

CE303 Introduction to Construction Engineering

Construction Contracts

Learning Objectives

~ The Student should be able to:

- Explain the types and requirements of a Contract.
- Explain "Notice to Proceed", "Substantial Completion" and "Project Completion".
- Understand Liquidated Damages.
- Explain "Retainage", "Value Engineering" and how it is used.

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Construction Contracts – Definition

- "A contract is a promise or a set of promises for the breach of which the law gives a remedy, or the performance of which the law recognizes as a duty."
- "A contract is a legal agreement between two legal entities in which each agrees to perform some action in return for an action by the other."

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Contract Criteria

- There must be a real agreement or "**meeting of minds**."
 - Must have an offer and an acceptance.
 - Otherwise, we simply have a negotiation, and not a contract.
- The description of work must be specific enough to allow for a contract.
 - Similarly, the offer must be complete to allow the contract.

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Contract Criteria

- The subject matter must be lawful.
 - Project must be able to get permit(s) (city, EPA approvals, etc.) and, therefore, satisfy zoning and building codes.
- There must be valid consideration.
 - Each must receive some value.
 - A promise to do something for someone, as a gift, is not a contract (and thus there is no liability).

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Contract Criteria

- The parties must be legally competent.
- Contract must be signed by person having authority to sign.

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Contract States

- Work to be done
- Compensation for the Contractor
- Time of Completion
- Other legal and business features of project as a whole, such as;
 - When payments will be made
 - Liquidated damages
 - Change orders
 - Acceptance
 - Retainage
 - Warranty etc. etc.

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The construction contract

- A compilation of documents
 - Invitation to bid
 - Instructions to bidders
 - General conditions
 - Supplementary conditions
 - Plans
 - Specifications
 - addenda
 - Agreement
 - Bond



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Construction Contract Types

- Competitive Bid Contracts
 - Mostly public, as well as much private work
 - Lump-sum contract
 - Unit-price contract
 - Cost-plus-fee contract
- Negotiated Contracts
 - Mostly private
 - Any mutually agreeable basis: lump-sum, unit-price or cost-plus-fee

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Lump Sum Contract

- Stipulates the work in exchange for a **fixed sum of money**
- Satisfactory completion of the work is obligation of the contractor regardless if total cost exceeds the estimated cost.
- Lump Sum adjusted by approved change orders only
- Advantages to the Owner:
 - Fixed price, know the cost up front
 - Maximizes contractor incentives to perform
- Disadvantage to the Owner:
 - Requires Finite Scope of Definition

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Unit Price Contract

- Based on **owner/engineer estimated** quantities of work and contractor estimated costs per unit of work
- Total sum paid to contractor remains uncertain until completion of the project.
 - Exact cost to owner is uncertain until completion
 - Owner needs presence on the site to verify true quantities of work completed.

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Unit Price Contract

- Owner advantage:
- Contractor must perform work required in the field at quoted price
 - Regardless if the quantities are greater than or less than estimated quantities.
 - Allows open competition on project involving uncertain quantities of work.

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Unit Price Contract

- Typical Uses:
 - Excavation - \$/cu yd
 - Piling - \$/linear ft
 - Paving - \$/sq yd
 - Concreting - \$/cu yd
 - Dredging - \$/cu yd

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Cost Plus Contract

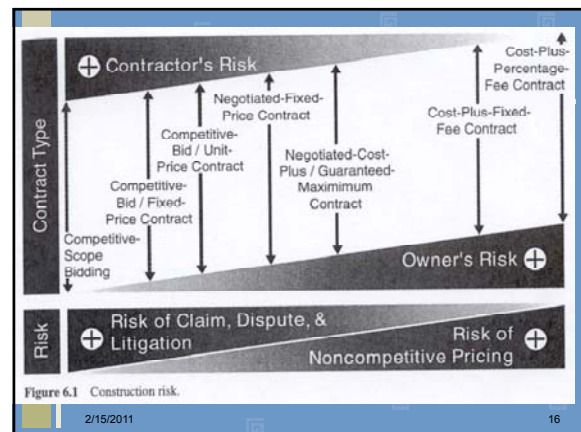
- Easier to enter into a cost plus contract rather than a lump sum contract because the final price and time of completion are often not known
- Special considerations are needed
- Suitable for emergency situations
 - But also being used more on large private projects.

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Varieties of Cost-Plus-Fee Contracts


- Cost – plus – percentage – of – cost contract
 - Cost plus fixed fee contract
 - Cost plus fixed fee plus bonus
 - Sliding scale percentage of the cost of the work
- Cost – plus – guaranteed maximum
 - Risk sharing
 - Savings shared by both parties

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Incentive/ disincentive Contracts

- **I-65 Widening**
 - Scope of Work
 - Broken up into 4 contracts of 4 sections
 - 18.8 miles of I-65 were widened (from 4 lanes to 6 lanes)
 - Included widening of the Barren River Bridge
 - Project Cost: \$101 million (involving 4 contracts)
 - Schedule Duration: 1075 days
 - From 10/23/00 to 10/01/03



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Incentives & Disincentives

- Incentives and Disincentives on 3 sections
- Incentives:
 - \$10,000 per day before contract completion date
 - \$1,000,000 (100 days early), \$500,000 (50 days early), and \$1,200,000 (120 days early) incentive caps
- Disincentives:
 - Contractor given 1 month leeway without disincentives
 - \$10,000 per day after the 1 month leeway

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Notice to Proceed

- N to P is sent in writing by the Owner to the Contractor after the contract is executed.
- It can be as late as 30 to 60 days after contract is executed.
- The Notice to Proceed starts the Contract Time clock:
 - On the date the owner sends the Notice to Proceed, or
 - it may specify within (5) Days, or
 - another specified date.

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Progress Payments

- Progress Payment made: - By Time (Monthly)
- Lump Sum Contract:
 - By Percent Complete (Schedule of Values)
- Unit Price Contract:
 - By Quantities in place for unit price contract (but requires that a detailed measure and oversee work and quantities)
 - By Stages of Completion (e.g., foundation, frame, etc.)
- Cost Plus Fee Contract must include the procedure for reimbursement.

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Progress Payments

- GC pays the subs when he gets paid.
- Contract Payment Timing
- Schedule of Values (submitted prior to first Application of Payment)
- Application of Payment (prepared and issued by the Contractor)
- Certificate of Payment (issued by the A/E)
- Payment (issued by the Owner)

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Original Contract Amount: \$570,000.00

Plus/Minus Approved Change Orders		
No. Dated		
No. Dated		
No. Dated		
No. Dated		
No. Dated		
Contract Amount To Date	\$570,000.00	

(a) Amount Earned To Date	\$154,945.00
Stored Materials	\$49,418.64
Total Amount Earned	\$204,363.64
(b) Retainage: 10%	\$20,436.36
Less Retainage Held in Escrow	
Current Retainage	\$7,245.59
(c) Total Due Less Retainage	\$197,118.05
(d) Less: Total Previously Approved	\$120,113.33
(e) Liquidated Damages	\$0.00
(f) Bonus For Early Completion	\$0.00
(g) TOTAL AMOUNT DUE THIS ESTIMATE	\$77,004.72

Further certify that all claims outstanding as of this date against the undersigned as Contractor for labor, materials, and expendable equipment employed in the performance of said contract up to this date have been paid in full accordance with requirements of said contract.

PROJECT NAME: Buena Vista Sanitary Sewer Rehabilitation - Phase I, Project No: 93-SC-3481 EST. No: 3

CONTRACTOR: _____ BY: Thomas A. Ballan TITLE: Controller DATE: 12/29/94

ENGINEER'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising the above application, the Engineer certifies to the Owner that to the best of the Engineer's knowledge, information, and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED: \$ _____

NAME: _____ NAME: _____

BY: _____ BY: _____

DATE: _____ DATE: _____

OWNER'S RECOMMENDATION FOR PAYMENT

APPROVED AND PAYMENT RECOMMENDED: OWNER: _____

BY: _____ TITLE: _____ DATE: _____

ITEM NO.	DESCRIPTION	CONTRACT QUANTITY	UNIT	CONTRACT PRICE	APPROVED QUANTITIES			AMOUNT TO DATE	PERCENT COMPLETE
					CURRENT	PREVIOUS	TOTAL		
01	Line Item								
A-1	Rehabilitation of Segment 38A-3 to 38A-33	1.0	EA	\$19,000.00	0.00	0.00	0.00	\$19,000.00	12.50%
A-2	Rehabilitation of Segment 38A-34 to 38A-35	1.0	EA	\$25,000.00	0.00	0.00	0.00	\$25,000.00	12.50%
A-3	Rehabilitation of Segment 38A-36 to 38A-37	1.0	EA	\$3,000.00	0.00	0.00	0.00	\$3,000.00	12.50%
A-4	Rehabilitation of Segment 38A-38 to 38A-39	1.0	EA	\$28,700.00	0.00	0.00	0.00	\$28,700.00	12.50%
A-5	Rehabilitation of Segment 38A-40 to 38A-41	1.0	EA	\$11,700.00	0.00	0.00	0.00	\$11,700.00	12.50%
A-6	Rehabilitation of Segment 38A-42 to 38A-43	1.0	EA	\$28,500.00	0.00	0.00	0.00	\$28,500.00	12.50%
A-7	Rehabilitation of Segment 38A-44 to 38A-45	1.0	EA	\$4,700.00	0.00	0.00	0.00	\$4,700.00	12.50%
A-8	Rehabilitation of Segment 38A-46 to 38A-47	1.0	EA	\$7,800.00	0.00	0.00	0.00	\$7,800.00	12.50%
A-9	Rehabilitation of Segment 38A-48 to 38A-49	1.0	EA	\$12,000.00	0.00	0.00	0.00	\$12,000.00	12.50%
A-10	Rehabilitation of Segment 38A-50 to 38A-51	1.0	EA	\$12,000.00	0.00	0.00	0.00	\$12,000.00	12.50%
A-11	Rehabilitation of Segment 38A-52 to 38A-53	1.0	EA	\$12,000.00	0.00	0.00	0.00	\$12,000.00	12.50%
A-12	Rehabilitation of Segment 38A-54 to 38A-55	1.0	EA	\$11,000.00	0.00	0.00	0.00	\$11,000.00	12.50%
A-13	Rehabilitation of Segment 38A-56 to 38A-57	1.0	EA	\$18,200.00	0.00	0.00	0.00	\$18,200.00	12.50%
A-14	Rehabilitation of Segment 38A-58 to 38A-59	1.0	EA	\$14,000.00	0.00	0.00	0.00	\$14,000.00	12.50%
A-15	Rehabilitation of Segment 38A-60 to 38A-61	1.0	EA	\$32,800.00	0.00	0.00	0.00	\$32,800.00	12.50%
A-16	Rehabilitation of Segment 38A-62 to 38A-63	1.0	EA	\$22,000.00	0.00	0.00	0.00	\$22,000.00	12.50%
A-17	Rehabilitation of Segment 38A-64 to 38A-65	1.0	EA	\$31,700.00	0.00	0.00	0.00	\$31,700.00	12.50%
A-18	Rehabilitation of Segment 38A-66 to 38A-67	1.0	EA	\$84,700.00	0.00	0.00	0.00	\$84,700.00	12.50%
A-19	Rehabilitation of Segment 38A-68 to 38A-69	1.0	EA	\$30,000.00	0.00	0.00	0.00	\$30,000.00	12.50%
A-20	Rehabilitation of Segment 38A-70 to 38A-71	1.0	EA	\$102,000.00	0.00	0.00	0.00	\$102,000.00	12.50%
A-21	Rehabilitation of Segment 38A-72 to 38A-73	1.0	EA	\$24,400.00	0.00	0.00	0.00	\$24,400.00	12.50%
A-22	Rehabilitation of Segment 38A-74 to 38A-75	1.0	EA	\$24,400.00	0.00	0.00	0.00	\$24,400.00	12.50%
A-23	Rehabilitation of Segment 38A-76 to 38A-77	1.0	EA	\$11,100.00	0.00	0.00	0.00	\$11,100.00	12.50%
A-24	Rehabilitation of Segment 38A-78 to 38A-79	1.0	EA	\$29,000.00	0.00	0.00	0.00	\$29,000.00	12.50%
A-25	Rehabilitation of Segment 38A-80 to 38A-81	1.0	EA	\$1,000.00	0.00	0.00	0.00	\$1,000.00	12.50%
SUBTOTAL PRICE									\$770,000.00

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Substantial Completion

- Achieved when the project or part of thereof is sufficiently complete to be occupied by the owner and to be put to beneficial use for its intended purpose.
- Can be achieved though not every requirement of the contract has been strictly complied with - Punch List of outstanding items.

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Substantial Completion

- Once achieved, the contractor cannot be held liable for breach of contract – no liquidated damages.
- It is entitled to the contract sum less any cost of correcting, or completing, the remaining work.
- Substantial Completion signals the end of the Contract Time – The clock stops.

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Final Project Completion

- Contractor
 - Completes Punch List Items
 - Makes final Application for Payment
- Architect inspects for full performance of Contract

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Final Project Completion

- Before Final payment, Owner can require:
 - An affidavit (signed statement) from the contractor that all debts have been paid.
 - Consent of surety, if any, to final payment (whomever should be gotten paid has)
 - Other data substantiating payment of all debts by contractor

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Final Project Completion

- Owner gives Final Payment
 - This constitutes a waiver of claims by both parties, except exclusion by previous agreements.
 - Warranties go into effect.

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Retainage

- Owner withholds money from the GC payments until the work is completed.
- GC can also hold from sub.
- Owner's desired outcome is the acceptable completion of the work.
- Incentive to keep the GC's attention.
- 10% common, can request reduction to 5% at Substantial Completion.
- Difficult for subs that have finished their work early on in the project.

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I, the undersigned, acknowledge and certify hereby that all labor, services, equipment, and materials provided on the above project have been performed and materials supplied in full accordance with the terms and conditions of the corresponding construction contract documents between the undersigned as Contractor and the Metropolitan Government of Nashville and Davidson County as Owner, dated October 13, 1994, and all authorized changes thereto, that the following is a true and correct statement of the contract amount up to and including the last day of the period covered by this estimate and that no part of the "Total Amount Due" has been received:

Original Contract Amount: \$570,000.00 Plus/Minus Approved Change Orders: No. Date: _____ No. Date: _____ No. Date: _____ No. Date: _____ No. Date: _____ No. Date: _____ Contract Amount To Date: \$570,000.00	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">(a) Amount Earned To Date: \$154,948.00</td> <td style="width: 50%;"></td> </tr> <tr> <td style="padding-left: 20px;">Store Materials: \$40,418.00</td> <td></td> </tr> <tr> <td style="padding-left: 20px;">Total Amount Earned: \$204,366.00</td> <td></td> </tr> <tr> <td style="padding-left: 20px;">(b) Retainage: 10%: \$20,436.60</td> <td></td> </tr> <tr> <td style="padding-left: 20px;">Less Retainage Held In Escrow: (\$13,300.37)</td> <td></td> </tr> <tr> <td style="padding-left: 20px;">Current Retainage: \$7,136.23</td> <td></td> </tr> <tr> <td style="padding-left: 20px;">(c) Total Due Less Retainage: \$197,229.73</td> <td></td> </tr> <tr> <td style="padding-left: 20px;">(d) Less Total Previously Approved: \$100,913.20</td> <td></td> </tr> <tr> <td style="padding-left: 20px;">(e) Liquidated Damages: \$0.00</td> <td></td> </tr> <tr> <td style="padding-left: 20px;">(f) Bonus For Early Completion: \$0.00</td> <td></td> </tr> <tr> <td style="padding-left: 20px;">(g) TOTAL AMOUNT DUE THIS ESTIMATE: \$96,316.53</td> <td></td> </tr> </table>	(a) Amount Earned To Date: \$154,948.00		Store Materials: \$40,418.00		Total Amount Earned: \$204,366.00		(b) Retainage: 10%: \$20,436.60		Less Retainage Held In Escrow: (\$13,300.37)		Current Retainage: \$7,136.23		(c) Total Due Less Retainage: \$197,229.73		(d) Less Total Previously Approved: \$100,913.20		(e) Liquidated Damages: \$0.00		(f) Bonus For Early Completion: \$0.00		(g) TOTAL AMOUNT DUE THIS ESTIMATE: \$96,316.53	
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Further certify that all claims outstanding as of this date against the undersigned as Contractor for labor, materials, and expendable equipment employed in the performance of said contract up to this date have been paid in full accordance with requirements of said contract.

PROJECT NAME: Buena Vista Sanitary Sewer Rehab - Phase I, Project No. 93-SC3481 EST. No. 3

CONTRACTOR: _____ BY: _____ TITLE: Controller, DATE: 12/29/94

ENGINEER'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising the above application, the Engineer certifies to the Owner that to the best of the Engineer's knowledge, information, and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED: _____ \$

NAME: _____ BY: _____ DATE: _____

OWNER'S RECOMMENDATION FOR PAYMENT

APPROVED AND PAYMENT RECOMMENDED: _____ OWNER: _____

BY: _____ TITLE: _____ DATE: _____

Retainage

- Isn't the performance bond enough?
- Performance bond covers only extreme events, i.e., breach of contract.
- Owner does not have to pay interest.
- In fairness, the owner may pay interest to the contractor.
- A more equitable solution is to put it into an interest bearing escrow account, allowing for a return.

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Value Engineering

- Involves the modification of plans and specifications, without loss of function, performance, safety, maintenance, operation and cost.
- Contractor may provide a better way to achieve same results, and therefore, shares in the savings.

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Value Engineering

- Used in both public and private contracts (open competition of ideas)
- Changes in plans and specs can only be approved by the Owner.
- Can be used in the Design Phase also, or even required by the Design Contract.
- May involve considering the Total Life-Cycle Costs, not just construction costs.

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Changes – Change Orders

- A contract can only be changed by a change order.
- In written form, prepared by the A/E under instructions from the Owner.
- The Contractor cannot change the contract unilaterally, but can only agree to choose not to agree with sum of the change order.

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Typical Causes of Change Orders on Highway Projects

- Unexpected conditions involving existing utilities;
- Unforeseen geotechnical conditions;
- Accelerated project development to meet firm bid dates;
- Unanticipated erosion control needs;
- Unforeseen environmental concerns;
- Owner Initiated
- Errors and omissions in contract documents; and
- Archeological conditions.

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Changes - Change Orders

- Contractor choices are limited to:
 - Signing the change order and agreeing to the price
 - Performing work and making a further claim after completion
 - Stopping work and be charged with breach of contract
- Primary issue:
 - The Direct Costs associate with the change
 - The contract limits indirect costs to some stipulated figures

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Changes - Change Orders

- Secondary or Impact Costs
- The change may affect the overall scope of work
- It may affect the time of completion, or delay other portions of work
- It may affect the coordination of work

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Differing Site Conditions

- An aspect of the project differs materially from that indicated on the contract documents.
- No implied contractual right exists for the contractor to collect for unforeseen conditions.
 - Exceptions: unforeseen condition due to incorrect or misleading information in contract documents.

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Contract Time – Considerations

- Calendar vs. Working Days
- Time is “Of the Essence” to the contract – material breach of contract.

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Liquidated Damages

- A contractually stipulated amount to be paid for a particular breach of contract
- A per diem amount, e.g., \$500 per calendar day, stipulated in the contract, that the owner will recover from the contractor if the project’s substantial completion exceeds the date specified in the contract & the delay is non-excusable.
- Not a penalty.

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Extension of Time

- Outside control of the Contractor or the Owner ~ Excusable Delay
- Within the control of the Owner ~ Compensable Delay
- Within the control of the Contractor ~ Non-Excusable Delay

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Extension of Time

- Contractor is granted extensions of contract time under the Excusable & Compensable Delays,
- and usually gets “Impact Costs” for a Compensable Delay if the delay can be demonstrated.
- Time can be extended only by Change Order.

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Contract Documents
– Resolution of Conflict

- Handwritten provision prevails over typed provision
- Typed provision prevails over printed provision
- Numbers as words prevail over number as figures

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Contract Documents
– Resolution of Conflict

- Usually specs prevail over drawings (general condition may require A/E interpretation)
- Item appearing only in specs, or in plans, interpreted as appearing in both (see AIA A201, 1.2.3.1: Duty to Inquire).

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Construction Contracts

Lecture End