



Construction Industry Institute®

Estimating as a Competency in Capital Projects

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Estimating as a Competency in Capital Projects

**Prepared by
Construction Industry Institute
Estimating as a Competency in Capital Projects Research Team**

**Research Summary 253-1
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Executive Summary

Cost estimating is a critical function for successful capital projects, and reliable estimates depend heavily on the competency of cost estimators. Tools that aid the estimating process cannot replace the judgment and experience of a competent estimator. The greatest challenge facing the cost estimating community over the next decade will be the loss of the knowledge and experience of the highly experienced estimators who will be retiring. A large percentage of experienced estimators are now either retiring or planning retirement, and there is an acute shortage of qualified cost estimators to replace them in the engineering and construction industry.

CII Research Team (RT) 253 was chartered to find solutions to both issues: the short supply of competent estimators and the loss of knowledge and experience of retiring estimators. RT 253 confirmed that there is indeed a serious shortage of cost estimators, now and for the immediate future, and that there are growing concerns about the gaps in the estimating competencies of junior estimators. For this study, the research team conducted four independent surveys and collected extensive data to accomplish the following objectives:

- Identify cost estimating competencies and investigate the gaps between the current and desired level of cost estimating competencies.
- Identify effective methods to recruit, attract, and retain cost estimators.
- Identify effective methods and strategies to transfer estimating knowledge and skills.
- Develop plans to educate and train new estimators.
- Identify career paths for cost estimators.

The team also identified effective solutions to fill these gaps. The solutions identified in this study include the following:

- more effective and targeted recruitment methods
- more effective methods to attract and retain cost estimators
- efficient methods to transfer estimating knowledge and skills
- development of ideal career paths.

The team produced the following deliverables:

- Research Summary 253-1, *Estimating as a Competency in Capital Projects*
- Implementation Resource 253-2, *Estimating Competency Assessment and Training Recommendations*
- Research Report 253-11, *Estimating as a Competency in Capital Projects*.

The findings in this study can be used as a set of practical guides when designing and developing recruitment and retention plans for cost estimators, cost estimating training programs, and a long-term career development plan for cost estimators in the engineering and construction industry.

Introduction

Background

The cost estimate for a capital project is critically important to both owners and engineering and construction companies. Owners rely on cost estimates to perform economic analyses of the return on their capital investments. Engineering and construction companies depend on the cost estimate for bidding and negotiating, which together provide the basis for securing future work and ensuring profitability. Most efforts to promote good estimating have focused on developing cost information, adjusting for time/size/location, and creating estimating tools—particularly, computerized tools that automate the estimating process. However, experienced estimators recognize that other factors contribute to producing reliable cost estimates.

CII Research Team (RT) 131, *Improving Early Estimates*, found that the skills and experience of the estimating team are significant factors in producing reliable estimates (Oberlender 1999). A 2007 essay in the trade journal *Cost Engineering* supports this finding in its citation of a U.S. Board of Contract Appeals ruling against a governmental agency. In the case, a contractor hired an experienced estimator to determine how much loss of productivity had been caused by the agency, and to act as an expert witness. The Board ruled in favor of the contractor, principally on the grounds of trust in the estimator's many years of experience and confidence in his demonstrated ability to use his expertise to extrapolate from cost data information (Zack 2007).

In recognizing the important role of estimators, the construction industry is confronted with the challenge of capturing and transferring the knowledge and skills of the highly experienced estimators who are

nearing retirement to the next generation of estimators. This challenge involves identifying and/or developing the following:

- current expertise and competency in the industry
- necessary training in and retention of best practices
- suggestions for building estimating skills.

The industry should also establish a systematic approach to better informing engineering and construction students of the opportunities and potential career paths for cost estimators. Because the shortage of estimators is so critical to the cost estimating community and to the industry at large, the challenges of recruiting, developing, and retaining a new generation of cost estimators should be energetically addressed as quickly as possible.

Research Objectives

The specific objectives of this research project are the following:

- Identify estimating competencies and investigate the gaps between the current and desired cost estimating competencies.
- Identify effective methods of recruiting, attracting, and retaining cost estimators.
- Identify effective methods and strategies for transferring estimating knowledge and skills.
- Develop plans for education and training programs for new estimators.
- Identify career paths for cost estimators.

Research Scope

The research was limited to those industry sectors served by CII, i.e., the building sector, heavy civil sector, and process/manufacturing industry sector. It also addressed both conceptual and detailed estimating in total

and individually, as appropriate. The research team collected data from the following sources:

- CII member companies
- national organizations that endorsed the research proposal
 - the Association for the Advancement of Cost Engineering International (AACE-I)
 - the American Society of Professional Estimators (ASPE)
 - the Project Management Institute (PMI)
 - the Construction Institute of the American Society of Civil Engineers (ASCE CI)
- universities, colleges, and other educational programs that offer estimating-related and construction courses.

Research Methodology

The research methodology consisted of three main phases: 1) the literature review phase, 2) the data collection phase, and 3) the data analysis and reports/tools development phase. (See Figure 1.) The first phase allowed the research team to determine the functions and required competencies of cost estimators and to understand the causes of the growing concerns in the cost estimating profession. The information gathered during this phase provided a larger context from which the research team members could draw to design the questionnaires used in the data collection phase. The data collection phase involved four independent surveys. The first survey and its follow-up telephone survey were used to identify the current and ideal level of cost estimating competencies and the methods used to recruit, attract, and retain cost estimators. The second and third surveys identified university-level academic programs related to cost estimating and non-academic training programs offered by professional organizations and consulting firms in the U.S. The fourth survey was conducted to identify the current and ideal career paths of cost estimators. The third and final phase of this research involved data analysis and the development of Research Report 253-11, Implementation Resource 253-2, and this research summary. The extensive data that were collected during the data collection phase were analyzed to accomplish the goals of this study. The following sections briefly describe the demographics of four surveys used in this study.

Industry Survey

An industry questionnaire was designed to identify estimating competencies, to determine the gaps between current and desired competencies, and to identify methods for recruiting, attracting, and retaining cost estimators. The questionnaire was sent to all CII member companies, and was also distributed at the AACE-I and ASPE national

workshops in 2008. A follow-up phone survey was conducted to supplement the main survey on some specific issues.

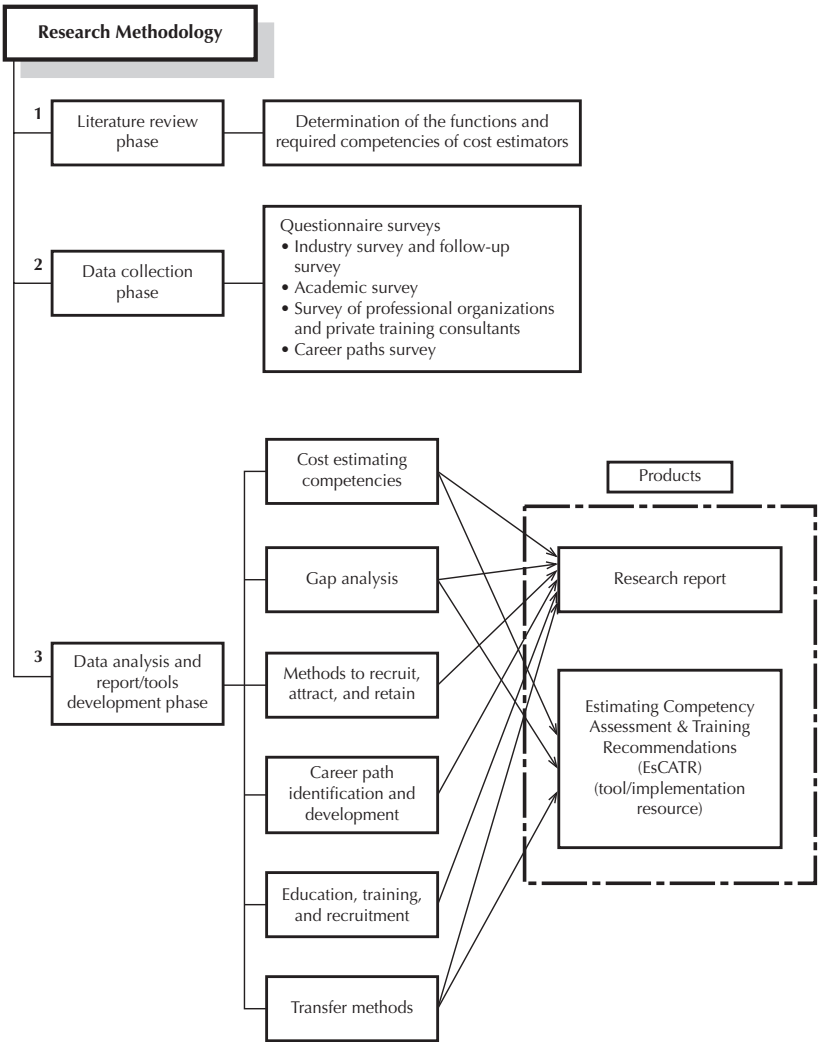


Figure 1. Research methodology

In all, 228 surveys were collected, with 79 percent of the forms collected from CII member companies, and 21 percent collected through AACE and ASPE workshops. (See Figure 2). Thirty-one percent of survey participants were from owner companies and 69 percent were from

non-owner companies (i.e., contractors and vendors). (See Figure 3.) The survey responses were classified by industry sector: the building sector, heavy civil sector, process/manufacturing sector, and the multi-sector group. (See Figure 4.)

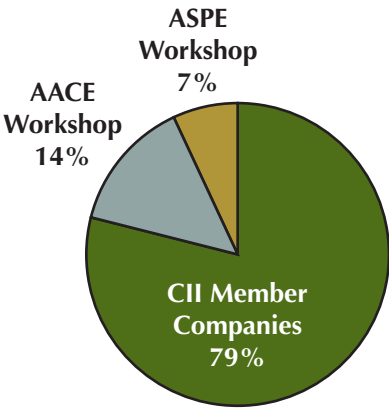


Figure 2. Respondents by source

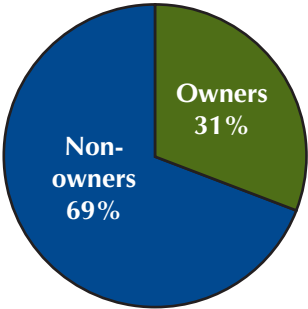


Figure 3. Respondents by company type

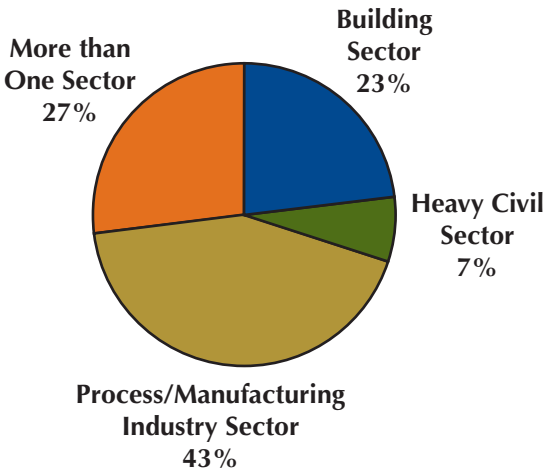


Figure 4. Respondents by industry sector

The collected data represented the opinions of estimators, managers,