Classes of Construction Cost Estimates

Design & Technology Series #19

Overview

Cost estimates are an important component of construction project delivery, supporting budgeting, approvals, and controls across a project's stage-gates, milestones, and lifecycle phases. Their accuracy and consistency are critical for informed decision-making, effective financial planning, and successful contract negotiations throughout the project.

The reliability of an estimate is determined by how closely it aligns with the actual project cost and is influenced by factors such as the level of detail and specifications available, estimating techniques used, the estimator's experience, and resources used to prepare the estimate.

Cost estimates evolve in accuracy as a project progresses. During the prefeasibility phase, estimates are inherently less precise due to limited information, but they must still be established and monitored throughout the project lifecycle. As more detailed plans and specifications become available, the accuracy of estimates improves. To manage expectations and support decision-making, organizations often adopt standardized classification of cost estimates.

Alberta Infrastructure's Cost Management Services adopts the ASTM E2516-11 Standard Classification for Cost Estimate Classification System (2024). ASTM E2516-11 is mainly based on the AACE International Recommended Practices 17R–97, 18R-97, and 56R-09 pertaining to Cost Estimate Classification System.

Other widely adopted classes of estimates are the Canadian Institute of Quantity Surveyors (CIQS) Cost Estimate Classification and the Public Services and Procurement Canada's Cost Estimate Definitions.

ASTM Cost Estimate Classification Matrix

ASTM E2516-11 (2024) defines five classes of cost estimates based on the degree of project definition and purpose, ranging from Class 5 (least defined) to Class 1 (most defined). Table 1 provides a summary of five classes.

As projects progress through design phases, the level of detail and accuracy of the estimates increases. Each class of estimate aligns with specific design milestones and deliverables. These classifications are described as follows:

- **Class 5**: Order of Magnitude Estimate. Based on minimal information (0–2% project definition). Used for business planning, viability assessment, project screening, and long-range capital planning. Accuracy range: -30% to +50%. Estimating Methods: Building area factoring, parametric models, expert judgment.

ASTM Class	Project Definition (% Complete)	End Usage	Typical Accuracy Range
Class 5	0–2%	Feasibility or screening	Low: -20% to -30% High: +30% to +50%
Class 4	1–15%	Concept Study	Low: -10% to -20% High: +20% to +30%
Class 3	10–40%	Budget Control	Low: -5% to -15% High: +10% to +20%
Class 2	30–70%	Control or Bid / Tender	Low: -5% to -10% High: +5% to +15%
Class 1	70–100%	Check estimate or Bid / Tender	Low: -3% to -5% High: +3% to +10%

Table 1: Cost Estimate Classification Matrix for Building and General Construction Industries (Source: Adapted from ASTM E2516-11 Standard Classification for Cost Estimate Classification System (2024))

- **Class 4**: Schematic Design Estimate. Based on schematic layouts (1–15% project definition). Used for concept evaluation, alterative scheme analysis, and preliminary budgeting. Accuracy: -20% to +30%. Estimating Methods: Parametric, assembly models, functional space pricing.

- **Class 3**: Budget Authorization and Initial Control Estimate. Based on design development (10–40% project definition). Used for funding requests and control estimates. Accuracy: -15% to +20%. Estimating Methods: High degree of unit cost line items but may be at an assembly level of detail rather than individual components and include cost assumptions.

- **Class 2**: Detailed Estimate. Based on detailed design and specifications (30–70% project definition). Used for tendering, contractor bid estimate and cost control baseline to monitor actual costs. Accuracy: -10% to +15%. Estimating Methods: detailed quantity take-offs and unit costs, with limited assumptions. Should include detailed labour, material, equipment, subcontractor and other costs.

- **Class 1**: Definitive Estimate. Based on detailed to full design and specifications (70–100% project definition). Used by subcontractors for bids, by owners for bid checks and to support change management including change

orders, claims evaluation and negotiations. Accuracy: -5% to +10%. Methods: highest degree of deterministic estimating with detailed take-offs and unit costs. Involves detailed bottom up estimate with detailed labour, material, equipment, subcontractor and other costs.

Expected Accuracy Range

When stating the expected accuracy levels for each project estimate class, in addition to the degree of project definition, the following should also be taken into consideration:

- Project complexity
- Availability and quality of reference cost data
- Quality of assumptions used
- Estimating techniques employed
- Market and pricing conditions
- Experience of the estimators

Figure 1 illustrates that the accuracy ranges associated with the different estimate classes can overlap. For example, a Class 4 estimate for one project may be as accurate as a Class 3 estimate for another. This can occur when the Class 4 estimate is based on a repeat project with reliable historical cost data, while the Class 3 estimate involves new or untested technology or construction methodology.

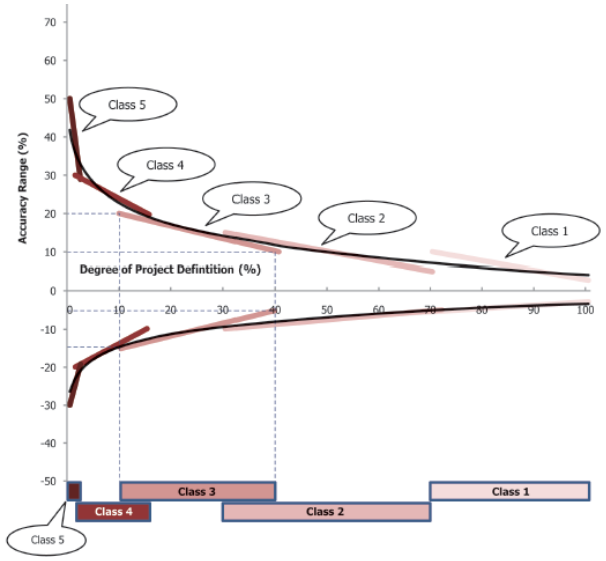

Figure 1: Example of the Variability in Accuracy Ranges for a Building and General Construction Industry Estimate (Reprinted with permission, from ASTM E2516-11 Standard Classification for Cost Estimate Classification Systems, copyright ASTM International)

For this reason, the classes of estimates present a range of index values, allowing for the consideration of project-specific and sector-specific factors when determining realistic accuracy expectations for each estimate class. While a target range may be expected for a particular estimate, the accuracy range should always be determined through risk analysis of the specific project and should never be pre-determined.

Comparison of Estimate Classifications

Figure 2 presents a chart comparing the terminology and class of estimates used by different associations and government departments. Public Services and Procurement Canada (Government of Canada) uses the four-level classification system from Class D, C, B and A, in ascending order of design completion. This Class D to A system is based on the CIQS class of estimates. The Government of Canada's Treasury Board uses Indicative and Substantive classification for project and expenditure approvals.

While terminology varies, the link between design maturity and estimate accuracy remains consistent across systems.

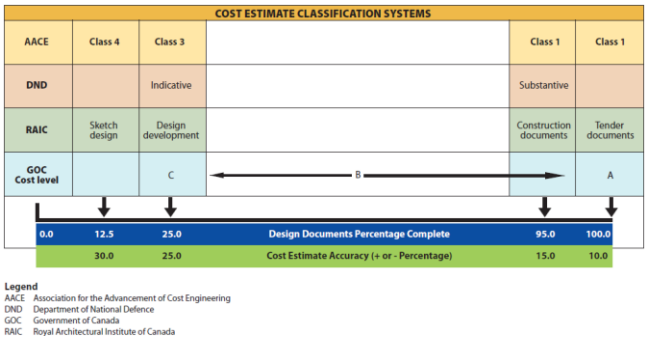

Figure 2: Cost Estimate Classification Comparison Chart (Source: Guide to Cost Predictability in Construction Report by Canadian Joint Federal Government / Industry Cost Predictability Taskforce (2012))

Alberta Infrastructure adopts the ASTM standard classification of cost estimates as a structured, industry-recognized approach to estimate development and communication. Project teams and stakeholders are encouraged to

- Align estimate class to project phase and purpose
- Recognize and communicate estimate limitations and contingencies
- Use suitable methodology (parametric, assembly, or detailed take-offs)
- Use risk factors, complexity, historical data, and current pricing to determine estimate reliability

References

(1) ASTM International. (2024). Standard classification for cost estimate classification system (Designation E2516-11, Reapproved 2024). ASTM International.

(2) AACE International. (2025). Cost estimate classification system (Recommended Practice 17R-97). AACE International.

(3) AACE International. (2020). Cost estimate classification system – as applied in engineering, procurement, and construction for the building and general construction industries (Recommended Practice 56R-08). AACE International.

(4) Canadian Joint Federal Government / Industry Cost Predictability Taskforce. (2012). Guide to cost predictability in construction: An analysis of issues affecting the accuracy of construction cost estimates.

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