"What Facility Planners Need to Know About Managing and Auditing Construction Contracts"

Presentation to Florida Educational Facilities Planners' Association
July 1, 2025 (2:15 pm to 3:15 pm)

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(Materials Reviewed and Updated 2025)

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Rich Townsend is Co-Owner of the consulting firm R. L. Townsend & Associates, LLC. The firm provides construction audit and construction cost control advisory services to a wide variety of organizations throughout the United States. Rich Townsend is a Certified Public Accountant (CPA), a Certified Internal Auditor (CIA), a Certified Fraud Examiner (CFE), and a Certified Construction Auditor (CCA). He currently serves on the advisory board for The National Association of Construction Auditors. He has been providing professional development training seminars through the Construction Audit & Cost Control Institute, Inc. since 2008. His extensive experience in construction auditing covers a wide range of industries such as public and private universities, school districts, hospitals/healthcare, industrial, real estate development, airport infrastructure, and airport terminal construction.

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Ashley Humphries is a Senior Construction Auditor at R. L. Townsend & Associates, LLC. Ashley is a Certified Internal Auditor (CIA), A Certified Fraud Examiner (CFE), and a Certified Construction Auditor (CCA). She has worked for the firm for the last nine years and has extensive experience working on construction audits of major construction projects for private and public universities, university healthcare organizations, public school districts, industrial, and real estate development. She has been part of the instructor team for the Construction Audit & Cost Control Institute for the last several years. She has also participated in presentations at the National Association of Construction Auditors annual conferences.

Key Partnerships

- Owner Representatives
- Design Architects and Engineers
- Construction Contractors and Trade Contractors

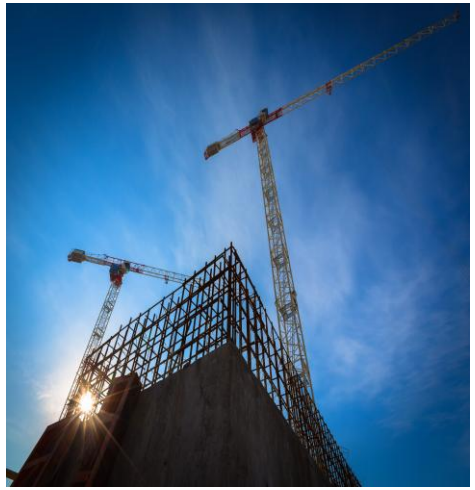
Common Construction Delivery Methods

- Design-Bid-Build
- Construction Manager at Risk (CMAR)
- Design-Build

Example Breakdown of "CM at Risk" GMP Contract Value

GMP Breakdown	Amount
General Conditions - Field Supervision	$ 5,000,000
General Conditions - General Requirements	$ 5,000,000
Subcontracts	$ 88,000,000
Subtotal Estimated Costs	$ 98,000,000
Insurance and Bonds	$ 2,000,000
Subtotal Costs	$ 100,000,000
Contractor FEE at 2.5%	$ 2,500,000
Contingency	$ 5,000,000
Total Guaranteed Maximum Price	$ 107,500,000
Preconstruction Services	$ 500,000
Total Guaranteed Maximum Price Including Precon	$ 108,000,000

RFP and Contract Documents



Making the Right Business Deal

Construction Cost Control and Audit

Cost Avoidance

Cost Recovery

Guaranteed Maximum Price (GMAX) Contracts

Preconstruction

General Conditions

General Requirements

GMAX Contracts

Preconstruction Phase Services, General Conditions and General Requirements All charges for preconstruction phase services, general conditions, and general requirements (i.e. costs to be reimbursed) shall be delineated separately in an Exhibit to this Agreement in the detailed format that was included in the Owner's RFP.

It is the intent of Owner that the approved estimated amounts of Preconstruction Services, General Conditions Costs, and General Requirements Costs will be a negotiated Not-To-Exceed amount approved by Owner when this Agreement and the GMP amendments are approved. It is agreed that the total agreed upon amounts for Preconstruction services, General Conditions, and General Requirements will be treated as a Not-To-Exceed Limit and will not be treated as a Fixed price or Lump Sum amount.

Pre-Contract - Staff Labor Rate Analysis

The construction GMP was approximately $15 million

Total general condition staff labor cost was estimated to be approximately $1.5 million based on proposed “all-inclusive” fixed labor rates

Labor burden was estimated to be approx 40% of labor. However, the base hourly wages used by the contractor to arrive at the proposed fixed labor rates were on average 50% higher than the employee actual base wages

Cost Avoidance Estimate = approximately $500,000 using lower audited lower rates.

Case Example – Excess Charges for Labor Burden

The construction contract was a $30 million cost-plus fee with GMP contract

Total hourly **union** labor cost on project was approximately $4.4 million including labor burden charged at 86.25%.

Contract said 86.25% was NTE…Contractor % included double counting of union vacation costs and excess charges for payroll taxes

Reported overcharge was approx. $700,000

Negotiated Settlement at 50% approx. = $350,000

Self Performed Work by Contractor (Example Contract Provisions)

The Construction Manager may self perform certain construction work when it benefits the Owner, results in cost and time savings, and is pre-approved by the Owner in writing. Such work will be at the Construction Manager's actual cost and subject to the supporting documentation provisions as outlined in this agreement.

Cost Avoidance Example

Non-Bid Self-Performed Work By Prime Contractor

On a $100 million project, the Contractor proposed to Self-Perform Work for a Lump Sum subcontract amount totaling $4 million.

Contract stated all self-performed work must be done as “Open Book” Cost-Plus xx% Fee with a Guaranteed Maximum Price.

Audit Recommended leaving the Self-performed work subcontract as a Cost-Plus with a GMP.

The audited actual Cost-Plus Fee totaled only $3 million.

Cost Avoidance = $1 million

Competitive Bid Lump Sum Self-performed Concrete Work

During an audit of a $150 million renovation project

Contractor awarded themselves a lump sum of $6 million for a self- performed concrete subcontract.

Costs incurred were only $4 million. Effective Fee was 50%

Cost plus Fee of 12.5% = $4,500,000

Negotiated credit of 1/2 of $1.5 million Excess Profit

Negotiated Cost avoidance totaled $750,000

Self Performed Work
Alternate Contract Language p. 1 of 2

For scope of work bid packages typically performed by subcontractors, Construction Manager or their teaming partner, or their joint venture partner, may "self-perform" such work on a cost-plus fee basis subject to an agreed upon guaranteed maximum price for the "self-performed work", where the Construction Manager will specify their self-performed work proposed percentage subcontract fee for the self-perform bid package scope of work with their bid submission.

The 'self-performed work' fee percentage will be limited to a percentage mutually agreed to by both parties when the Owner agreed to accept the Construction Manager's self-performed work as "best value" for the project. The Construction Manager must bid their proposed Work to be "self-performed" against at least three non-related party trade contractors submitting responsible bona fide bids and Owner will decide if such bid constitutes the "best value' for the District.

The Construction Manager's detailed bid for any Self-Performed Work Bid Package must be turned in to the Owner as a sealed bid 24 hours before the bids are due from any other bidders. Any subcontract for "self-performed work" will provide for payments in an amount equal to the Cost of the Work (as defined in the Agreement) plus the mutually agreed upon Construction Manager's self-performed work subcontract fee subject to the mutually agreed not-to-exceed "self-performed work" subcontract guaranteed maximum price.

Self Performed Work by CMAR
Alternate Contract Language p. 2 of 2

All terms and provisions of any subcontract for "self-performed work" will be consistent with the terms and conditions of the Agreement with the exception of the agreed upon subcontract Fee percentage. All savings under any such subcontract for "self-performed work" shall be applied to reduce the Cost of the Work under the Agreement and the Guaranteed Maximum Price of the Agreement.

For purposes of defining "self-performed work" subject to this Contract provision, any division of Construction Manager, or any separate Construction Manager or subcontractor that is partially owned or wholly owned by the Construction Manager or any of their employees or employee's relatives will be considered a related party entity and not a non-interested trade contractor and will be subject to this provision regarding "self-performed work".

No self-performed work will be allowed to be performed on a lump sum basis.

Cost Avoidance Example

Cost-Plus 7.5% Fee GMP Mechanical Subcontract with $50 Million GMP

Contractor’s estimating “experts” recommended converting to Lump Sum at $50 million

Audit Recommended leaving the contract as a Cost Plus with a GMP

End of Job Audit Resulted in Cost Avoidance = $5 million

Cost Avoidance Example $12 Million Proposed Lump Sum Change Order Negotiated to a GMP

$10 million lump sum sitework contract with a proposed $12 million lump sum change order

Audit recommended treating the $12 million as a GMP

Final audited cost-plus fee = $9 million

Cost Avoidance totaling approximately $3 million

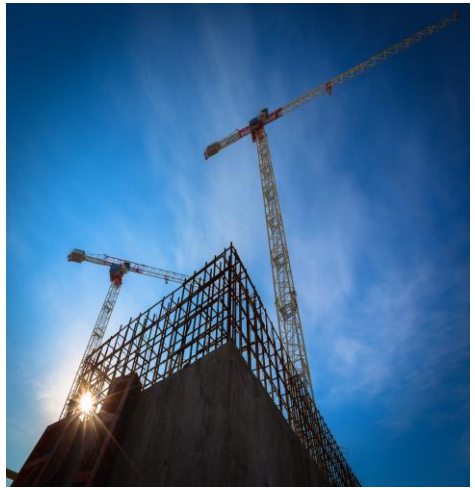
KEY CONTRACTING POINT

MANAGEMENT AND AUDIT PARTNERSHIP

For large negotiated contract or change order situations….

Use Cost Plus Fee with GMP contract structure versus “Negotiated Lump Sum”

Change Order Cost Control



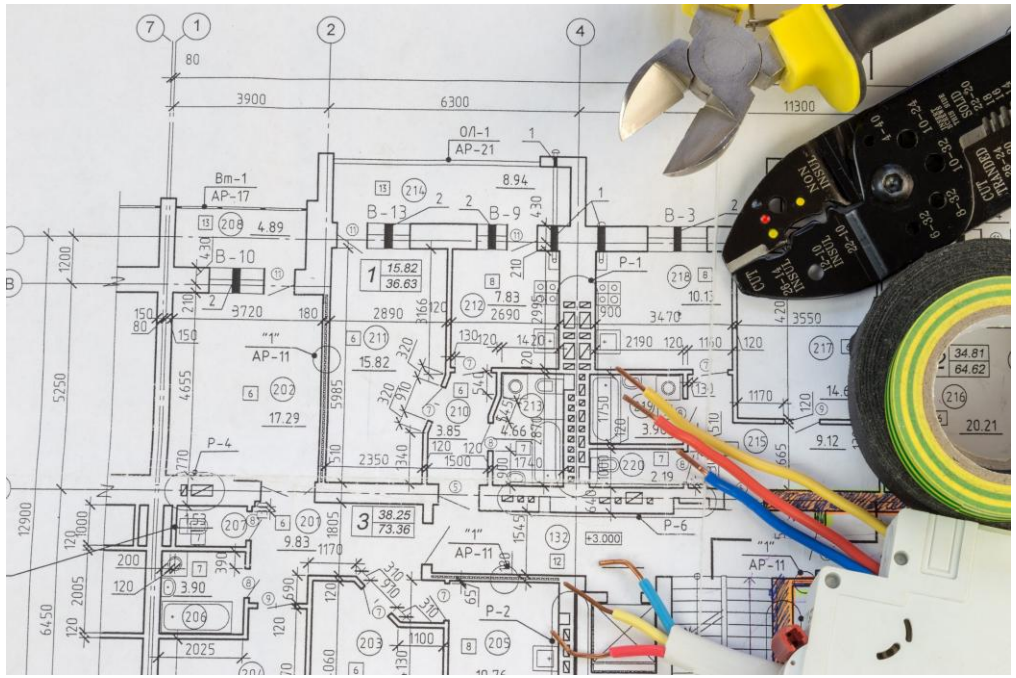
Minimizing Avoidable Change Orders

Tariffs – Possible Material Price Escalation

Tariffs

Strategies for Bidding

Mitigation Strategies



POSSIBLE PROBLEMS WITH SHIFTING 100% OF THE RISK OF INCREASED COSTS DUE TO NEW TARIFFS TO YOUR CONTRACTORS AND TRADE CONTRACTORS

CON: Elevated bid pricing with possible windfall profits resulting if escalation is not as high as they estimated and included in their competitive bids.
Note: This is important in today's world of tariffs and the current political environment where tariffs can be reduced or rescinded at any time.

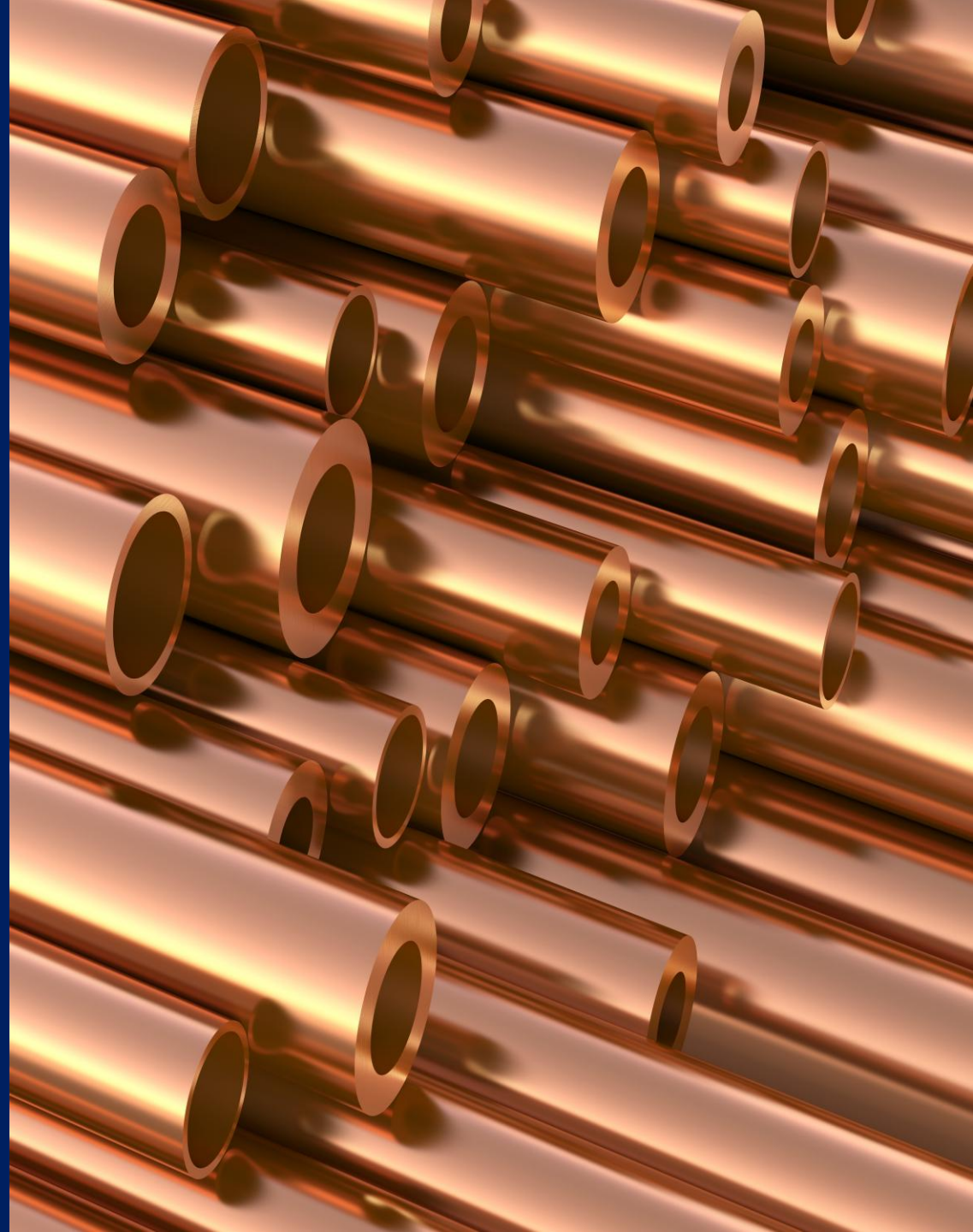
STRATEGIES FOR THE BIDDING PROCESS

Include Contract Language Specifically Addressing How Material Cost Escalation/De-escalation Will Be Handled Once Original Contract Value is Established

Contract escalation/de-escalation provisions can be implemented by a contract exhibit or an amendment if contract has been issued.

Most contractors, subcontractors, material suppliers are going to start qualifying their bids and/or including recommended contract language in their contracts going forward.

Rather than be reactive, proactively implement your own contract language before going out for bid.



PROACTIVE CONTRACT REQUIREMENTS

Contractually Require Cost Mitigation Strategies be Used Wherever Possible:

- Early Procurement:
  Pre-purchase materials where feasible: propose pre-purchasing or pre-ordering critical materials at current prices to lock in costs.

- Supplier Relationships:
  Work closely with suppliers to secure fixed-price contracts or bulk purchasing agreements for materials.

- Where possible allow for possible approval of alternative materials that achieve the same function but are less prone to price volatility due to the impacts of tariffs.

Example Tariff Related Change Order Contract Language

Important NOTE

Construction contract provisions have important legal consequences, and the suggestions in this presentation are not intended as a substitute for competent professional legal services and advice.

Suggestions for contract provisions included in this presentation must be reviewed and adapted to meet your project-specific needs. Federal, State and Local laws may vary with respect to the applicability or enforceability of specific provisions in this document.

Example Tariff Related Change Order Contract Language

1 **PRICE IMPACTED MATERIALS:** It is understood that vendors providing materials to the Owner's Project may be experiencing industry wide economic fluctuations that affect the price, availability, delivery and execution of the Project. The intent of this document is to reasonably reconcile ONLY the Project's materials cost escalation. This form will be used by the Owner to provide a good faith adjustment of market price impacted materials.

2 **PROJECT BASELINE:** Compliance with establishing the project baseline will be a condition precedent to requesting Owner approval of a materials cost escalation. The Contract Documents (Drawings, Specs, and Contract) establish the elements required to establish the project baseline. The Contractor has a duty to mitigate Materials Cost Escalation.

3 **PRICE INCREASE:** In the event of a Material Price INCREASE, the Contract Price shall be reasonably adjusted to reconcile the Materials' Price INCREASE. NO adjustment for Contractor Fee will apply.

4 **PRICE DECREASE:** In the event of a Materials' Price DECREASE, the Contract Price shall be reasonably adjusted to reconcile the Material's Price DECREASE. NO adjustment for Contractor Fee will apply.

5 **NO ADJUSTMENT FOR MATERIALS QUANTITIES:** No adjustments will be made for changes in materials quantities. The intent of this document is to reconcile ONLY materials costs.

Example Tariff Related Change Order Contract Language

The Owner shall have the right to conduct audits for the purpose of substantiating cost increases due to tariffs. These audits are intended to verify the validity and accuracy of the cost increase claims submitted by the Contractor and or/all other lower tier subcontractors (all referred to as “Contractor” in this exhibit.) The Contractor shall provide the Owner or its designated auditors with access to all relevant records and documentation required for the audit. This includes providing timely access to records, responding to inquiries, and facilitating interviews with relevant personnel if needed.

The Contractor agrees to fully cooperate with the Owner or its designated auditors during the audit process. The Owner shall ensure that all information obtained during the audit is treated as confidential and used solely for the purpose of substantiating the cost increase due to tariffs. The Owner shall not disclose any confidential information to third parties without the Contractor's prior written consent, except as required by law.

Example Tariff Related Change Order Contract Language

If the audit confirms the validity of the cost increases and/or decreases, the parties shall negotiate in good faith to determine an equitable adjustment to the contract price. The adjusted pricing shall be documented in a formal amendment to the contract, signed by both parties. The Owner's approval of any price adjustment shall be in writing.

Should the audit reveal any discrepancies or inaccuracies in the claimed cost increases, the Contractor shall bear the responsibility for any unsubstantiated costs and shall not be entitled to an adjustment in the contract price for those costs.

Any access needed shall be granted during normal business hours and upon reasonable notice. The audit shall include a review of all documentation and records related to the cost increases, including but not limited to:

Example Tariff Related Change Order Contract Language

1.1.1 Official tariff notifications or announcements from relevant government authorities. The Contractor is required to provide copies of official tariff notifications or announcements issued by the relevant government authorities serving as verification that new tariffs have been implemented and are affecting material costs.

1.1.2 Supplier price increase notices explicitly stating that the increase is due to tariffs. The Contractor must submit written documentation from suppliers indicating the new prices and explicitly stating that the increase is due to tariffs. Acceptable forms of documentation include letters, emails, or formal notices from suppliers.

1.1.3 Historical Cost Data. Cost comparisons detailing specific material costs prior to the implementation of tariffs and after the tariff increase, including calculations showing the impact of the tariffs on the overall cost, supported by material invoices of prior purchases and supplier increase notices and purchase invoices detailed within 1.1.2, 1.1.4, 1.1.5, and 1.1.6 as justification of material price increase due to tariffs.

Example Tariff Related Change Order Contract Language

1.1.4 Contracts and agreements with suppliers that include price escalation clauses related to tariffs. The Contractor shall provide copies of contracts or agreements with suppliers that contain price escalation clauses related to tariffs outlining the conditions under which prices can be increased due to external factors like tariffs.

1.1.5 Recent invoices and receipts showing the increased costs of materials. The Contractor is required to submit recent invoices and receipts that clearly show the increased costs of materials. The dates and amounts on these documents must reflect the impact of the tariff-related price increases.

1.1.6 Correspondence with suppliers discussing the price increases and the impact of tariffs. The Contractor must include any correspondence with suppliers discussing the price increases and the impact of tariffs. This correspondence can be in the form of emails, letters, or meeting notes and should demonstrate the dialogue and agreement between the Contractor and suppliers regarding the price changes.

Example Tariff Related Change Order Contract Language

1.1.7 Financial records showing the overall impact of the price increases on costs. The Contractor is obligated, if requested by the Owner or its designated auditor, to provide relevant financial records, such as profit and loss statements, expense reports, or other pertinent documents, that show the overall impact of the price increases on costs demonstrating how tariffs have affected the Contractor's finances.

1.1.8 Receipts and Bills of Lading that show the actual costs incurred and the quantity of materials affected by the tariff increase.

1.1.9 Copies of proof of payment to suppliers for the materials at the increased cost. This includes but is not limited to canceled checks, receipts, and electronic payments involved in the purchasing of the materials.

Controlling Cost of Change Orders

- Lump Sum Change Order Proposals
- T&M (or Cost-Plus) Change Orders
- Unit Price Change Orders

Example Change Order Contract Language

The contract language contained in this Exhibit "A" will supplement and take precedence over all other change order pricing contract provisions in the contract documents provided by either the Owner, Construction Manager (Prime Contractor), General Contractor (Prime Contractor), Design-Builder (Prime Contractor) and/or Architect/Engineer.

It is understood that these contract provisions will govern the pricing and administration of all change order proposals to be submitted by Trade Contractors and/or all other lower tier subcontractors (all referred to as "Contractor" in this Exhibit "A"). **In the event of a conflict between the other contract documents used for the project, the change order pricing contract provisions in this Exhibit "A" shall govern.**

Prime Contractor agrees that it will incorporate the provisions of this Exhibit "A" into all agreements with lower tier Contractors who will also include this Exhibit "A" into agreements with all lower tier subcontractors, etc. It is understood that these change order pricing provisions apply to all types of contracts and/or subcontracts specifically including lump sum (or fixed price contracts), unit price contracts. It is further understood that these change order provisions will apply to all methods of change order pricing specifically including lump sum change order proposals, unit price change order proposals, and cost plus Fee change order proposals.

Whenever change order proposals to adjust the contract price become necessary, the Owner will have the right to select the method of pricing to be used by the contractor in accordance with the pricing provisions found in this Exhibit "A". The options will be (1) lump sum change order proposal, (2) unit price change order proposal, or (3) cost plus Fee change order proposal as defined in the following provisions.

Example Maximum Change Order Markup Percentages

Maximum Markup Percentage Allowable on Self-Performed Work: With respect to pricing change orders, the maximum Markup Percentage Fee to be paid to any Contractor (regardless of tier) on self-performed work shall be a single markup percentage not-to-exceed fifteen percent (15%) of the net direct cost of (1) direct labor and allowable labor burden costs applicable to the change order or extra work; (2) the net cost of material and installed equipment incorporated into the change or extra work, and (3) net rental cost of major equipment and related fuel costs necessary to complete the change in the Work.

Maximum Markup Percentages Allowable on Work Performed by Lower Tier Contractors: With respect to pricing the portion of change order proposals involving work performed by lower tier contractors, the maximum Markup Percentage Fee allowable to the Contractor supervising the lower tier contractor's work shall not exceed five percent (5%) of the net of all approved change order work performed by all subcontractors combined for any particular change order proposal.

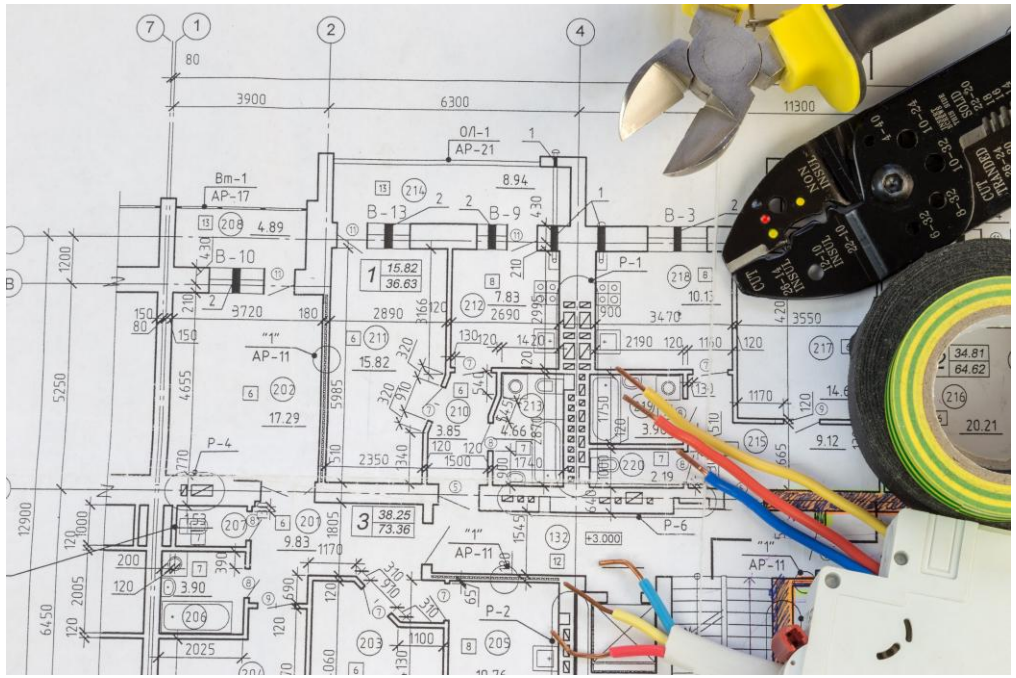
Change Order Contract Language And Change Order Pricing Audit Examples

Change Order Pricing from a Contractor Consultant Perspective

Contract Language

Indirect Costs and Determining what is Allowable

Analysis Example



What a Contractor Consultant Says about Change Order Pricing

"Reasons to Bill Aggressively for Change Orders"

- **'…..by submitting "aggressive" change order pricing, you can enhance your profits'.**
- **'By billing "aggressively" for your other change orders, you can mitigate your losses'.**
- **"Once on the job, it is unlikely a contractor is going to hire another company to perform a change order. There is no competition…'**

Source: On-line website for contractor consultant.

Summary of a Proposed Electrical Change Order Before Audit Review

Cost Type Recap:	Mark up	Amount
1 Labor	0.00%	95,255.31
2 Materials	0.00%	173,323.66
3 Subcontractor	0.00%	43,350.00
5 Equipment-Owned	0.00%	21,924.18
7 Other	0.00%	5,000.00
Subtotal Item		338,853.15

BOND	1.50%		5,115.31
MBE	0.00%		0.00
SUB-CONTRACT	5.00%		2,167.50
PACKAGE MATERIALS	6.00%		0.00
PROFIT AND OVERHEAD	15.00%		51,920.39
Requested Total For Item		1	398,056.35

Owner Reps Need to Ask for Detail underlying the change order pricing such as….

1. Takeoff showing pricing of commodity materials such as conduit, fittings, and wire

2. Takeoff details by line item for labor productivity factors used

3. Backup for quoted materials

4. Backup invoices for any sub-subcontractor costs

5. Details for all equipment charges included in the change order (Make, model number, etc.)

Excerpt from Electrical Change Order
Excerpt from Detailed "Takeoff"

Takeoff Report: 29 Oct 2024 7:50:12

Phase: DISTRIBUTION EQUIPMENT

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
20751	8.00	EA	M	2	EMT 90-ELBOW	48.4128	387.30	0.7500	6.00
70043	560.00	FT	M	3/0	THHN/THWN CU (STR)	44.6720	25,016.31	0.0390	21.84
70152	140.00	FT	M	3.	GREEN THHN CU (GRD 400A)	16.8275	2,355.85	0.0225	3.15
30543	18.00	EA	M	2	EMT STEEL-COMP COUPLING	34.3193	617.75	0.4500	8.10
630171	17.00	EA	M	2	CABLE/CONDUIT 1-PIECE STRUT CLAMP	3.3952	57.72	0.0600	1.02
30689	16.00	EA	M	2	EMT STEEL COMP IN-THRT CONN	92.1550	1,474.48	0.7800	12.48
40237	16.00	EA	M	2	PLASTIC BUSHING	2.4673	39.48	0.4160	6.66
					EMT ON SURFACE STRUT Totals:	*1,234.4873*	***30,862.18***	*2.8498*	***71.25***
TITLE	25.00	EA	M	2 1/2	EMT ON SURFACE STRUT	0.0000	0.00	0.0000	0.00
10059	75.00	FT	M	2 1/2	EMT	13.9040	1,042.80	0.1420	10.65
20752	6.00	EA	M	2 1/2	EMT 90-ELBOW	100.7256	604.35	0.9000	5.40
70048	420.00	FT	M	350	THHN/THWN CU (STR)	90.7324	38,107.62	0.0570	23.94
70154	105.00	FT	M	1.	GREEN THHN CU (GRD 600A)	23.4704	2,464.39	0.0285	2.99
30544	14.00	EA	M	2 1/2	EMT STEEL-COMP COUPLING	160.4308	2,246.03	0.6000	8.40
630173	13.00	EA	M	2 1/2	CABLE/CONDUIT 1-PIECE STRUT CLAMP	5.7150	74.30	0.0750	0.98
30690	12.00	EA	M	2 1/2	EMT STEEL COMP IN-THRT CONN	381.5891	4,579.07	0.9360	11.23
40238	12.00	EA	M	2 1/2	PLASTIC BUSHING	4.9259	59.11	0.5200	6.24
					EMT ON SURFACE STRUT Totals:	*1,967.1070*	***49,177.67***	*2.7932*	***69.83***

The above is only one of several pages of Commodity Material Takeoff Pages.
Total Commodity Materials in the Change Order totaled $173,324.
Total Estimated Labor to istall commodity materials totaled $95,255

Electrical Change Order Takeoff Analysis

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
70043	560.00	FT	M	3/0	THHN/THWN CU (STR)	44.6720	25,016.31	0.0390	21.84
10059	75.00	FT	M	2 1/2	EMT	13.9040	1,042.80	0.1420	10.65
70048	420.00	FT	M	350	THHN/THWN CU (STR)	90.7324	38,107.62	0.0570	23.94

Material Per Contractor = $25,016 / 560 LF = $44.67/ Linear Foot (LF)

Above line items restated below:

Qty	U/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
560	FT	3/0	THHN/THWN	$ 44.6720	$ 25,016.31	0.0390	21.84
75	FT	2-1/2	EMT	$ 13.9040	$ 1,042.80	0.1420	10.65
420	FT	350	THHN/THWN	$ 90.7324	$ 38,107.62	0.0570	23.94
			Totals		**$ 64,166.73**		**56.43**

Using Tra-Ser and NECA to Audit Electrical Change Orders

- What is Tra-Ser? What is NECA?
- Using Tra-Ser to Identify Overcharges on Commodity Materials
- Using NECA to Identify Overcharges on Labor Hours
- Calculating the Overcharges in a Workpaper

SOUTHWIRE COMPANY LLC 20507002

PRODUCT DETAILS

Manufacturer	Affiliate	Brand Name
SOUTHWIRE COMPAN...	SOUTHWIRE COMPAN...	SOUTHWIRE

Product Name	Description	Commodity Code
CABLE	3/0-1C THHN/THWN...	01130

FEATURES/BENEFITS

SIMpull CU THHN/THWN(-2) Conductors Are Primarily Used in Conduit and Cable Tr
Conductors Are Designed to be Installed Without Application of a Pulling Lubricant;
Technology; ROHS Compatible

LONG DESCRIPTION

THHN, THWN-2, MTW TYPE; 500 FT; 568 MIL OUTER DIAMETER; ANNEALED COPPER CONDUCTOR MATERIAL; UL 83/758/1063/15
C) CURRENT RATING; 90 DEG C TEMPERATURE RATING; PVC INSULATION MATERIAL; 3/0 AWG CONDUCTOR SIZE; NYLON JACKET
STANDARD ASTM B3, ASTM B8, ASTM B787, FEDERAL SPECIFICATION A-A-59544, NFPA 70, NEMA WC-70

Pricing | Distributor Pricing | Specifications | UPC History | Custom Fields | Downloads

STANDARD PRICING

List	Col3	AMP	Resale	Currency
$19,534.44	$19,534.44	$3,361.30	$17,581.00	USD

UOM	UOM Quantity	Qty 3
M	500	500

Cost of 3/0 THHN Stranded Copper Wire Per Tra-Ser …

AMP (Average Market Price)

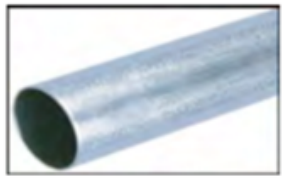
$3,361/1,000 = $3.36 per LF versus the $44.67 per LF changed in change order

Using NECA Labor Productivity Factors to Analyze Change Order Labor Hour Estimates

Takeoff Report: 29 Oct 2024 7:50:12

Phase: DISTRIBUTION EQUIPMENT

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
10059	75.00	FT	M	2 1/2	EMT	13.9040	1,042.80	0.1420	10.65



Electrical Metallic Tubing (EMT)	X					
1/2-inch		4.50	5.60	6.70		C
3/4-inch		5.00	6.20	7.50		C
1-inch		5.50	6.80	8.20		C
1 1/4-inch		6.20	7.80	9.30		C
1 1/2-inch		7.00	8.70	10.50		C
2-inch		8.00	10.00	12.00		C
2 1/2-inch		9.50	11.80	14.20		C
3-inch		11.00	13.70	16.50		C
3 1/2-inch		13.00	16.20	19.50		C
4-inch		16.00	20.00	24.00		C

NECA Normal

NECA Difficult = 25% more hours than NECA Normal

NECA Very Difficult = 50% more hours than NECA Normal

Audit Email to contractor:

"The wire material pricing was so overstated that it is possible there could have been a systemic decimal point error causing material pricing to be overstated."

The estimated labor hours for all conduit and wire were calculated using NECA-3 – Very Difficult. The Owner advised they believe NECA -1 Normal should be used to estimate labor hours for this change order.

Contractor Initial Response

The material rates utilized within the PCO consider essential portions in the makeup of the unit costs including procurement, handling, storage, waste management, clean-up & warranty. ***The returned comments do not include additional considerations for costs due to new year escalations & tariffs.*** *However, these items can be reduced to a unified agreement to help facilitate execution of the PCO.*

The methodology behind the NECA level applied observes examples such as: (1) congested work areas where existing contract scope resides, (2) disruption to normal contract schedule workflow agreed upon in contract, (3) specialized existing structure conditions requiring structure coordination resulting in downtime & (4) complexity of the temporary service gear & raceway installation requiring special installation including essential planning & layout, etc.

Results of Pre Approval Change Order Pricing Audit

Before Audit - Per Subcontractor

Per Subcontractor - Before Audit	
Labor	$ 95,255.31
Materials	$ 173,323.66
Subcontractor	$ 43,350.00
Equipment - Owned	$ 26,924.16
Subtotal	**$ 338,853.13**
Bond - 1.50%	$ 5,115.31
Sub-Contract - 5 %	$ 2,167.50
Profit & Overhead - 15%	$ 51,920.39
Total	**$ 398,056.33**

After Audit - Per Subcontractor

After Audit	
Labor	$ 88,261.63
Materials	$ 91,880.23
Subcontractor	$ 19,200.00
Equipment - Owned	$ 23,320.76
Subtotal	**$ 222,662.62**
Bond - 1.50%	$ 3,354.34
Sub-Contract - 5 %	$ 960.00
Profit & Overhead - 15%	$ 11,348.85
Total	**$ 238,325.81**

Cost Avoidance totaled approximately $160,000

Key Contracting Point

Right to Verify Change Order Pricing Information: Contractor, subcontractor and sub-sub-contractor agrees that any designated Owner's representative will have the right to examine (copy or scan) the records of the Contractor, subcontractor or sub-sub contractor's records (during the contract period and up to three years after final payment is made on the contract) to verify the accuracy and appropriateness of the pricing data used to price all change order proposals and/or claims.

Contractor agrees that if the Owner determines the cost and pricing data submitted (whether approved or not) was inaccurate, incomplete, not current, or not in compliance with the terms of the contract regarding pricing of change orders, an appropriate contract price adjustment will be made. Such post-approval contract price adjustments will apply to all levels of contractors and/or subcontractors and to all types of change order proposals specifically including lump sum change orders, unit price change orders, and cost-plus change orders.

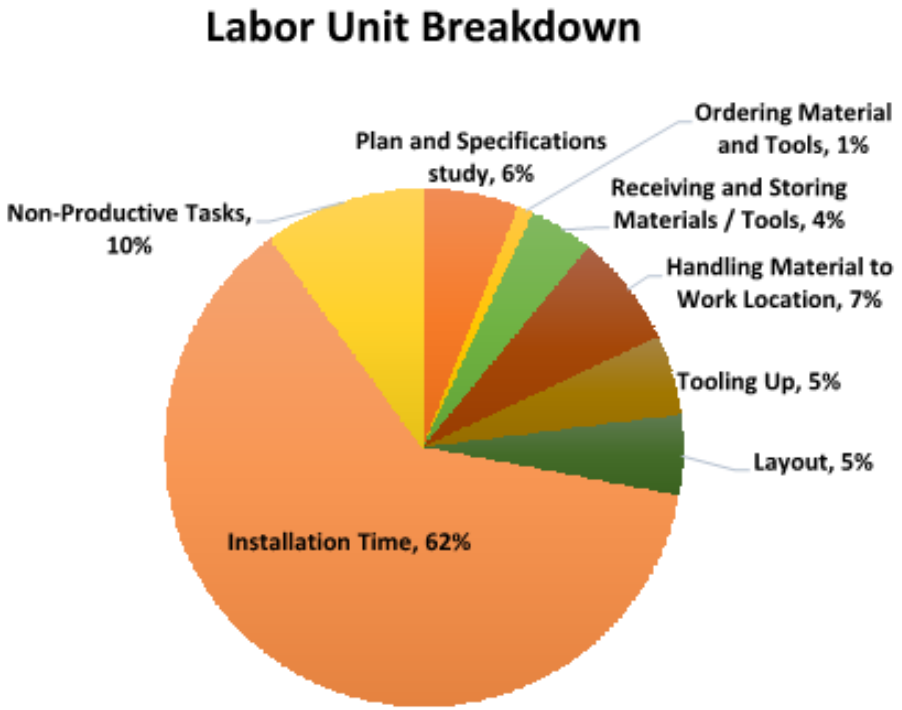
Key Contracting Point
Excerpt from A Florida Public School Contract

Truth-in-Negotiation. The Construction Manager certifies that the wage rates and other factual unit costs supporting the compensation are accurate, complete and current at the time of execution of each Project of which this certificate is a part. The original price and any additions thereto shall be adjusted to exclude any sums by which the Owner determines the Project amount was increased due to inaccurate, incomplete or non-current wage rates, labor burden rates and other factual unit costs (including wage rates and labor burden rates that include amounts that are not considered reimbursable under the terms of the Agreement) and that such original Project adjustments shall be made within one year following the end of the Agreement.

National Electrical Contractors Association
NECA

NECA Manual of Labor Units (MLU) – estimates electrical construction labor required to install typical electrical and communications systems

See the narrative descriptions on the next three pages.



Scope of Work Operations Included in NECA Labor Units

1) **Plan and Specifications study** – Drawing quality will vary this percentage, depending on the complexity of the project. Detailed circuiting and identification will benefit the contractor. Organized plans by the foreman will provide reduced non-productive time.

2) **Ordering Material and Tools** – Materials cannot be installed unless they are on the project site. Proper tools must be provided to field workers for the most efficient installation possible. The best foremen are those who preplan material deliveries well in advance to meet the best labor production possible.

3) **Receiving and Storing Materials and Tools** – Having proper accessible storage for materials on site is paramount. Much labor is wasted when materials are not properly stored. It is unwise to have too much material onsite, but it is also unwise to have too little material onsite. It is a great waster of labor costs to have electricians waiting for materials to be delivered to the job site.

4) **Handling Material to Work Location** – The materials must be stored as close as possible to the installation area. Moving materials multiple times, is costly. This labor can be minimized by use of the following:
    - Tote boxes for materials and tools
    - Four-wheel carts with shelves
    - Portable storage boxes
    - Additional gang boxes

Scope of Work Operations Included in NECA Labor Units

5) **Tooling Up** – Tools are required. For some tasks, the tooling up time will be more due to the intensity of the labor required. For example, setting up for a large wire pull may be a larger percentage than setting up for threading conduit. Temporary power is an important aspect of tooling up. Depending on the project, a temporary generator may be required.

6) **Laying Out the Work** – Electricians must study the installation drawings in order to properly install the work. The more time spend, the less productive your labor unit. Poor drawing quality is detrimental to productivity. Obtaining missing information before the drawings are sent to the project site, will save the contractor labor, thus saving money. A set of prepared layout drawings is valuable on most projects.

   These drawings should include, but not limited to the following:

   - Branch circuits and combined home runs
   - Feeder layouts and conduits racks
   - Schedule of device and plates colors and finishes
   - Architectural information – ceiling heights, wall types, etc.
   - Mechanical equipment locations

Scope of Work Operations Included in NECA Labor Units

8) **Non-Productive Tasks –** Clean up is part of the labor unit.

Non-productive labor tasks would include, but not limited to:

- Restroom breaks
- Water breaks
- Personal phone calls by workers
- Talking with co-workers and other tradesmen
- Going to electrical supply for materials
- Waiting for elevators
- Climbing scaffolding
- Cleaning an area so work may be performed
- Safety meetings, toolbox talks, and project meetings
- Waiting for instructions, tools, or materials

The standard labor unit does not include non-productive supervision time. Additional non-working supervision labor hours should be added during the summarization of the bid.

PRODUCTIVITY FACTORS

- NECA Normal
- NECA Difficult
- NECA Very Difficult

SITUATIONS	NORMAL	DIFFICULT	VERY DIFFICULT	GRADE
Hours Worked	40	50	Over 50	
Shifts	Day	2nd Shift	3rd Shift	
Job Documents	Standard	Poor	None	
Working Conditions	Indoor - controlled environment	Indoor not controlled Outdoor - moderate	Extreme weather	
Crew Density	Normal	Moderate	Extreme	
Working Height	Up to 10'	10'-20'	20' and up	
Floors	0 -3	4 - 7	8 and up	
Job Duration	Normal for Project Size	Larger for Project Size	Shorter for project Size	
Bldg Sq. Ft.	Up to 20K sq'	20-100K sq'	Over 100K sq'	
Proj. Size	Up to $100K	$100K-750K	Over $750K	
Site Size	1 acre or less	2-5 acres	6 acres & over	
Safety	Standard	Moderate	Extreme	
Job Condition	New construction	Remodel	Work while occupied	
Clean-up	Routine	"No Dust"	"Clean Room" Condition	
Installation	Repetitive	Moderate Repetitive	No Repetition	
Type of Construction	Frame	Block	Concrete or Exposed	
Systems	Common	Special	Complex	
Conduit Type	PVC, EMT, Flex	Rigid, IMC, Alum.	PVC Coated Rigid	
Project Access	Unlimited	Limited	Escorts	
Voltage	0-600V	600V-5KV	Over 5KV	
Tools / Equipment	Standard	Non-standard	Specialty	
Craft Co-ordination Required	Minimum	Moderate	Maximum	
Labor Base	Readily Available	Moderately Available	Not Available	
Information Flow	Timely	Delayed	Limited	
Decision Making	Timely	Delayed	Limited	
Job Continuity	No interruptions	Moderate Interruptions	Extreme Interruptions	
Change Order Quantity	Minimal	Moderate	Excessive	
Change Order Timing	Prior to Installation	During Installation	After Installation	
Job Schedule	As Planned	Moderately Compressed or Extended	Excessively Compressed or Extended	
Job Meetings	Regularly Scheduled	"Crisis" Meetings	Minimal	
			PROJECT TOTAL SCORE	

How to Determine the Appropriate Labor Column

Grade Each Situation

- 1 point: Normal or not applicable
- 2 points: Difficult
- 3 points: Very Difficult

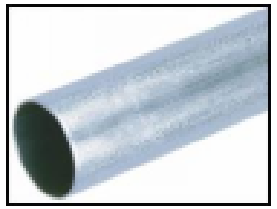
If you project total score is:

- 30 to 40 points = Normal Project
- 41 to 70 points = Difficult Project
- 71 to 90 points = Very Difficult Project

NECA
Manual of Labor Units Example

NECA Manual of Labor Units
2021-2022 Edition

Section 8: Division 26—Electrical



Description	Rev	Normal	Difficult	Very Difficult	Company Experience	Unit
Electrical Metallic Tubing (EMT) and Fittings						
Electrical Metallic Tubing (EMT)						
Note: Add 10% for colored conduit (handling, layout, design)						
1/2-inch		4.50	5.80	6.70		C
3/4-inch		5.00	6.20	7.50		C
1-inch		5.50	6.80	8.20		C
1 1/4-inch		6.20	7.80	9.30		C
1 1/2-inch		7.00	8.70	10.50		C
2-inch		8.00	10.00	12.00		C
2 1/2-inch		9.50	11.80	14.20		C
3-inch		11.00	13.70	16.50		C
3 1/2-inch		13.00	16.20	19.50		C
4-inch		16.00	20.00	24.00		C

Comparison of Labor Productivity Factors for ¾ EMT Conduit per Various Estimating Sources

NECA - Very Difficult	0.0750	per LF
NECA - Difficult	0.0625	per LF
NECA - Normal	0.0500	per LF
R. S. Means - including Couplings only	0.0320	per LF
Get-A-Quote.Net (including couplings)	0.0350	per LF
NEC Costbook (Not Including Couplings)	0.0400	per LF
NEC Costbook (Including set Screw Couplings)	0.0440	per LF
NEC Costbook (Including steel Compression Couplings)	0.0459	per LF

Checking Proposed Change Order Labor Hours

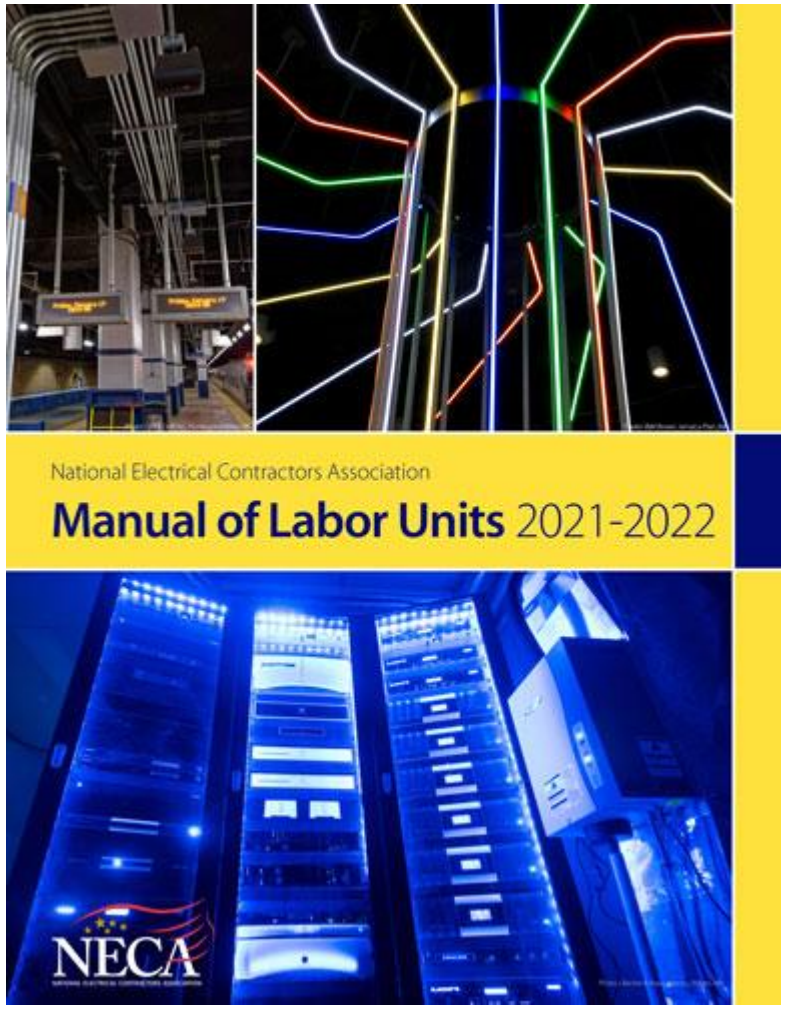
The following estimate uses NECA Very Difficult Labor Units:

Branch Circuit Conduit and Wire:	Quantity	Unit	Labor Units	Labor Hours
Branch circuit 3/4" EMT conduit - OH	10,000	C	7.50	750.00
Branch circuit 3/4" EMT coup - Comp	1,000	E	0.39	390.00
Branch circuit wire - 12# THHN - CU STR	40,000	M	9.00	360.00
Total				1,500.00

The following estimate uses NECA Normal Labor Units:

Branch Circuit Conduit and Wire:	Quantity	Unit	Labor Units	Labor Hours
Branch circuit 3/4" EMT conduit - OH	10,000	CLF	5.000	500.00
Branch circuit 3/4" EMT coup - Comp	1,000	E	0.260	260.00
Branch circuit wire - 12# THHN - CU STR	40,000	M	6.000	240.00
Total				1,000.00

Tools for Checking Labor Units Used by Electrical and Mechanical Contractors to Price Lump Sum Change Order Proposals



MCAA

Non-Member Subscription Agreement for the MCAA WebLEM

Terms and Conditions

These are the terms and conditions under which the company, whose information appears in the form below ("Your Company"), is subscribing to the WebLEM offered by the Mechanical Contractors Association of America, Inc. ("MCAA"), located at 1385 Piccard Drive Rockville, MD 20850. Please read these terms and conditions carefully before submitting this form to MCAA. By completing and submitting this form, Your Company agrees to be bound by these terms and conditions as a prerequisite to WebLEM subscription.

Your Company also agrees to pay an annual maintenance fee. This fee will be due and payable in the year following the initial subscription to the WebLEM and will be invoiced each year thereafter.

The material in the WebLEM is copyrighted by MCAA. No reproduction of the material is permitted without prior written permission of MCAA.

This subscription form must be submitted and agreed to by the Owner, Partner, or if a Corporation, by an Officer of Your Company.

Access Fee	$7,500
Maintenance Fee (billed every January)	$1,150

Redistribution of Labor Hours
Productive Crew Mix

- Working Foreman
- Journeymen
- Apprentices

Note: Eliminate Charge for General Foreman BC it is covered by contractual markup…

Per Contractor				
Labor	% of Total	Hours	Rate	Total Labor
Gen Foreman	10%	40	$ 80.00	$ 3,200.00
Journeyman	100%	400	$ 60.00	$ 24,000.00
				$ 27,200.00

Per Audit				
Labor	% of Total	Hours	Rate	Total Labor
Foreman	10%	40	$ 70.00	$ 2,800.00
Journeyman	60%	240	$ 60.00	$ 14,400.00
Apprentice	30%	120	$ 35.00	$ 4,200.00
Total				**$ 21,400.00**

Audit Adjustment = Elimination of 10% add on for general foreman and redistribution of 400 hours according to crew mix

Productive "Crew Mix"

- Working Foreman
- Journeymen
- Apprentices

- Also …. Consider the impact of regular contractor employee labor that is supplemented by labor from temporary labor agencies such as "Hard Hat" or "Man-Power" etc.

10″ Concrete Floor Slabs

Credit Alternate to Use 8″ Floor Slabs versus the specified 10″ Floor Slabs for the top ½ of the $90 million 46 story building

Audit Inspection Identified "Non-Conforming Work"

Overcharge was at least $400,000

Example Of Accepted Add Alternates

Base Price-	$ 826,200.00
Substitute-Panasonic Reversimatic (Energy Star Fan with FD	$ 0.00
Alternate 7 /taken- Bathroom supply duct, flex, FD, and grille	$ 24,500.00
Alternate 8 /taken- Condensing unite have been designed on the roof	$ 1,750.00
Design Change 1- RTU's in lieu of split systems (lounge/laundry facility) (Includes incremental costs of equipment & material)	$ 18,200.00
Design Change 2- Daikin VRV in lieu of Daikin mini-splits (Engineer changed the equipment on the construction documents)	$ 48,000.00
Design Change 3- Fire Damper Assembly Change by MEP (Engineer specified FD assemblies)	$ 24,000.00
Design Change 4- Added Heaters (Engineer Added 84 unit heaters)	$ 12,200.00
Design Change 5- Gravity Relief Vents (Engineer specified SEIHO)	$ 14,000.00
TOTAL	$ 968,500.00

Example Of Contractor And Employee Collusion

On $25 million of contractor billings over a 6-year period…

The contractor overbilled $10 million due to collusion between owner employee and contractor..

The entire $25 million was authorized on a series of PO’s valued at $25,000 or less…

CMAR Owns and Operates a Subsidiary that Buys Material and Re-Invoices Material to the Project at Prices that are on average 2 x the Actual Material Costs

During an audit of a $25 million cost plus fee with GMP construction contract …

CMAR's subsidiary billed the project for approximately $400,000 of doors and hardware they delivered to the project

The estimated overcharge was at least $200,000 on this project

Electrical Subcontractor Charges for Commodity Materials were 2 to 3 times more than Actual Costs

During an audit of a $100 million project……

Electrical subcontractor billed for commodity materials (wire, conduit, fittings, etc.) at “lowest book price less 20%”

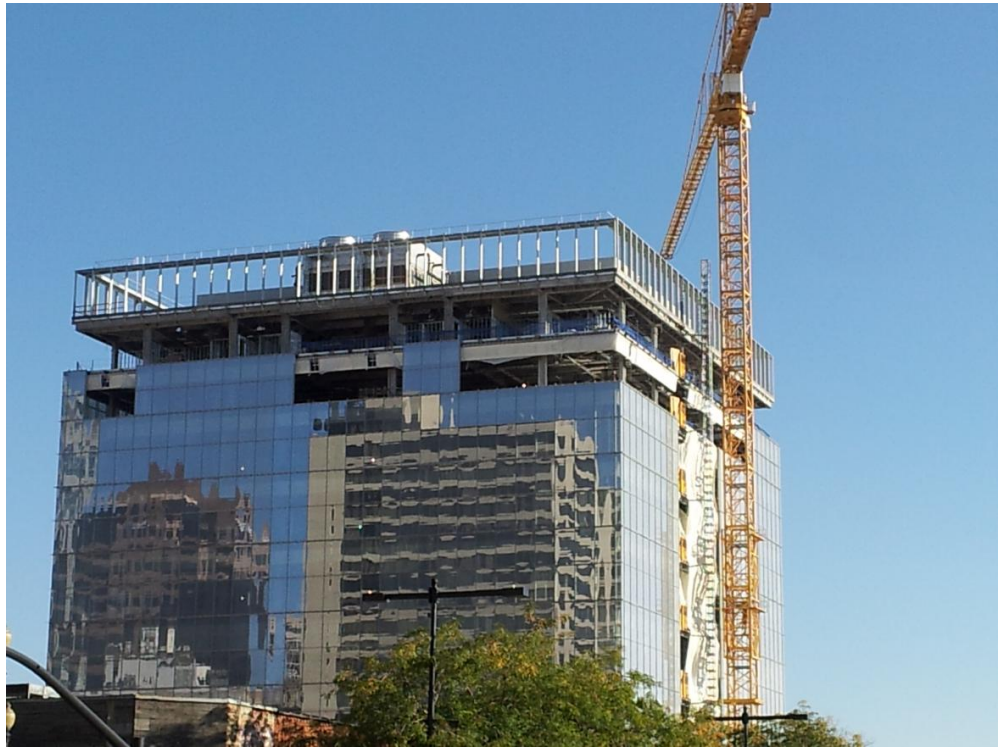
Their subcontract billings totaled $13 million, the overcharge on commodity materials was at least $1.5 million

Middleman Electrical Supplier

During an audit of a $200 million project with a $20 million cost plus electrical subcontract

Audit investigated a ‘middleman electrical supplier’

Estimated overcharges totaled $600,000



Examples Of Fraud And Collusion

- Collusion between Construction Manager and Subcontractors to Shift Cost from Hard Bid Fixed Price Contracts to Negotiated GMP Contracts Resulting in $30 million in Overcharges

- Construction Manager Consultants Extorted $14 million in kickbacks from Contractors and Subcontractors

Bonds And Insurance

- Liability Insurance
- Builder’s Risk Insurance
- Performance & Payment Bonds
- Contractor Controlled Insurance
- Subcontractor Default Insurance

Post-Hurricane Builders Risk Insurance Premium ‘Allowance’

During an audit of a $14 million construction project

Contractor charged $250,000 for Builder’s Risk Insurance Allowance

Cost recovery totaled $200,000

$200 million in Cost-Plus Fee CMAR Contracts

- Our audit team was engaged after the CM Proposals were submitted and after the CMs were selected…but before the CMAR contracts were signed and GMPs were submitted
- CMARs proposed to provide Liability Insurance and P&P bonds at excessive %'s
- Audit assisted the Owner in GMP negotiations to reduce amounts to be charged Liability Insurance and P&P Bonds
- Cost Avoidance related to negotiated reduction is billable amounts for insurance and bonds totaled approximately $2 million for all three projects

Recommended Contract Language For Charges For Conventional Liability Insurance

The amount to be reimbursed to the Contractor for conventional contractually required liability insurance (professional liability, general liability, umbrella liability, excess liability, pollution liability, cyber liability, and auto liability will be actual costs of insurance premiums for insurance required to be carried by the contractor by the contract documents not to exceed an aggregate of .6% of the net reimbursable Cost of Work (not including liability insurance and not including fee. If the Contractor's cost of contractually required liability insurance is greater than the amount agreed to be reimbursed per this contract provision, the difference shall be considered to be covered by the Contractor's FEE. Deductibles are not reimbursable.

If the Owner elects to use an Owner Controlled Insurance program to provide liability and worker's compensation insurance for the prime contractor and all trade contractors, then the Prime Contractor shall NOT be allowed to charge any other liability insurance as reimbursable costs. Any such additional liability costs shall be considered covered by Contractor's FEE.

Recommended Contract Language When Owner Elects To Use Owner-Controlled Insurance (OCIP)

- In the event that the OWNER elects to utilize an Owner Controlled Insurance Program (OCIP) to provide liability insurance and worker's compensation insurance for the prime contractor and all eligible subcontractors, no other prime contractor or subcontractor liability insurance or worker's compensation insurance costs will be allowed to be billed to the project as a direct reimbursable cost. *Note: The only exception to this limitation will be the cost to provide worker's compensation for off-site employees who cannot be covered by the OCIP program or the cost of insurance for subcontractors who cannot be covered by the OCIP policy.*

- The costs of any other insurance the prime contractor and/or the subcontractors elect to carry will be considered to be covered by the prime contractor's Fee.

Performance And Payment Bonds
True-up If there is a Savings on the Project

The CM requests a final invoice from the bond company and the following summarizes the details on the final bond invoice:

Calculation	Amounts	Rate per $1,000	Base Bond Premium for 1st 36 months
First $100,000	$ 100,000	$25/$1,000	$ 2,500
Next $400,000	$ 400,000	$15/$1,000	$ 6,000
Next $2,000,000	$ 2,000,000	$10/$1000	$ 20,000
Next $2,500,000	$ 2,500,000	$7.50/$1,000	$ 18,750
Next $2,500,000	$ 2,500,000	$7.00/$1,000	$ 17,500
Subtotal	**$ 7,500,000**		**$ 64,750**
Over $7,500,000	$ 91,000,000	$6.50/$1,000	$ 591,500
Total Bond Premium for 1st36 months	$ 98,500,000		$ 656,250
Amount Previously Paid for Bond on the Project			$ 682,250
True-Up Credit Due			$ (26,000)

Apprentices Billed as Journeymen

During an audit of a $75 million project……

Sheetmetal subcontractor was billing for apprentices at the journeyman rate

Cost recovery totaled $900,000

KEY CONTRACT AND AUDIT POINTS

Do not agree to pay all-inclusive hourly rates unless they are fully auditable.

Always examine employee payroll register to verify rates paid and hours paid to employees correlate amounts billed to the job.

Unpaid Overtime Hours Billed on Salaried Staff

During an audit of a $30 million project……

Prime Contractor Billed Approximately $750,000 for one year of staff labor including hours worked but not paid

Cost recovery totaled $250,000

Cost Recovery Example
The Advantage of Controlled Access and Badging Data

The contract was a $72 million cost-plus fee CMAR contract

Contractor billed approximately $4 million for hourly craft labor

Badging data was analyzed resulting in negotiated audit credits totaling $600,000

- Billed but never issued badges
- Billed but no record of badge in/out

The Advantage Of Controlled Access And Badging Data

SiteTraxx Terminals

- Plug and Play Solution – 110 vac required
- Biometric Solution (Biological and Behavioral)
- Backlog of all records
- Backup Power Supply (99% uptime)
- All Communication uplinks included
- 24 Hour Monitoring

Labor Documentation For Cost-Plus Contracts

Require Labor Rate Breakdowns And Contemporaneous Documentation With:

- Names
- Positions
- Dates And Location Worked
- Hours
- Rates
- Description Of Work Performed

Cost Avoidance Example

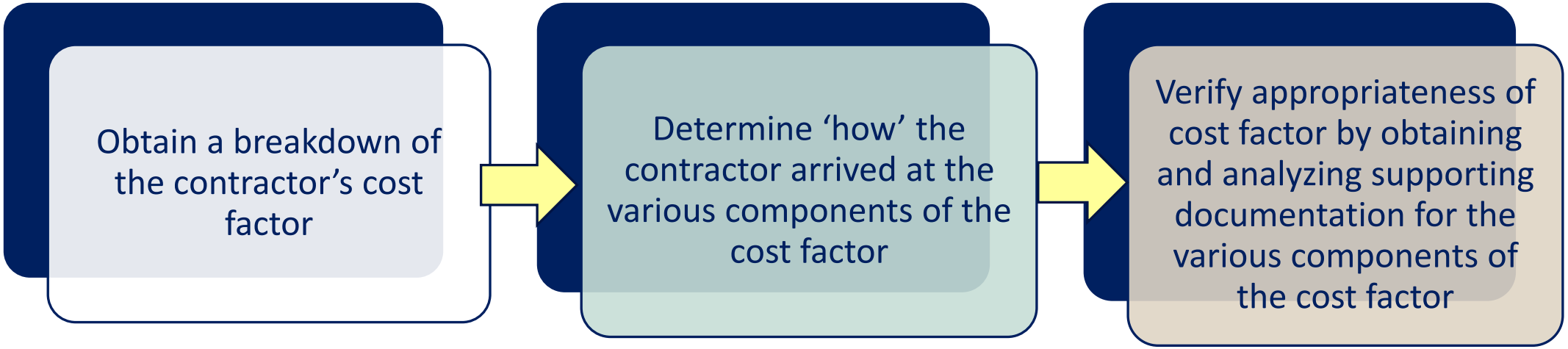
On a cost-plus construction contract with $500 million in payments to the construction contractor….

Total raw labor cost billed to the project was approximately $100 million

Payroll taxes and insurance costs were charged at 30%....actual audited costs were only approx. 20%

Cost Avoidance = $10 million

Three-Step Approach to Analyzing Construction Cost Factors



U.S. Example Labor Rate And Burden Breakdown

Cost Component	ST Rate	OT Rate	DT Rate
Wages - Journeyman	$ 40.00	$ 60.00	$ 80.00
Payroll Taxes - FICA 6.2%	$ 2.48	$ 3.72	$ 4.96
Payroll Taxes - Medicare 1.45%	$ 0.58	$ 0.87	$ 1.16
Payroll Taxes - State Unemployment 6%	$ 2.40	$ 3.60	$ 4.80
Payroll Taxes - Federal Unemployment .8%	$ 0.32	$ 0.48	$ 0.64
General Liability Insurance at 6%	$ 2.40	$ 3.60	$ 4.80
Worker's Compensation @ 10%	$ 4.00	$ 6.00	$ 8.00
Medical/Dental/Life, etc. @12%	$ 4.80	$ 7.20	$ 9.60
Pension Contribution at 10%	$ 4.00	$ 6.00	$ 8.00
Other at 10%	$ 4.00	$ 6.00	$ 8.00
Total Labor & Labor Burden Cost	$ 64.98	$ 97.47	$ 129.96
Subtotal Labor Burden Costs Per Hour	$ 24.98	$ 37.47	$ 49.96
Total Burden Costs as a % of Wages	62%	62%	62%
Total Cost as a % of Straight Time Cost	100%	150%	200%

NOTE: Several of the line-item rates above would be incorrect or excessive.

$4/hr Charge For Small Tools and Consumables on $100 million cost-plus subcontract

CONTRACT	COLLUSION	RECOVERY
Cost-plus fee subcontract that included approximately 1,000,000 hours of labor and an agreed upon charge for small tools and consumables at $4 per hour	Subcontractor colluded with material suppliers to receive small tools and consumables for free in exchange for allowing overcharges on material invoices	Cost Recovery = $4 million

One type of overcharge was billing for more materials than delivered. The second type overcharge was for allowing excessive prices to be charged for commodity materials.

US PAYROLL TAXES: FICA, MEDICARE, AND FUTA

FICA

FICA is 6.2% on the first $168,600 for 2024

$176,200 for 2025

MEDICARE

Medical payroll tax in 1.45% with no annual wage limit

FUTA

After 6-3-2011, the net after state tax credit, Federal Unemployment Tax usually equals .6% of the 1st $7,000 per employee (for most states)

U.S. Payroll Taxes: FUTA

The FUTA tax levies a federal tax on employers covered by a state's UI program. The standard FUTA tax rate is 6.0% on the first $7,000 of wages subject to FUTA. The funds from the FUTA tax create the Federal Unemployment Trust Fund, administered by the United States Department of Labor (DOL).

Generally, employers may receive a credit of 5.4% when they file their Form 94(PDF), Employer's Annual Federal Unemployment (FUTA) Tax Return, to result in a net FUTA tax rate of 0.6% (6.0% - 5.4% = 0.6%).

U.S. State Unemployment Tax

In Florida, the maximum amount of wages subject to unemployment insurance (UI) tax is $7,000 per employee.

Worker's Compensation Insurance - Example

WC Class Code	Class Description	Payroll	Manual Rate per $100	Manual Premium
5213	Concrete NOC	$ 1,500,000	$ 25.00	$ 375,000
5403	Carpenter - NOC	$ 1,000,000	$ 16.00	$ 160,000
5437	Carpenter - Interior	$ 3,000,000	$ 8.00	$ 240,000
5606	Executive Supervision	$ 750,000	$ 5.00	$ 37,500
8809	Officers	$ 100,000	$ 1.00	$ 1,000
8810	Clerical	$ 2,500,000	$ 0.50	$ 12,500
	Totals	$ 8,850,000		$ 826,000
			Avg %	9.33%

Worker's Compensation Insurance – Effective %

WC Class Code	Class Description	Payroll	Manual Rate per $100	Manual Premium	Net Effective Premium	Net Effective %
5213	Concrete NOC	$ 1,500,000	$ 25.00	$ 375,000	$ 141,750	9.45%
5406	Carpenter - NOC	$ 1,000,000	$ 16.00	$ 160,000	$ 60,480	6.05%
5412	Carpenter - Interior	$ 3,000,000	$ 8.00	$ 240,000	$ 90,720	3.02%
5606	Executive Supervision	$ 750,000	$ 5.00	$ 37,500	$ 14,175	1.89%
8809	Officers	$ 100,000	$ 1.00	$ 1,000	$ 378	0.38%
8810	Clerical	$ 2,500,000	$ 0.50	$ 12,500	$ 4,725	0.19%
	Totals	$ 8,850,000		$ 826,000	$ 312,228	3.53%
9998	Experience Modification Factor		0.60	$ (330,400)		
	Net Premium After Adjustment for Experience Modifier			$ 495,600		
9887	Premium Credit Schedule Rating Plan		0.70	(148,680)		
	Net Audited Adjusted Premium Before Discount			$ 346,920		
	Premum Discount Adjustment		0.10	$ (34,692)		
	Net Audited Premium			$ 312,228		
			Avg %	3.53%		

Construction Auditing

Worker's Compensation Premium is not generally paid on the premium portion of overtime.

Make sure to verify that the classification of workers that is used to calculate the audited premium is the same as the one used to calculate job costs.

Obtain data used by the insurance company to calculate audited premiums at the end of the insurance policy period.

Liability Insurance Premium Basis - Revenues

Class Description	Revenue	GL Rate per $1000	GL Premium
Revenues to $100 million	$ 100,000,000	$ 0.30	$ 300,000
Revenues > $100 million	$ 37,500,000	$ 0.20	$ 75,000
Totals	$ 137,500,000		$ 375,000
		Avg %	0.27%

Follow-up on possible insurance policy dividends from mutual insurance companies!

Vacation, Holiday & Sick Cost Factors Or Accrual Charges

Typical Overcharges Include:

- Developing cost factors, accrual factors, or billable rates that charge more than the contractor's actual costs for paid time not worked
- Billing the project for paid time not worked hours or charging for paid time not worked in separate accrual charges

Example – Union Benefit Costs

Base Wage rate	$	31.86	per straight time hour
Welfare benefits contribution	$	7.95	per hour worked
Pension benefits contribution	$	5.25	per hour worked
Annuity benefits contribution	$	6.25	per hour paid
Job training	$	0.10	per hour worked up to 40 hours per week
Subtotal benefits costs	$	19.55	
Percentage per straight time Hour		61.36%	

Example Effective Labor Burden On Overtime – Union Example

Cost Component	ST Rate	OT Rate	DT Rate
Wages	$ 31.86	$ 47.79	$ 63.72
Payroll Taxes at 10%	$ 3.19	$ 4.78	$ 6.37
Worker's Compensation @ 10%	$ 3.19	$ 3.19	$ 3.19
Welfare benefits contribution	$ 7.95	$ 7.95	$ 7.95
Pension benefits contribution	$ 5.25	$ 5.25	$ 5.25
Annuity benefits contribution	$ 6.25	$ 9.38	$ 12.50
Job training	$ 0.10	$ -	$ -
Total Labor Cost	$ 57.78	$ 78.33	$ 98.98
Subtotal Labor Burden Costs Per Hour	$ 25.92	$ 30.54	$ 35.26
Total Burden Costs as a % of Wages	81%	64%	55%
Total Cost as a % of Straight Time Cost	100%	136%	171%

Effective Labor Burden On Overtime
Non-Union Example

Cost Component	ST Rate	OT Rate	DT Rate
Wages at $40 per ST hour	$ 40.00	$ 60.00	$ 80.00
Payroll Taxes at 10%	$ 4.00	$ 6.00	$ 8.00
Worker's Compensation @ 10%	$ 4.00	$ 4.00	$ 4.00
Health Benefits at 75% of $750/month	$ 3.25	$ -	$ -
Vacation, Holiday at 25 days per year	$ 3.85	$ -	$ -
401k Match at 50% of 1st 6%	$ 1.20	$ 1.80	$ 2.40
Total Labor Cost	$ 56.29	$ 71.80	$ 94.40
Subtotal Labor Burden Cost per Hour	$ 16.29	$ 11.80	$ 14.40
Total Burden Cost as a % of Wages	41%	20%	18%
Total Cost as a % of Straight Time Cost	100%	128%	168%

Problem: Excessive Charges For Contractor Owned Equipment Rental

- Aggregate bare rental charges for a particular piece of equipment may exceed the fair market value of the piece of equipment at the time it was first needed for the job
- Hourly, Daily, Weekly or Monthly Rates may exceed fair market rates or may exceed maximum rates allowed by contract
    - 1) Consider "bare" rental rates versus "maintained and fueled" rental rates
    - 2) Consider "without operator" rates versus "with operator" rates
    - 3) Consider "bare rates without markup for overhead and profit" versus "rates including overhead and profit"

Contractor charged approximately $500,000 for Contractor Owned Equipment.

Contractor argued contract language regarding caps on equipment should not apply “because they could have rotated pieces of equipment on and off the job”….

During an audit of a $75 million cost plus fee with GMP construction contract …

Contractor billed the project for approximately $500,000 of contractor owned equipment rented to the project

Owner deducted $250,000 from the final payment to the Contractor to account for contractual cap = to equip. purchase price

Contract Solution: Contractor Owned Equipment

The aggregate rentals chargeable for each piece of Contractor owned tools or equipment shall not exceed xx% of the fair market value of such equipment at the time of its commitment to the Work.

The original purchase price and date of purchase of the equipment will be documented with a copy of the purchase invoice for the piece of equipment.

Such aggregate limitations will apply and no further rentals shall be charged even if a piece of equipment is taken off the job and is later replaced by a similar piece of equipment.

For purposes of computing the aggregate rentals applicable to aggregate rental limitations, rental charges for similar pieces of equipment will be combined if the pieces of equipment were not used at the same time.

A Comparison To The Monthly Published Rate Per The Rental Rate AED Green Book:

Greenbook Monthly Retal Rate = $683

EquipmentWatch

www.equipmentwatch.com

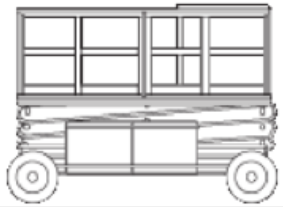
All prices shown in US dollars ($)

AED Green Book®

February 20, 2025

Genie GS-1930 (disc. 2020)
Electric Self Propelled Scissor Lifts

Size Class:
To 20 ft
Weight:
2702 lbs



Configuration for GS-1930 (disc. 2020)

Maximum Platform Capacity	**500.0 lbs**	Maximum Platform Height	**19.0 ft**
Platform Size	**29' X 64'**	Power Mode	**Electric**
Voltage	**24.0 V**		

AED Rental Rates

These rental rates reflect an average for equipment of this type and size. Rates shown for specific brands or models are provided for convenience only. Rates charged by rental companies for specific brands or models will vary depending on many factors

	Monthly	Weekly	Daily
Published Rates	USD $687.00	USD $363.00	USD $173.00
Adjustments			
Region (Texas: 99.46%)	(USD $3.69)	(USD $1.95)	(USD $0.93)
User Defined			
Rental Rates (100%)	-	-	-
Total:	**USD $683.31**	**USD $361.05**	**USD $172.07**

Date Last Updated: Dec 01, 2024

A Comparison To The Monthly Published Rate Per The Rental Rate Blue Book:

EquipmentWatch

www.equipmentwatch.com

All prices shown in US dollars ($)

Rental Rate Blue Book®

February 20, 2025

Genie GS-1930 (disc. 2020)
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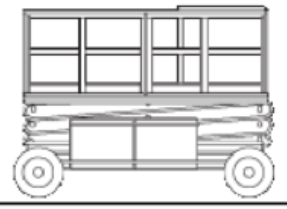

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Maximum Platform Capacity	**500.0 lbs**	Maximum Platform Height	**19.0 ft**
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Voltage	**24.0 V**		

Blue Book Rates

** FHWA Rate is equal to the monthly ownership cost divided by 176 plus the hourly estimated operating cost.

	Ownership Costs				Estimated Operating Costs	FHWA Rate**
	Monthly	Weekly	Daily	Hourly	Hourly	Hourly
Published Rates	USD $2,950.00	USD $825.00	USD $205.00	USD $31.00	USD $17.06	USD $33.82
Adjustments						
Region (Texas: 101.2%)	USD $35.40	USD $9.90	USD $2.46	USD $0.37		
Model Year (2020: 100%)	-	-	-	-		
Adjusted Hourly Ownership Cost (100%)	-	-	-	-		
Hourly Operating Cost (100%)					-	
Total:	**USD $2,985.40**	**USD $834.90**	**USD $207.46**	**USD $31.37**	**USD $17.06**	**USD $34.02**

Blue Book Monthly Rate = $2,985

Recommendation: DO NOT agree to Blue Book Rates!

EquipmentWatch

www.equipmentwatch.com

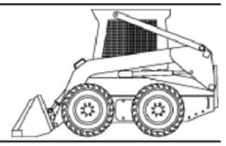
All prices shown in US dollars ($)

AED Green Book®

February 20, 2025

Bobcat S300 (disc. 2011)
Skid Steer Loaders

Size Class:
2,901 - 3,300 lbs
Weight:
8448 lbs



Configuration for S300 (disc. 2011)

Horsepower	**81.0 hp**	Operator Protection	**ROPS/FOPS**
Power Mode	**Diesel**		

AED Rental Rates

These rental rates reflect an average for equipment of this type and size. Rates shown for specific brands or models are provided for convenience only. Rates charged by rental companies for specific brands or models will vary depending on many factors

	Monthly	Weekly	Daily
Published Rates	USD $2,750.00	USD $1,052.00	USD $342.00
Adjustments			
Region (Texas: 103.25%)	USD $89.38	USD $34.19	USD $11.12
User Defined			
Rental Rates (100%)	-	-	-
Total:	**USD $2,839.39**	**USD $1,086.19**	**USD $353.12**

Monthly Green Book divided by 173.3
$2,839.39/173.3 = $16.38 base rent
plus $10.61 per hour for fuel = $26.99 per hour for a fueled rate.

EquipmentWatch

www.equipmentwatch.com

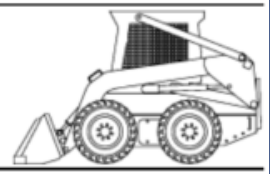
All prices shown in US dollars ($)

Rental Rate Blue Book®

February 20, 2025

Bobcat S300 (disc. 2011)
Skid Steer Loaders

Size Class:
2,901 - 3,300 lbs
Weight:
8448 lbs



Configuration for S300 (disc. 2011)

Horsepower	**81.0 hp**	Operator Protection	**ROPS/FOPS**
Power Mode	**Diesel**		

Blue Book Rates

** FHWA Rate is equal to the monthly ownership cost divided by 176 plus the hourly estimated operating cost.

	Ownership Costs				Estimated Operating Costs	FHWA Rate**
	Monthly	Weekly	Daily	Hourly	Hourly	Hourly
Published Rates	USD $9,120.00	USD $2,555.00	USD $640.00	USD $96.00	USD $38.09	USD $89.91
Adjustments						
Region (Texas: 96.8%)	(USD $291.84)	(USD $81.76)	(USD $20.48)	(USD $3.07)		
Model Year (2011: 100%)	-	-	-	-		
Adjusted Hourly Ownership Cost (100%)	-	-	-	-		
Hourly Operating Cost (100%)					-	
Total:	**USD $8,828.16**	**USD $2,473.24**	**USD $619.52**	**USD $92.93**	**USD $38.09**	**USD $88.25**

Non-Active Use Rates

	Hourly
Standby Rate	USD $25.08
Idling Rate	USD $60.77

Rate Element Allocation

Element	Percentage	Value
Depreciation (ownership)	15.94%	USD $1,453.86/mo
Overhaul (ownership)	65.89%	USD $6,008.71/mo
CFC (ownership)	8.58%	USD $782.31/mo
Indirect (ownership)	9.6%	USD $875.12/mo
Fuel (operating) @ USD 3.54	27.86%	USD $10.61/hr

Revised Date: 1st quarter 2025

Recommendation: DO NOT agree to Blue Book Rates!

Third Party Equipment Rental Charges May Be Excessive

Charges may be for "lease/purchase" rather than just rental

Charges may be for equipment not used on job or not used entirely on the job

Rebates from equipment rental companies may be received without being credited to the job billings

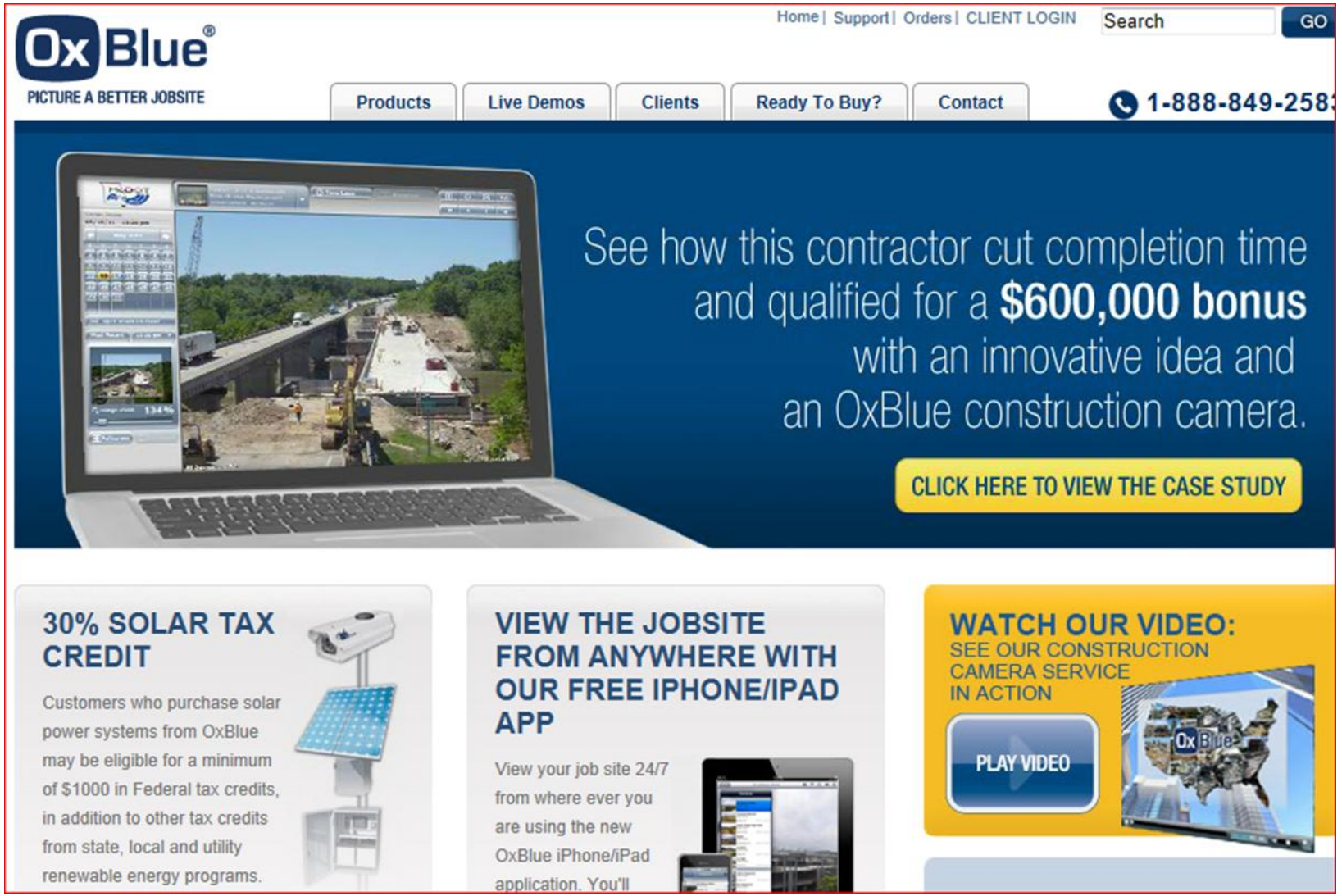
Audit analysis work may include examining GPS data for equipment locations, fuel logs for fuel usage, and/or engine hour readings to determine the extent the equipment was actually used compared to the amount billed.

Jobsite Cameras To Document Construction Activity

Other Camera Sources:

MultiVista

EarthCam



Relocation And Temporary Living Expenses

- Charges for unapproved relocations or unapproved temporary living expenses

- Excess charges for relocations and temporary living expenses

Problem: Quantities Billed Exceed Actual Billable Quantities

Example:

Bill for 130,000 CY of work when only 100,000 CY was billable.

Special Considerations For Quantities Billed By Cubic Yard (Or Cubic Meter)

- Bank Cubic Yards (BCY)
- Loose Cubic Yards (LCY or TCY)
- Compacted Cubic Yards (CCY)

Four Step Approach To Verifying Contract Quantities Billed

- Find out how the billed quantity was arrived at
- Obtain engineer's worksheets showing how estimated quantity was arrived at
- Review contract for specific basis and measurement method
- Independently verify the actual work in place

Watch Out For Anything Measured Using A Conversion Factor

Contractor Used Conversion Factor to Calculate BCY of unisuitable soil excavation cut and fill	Per Contractor	Per Audit	Difference
Tons of suitable Material Purchased	110,000	110,000	-
Conversion Factor	1.10	1.5	0.40
Number of Cubic Yards Cut and Fill	100,000	73,333	(26,667)
Unit Price per Cubic Yard	$15	$15	-
Totals Change order Amout	$ 1,500,000	$ 1,100,000	$ (400,000)

Special Considerations for Quantities Billed by Weight

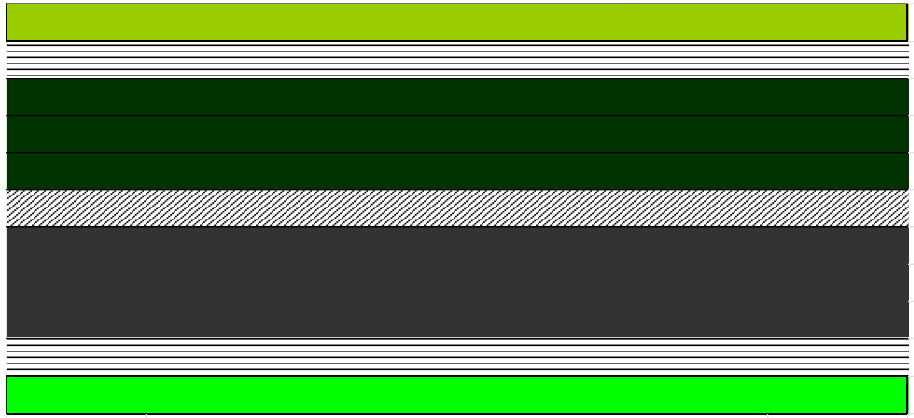
Scale Accuracy

1. Accuracy of Tare Weight
2. Accuracy of Gross Weight
3. Accuracy of Net Weight Consider Normal Moisture Content

Consider Moisture Content

Consider Amount Remaining in Truck

Example of Overbilling: Sod Mulch Unit Price $1.00 per SY



<---Sod mulch area
<---Shoulder of road
<---Westbound highway
<---Median
<---Eastbound highway
<---Shoulder of road
<---Sod mulch area

10 miles of highway resurfacing
20 miles of sod mulch 6 feet wide along shoulder or road

Pay item Unit Price = $1.00 per square yard

5,280	linear feet per mile
6	width of sod mulch
31,680	square feet per mile
9	square feet per square yard
3,520	square yards per mile
20	miles
70,400	square yard estimate per engineer

One Third Overcharge = $ 23,467

Example of Billing for Excessive Quantities

Length	Width	Depth	Cubic Feet	Cubic Yards	Price per CY	Amount
1,000	4	4	16,000	593	$ 400.00	$ 237,037
1,000	5	5	25,000	926	$ 400.00	$ 370,370
		Difference	9,000	333	-	133,333

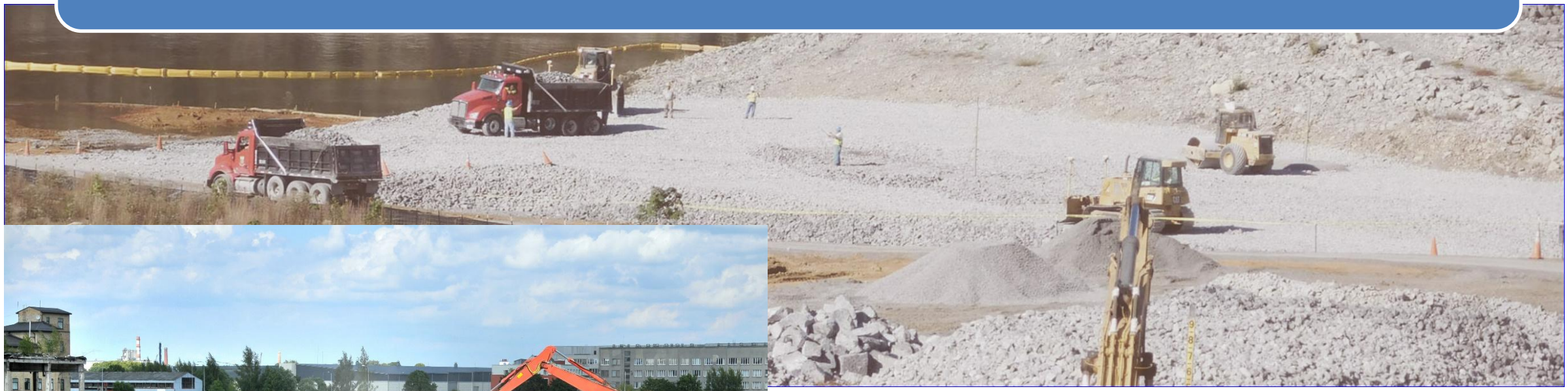
Determine whether or not "pay limits" apply…… limit may be "neat lines shown on the plans"

Rock Crusher

Contractor was paid $2.4 million at $16 per cubic yard (CY) to crush rock to be used for building pads.

The total CY billed = 150,000

What Went Wrong



Rock Crusher Used to create a Stockpile Crushed Stone

Measure by the ton….
Converted to CY

Example of work installed does not meet specifications and other problems:

- Example:
  - On-Site Road Sub-base 12” thick
  - Billed approx. 10,000 CY

Effectively Auditing and Administering Construction Contracts

Create and Use Best practice Construction Contract Language

Use “ROI” approach to addressing potential overcharges or overpayments

Understand the “Big Picture” and the “interrelationship” of transactions

Summary

Help your organization make the right business deal!

Monitor as you go and conduct close-out audits at a minimum!

Good luck with all your construction audit and construction cost control activities!

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