Classification

OPCC Estimate Classification and Development
HDR Water and Heavy Estimating

Estimate Class	Class 5		Class 4		Class 3		Class 2		Class 1	
LEVEL OF PROJECT DEFINITION Expressed as a % of complete definition	0% to 2%		1% to 15%		10% to 40%		30% to 70%		70% to 100%	
END USAGE Typical Purpose of Estimate	Concept Screening or Feasibility		Concept/Alternatives Study or Feasibility		Budget Authorization, or Control		Control or Bid / Tender		Check Estimate or Bid / Tender	
METHODOLOGY Typical estimating method	Timberline Model Estimating, Parametric Models, Judgment, Equipment Budgets		Timberline Model Estimating, Parametric Models, Selective Deterministic, Equipment Budgets		Selective Deterministic, Timberline Assembly Estimating, Equipment Budgets		Primarily Deterministic with Detailed Unit Cost with Forced Detailed Take Off, Vendor Quotes		Deterministic with Detailed Unit Cost and Detailed Take-Off	
EXPECTED ACCURACY RANGE Typical variation in low and high ranges [a]	L: Range -20% to -50%; Typically -25%	H: Range +30% to +100%; Typically +50%	L: Range -15% to -30%; Typically -20%	H: Range +20% to +50%; Typically +40%	L: Range -10% to -20%; Typically -15%	H: Range +10% to +30%; Typically +30%	L: Range -5% to -15%; Typically -10%	H: Range +5% to +20%; Typically +20%	L: Range -3% to -10%; Typically -5%	H: Range +3% to +15%; Typically +10%
UNDEFINED SCOPE OF WORK ESTIMATE DEFINITION (Contingency)	Cost included in the OPCC Estimate which can not otherwise be allocated to specific task due to lack of Project Definition assuming relative stability of project scope and assumptions upon which the estimate is based. [1.]		Cost included in the OPCC Estimate which can not otherwise be allocated to specific task due to lack of Project Definition assuming relative stability of project scope and assumptions upon which the estimate is based. [1.]		Cost included in the OPCC Estimate which can not otherwise be allocated to specific task due to lack of Project Definition assuming relative stability of project scope and assumptions upon which the estimate is based. [1.]		Cost included in the OPCC Estimate which can not otherwise be allocated to specific task due to lack of Project Definition assuming relative stability of project scope and assumptions upon which the estimate is based. [1.]		Cost included in the OPCC Estimate which can not otherwise be allocated to specific task due to lack of Project Definition assuming relative stability of project scope and assumptions upon which the estimate is based. [1.]	
UNDEFINED SCOPE OF WORK ESTIMATE %	Range 25% to 40%; Typically 25%		Range 20% to 30%; Typically 20%		Range 15% to 25%; Typically 15%		Range 10% to 20%; Typically 10%		Range 5% to 15%; Typically 5%	
EXPANDED CLASS DEFINITION	Class 5 estimates are generally prepared based on very limited information, and subsequently have very wide accuracy ranges. As such, some companies and organizations have elected to determine that due to the inherent inaccuracies, such estimates cannot be classified in a conventional and systematic manner. Class 5 estimates. Often, little more than proposed site layout, plant type, location, and capacity are known at the time of estimate preparation. Special site conditions (ex. rock, piles, environmental, &etc) are not taken into account at this level.		Class 4 estimates are generally prepared based on limited information, and subsequently have wide accuracy ranges. They are typically used for alternatives or concept screening, determination of feasibility, concept evaluation, and preliminary budget approval. Typically, engineering is from 1% to 15% complete, and would comprise at a minimum the following: capacity, block schematics, indicated layout of structures and piping, sized process flow diagrams (PFDs) for main process systems, preliminary motor and instrument lists, and preliminary engineered process and utility equipment lists. Estimates may be limited to compare alternatives and not indicative of project cost.		Class 3 are generally prepared based on average design development level of 30% and as such are prepared to form the basis for budget authorization, appropriation, and/or funding. They typically form the initial cost control estimate against which all actual costs and resources will be monitored. Engineering development for different areas will range from 10% to 40% complete, minimum design documents would comprise of the following: sized process flow diagrams (PFDs), P&ID's, site plan, preliminary yard piping plan, developed facility layout drawings and initially sections, complete motor and instrument list, and complete engineering process and major utility equipment lists.		Class 2 estimates are prepared based on average design development level of 60% and as such are prepared to form a detailed control baseline against which all project work is monitored in terms of cost. For design build contractors, this class of estimate is often used to establish the project Guaranteed Max Price, "GMP" proposal for the client. Engineering development for different areas will range from 30% to 75% complete, minimun design documents would comprise of the following: Process flow diagrams(PFDS), utility flow diagrams, piping and instrument flow diagrams (P&IDS), heat and material balances, final site plan, final yard piping plan, final layout drawings, significant sections, complete engineered process and utility equipment lists, single line diagrams for electrical, final electrical equipment and motor schedules, vendor quotations, detailed project execution plans, resourcing and work force plans, detailed demolition plans,etc.		Class 1 estimates are generally prepared based on average design development of 95% for the total project and as such are used to establish the final cost of the project. This estimate is often referred to as the final or current control estimate and becomes the baseline for cost/schedule control of the project. Class 1 estimates may be prepared for parts of the project to comprise a fair price estimate or bid check estimate to compare against a contractor's bid estimate, or to evaluate/dispute claims. Engineering development for different areas will range from 50% to 100% complete, and would comprise virtually all engineering and design documentation of the project, and complete project execution and commissioning plans.	
END USAGE DEFINED	Class 5 estimates are prepared for any number of strategic business planning purposes, such as but not limited to market studies, assessment of initial viability, evaluation of alternate schemes, project screening, project location studies; evaluation of resource needs and budgeting, long-range capital planning, etc.		Class 4 estimates are prepared for a number of purposes, such as but not limited to, detailed strategic planning, business development, project screening at more developed stages, alternative scheme analysis, evaluation of alternative solutions, confirmation of economic and/or technical feasibility, and preliminary budget approval or approval to proceed to next stage. When used for project planning, the appropriate markups (professional services, land acquisition, legal, etc) should be applied to the estimate.		Class 3 estimates are typically prepared to support full project funding requests, and become the first of the project phase "control estimate" against which all actual costs and resources will be monitored for variations to the budget. They are used as the project budget until replaced by more detailed estimates. The appropriate markups (professional services, land acquisition, legal, etc) should be applied to the estimate when presented to client.		Class 2 estimates are typically prepared as the detailed control baseline against which all actual costs an resources will now be monitored for variation to the budget, and form a part of the change/variation control program.		Class 1 estimates are typically prepared to form a current control estimate to be used as the final control baseline against which all actual coasts and resources will now be monitored for variations to the budget, and form a part of the change/variation control program. They may be used to evaluate bid checking, to support vendor/contractor negotiations, or for claim evaluations and dispute resolution.	
ESTIMATING METHODS USED	Class 5 estimates virtually always use stochastic estimating methods such as cost/capacity curves and factors, Timberline Model Estimates, or in house capacity curves for similar plants, prior experience with similar projects, or other parametric and modeling techniques.		Class 4 estimates are frequently a mix of forced deterministic, Timberline, and stochastic estimating methods such as cost/capacity curves and factors, Timberline Model estimating, gross unit costs/ratios. Use of budget quotes from engineered equipment vendors is recommended.		Class 3 estimates usually involve more deterministic, timberline, estimating methods that stochastic methods. They usually involve a high degree of unit cost line items, although these may be at an assembly level of detail rather than individual components. Factoring and other stochastic methods may be used to estimate less-significant areas of the project.		Class 2 estimates always involve a high degree of deterministic, Timberline, estimating methods. Class 2 estimates are prepared in great detail, and often involve tens of thousands of unit cost line items. For those areas of the project still undefined, an assumed level of detailed takeoff (forced detail) may be developed to use as line items in the estimate instead of relying on factoring methods.		Class 1 estimates involve the highest degree of deterministic, Timberline, estimating methods, and require a great amount of effort. Class 1 estimates are prepared in great detail, and are usually performed on only the most important or critical areas of the project. All items in the estimate are usually unit cost line items based on actual design quantities.	

Modified for HDR Internal Use from a Spreadsheet developed by Larry Dysert, CCC, Conquest Consulting Group

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Estimate Class	Class 5	Class 4	Class 3	Class 2	Class 1
EXPECTED ACCURACY RANGE	Typical accuracy ranges for Class 5 estimates are -20% to 50% on the low side, and +30% to +100% on the high side, depending on the technological complexity of the project, appropriate contingency determination. Ranges could exceed those shown in unusual circumstances.	Typical accuracy ranges for Class 4 estimates are -15% to -30% on the low side, and +20% to +50% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances.	Typical accuracy ranges for Class 3 estimates are -10% to -20% on the low side, and +10% to +30% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances.	Typical accuracy ranges for Class 2 estimates are -5% to -15% on the low side, and +5% to +20% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances.	Typical accuracy ranges for Class 1 estimates are -3% to -10% on the low side, and +3% to +15% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances.
EFFORT TO PREPARE (for US$20MM project):	As little as 1 hour or less to prepare to perhaps more than 200 hours, depending on the project and the estimating methodology used.	Typically, as little as 20 hours or less to perhaps more than 300 hours, depending on the project and the estimating methodology used.	Typically, as little as 150 hours or less to perhaps more than 1500 hours, depending on the project and the estimating methodology used.	Typically, as little as 300 hours or less to perhaps more than 3000 hours, depending on the project and the estimating methodology used. Bid Estimates typically require more effort than estimates used for funding or control purposes	Class 1 estimates require the most effort to create, and as such are generally developed for only selected areas of the project, or for bidding purposes. A complete Class 1 estimate may involve as little as 600 hours or less, to perhaps more than 6,000 hours, depending on the project and the estimating methodology used. Bid estimate typically require more effort than estimates used for funding or control purposes.