

## Auditing Unit Priced Construction Contracts

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Let's talk about an opportunity.



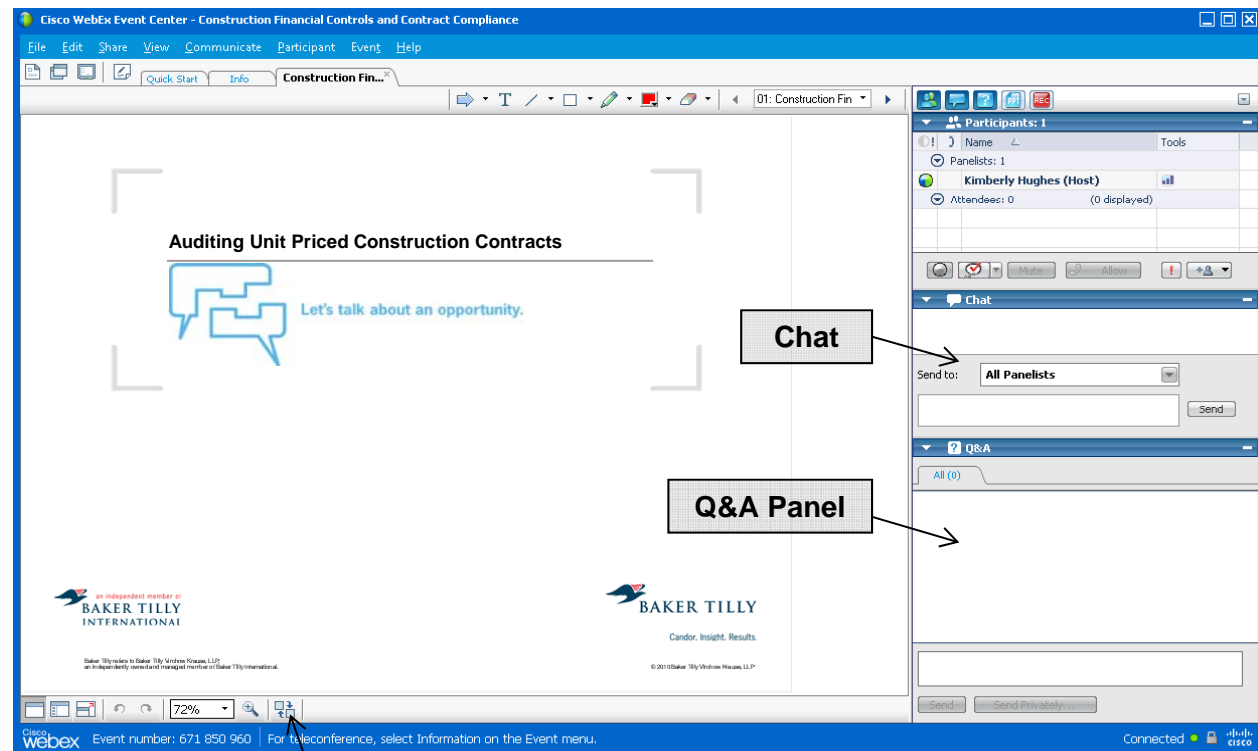
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# Introductions



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## Today's topics:

Auditing unit priced construction contracts



## Polling question #1



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Were you able to attend or watch the recording of any of the previous construction cost control and audit webinars?

- A. Yes
- B. No
- C. Not yet, but I plan to view the recordings.

Please respond using the polling section in the WebEx screen to the right.

## Learning objectives



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- > Recognize when to use unit price contracts
- > Learn how to identify unit price contract risk
- > Understand the primary audit plan elements to minimize risk



## Key terms



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- > Unit price
- > Unit cost
- > Inspection and approval
- > Plans and specifications
- > Material substitution
- > Certified materials
- > Material credits
- > Recycling credits
- > Aggregate
- > Prevailing wage
- > Certified payroll

**Working definition: All inclusive price or rate to build/install a single unit of work.**

All inclusive price or rate should include:

- > Labor
- > Materials
- > Equipment
- > Taxes
- > Permits and inspections
- > Overhead and profit

Engineering and design costs are typically excluded from unit prices.

## Unit priced contracts



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### Examples:

- > \$100 per foot of pipe installed
- > \$4 per cubic yard removed
- > \$450 per ton of steel installed
- > \$10 per square yard installed
- > \$250 per electrical outlet installed

## Polling question #2



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**Which of these  
construction services  
would use unit price  
contracts?**

- A. Master services agreement
- B. Underground utility
- C. Hazardous material abatement
- D. All of the above

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### When are unit priced contracts used:

- > Total quantities may be difficult or undeterminable on bid day
- > Total contract value may be difficult or undeterminable on bid day
- > Unit scope is fully definable, repeatable and provides basis for measurement
- > Progress is measured in units completed rather than percent complete

### What type of work are unit priced contracts frequently used for?

- > Underground construction: utility work, tunnels and infrastructure
- > Master services agreements
- > Highway and roadway construction
- > Rail bed and track construction
- > Pipeline above and underground
- > Utility construction: transmission lines, communication towers, campus interconnects
- > Repeatable units of work

### Repeatable units of work:

- > Electrical outlets
- > Light fixtures
- > Sprinkler heads
- > Windows
- > Doors

May be found as supplemental rate schedules within the subcontract to facilitate changes to the building programming.

### Master service contracts

- > Flat monthly rate
- > Predefined scope of work
- > Often includes labor and consumable materials
- > Major repairs fall outside of the standard service scope



## Unit priced contract risk analysis: contract templates



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### American Institute of Architects (AIA)

- > Contractor centric
- > Architect centric

### American Council of Engineering Companies (ACEC)

- > Consulting/design engineer centric
- > Owner centric

### Consensus Documents

- > Owner centric

## Unit priced contract term categories



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- > Contract templates
- > Cost of work
- > Change order management
- > Third party resources
- > Miscellaneous
- > Funding program requirements
- > Billing terms
- > Insurance
- > Progress reporting
- > Site control

## Unit priced contract risk analysis: funding program requirements



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### Public funding programs: TIF, grants, incentive programs, public bond

- > Davis-Bacon
- > WBE/DBE/MBE participation
- > Affirmative action compliance
- > Mandatory set aside
- > Compliance audit
- > Use restrictions
- > Supplier restrictions
- > Contractor bonding
- > Mandatory competitive bid

# Public funding



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Risk Element	Risk Mitigation	Supporting Documents
Davis-Bacon compliance	Verify contractors are paying laborers' salary and benefits that meet or exceed local CBA	<ul style="list-style-type: none"><li>&gt; Certified payroll report</li><li>&gt; Collective bargaining agreement (CBA)</li></ul>
WBE/DBE/MBE participation	Verify the required participation % has been met	<ul style="list-style-type: none"><li>&gt; Contractors certified status</li><li>&gt; Subcontracts</li><li>&gt; Bid tabulations</li></ul>
Supplier restrictions	Verify amount of work awarded to local suppliers	<ul style="list-style-type: none"><li>&gt; Subcontracts</li><li>&gt; Purchase orders</li><li>&gt; Documents of business ownership</li></ul>

## Unit priced contract risk analysis: funding program requirements



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### Private funding programs: Bond issues, bank loans, operating revenue, philanthropy

- > Financial statement reporting
- > Compensating balances
- > Escrowed funds
- > Insurance requirements
- > Performance bonds
- > General few restrictions placed on the owner

## Polling question #3



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Which of these risks is *not* usually associated with unit priced contracts?

- A. Completed quantities overstated
- B. Unit of measure conversion error
- C. Labor burden inflated
- D. Construction material substitution

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## Billing terms – risk elements



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- > Price escalation
- > Undefined working units (How long is a day?)
- > Volume prices (Is it gallons installed or opened?)
- > Overhead and profit are applied on top of unit price
- > Target budget price
- > Rate increases are inflated
- > Non-allowable pass through expenses
- > Different types of unit prices
- > Sales tax management
- > Surcharges

# Billing terms



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Risk Element	Risk Mitigation	Supporting Documents
Annual price increases	Verify new price calculations Confirm economic drivers exist to trigger price increases	> Unit price bid > Rate adjustment formula
Undefined working units	Update contracts or statement of work with revised definitions	
Volume prices (gallons used or gallons opened)	Update contract or statement of work with revised definitions	
Fuel surcharge inflation	Calculate surcharge based on third party metrics or standards	> US Energy Information Administration > Equipment logs > Fuel usage logs



## Case study: annual price adjustment



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### Facts:

- > Contract provides for a price increase based on the CPI
- > Applicable CPI region: West
- > Price increase applied uniformly across each line of the bid schedule

2011 Consumer Price Index				
National	Northeast	Midwest	South	West
3.2%	3%	3.2%	3.4%	2.8%

## Case study: annual price adjustment



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Contractor submits revised rate schedule based on the CPI adjustment along with January 2012 invoice.

Description	2011 Unit Price	Proposed Increase	2012 Price
Semi-Annual Elevator Safety Inspection	\$375	\$13	\$388
Quarterly Preventive Maintenance	\$800	\$28	\$828
Repairs and Maintenance of Consumables	\$165	\$6	\$171

## Case study: annual price adjustment



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### Auditor's price adjustment calculation

Description	2011 Unit Price	CPI Adj of 2.8%	2012 Price
Semi-Annual Elevator Safety Inspection	\$375	\$10.50	\$385.50
Quarterly Preventive Maintenance	\$800	\$22.40	\$822.40
Repairs and Maintenance of Consumables	\$165	\$4.60	\$169.60

### January Invoice for Maintenance Services

Description	2012 Price	Completed Since Last Invoice	2012 Price
Semi-Annual Elevator Safety Inspection	\$388	1	\$388
Quarterly Preventive Maintenance	\$828	2	\$1,656
Repairs and Maintenance of Consumables	\$171	5	\$855
<b>Total</b>			<b>\$2,899</b>

## Case study: auditor's notes



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1. Contractor used the highest CPI rate instead of the correct rate for their region
2. Contractor rounded rates up to the nearest whole dollar
3. Contractor billed 2011 completed but unbilled services under the new 2012 rates. Overcharging by \$99.
4. Net impact would result in \$143 in overcharges or 2.3% of the contract value

## Polling question #4



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One cubic yard is equal  
to how many cubic feet?

- A. 9
- B. 27
- C. 54

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- > Reverse engineer the invoice to determine the billing method
- > Review the engineer's estimates
- > Review the inspection reports authorizing completion
- > Reconcile estimates with inspection reports and document variances
- > Verify variances are authorized
- > Compute billings based on authorized completion and contract billing method
- > Reconcile invoice and computed totals

## Cost of work – risk elements



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- > Units conversion
- > Overstated quantities
- > Working conditions premiums
- > Accelerated schedule premiums
- > Cost of rework (usually T&M)
- > Recycling and reclamation
- > Inferior materials are substituted (Certified Materials)
- > Manufactures certificates
- > Owner direct purchases



# Cost of work



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Risk Element	Risk Mitigation	Supporting Documents
Overstated quantities	Reconcile billed quantities with inspection reports. Verify billing computations.	<ul style="list-style-type: none"> <li>&gt; Inspection reports</li> <li>&gt; Estimated quantities</li> <li>&gt; Statement of work</li> </ul>
Certified materials	Verify materials purchased with material certificates.	<ul style="list-style-type: none"> <li>&gt; Receiving tickets</li> <li>&gt; Purchase orders</li> <li>&gt; Manufacturers certificate</li> </ul>
Cost of rework	Verify the cause of rework through inspection reports. Reject charge if quality is the root cause.	<ul style="list-style-type: none"> <li>&gt; Inspection/rejection report</li> <li>&gt; Rework authorization</li> </ul>
Working conditions premium	Reconcile premium days with site conditions to verify authenticity of charge.	<ul style="list-style-type: none"> <li>&gt; Weather report</li> <li>&gt; Superintendent's diary</li> </ul>

## Overstated quantities case study



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### Facts:

- > Scope: Dig a trench 500 x 6 x 6 feet
- > Inspection report verified 500 x 6 x 6 foot trench
- > Trenching price: \$50 per cubic yard removed
- > Trucking price: \$250 per truckload
- > Each truck holds 15 yards of dirt. 60 truckloads were required.
- > Owner was invoiced \$60,000

# Overstated quantities case study



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## Invoice analysis

Cost Type	Quantity	Rate	Amount
Trucking	60	\$250	\$15,000
Removal	900	\$50	\$45,000
Total			\$60,000

Note:  $15 \times 60 = 900$

## Auditor's invoice compilation

Cost Type	Quantity	Rate	Amount
Trucking	60	\$250	\$15,000
Removal	666	\$50	\$33,300
Total			\$48,300

Note:  $500 \times 6 \times 6 / 27 = 666$

## Case study: auditor's observations



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1. Owner was overcharged by \$11,700
2. 50% more truckloads were required than the original estimate

## Polling question #5



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**Which source document  
is the most reliable  
progress report?**

- A. Superintendent's field report
- B. Owner's site inspection report
- C. Engineer's acceptance report

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# Cost of work



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Risk Element	Risk Mitigation	Supporting Documents
Units of work conversion	Verify unit conversion accuracy	<ul style="list-style-type: none"> <li>&gt; Inspection reports</li> <li>&gt; Estimated quantities</li> <li>&gt; Trucking ticket and invoices</li> </ul>
Cost of accelerated schedule	Verify that accelerating the schedule resulted from an event outside the contractor's control.	<ul style="list-style-type: none"> <li>&gt; Work authorization</li> <li>&gt; Construction schedule</li> <li>&gt; Weather reports</li> <li>&gt; Contractor time sheets</li> </ul>
Recycling and disposal	<ul style="list-style-type: none"> <li>&gt; Verify recycling receptacles were leased for the job</li> <li>&gt; Reconcile projected volume of recycled material with actual</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Disposal service invoices</li> <li>&gt; Salvage credit vouchers</li> </ul>
Site reclamation	Verify site reclamation with site visits and cost of reclamation analysis	<ul style="list-style-type: none"> <li>&gt; Site inspection reports</li> <li>&gt; Site photographs</li> <li>&gt; Time sheets</li> <li>&gt; Supplier invoices</li> </ul>

### Facts: Underground utility replacement

- > Remove 500 square yard existing sidewalk \$40 per square yard
- > Remove 1,000 linear feet of existing curb \$15 per linear feet
- > Grade and seed 5,000 square yards \$4 per square yard
- > Surface 1,000 cubic yards of sidewalk \$550 per cubic yard

## Case study: unit conversion



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### Engineer's inspection reports:

- > Sidewalk removal – 4,800 square feet
- > Curb removal – 1,000 linear feet
- > Grading and seeding – 1 acre
- > Sidewalk paving – 1,000 cubic yards



## Case study: unit conversion



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### Contractor's Invoice

Cost Type	Quantity	Rate	Amount
Sidewalk Removal	1,600	\$40	\$64,000
Curb Removal	1,000	\$15	\$15,000
Grading & Seed	5,000	\$4	\$20,000
Sidewalk Paving	1,000	\$550	\$550,000
<b>Total</b>			<b>\$649,000</b>

### Auditor's Computation

Cost Type	Quantity	Rate	Amount
Sidewalk Removal	534	\$40	\$21,360
Curb Removal	1,000	\$15	\$15,000
Grading & Seed	4,840	\$4	\$19,360
Sidewalk Paving	1,000	\$550	\$550,000
<b>Total</b>			<b>\$605,720</b>

## Case study: auditor's observations



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1. Inspection reports did not use the same units of measure as the estimates
2. Actual sidewalk removal was more than the estimate. Was this approved?
3. Actual grading and seeding was less than the estimate.
4. Sidewalk unit conversion was incorrect resulting in \$42,640 overcharge. 1 square yard = 9 square feet
5. Contractor billed for estimated grading and seeding and not actual work completed resulting in \$640 overcharge. 1 acre = 4,840 square yards

## Site control – risk elements



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- > Environmental regulations are violated
- > Site and adjoining property is damaged
- > Availability of land
- > Land restoration
- > Hazardous conditions
- > Discovery of new or unknown hazardous materials
- > Traffic control
- > Obligations to repair existing facilities
- > Conflicting utilities
- > Third party right of way
- > Work disruption
- > Rite of ways are violated

# Site control



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Risk Element	Risk Mitigation	Supporting Documents
Environmental regulations are violated	<ul style="list-style-type: none"> <li>&gt; Interview PM and environmental manager</li> <li>&gt; Site visit to observe plan compliance</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Environmental site assessment</li> <li>&gt; Environmental, health and safety plan</li> <li>&gt; Safety compliance report</li> </ul>
Land restoration	<ul style="list-style-type: none"> <li>&gt; Site visit</li> <li>&gt; Reconcile restoration costs with restoration plan</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Right of way agreement</li> <li>&gt; Land usage agreement</li> <li>&gt; Site management plan</li> </ul>
Work disruption	<ul style="list-style-type: none"> <li>&gt; Interview PM</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Traffic management plan</li> <li>&gt; Utility services outage plan</li> </ul>
Discovery of new or unknown hazardous materials	<ul style="list-style-type: none"> <li>&gt; Reconcile subcontractor invoices with hazmat plan</li> <li>&gt; Meet with counsel to discuss options</li> </ul>	<ul style="list-style-type: none"> <li>&gt; Hazardous materials management plan</li> <li>&gt; Disposal certificates or acceptable substitute</li> <li>&gt; Supt daily diary</li> </ul>

### Facts:

- > Major building remodel project
- > Site is on an established, urban, land locked campus
- > Original building was constructed in 1973
- > Architect, contractor and engineer suspect asbestos exists in the building
- > Amount of hazardous material exposure is unknown
- > Total cost of remediation is unknown
- > Asbestos subcontractor is retained under a unit price contract

## Case study: site control



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Risk Element	Audit Plan
Unlicensed contractor	Verify asbestos contractor is properly licensed
Unlicensed disposal site	Verify disposal site is licensed and qualified
Asbestos remediation was not performed or incomplete	Obtain inspection reports certifying the site as asbestos free or contained after work is completed
Illegal hazardous waste disposal	Obtain quantity of hazardous material disposed of from disposal site documentation
Illegal hazardous waste disposal	Reconcile disposal quantity with subcontractor's field log
Overcharging for services and disposal	Reconcile disposal quantity with subcontractor's invoice
Subsequent claims for hazardous waste mismanagement	Verify findings with project health and safety manager

## Case study: auditor's observations



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- > Subcontractor is properly licensed and experienced
- > Every bag of hazardous materials was logged and accounted for
- > Disposal site is hazardous materials certified
- > Site inspection reports confirm construction site is safe
- > No billing variances
- > Subcontract was not competitively bid however procurement waived this requirement due to the nature of the work

## Third party information – risk elements



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- > Reliance upon third party information
- > Reliance upon third party construction resources
- > Utilities
- > Government agencies
- > Underground facilities
- > Multiple owners of facilities
- > Reviewing and checking underground data is included in the unit price



Questions?



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## Questions?

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We will answer as many questions as time permits.

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