COLLEGE OF ENVIRONMENTAL DESIGN

MAINTENANCE & CONSTRUCTION CONTRACTS

Presented By

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Presentation Outline

- Formation of Contract
- Brief definition
- Nature of a Contract
- Contract Documents
- Types of Contracts
- Advantages and Disadvantages of each type
- Concluding comments

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Objectives of this Lecture

To acquire a basic understanding of the nature and formation of construction and maintenance contracts.

To understand the liabilities of the contractor in tort.

To Acquire a basic understanding of Contract Documents

To identify the types of maintenance and construction contracts.

To identify the advantages and disadvantages of each type of contract

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Formation of a Contract - Definition

Definition

A Contract for Building or Maintenance work is an agreement between two parties:

The Builder or Contractor, and

The Owner or Employer.

The basis of the Contract is the Offer by the Contractor to carry out the work and Acceptance of that offer by the Owner.

Once the contract (normally the Contractor's offer) is agreed Upon between the Owner and the Contractor, it will be binding on both parties.

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Formation of a Contract – Nature of Contracts 1/2

Nature of Contracts

The interests of the two parties do differ - the owner desires highest quality at the lowest price, and the contractor desires the highest possible profit.

There is no advantage to the owner in securing a low price if the result is poor quality of work.

Thus, the essence of the agreement should be the payments of a reasonable sum for work which is properly executed and completed on time.

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Formation of a Contract – Nature of Contracts 2/2

Nature of Contracts(Continue)

Cases in which the contractor may not complete the work and will not be considered as breaching the contract include:

Impossibility - if circumstances become so different

Illegality - when performance is illegal

Default of the other party - if either party is not interested to continue, then the other party can treat it as repudiation of the contract and sue for damages.

Waiver - when both parties agree to change or revise the contract.

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Formation of a Contract – The liabilities of the contractor in tort

The liabilities of the contractor in tort

A tort is a civil wrong which occurs by reason of a breach of a general duty which is owned to society as a whole.

Negligence - **A professional man is responsible about his duties. Thus, when damage is occurred due to design or construction faults, he will be responsible.**

Nuisance - **Not to harm neighbors**

Trespass -**Not to use or cross the boundaries**

Normally owners are not responsible for the torts of an independent contract but there are exceptions to this rule

Work which by its nature are dangerous

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Contract Documents 1/7

The term "Contract documents" refers to all the records in connection with the work at any specific time.

A contract document maybe of:

A-Prior to bidding

B-As construction nears completion

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Contract Documents 2/7

A-Prior to bidding contract document consists of:

1. **drawings,**
2. **the specifications, and**
3. **the project proposal form.**

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Contract Documents 3/7

B-As construction nears completion document consists of:

1. **drawings,**
2. **the specifications,**
3. **all addenda,**
4. **the proposal form completed and signed by the contractor,**
5. **the signed contract form between the owner and the contractor,**
6. **all bulletins,**
7. **the contractor's reply to bulletins,**
8. **all change orders, all field orders, and all field work orders.**

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Contract Documents 4/7

1. **Drawings**

   The drawings indicate arrangement of materials, location of the project on the site, the location of all utility lines, roads, and elevations, overall dimensions of all items, and other details.

2. **Specifications**

   Specifications may be defined as "a description of the quality of materials and equipment to be used on a project and their application or installation".

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Contract Documents 5/7

3. **Addenda**

   The addenda consist of change in drawing, in the specifications, or in both before the contract is awarded.

4. **The proposal form**

   The proposal form is prepared by the architect or engineer and given to the bidders to fill out and return.

5. **The contract form**

   The contract form is written by the architect or engineer or by the owner's attorney. It is the agreement between the owner and the one bidder selected by the owner.

Contract Documents 6/7

6. **Bulletins**

   A "bulletin" is a request for a price for making a change in the contract. The contractor has a specific task for a specific amount of money.

7. **Change Orders**

   If the owner accepts the offer of the contractor, a "change order" is issued by the architect or engineer. The change order gives the contractor authority to proceed with the changes made to the contract by the bulletin.

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Contract Documents 7/7

8. **Field Orders**

   A "field order" is an order issued by the clerk of the works, or his employers, in the field making changes in the contract that the contractor agrees to do at no change in the cost.

9. **Field Work Orders**

   A "field work order" is a change in the contract issued by the architect or engineer in the field when immediate work is required and there is not enough time to issue a bulletin.

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Types of Contracts

1. The Fixed-Price Contract
2. The Cost Plus Contracts
   1. The Cost Plus a Percentage Contract
   2. The Cost Plus a Fixed- fee Contract
   3. The Cost Plus a Fixed- fee with a Guaranteed Maximum
   4. The Cost Plus a % with a Maximum Price
3. The Unit Price Contract
4. The Schedule Contracts
5. The Term Contracts

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Types of Contracts – 1. The Fixed-Price Contract 1/2

The Fixed-Price Contract

The fixed-price contract states that "for a specific sum of money, the bidder will agree to do a specific amount of work".

- It is the most common type of contract.
- At the present time, over ninety percent (90%) of the contracts are fixed price contracts.

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Types of Contracts – 1. The Fixed-Price Contract 2/2

Advantages of Fixed-Price Contracts

- Competition ensures that Owners receive the lowest possible price.
- Since the time involved is stipulated, Owners know in advance exactly what they are buying, the amount they are paying and when they will get it.
- It is to the advantage of a contractor to finish the work as soon as possible (without overtime). A slow work costs the contractor money.

Disadvantages of Fixed-Price Contracts

- Time involved for preparing the plans and specifications is considerably longer than in other types of contracts. Thus, where completion time is very important, other contract types are better.
- Because price determines who is awarded the contract, the quality of work will be poor. A Contractor is required to "cut corners" to be the lowest bidder.
- Difficult to make changes

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Types of Contracts – 2. The Cost Plus Contracts

In these types of contracts,

the contractor agrees to furnish a product and charge the owner all of the direct costs plus an agreed amount of money to cover the overhead and profit of the contractor.

These types of contracts are classified as follows:

1. **The Cost Plus a Percentage Contract**
2. **The Cost Plus a Fixed- fee Contract**
3. **The Cost Plus a Fixed- fee with a Guaranteed Maximum**
4. **The Cost Plus a % with a Maximum.**

Types of Contracts – 2.1. The Cost Plus a % Contract 1/3

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Cost Plus Percentage Contract

The "cost plus a percentage contract" is selected when the cost of a project is immaterial and the owners desire the best materials and workmanship.

The contractor agrees to furnish a product and charge the owner all of the direct costs plus a stipulated percentage of the direct costs to cover the overhead and profit of the contractor.

It is important

- to specify the items that are included in the direct costs and in the Overhead and Profit.
- That a method be established for the owner to audit contractor's expenses. The contractor should be required to establish proper accounting procedures.

Types of Contracts – 2.1. The Cost Plus a % Contract 2/3

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Advantages of Cost Plus Percentage Contracts to the Owner

This type of contract makes it desirable for the contractor to use the most expensive materials and methods of installation because the greater the total cost, the more money the contractor makes.

The owner is in full control. Owners may change their minds as to their requirements, destroy work they don't like, or double or triple their requirements. The contractor makes money on additions and only gets lower anticipated profit on reductions but not loss actual profit.

Field work may be started before the plans and specifications are complete. The contractor can accept a project without seeing the plans. He only needs to know enough to enable him establish a percentage to cover the Overhead and Profit.

Types of Contracts – 2.1.The Cost Plus a % Contract 3/3

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<u>Disadvantages of Cost Plus Percentage Contracts</u>

They entail excessive costs because it is to the contractor's advantage to increase the cost. For this reason, only few cost plus a percentage contracts are awarded.

The contractor is encouraged to use inefficient (time wasting) labor and expensive materials.

The contractor has no inducement to discourage the use of inefficient labor. The worker is not pushed hard and automatically slows down and it doesn't take long for the laborer to realize that he is working on a cost plus contract.

Types of Contracts –2.2 The Cost Plus a Fixed- fee Contract 1/2

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<u>Cost Plus a Fixed-fee Contract</u>

This type is the same as a cost plus a percentage contract except that the consideration for the contractor consists of an agreed upon fixed sum of money rather than a percentage of the cost.

This means that the contractor's fee remains the same even if the final cost is twice or half the estimated cost.

As this type of contract is a combination of the other two types, it has some of their advantages and disadvantages.

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Types of Contracts -2.2 The Cost Plus a Fixed- fee Contract 2/2

Advantages and Disadvantages of Cost Plus a Fixed-fee Contracts

The plans have to be underway so that the contractor has some idea of the amount of work required to enable him establish a fee.

The owner still gets quality construction, but the contractor cannot afford delays that will keep the job going longer than expected.

The final cost will be lower than cost plus percentage because the contractor gets no percentage of additional costs.

The contractor will try to hurry the job because the sooner he finishes, the more money he makes.

Labor will be driven harder because the contractor wants to finish the project.

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Types of Contracts -2.3 The Cost Plus a Fixed- fee with a Guaranteed Maximum 1/2

Cost Plus a Fixed Fee with a Guaranteed Maximum

A contractor entering into this type of contract agrees to build a structure on a cost-plus-fixed-fee basis, and also agrees that the structure will not cost more than a specified amount of money.

In this respect, this type is similar to the fixed-price contract.

Advantages

The owner is obligated to pay only a specific sum of money

The owner has the privilege of making minor changes in the plans, excluding those that would bring the cost of the project above the amount agreed upon as maximum.

Types of Contracts -2.3 The Cost Plus a Fixed- fee with a Guaranteed Maximum 2/2

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Disadvantages of Cost Plus a Fixed Fee with a Guaranteed Maximum

Same as those of the cost-plus-fixed fee, with some additional disadvantages of the fixed-price contract but to lesser extent.

The plans must be almost finished.

Types of Contracts -2.4 The Cost Plus a % with a Maximum Price 1

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Cost Plus a Percentage with a Maximum Price

This is similar to the cost plus a fixed fee with a guaranteed maximum.

The difference is that the contractor is paid a percentage of the cost of the structure as fee rather than a fixed fee.

Advantages

As the owner is protected by the maximum price and as a fixed fee is usually determined by the maximum cost, the owner may save money if the cost is less than the maximum.

Disadvantages

It does give the contractor an inducement to calculate the costs as close as possible to the maximum.

Types of Contracts – 3. The Unit Price Contract 1/4

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The Unit Price Contract

The "unit price contract" is one where the actual amount of work is unknown; so the bidder charges the owner a specific amount of money for each unit or type of work.

For example: the contractor may agree to excavate, drive piles, and place a foundation for a specific project.

As soil conditions are not known, the amount of work cannot be established in advance.

In such a case, the contractor can bid a price per cubic yard for excavating, another price per cubic yard for backfilling, a price per foot for driving piles, a price per square foot for building and stripping forms.

Types of Contracts -3. The Unit Price Contract 2/4

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Advantages of Unit Price Contract

It allows owners to receive competitive prices from several contractors when the extent of work is unknown.

It allows the owner the freedom to make changes in the volume of work required while the job progresses without changing the contract.

It permits the owner to control the amount of money that will be spent. The owner knows the cost of any specified work in advance and can stop work at any stage.

Disadvantages of Unit Price Contract

It leads to high cost. For protection, the contractor is required to bid for the most expensive process within any unit.

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Types of Contracts – 3. The Unit Price Contract 3/4

Disadvantages of Unit Price Contract cont.

It is very possible that there will be additional items for which prices have not been established, and which will require negotiations.

The cost of inspecting is greatly increased — checking of quantities, checking delivery of materials, taking of measurements.

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Types of Contracts – 3. The Unit Price Contract 4/4

Uses of Unit Price Contract

Contracts for Piling and Maintenance - type contracts (where budget is limited) are awarded in this manner. This way, the engineer after receiving the unit prices, can determine exactly the extent of repairs permitted by the budget.

Paving contracts are often awarded on a unit basis because it is difficult to administer them on a other basis.

Because of the large area involved, a slight difference in thickness can mean many tons of material. The price per ton for bituminous concrete or the price per cubic yard of Portland cement is easier to control.

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Types of Contracts – 4. The Schedule Contracts 1/2

Schedule Contracts

This type is also called Measure and Value contract.

It represents different materials and labors used in the job on agreed time.

Useful where details are too scanty to permit the preparation of a precise specification at the time of commencing the work.

The schedule lists all the items of labor and materials which are expected to be required. The schedule may be

ad hoc for a particular job based on past experience of similar jobs, or

a standard schedule designed to cover a wide range of jobs.

The schedule may be

Unpriced, in which case the contractor tender by inserting a rate against each item, or

Priced based on standard rates and contractors tender by quoting a percentage on or off the standard rates.

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Types of Contracts – 4. The Schedule Contracts 2/2

The work is measured on completion in terms of the schedule items and priced out either at the contractor's rates or at the standard rates plus or minus the quoted percentage.

The cost is, therefore, not known until the work has been completed. Although an estimated cost may be prepared before commencement of the work.

Advantages of Schedule Contracts

Establish standard work description and indicate pricing rates

Establish trends in maintenance prices.

Disadvantages of Schedule Contracts

Non-uniformity among contractors for pricing individual work

Schedule rates are averages and do not reflect actual costs.

Types of Contracts – 5. Terms Contracts 1/3

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Terms Contracts

Under this type, the contractor is given the opportunity to carry out all work of a certain type of work falling within certain limits of cost for an agreed period in a particular area at agreed rates.

The work done is usually priced on either:

- A schedule (measured term) priced on schedules of rates
- A cost reimbursement (day work term) basis paid for labor and materials
- For the larger jobs, it may be more advantageous to negotiate a lump sum (also for specified work).

Types of Contracts -5. The Terms Contracts 2/3

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Advantages of Term Contracts

Lower prices quoted by contractors in consideration of the benefits of an assured program of work (usually two years)

Saving in time and overheads compared with that entailed in arranging single-job contracts.

The long term relationship results in the contractor becoming increasingly familiar with the building and the needs of the occupants.

Involvement of the contractor on the maintenance planning and possibly suggest alternative timings for the work resulting in some cost savings.

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Types of Contracts – 5. The Term Contracts 3/3

Disadvantages of Term Contracts

The reasonableness of the contractor's rates are tested in open competition only at infrequent intervals and may become increasingly unfavorable.

If a contractor's employment is terminated for any reason, a number of partly finished jobs will be left which have to be completed by another contractor at an increased cost.

Towards the end of the contractor period, the number of orders, especially for the larger jobs will tail off and at the beginning of the next period.

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Types of Contracts – 6. The Term Contracts 1/1

Labor Contracts

The contractor will provide the needed manpower for a specific time for the owner.

The manpower may include the engineers, staff, technicians, labors, etc. which they meet the owner's needed qualification for each type.

Types of Contracts – General Comments 1/2

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General Comments

While it is possible to negotiate a fixed-price contract, usually the owners receives quotations from several bidders, selects one and award a contract. While it would be possible to take bids on cost-plus contracts, the contract is usually awarded by negotiations with a single contractor selected by the A/E after consulting with the owner.

On fixed-price and unit price contracts, the A/E has little difficulty maintaining control during construction, but the cost-plus-type contract demands a very close relationship between the contractor and the A/E. The A/E is supervising the spending of the owner's money and so frequent visits with the owner are required.

Types of Contracts – General Comments 2/2

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General Comments cont.

At the start of the project, the A/E must have a clear understanding of the extent of authority given. The A/E must insist that all correspondence from the contractor to the owner come through him.

Unfortunately, the A/E cannot control the actions of a despotic owner. When an owner issues orders directly to the contractor, the contractor is encouraged to take any problems directly to the owner. and the A/E is in an untenable position.

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New trends on other forms of contracts 1/7

Public-private partnerships (PPP)

What is a PPP?

It refers to contractual agreements formed between a public agency and private sector entity that allow for greater private sector participation in the delivery of projects.

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New trends on other forms of contracts 2/7

The build-operate-transfer (BOT) / design-build-operate-maintain (DBOM) model

Definition

The build-operate-transfer (BOT) / design-build-operate-maintain (DBOM) model is an integrated partnership that combines the design and construction responsibilities of design-build procurements with operations and maintenance.

These integrated PPPs transfer design, construction, and operation of a single facility or group of assets to a private sector partner.

This project delivery approach is practiced by several governments around the world and is known by a number of different names, including "turnkey" procurement, BOT, and DBOM.

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New trends on other forms of contracts 3/7

Responsibilities

A single design-build-operate contract for the entire project with financing secured by the public agency, under which the contractor provides long-term operation and/or maintenance services, with the public sector sponsor retaining the operating revenue risk and any surplus operating revenue.

Build-Operate-Transfer/Design-Build-Operate-Maintain Roles and Responsibilities

	Own	**Conceive**	**Design, Build, O&M**	**Financial Responsibility**
Build-Operate Transfer (BOT) Design-Build-Operate-Maintain (DBOM)	Public	Public	Private by fee contract	Public

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New trends on other forms of contracts 4/7

Advantages

The advantage of the BOT / DBOM approach is that it combines responsibility for usually disparate functions—design, construction, and maintenance—under a single entity.

This allows the private partners to take advantage of a number of efficiencies. The project design can be tailored to the construction equipment and materials that will be used.

In addition, the BOT team is also required to establish a long-term maintenance program up front, together with estimates of the associated costs.

The team's detailed knowledge of the project design and the materials utilized allows it to develop a tailored maintenance plan that anticipates and addresses needs as they occur,

Thereby reducing the risk that issues will go unnoticed or unattended and then deteriorate into much more costly problems.

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New trends on other forms of contracts 5/7

Life Cycle Costing

The benefits of "life cycle costing" are particularly important, as most infrastructure owners spend more money maintaining their systems than on expansion.

In addition, the life-cycle approach removes important maintenance issues from the political vagaries affecting many maintenance budgets, with owners often not knowing how much funding will be available to them from year to year.

In such cases, they are often forced to spend what money they do have on the most pressing maintenance needs rather than a more rational and cost-effective, preventive approach.

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New trends on other forms of contracts 6/7

Procurement Process

Owners award BOT / DBOM contracts by competitive bid following a transparent tender process.

Proposers respond to the specifications provided in the tender documents and are usually required to provide a single price for the design, construction and maintenance of the facility for whatever period of time is specified.

Proposers are also required to submit documentation on their qualifications, thereby allowing owners to compare the costs of the different offers and the ability of the proposers to meet their specified needs.

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New trends on other forms of contracts 7/7

Standard Specifications

While the potential exists to reap substantial rewards by utilizing the integrated BOT / DBOM approach, owners who are not accustomed to this approach must take great care to specify all standards to which they want their facilities designed, constructed, and maintained.

With a BOT / DBOM procurement, owners relinquish much of the control they typically possess with more traditional project delivery. Unless needs are identified up front as overall project specifications, they will not generally be met.

This is important, because from design through operation, BOT / DBOM contracts can extend for periods of up to 20 years

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New trends on other forms of contracts 7/7

For further information in this subject visit the following site:

http://www.fhwa.dot.gov/PPP/bot.htm

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THANK YOU