Building Construction 3rd edition Mehta Solutions Manual

SKU: 9780134454177-SOLUTIONS

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Pearson

Instructor's Resource Manual
to accompany

Building Construction: Principles, Materials, & Systems
Third Edition

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ISBN-13: 978-0-13445452-8

ISBN-10: 0-13-445452-9



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Chapter 1 • An Overview of Building Delivery Process

Chapter Outline

1.1 Project Delivery Phases
- Predesign
- Design phase
- Preconstruction phase
- Construction phase
- Post construction phase

1.2 Pre-design phase
- Planning phase, the project is defined in terms of its design goals, function, purpose, scope, size and economics. Defining the problem is essential to achieving a successful program.

1.3 Design phase
- Typical design team consists of the architect, civil and structural consultants, and mechanical, electrical and plumbing and fire-protection (MEPF) consultants.
- Architect's liability for work done by owner contracted consultant.
- Engineer as prime design professional.

1.4 Three Sequential Stages in Design Phase
- Schematic design stage (SD) – emphasis on design with creative, conceptual and innovative concepts.
- Design development stage (DD) – emphasis on decision-making.
- Construction documentation stage (CD) – emphasis on documentation.
- Construction drawings
  - Specifications
  - Construction document set

1.5 CSI MasterFormat and specification
- MasterFormat is the organization of the specifications developed by the Construction Specifications Institute (CSI).
- 50 divisions of MasterFormat, and organizational system.
- Recollect the MasterFormat division sequence by imagining the construction sequence.
- The role of divisions 01 & 02, general requirements and existing conditions.
- MasterFormat and construction-related information.

1.6 The Construction Team
- Roles of general contractor, sub-contractors and sub-sub-contractors and suppliers.
- Two-party contractual relationships

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1.7 Preconstruction phase: the bid documents

- Preparation of bid documents (bid package) by architect.
- The structure and contents of the project manual including specifications, procurement and contracting requirements addenda and contract modifications.

1.8 Preconstruction phase: the surety bonds

- Bid bonds, performance bonds and payment bonds.
- Advantages and disadvantages of bonds: mandates, costs and value.

1.9 Preconstruction phase: selecting the general contractor and project delivery method

- There are many well-established project delivery methods, and the delivery method determines the bid process.
- Differences in delivery method determine
  - the basis of selection of the general contractor
  - timing of selection in terms of the design process
  - role of the general contractor during the design phase
  - level of coordination between design and construction team throughout the project.
- In all delivery methods, the general contractor must conform to the work described in contract documents.
- Specific delivery methods are detailed later in this chapter.

1.10 Construction phase: submittals and construction progress documentation

- The design team in part of the review process of all documentation provided by the contractor during this phase.
- Shop drawings for products that are fabricated off site.
- Full scale mock-ups
- Meeting minutes, correspondence change order logs, time schedule, third party inspections and videos and other imagery are among the documentation of the construction progress provided by the general contractor.

1.11 Construction phase: contract administration

- Quality control and the responsibilities of the general contractor and third party inspectors.
- Why hire a contract administrator?
- Architect's observation of construction focuses what and where, and the identification of variations from the construction documents.
- General contractor determines the means and methods and timing of construction.
- The architect inspects at two points: to verify if the work is substantially completed and fully complete, triggering the release of final funding.
- Payment certifications
- Change orders and contract modifications

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1.12 Post Construction phase: project closeout

- Substantial completion and the punch list.
- Certificate of occupancy and the substantial completion inspection.
  - Guaranties and warranties
  - Certificate of substantial completion means GC liability for site utilities, security, etc. are transferred to the owner.
- Final completion
  - Record documents of the project as built provided for the owner.

1.13 Project delivery: Design-Bid-Build (DBB)

- Competitive sealed bidding vs. competitive sealed proposal
- Invitational bidding

1.14 Project delivery: Design-Negotiate-Build (DNB)

- Similar to DBB, but owner negotiates price with one or more GC and owner awards contract to bid that meets owner's goals.

1.15 Project Delivery: construction management-related methods

- Construction manager as the owner's agent (CMAA)
- Construction manager at risk (CMAR)
  - Evolved to address problems related to liability and responsibility issues resulting from the earlier CMAA method.
  - Owner contracts directly with construction manager.

1.16 Project Delivery: Design-Build (DB)

- Owner awards the contract to one firm who designs and builds the project.

1.17 The Integrated Project Delivery (IPD) Method

- Promotes collaboration and integration among all member of the team by establishing an atmosphere of trust across all team members.
- Project is run by a team, and risks and rewards are shared by all.
- Collaborative approach is facilitated by building information modeling technologies (BIM).
  - Design and construction team build data-rich, 3-D virtual construction model building.
  - Model is used to detect clashes among building components.
  - Time and effort shifted to design phase.
  - Model can be used throughout the life of the building, tracking performance, maintenance and repair needs, etc.

1.18 Fast track Project Scheduling

- Sequential scheduling of construction phase allows building construction of an early segment of the project to begin construction before design is completed on subsequent segments.
- Requires that CG or CM on board during design phase to facilitate multiple contracts.

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Practice Quiz Answer Location

Question Page	Question & Answer	Answer Section
7	1-d	1.1
7	2-b	1.2 & 1.3
7	3-b	1.3
7	4-a	1.2
7	5-d	1.3
7	6-c	1.4
7	7-b	1.4
7	8-b	1.4
7	9-b	1.4
7	10-e	1.4
7	11-d	1.4
16	12-a	1.5
16	13-d	1.5
16	14-e	1.5
16	15-c	1.5
16	16-e	1.5
16	17-a	1.5
16	18-e	1.5
16	19-c	1.6
16	20-c	1.7
16	21-d	1.7
16	22-b	1.7

Question Page	Question & Answer	Answer Section
16	23-d	1.8
16	24-b	1.8
16	25-e	1.8
16	26-e	1.8
16	27-a	1.8
16	28-e	1.8
29	29-e	1.10
29	30-b	1.10
29	31-a	1.10
29	32-c	1.11
29	33-c	1.12
29	34-a	1.12
29	35-b	1.12
29	36-c	1.12
29	37-b	1.11 & 1.12
29	38-d	1.12
30	39-a	1.12
30	40-e	1.13
30	41-e	1.15
30	42-b	1.16
30	43-e	1.17
30	44-b	1.17

In-class or Homework Activities

- Simple design project, find something on campus or in a room that has a design flaw, have students work in teams or individual to decide.
    - What is the problem? (i.e. doors open in wrong direction)
    - Who is responsible for design? (Owner or architect or installer or manufacture?) How would you fix the problem?
    - How would the designers fix the problem?
- Have the students make an excel spreadsheet showing sustainable examples of materials in each of the CSI master format divisions with the following columns: Div. #, Description, Example of sustainable material, website for information, picture of information, and why it is sustainable.
- Bring a sample of a project manual and bid documents and make up questions related to that project where the students can find information. Where is the project? What are the bidding instructions? Time, Date, etc.

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Special Chapter Content

- Building (Project) Program –AIA Document B141 Pg. 3
- Working Drawings –used until the 20th century for what is now called construction drawings Pg. 6
- Relationship between Construction Drawings and Specifications Pg. 6
- Difference between Div. 10 - Specialties and Div. 13 –Special Construction Pg. 10
- Summary of Architects functions as construction contract administrator Pg. 20
- Value Engineering = the science of obtaining balance among the cost, reliability, and performance. Pg. 20
- Project Delivery Methods at a Glance Pg. 30

Review Question Answer Key
Page 30

Question Number	Answer	Answer Section
1	Predesign, design, pre-construction, construction, post-construction	1.1-1.4
2	See figure 1.9.	1.6
3	See figure 1.7.	1.5
4	Project manual. See figure 1.12.	1.7
5	See figures 1.9 and 1.11.	1.7
6	Minor changes vs. major changes	1.11
7	As built documents (record documents) provide the owner with precise information require for management and maintenance of the building and in the case that additions or changes are required.	1.12
8	Drawings prepared for components and products typically fabricated off site by subcontractors.	1.10
9	Bid bonds, performance bonds, payment bonds	1.8
10	CMAA: Construction manager as agent CMAR: Construction manager as risk	1.15
11	CMAA, CMAR, DB	1.15

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Question Number	Answer	Answer Section
12	Requires complete cooperation among all parties. See figure 1.22.	1.17
13	See figure 1.25.	1.18

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