

# **Chapter18**

## **Contract Construction**

# Chapter 18

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# 18-1 INTRODUCTION

## The Construction Process

- Several organizational and management methods by which construction may be accomplished were described in Chapter 1.
- Construction by a general contractor employed under a prime construction contract is only one of these methods. It is widely used, and it will form the basis for this chapter's discussion of contract construction, including:
  - bidding and contract award,
  - construction contracts,
  - plans and specifications, and
  - contract administration.

# Construction Contract Law

- Construction professionals are not usually lawyers and therefore should not attempt to act as their own lawyers.
- construction professionals must have a thorough:
  - understanding of the customary practices and
  - underlying legal principles involving contract construction.

# Construction Contract Law

- Virtually every action taken by a contractor, construction manager, or architect/engineer at a construction site has legal implications.
- construction professionals must:
  - understand the contractual consequences of their activities and
  - be able to recognize when legal advice should be secured.

# **18-2 BIDDING AND CONTRACT AWARD**

- **Bid Preparation**
- **Bidding Procedure**
- **Contract Award**
- **Subcontracts**

# Bid Preparation

- a construction company in order to grow, it must achieve a reputation for **good quality** and **timely completion** while achieving a reasonable **profit**.
- profit is an obvious and principal motive for bidding on a construction contract.

# Bid Preparation

- other reasons why a contractor may choose to bid on a project could be:
  - to keep equipment in operation and prevent loss of skilled workers and managers during the low construction activity time. (not for long run)
  - desire for prestige and the maintenance of goodwill with regular clients.
  - Projects that receive wide publicity because of their national importance (**landmark**). (gain public recognition)
- Contractor may bid in undesirable project to maintain good relation with the owner, with normally high profit.



# Bid Preparation

- Once a contractor has decided to bid on a project, he must prepare a detailed cost estimate for the execution of the project.
- The first step in preparation of a cost estimate is to take off (or extract) the quantities of material required by the plans and specifications.
- These quantities are then extended (or multiplied by unit cost estimates) to provide a total estimated material cost for the project.

# Bid Preparation

- Similar estimates are made for labor, equipment, and subcontract costs.
  - The costs of equipment, labor, and material are often referred to as *direct costs*.
- Next, estimates are made of the administrative and management expenses that will be incurred at the project site.
  - These costs are often referred to as job overhead or *indirect costs*.

# Bid Preparation

- After all project costs have been estimated, it is necessary to add an additional amount (or markup) for general overhead and profit.
- *General overhead* must cover the cost of all company activities not directly associated with individual construction projects.
- Major items of general overhead include:
  - salaries of headquarters personnel (company officials, estimators, clerks, accountants, etc.),
  - rent and utilities,
  - advertising,
  - insurance,
  - office supplies, and
  - interest on borrowed capital.

# Bid Preparation

- The usual procedure for prorating general overhead expenses to projects is:
  - = ((estimate total annual overhead expense) / (expected dollar volume of construction work for the year)) x the project bid price.
- The amount to be added for *profits* is a management decision that could be calculated by using bidding strategy.

# Bidding Procedure

- The principal steps in the bidding procedure for a fixed-price construction contract include:
  - solicitation,
  - bid preparation,
  - bid submission,
  - bid opening,
  - selection of the lowest qualified bid, and
  - contract award.
- To ensure adequate competition, at least three bids should be obtained.

# Bidding Procedure

- A deposit may be required to ensure the return of project plans and specifications furnished to unsuccessful bidders.
- The time allowed for bid preparation should be based on the size and complexity of the project.
  - Three weeks has been suggested as a reasonable minimum time.

# Bidding Procedure

- Bid openings are frequently open to the public.
- After the bids are opened, they are evaluated by the owner to determine the **lowest qualified bid**.
- The *qualification* of a contractor is the determination that the contractor possesses both the **technical and financial** ability to perform the work required by the contract.

# Contract Award

- Another method of bidder qualification is called *prequalification*.
- Under this procedure only those contractors determined to be capable of performing are invited to submit bids for the project.
- A more common, although indirect, method of prequalification is to require bonding of the contractor.



# Contract Award

- Bonds used in construction include:
  - **bid bonds**: guarantees that a contractor will provide the required performance and payment bonds if awarded the contract
  - **performance bonds**: guarantees completion of the project as described in the contract documents, and
  - **payment bonds**: guarantees the payment of subcontractors, laborers, and suppliers by the contractor.
- the winning bidder is notified by a letter of acceptance or notice of award.

# Subcontracts

- *Subcontracts* are contracts between a prime contractor and secondary contractors or suppliers.
- Subcontracts are widely used in building construction for the installation of electrical, plumbing, and heating and ventilating systems.

# Subcontracts

- *bid shopping*: is a practice of attempting some contractors to obtain lower subcontract prices by negotiating with other subcontractors and that happened after receiving the contract award.
- It is widely considered an **unethical** practice which leads to poor subcontractor performance.
- As a result, It is require by the bidder to identify subcontractors at the time of bidding and to use only these subcontractors on the project.

# 18-3 CONSTRUCTION CONTRACTS

- **Contract Elements**
- **Contract Types**
- **Contract Documents**
- **Contract Time**

# Contract Elements

- The legally essential elements of a construction contract include:
  - an offer,
  - an acceptance, and
  - a consideration (payment for services to be provided).
- The offer is a bid or proposal submitted by a contractor to build a certain facility according to the plans, specifications, and conditions set forth by the owner.
- Acceptance takes the form of **a notice of award**, as stated earlier.
- Consideration usually takes the form of cash payment, but it may legally be anything of value.

# Contract Types

- Contracts may be classified in several ways.
- Two principal methods of classification are:
  - A. by method of award and
  - B. by method of pricing.

# Contract Types

- The types of contract by *method of award* are:
  - A.1. formally advertised contracts and
  - A.2. negotiated contracts.
- All terms and conditions of the final contract are those mutually agreed to by the two parties

# Contract Types

- The two types of contracts by method of pricing are:
  - B.1. *fixed-price contracts* and
  - B.2. *cost-type contracts*.
- There are two principal forms of fixed-price contracts:
  - B.1.1. firm fixed-price contracts and
  - B.1.2. fixed price with escalation contracts.
    - contain a provision whereby the contract value is adjusted according to a specified price index.
    - reduce the risk to the contractor (inflation time)



# Contract Types

- Other classifications of fixed-price contracts include:
  - B.1.1.1 *lump-sum contracts*: provides a specified payment for completion of the work described in the contract documents.
  - *B.1.1.2. unit-price contracts*: specify the amount to be paid for each unit of work but not the total contract amount
- A combination of lump-sum and unit-price provisions may be used in a single contract.

# Contract Types

- B.2. Cost-type (or cost-plus) contracts are available in a number of forms. Some of these include:
  - B.2.1. Cost plus percentage of cost.
  - B.2.2. Cost plus fixed fee.
  - B.2.3. Cost plus fixed fee with guaranteed maximum cost.
  - B.2.4. Cost plus incentive fee (for reducing project cost & time).

# Contract Documents

- A construction contract consists of the following documents:
  - Agreement.
  - Conditions of the Contract, usually:
    - General Conditions (for all project) and
    - Special Conditions (for certain project).
  - Plans and Specifications.
  - Use standard contract.
  - May include value engineering (VE) clause and split savings.

# Contract Time

- The time allowed (expressed as either days allowed or as a required completion date) for completion of a construction project is normally specified in the contract along with the phrase "time is of the essence."
- Delay Penalty (*liquidated damages clause*)
  - damages resulting from late completion.

# Contract Time

- Construction contracts normally contain provisions for time extensions to the contract due to circumstances beyond the control of the contractor, such as:
  - owner-directed changes,
  - acts of God (fire, flood, etc.), and
  - strikes.

# 18-4 PLANS AND SPECIFICATIONS

- **Plans**
- **Specifications**
- **Shop Drawings and Samples**

# Plans & Specifications

- Plans : *Construction plans* are drawings that show the location, dimensions, and details of the work to be performed.
- Specifications: *Construction technical specifications* provide the detailed requirements for the materials, equipment, and workmanship to be incorporated into the project.

# Specifications

- The two basic ways in which the requirements for a particular operation may be specified are:
  - by method specification: states the precise equipment and procedure to be used in performing a construction operation, or
  - by performance specification: specifies only the result to be achieved and leaves to the contractor the choice of equipment and method.



# TABLE 18-1: Organization of the uniform system for building specifications

Division	Title
1	General Requirements
2	Site Work
3	Concrete
4	Masonry
5	Metals
6	Wood and Plastics
7	Thermal and Moisture Protection
8	Doors and Windows
9	Finishes
10	Specialties
11	Equipment
12	Furnishings
13	Special Construction
14	Conveying Systems
15	Mechanical
16	Electrical

# Shop Drawings and Samples

- *Shop drawings* are drawings, charts, and other data prepared by a contractor or supplier which describe the detailed characteristics of equipment or show how specific structural elements or items of equipment are to be fabricated and installed.
- Contract documents should contain the specific requirements for submission of **shop drawings and samples**.

# Shop Drawings and Samples

- Some suggested provisions include:
  - Identification of items requiring samples or shop drawings.
  - Procedure for submission of shop drawings, including format, marking, and number and distribution of copies.
  - Procedure for submission of samples, including size and number required.
  - Eliminating the requirement for shop drawings and samples when standard catalog items are to be used.

# **18-5 CONTRACT ADMINISTRATION**

- **Progress Reports and Payment**
- **Changes and Delays**
- **Acceptance and Final Payment**
- **Claims and Disputes**
- **Contract Termination**

# Progress Reports and Payment

- The contract may require :
  - the contractor to submit his plan and schedule in the CPM format (Chapter 16) and
  - may also require periodic updating of the schedule as work progresses.
- Progress payments are made at the interval specified in the contract,
  - usually monthly or upon completion of certain milestones.

# Changes and Delays

- The majority of changes are due to:
  - design modifications initiated by the owner or designer.
  - adjustments to the contract required by site conditions differing ("changed conditions").

# Changes and Delays

- all change orders issued should contain an adjustment in contract time and price which is mutually acceptable to the contractor and owner.
  - To minimize disputes
- The three general categories of delay include:
  - those beyond the control of either the contractor or owner ("acts of God"),
  - those under the control of the owner, and
  - those under the control of the contractor.

# Acceptance and Final Payment

- based on a final inspection
  - performed by the owner's representative.
  - The list of deficiencies to be corrected
    - prepared at the final inspection
    - sometimes referred to *punch list of record*.
  - *certificate of substantial completion*.
  - request and receive a final progress payment for the completed portion of the project.



# Acceptance and Final Payment

- submit a *request for final payment*,
- issue a final *certificate of payment*
  - When inspection confirms the correction of all deficiencies.
- provides a warranty against defective work for some period
  - usually 1 year.

# Claims and Disputes

- A *claim* : is a request by the contractor for a time extension or for additional payment based on the occurrence of an event beyond the contractor's control that has not been covered by a change order.
- Examples of such events include:
  - unexpected site conditions,
  - delays in delivery of owner-provided property, and
  - changes directed by the owner.

# Claims and Disputes

- *Disputes*: are disagreements between the contractor and owner over some aspect of contract performance.
- Disputes may involve:
  - unsettled claims,
  - substitution for specified materials,
  - the responsibility for delays in project completion,
  - the effect of changes ordered by the owner.

# Contract Termination

- contract may be terminated by:
  - nonadversary methods.
    - terminated by satisfactory performance
    - mutual agreement and
    - impossibility of performance.
  - adversary process:
    - breach of contract.