

Construction Cost Estimating WHITE PAPER

Understanding Construction Cost Data - Improve facilities repair, renovation, maintenance, and new cost management.

ESTIMATE CLASS	Primary Characteristic	Secondary Characteristic		
	MATURITY LEVEL OF PROJECT DEFINITION DELIVERABLES Expressed as % of complete definition	END USAGE Typical purpose of estimate	METHODOLOGY Typical estimating method	EXPECTED ACCURACY RANGE Typical variation in low and high ranges
Class 5	0% to 2%	Concept screening	Capacity factored, parametric models, judgment, or analogy	L: -20% to -50% H: +30% to +100%
Class 4	1% to 15%	Study or feasibility	Equipment factored or parametric models	L: -15% to -30% H: +20% to +50%
Class 3	10% to 40%	Budget authorization or control	Semi-detailed unit costs with assembly level line items	L: -10% to -20% H: +10% to +30%
Class 2	30% to 75%	Control or bid/tender	Detailed unit cost with forced detailed take-off	L: -5% to -15% H: +5% to +20%
Class 1	65% to 100%	Check estimate or bid/tender	Detailed unit cost with detailed take-off	L: -3% to -10% H: +3% to +15%

Cost Estimate Classification Matrix for Process Industries from AACE RP No. 18R-97ⁱⁱⁱ

Understanding construction cost data is critical before proceeding to the procurement phase for any repair, renovation, maintenance, or new build activity. Robust cost visibility and cost management require a detailed analysis of granular labor, material, and equipment components specific to the local market.

Construction cost data encompasses detailed information on the expenses associated with planning, procuring, executing, and completing construction projects. This includes material, labor, equipment, subcontractor services, and overhead costs. Utilizing objective, reliable local market cost data is crucial for defensible estimating, enabling contractors to create realistic bids and for both design/builders and real property owners to manage project costs effectively.

Key Components of Construction Cost Data:

- **Material Costs:** This includes the price of all materials used in construction, such as concrete, steel, lumber, wiring, fasteners, etc.

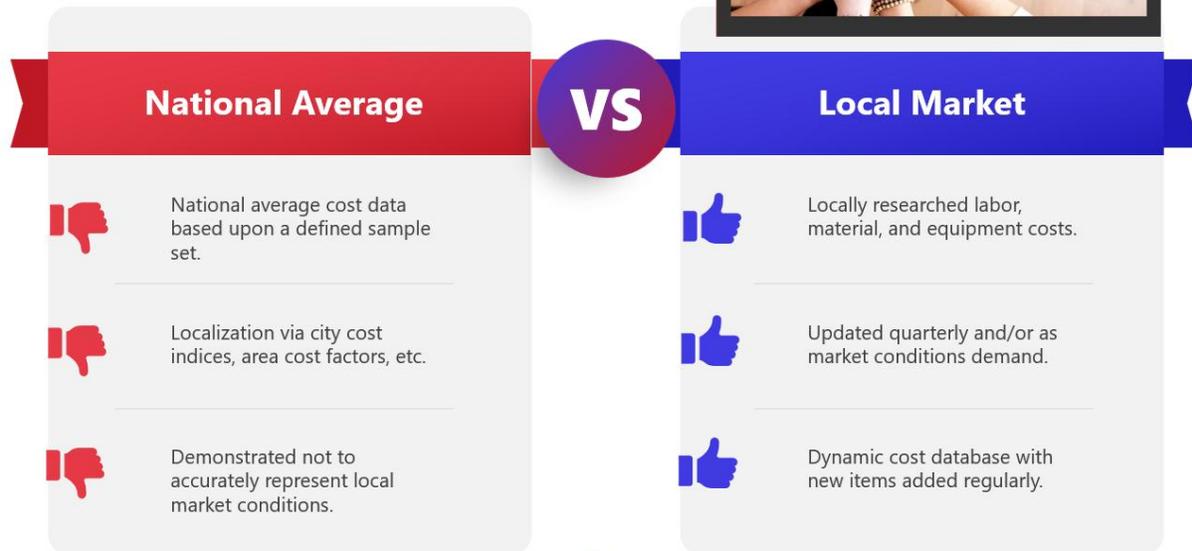
- **Labor Costs:** This encompasses wages, benefits, and other costs directly associated with construction workers.
 - **Equipment Costs:** This covers the cost of renting or purchasing construction machinery and equipment.
 - **Subcontractor Costs:** This includes the expenses for specialized tasks performed by subcontractors.
 - **Overhead and Profit Costs:** This includes indirect costs such as permits, insurance, and project management expenses as well as design/builder profits. When estimating any construction related activity it is important to differentiate between "raw costs", costs with overhead and profit, and total costs (raw costs plus overhead and profit and various other fees).
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- **Reliable estimates** are based on sound methodology, detailed data, and reasonable assumptions. They are estimates that can be trusted to provide a realistic projection of costs.
 - **Precise estimates** are detailed, breaking down costs into individual components and utilizing tools and techniques to minimize potential errors in calculations and takeoffs.
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Sources of Construction Cost Data:

- **RSMeans Data:** RSMeans provides national average costs, which are then adjusted using City Cost Indexes (CCI) to reflect differences across locations. CCI is a useful tool for comparing costs between cities or to the national average, but should not be used for procurement-level estimates. Relying solely on CCI adjustments for detailed estimates can lead to substantial discrepancies between the estimate and actual local costs. Procurement involves obtaining detailed proposals from subcontractors and suppliers, which requires a precise understanding of the specific costs of materials, labor, and equipment for each task. The CCI, with its broad multipliers, cannot provide this level of detail.

Construction Estimating Cost Data



- **Local Market Data:** Provides granular, verifiable, locally researched cost data that reflects local market material, labor, and equipment costs. Offering more specificity than national averages, data from **Four BT, LLC**, for example, can be provided on a city or even a site basis. (Note: **Gordian** develops and maintains RSMMeans data and offers access through online platforms and other formats.)
- **ENR (Engineering News-Record):** Provides cost trends for construction including trades and materials and various economic factors.
- **4BT OpenCOST™:** Offers local market construction cost data with over 90,000 detailed line items, with data updated quarterly.
- **Mortenson Construction Cost Index:** Provides a quarterly index for non-residential construction projects in various locations.

Importance of Accurate Cost Data:

- **Reliable Estimating:** Objective, granular, local market cost data allows for more precise cost estimations, reducing the risk of underestimating or overestimating expenses,

- **Informed Decision Making:** Verifiable cost data empowers project owners and contractors to make informed decisions about project feasibility, design choices, and resource allocation.
 - **Realistic Bids:** By having access to detailed local market cost information, contractors can create competitive bids that reflect the project's actual cost.
 - **Effective Cost Management:** Reliable, current cost data is crucial for effective cost management throughout the project lifecycle, enabling timely adjustments and cost control measures.
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The term "accurate construction cost estimate" is inappropriate. Construction estimates are, by their very definition, predictions or forecasts about future costs. While the goal is always to get as close to the final actual cost as possible, construction cost estimates are inherently susceptible to various factors that can impact their precision.

- **No definitive datum for measuring accuracy:** Unlike measuring the length of a table, where a known standard exists (e.g., a tape measure), there's no single, universally accepted "true" value for the cost of a future construction project.
- **The "as-built cost" is not a reliable datum:** Many variables influence the final as-built cost, including changes in scope, unforeseen circumstances, and even the project delivery method.

Factors to consider when creating a construction cost estimate include the following:

- **Market Fluctuations:** Prices of materials, labor, and equipment can change unpredictably due to market demand, supply chain issues, and economic factors.
- **Labor Availability and Costs:** Shortages of skilled labor, changing wage rates, and benefits can significantly impact project budgets.
- **Project Complexity and Scope:** Projects with intricate designs, specific architectural requirements, or specialized materials can have higher cost variability and unforeseen expenses.
- **Incomplete or Vague Project Information:** Lack of detailed blueprints, specifications, and scope documents can lead to assumptions and errors in estimates.
- **Unforeseen Circumstances:** Weather conditions, regulatory delays, site conditions, and other unexpected events can significantly affect project costs.

- **Estimator's Experience and Expertise:** The experience and knowledge of the estimator play a crucial role in the quality of the estimate.
 - **Subcontractor Management:** Relying solely on subcontractor bids can be risky, and potential delays or incomplete proposals can impact the estimate.
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Given the inherent uncertainties, industry professionals increasingly emphasize the concepts of **reliability** and **precision** when discussing construction cost estimates.

- **Reliable estimates** are based on detailed information, reflecting current local market conditions and communicated clearly and plainly. They are "able to be trusted" and "consistently good in quality."
 - **Precise estimates** break down costs into detailed line items and utilize tools and techniques to reduce potential errors.
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Improving the quality of estimates

While absolute accuracy is unattainable, several strategies can help improve the quality and reliability of cost estimates:

- **Detailed Information Gathering:** Thoroughly examining bid documents, visiting the construction site, and conducting accurate quantity takeoffs are crucial steps.
- **Leveraging Historical Data:** Analyzing past project costs, can help benchmark costs, however, cannot be used for creating current estimates unless each individual item is reviewed and appropriately updated.
- **Using Advanced Tools:** Integrating digital estimating software, BIM, and automated takeoff tools can significantly enhance efficiency and precision.
- **Refining Labor Cost Calculations:** Accurately assessing labor needs, factoring in prevailing wages, and considering productivity, trade types and skill levels are essential.
- **Verifying Subcontractor Quotes:** Thoroughly reviewing subcontractor proposals and cross-checking them against independent takeoffs and local market construction cost databases can help identify potential discrepancies.

- **Promoting Early Collaboration:** Engaging with all project stakeholders from the initial stages can ensure a clear understanding of the project scope and requirements.
- **Building Flexibility and Contingency:** Including contingency allowances in estimates helps manage unexpected costs and risks.

By focusing on these principles and best practices, construction professionals can strive to create robust and trustworthy estimates that support effective decision-making and project success, even if achieving 100% accuracy remains a challenge.

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