’s Responsibilities

- 8.01 Communications to Contractor
- 8.02 Replacement of Engineer
- 8.03 Furnish Data
- 8.04 Pay When Due
- 8.05 Lands and Easements; Reports and Tests
- 8.06 Insurance
- 8.07 Change Orders
- 8.08 Inspections, Tests, and Approvals
- 8.09 Limitations on Owner’s Responsibilities
- 8.10 Undisclosed Hazardous Environmental Condition
- 8.11 Evidence of Financial Arrangements
- 8.12 Compliance with Safety Program

Article 9 – Engineer’s Status During Construction

- 9.01 Owner’s Representative
- 9.02 Visits to Site
- 9.03 Project Representative
- 9.04 Authorized Variations in Work
- 9.05 Rejecting Defective Work
- 9.06 Shop Drawings, Change Orders and Payments
- 9.07 Determinations for Unit Price Work
- 9.08 Decisions on Requirements of Contract Documents and Acceptability of Work
- 9.09 Limitations on Engineer’s Authority and Responsibilities
- 9.10 Compliance with Safety Program

Article 10 – Changes in the Work; Claims

- 10.01 Authorized Changes in the Work
- 10.02 Unauthorized Changes in the Work
- 10.03 Execution of Change Orders
- 10.04 Notification to Surety
- 10.05 Claims

Article 11 – Cost of the Work; Allowances; Unit Price Work

- 11.01 Cost of the Work
- 11.02 Allowances
- 11.03 Unit Price Work

Article 12 – Change of Contract Price; Change of Contract Times

- 12.01 Change of Contract Price
- 12.02 Change of Contract Times
- 12.03 Delays

Article 13 – Tests and Inspections; Correction, Removal or Acceptance of Defective Work

- 13.01 Notice of Defects
- 13.02 Access to Work
- 13.03 Tests and Inspections
- 13.04 Uncovering Work
- 13.05 Owner May Stop the Work
- 13.06 Correction or Removal of Defective Work
- 13.07 Correction Period
- 13.08 Acceptance of Defective Work
- 13.09 Owner May Correct Defective Work

Article 14 – Payments to Contractor and Completion

- 14.01 Schedule of Values
- 14.02 Progress Payments
- 14.03 Contractor's Warranty of Title
- 14.04 Substantial Completion
- 14.05 Partial Utilization
- 14.06 Final Inspection
- 14.07 Final Payment
- 14.08 Final Completion Delayed
- 14.09 Waiver of Claims

Article 15 – Suspension of Work and Termination

- 15.01 Owner May Suspend Work
- 15.02 Owner May Terminate for Cause
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Article 16 – Dispute Resolution

- 16.01 Methods and Procedures

Article 17 – Miscellaneous

- 17.01 Giving Notice
- 17.02 Computation of Times
- 17.03 Cumulative Remedies
- 17.04 Survival of Obligations
- 17.05 Controlling Law
- 17.06 Headings

Sample Questions (CDT)

The sample questions used in this study guide do NOT necessarily represent those questions used in the examination. They are intended to familiarize you with the types of questions and formats that will be presented on the examination. Examination questions may not be limited to the types represented below.

1. A facility's "life cycle" includes all of the following EXCEPT:
 - a. Project conception
 - b. Financing
 - c. Construction
 - d. Facility management

2. The objective of the competitive bidding process is:
 - a. To ensure that all qualified bidders may submit bids on public work projects
 - b. To ensure that public works contracts are always awarded to the lowest bidders
 - c. To ensure that the intent of the governing public laws is maintained in the awarding of contracts
 - d. To ensure that the cost of the project is reasonable and consistent with the prevailing conditions in the building industry

3. Multiple-prime contracts are normally a part of:
 - a. Turn-key construction
 - b. Negotiated contracts
 - c. Long duration construction projects
 - d. Fast-track construction

4. The specification-type document prepared during the design development phase is called the:
 - a. Outline specification
 - b. Rough draft specification
 - c. UniFormat™ elements
 - d. Cost estimate

5. The contractual relationship governed by the conditions of the contract is between:
 - a. Owner and contractor
 - b. A/E and contractor
 - c. Owner and subcontractors
 - d. A/E and subcontractors

6. The procurement documents include all of the following EXCEPT:
 - a. Procurement requirements
 - b. Contract modifications
 - c. Project manual
 - d. Drawings

7. To be effective in communicating, specifications should be:
 - a. Complete, concise, and correct
 - b. Concise, clear, and correct
 - c. Clear, correct, complete, and concise
 - d. Concise, correct, and complete

8. Which of the following is NOT a contract modification:
 - a. Change order
 - b. Construction change directive/work change directive
 - c. Addendum
 - d. Architect's supplemental instructions/field order

9. Who is solely responsible for control over construction means and methods?
 - a. Contractor
 - b. Supplier of equipment being installed
 - c. Owner
 - d. A/E

10. AIA Document A201 and EJCDC C-700 state that who will interpret and decide matters concerning performance based on the contract documents upon written request?
 - a. Contractor
 - b. Building official
 - c. Owner
 - d. A/E

11. Resource drawings serve which purpose?
 - a. Show existing work that is to be modified
 - b. Show construction related to the work, but which is not included in the contract
 - c. Provide the owner with a set of documents that will facilitate operation
 - d. Drawings prepared by manufacturers, suppliers, and the contractor to illustrate portions of the work.

Answers to Sample Questions

1. b - PRM 1.4
2. d - PRM 3.4
3. d -PRM 3.4
4. a - PRM 4.9
5. a - PRM 5.1
6. b - PRM 5.1
7. c - PRM 5.8
8. c - PRM 5.12
9. a - AIA Document A201, 3.3.1 /EJCDC C-700, 6.01
10. d - AIA Document A201, 4.2.11/EJCDC C-700, 9.08
11. b - PRM 7.1

NOTES

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USER RESPONSE FORM - CDT EXAMINATION STUDY GUIDE

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