

THE JOURNAL OF AACE® INTERNATIONAL -
THE AUTHORITY FOR TOTAL COST MANAGEMENT™

COST ENGINEERING

August 2011

www.aacei.org

DEVELOPING AND IMPLEMENTING A
PROJECT KNOWLEDGE
MANAGEMENT SYSTEM (PKMS)

PRESIDENT'S
MESSAGE
DINING WITH
THE SECTIONS

CONTROL AND AUDIT
DEVICES FOR
CLAIMS
MANAGEMENT

CERTIFICATION CORNER
CERTIFICATION
BOARD APPROVES
CHANGES FOR THE
RECERTIFICATION
PROCESS



PUTTING THE
PIECES TOGETHER

COST ENGINEERING



TECHNICAL ARTICLES

11 **Developing and Implementing a Project Knowledge Management System (PKMS)**

Cristina Figueiredo, P.Eng., and Ray S. Philipenko, P.Eng.

In today's competitive business environment, it is critical for companies to develop, implement, and maintain an effective institutional memory that will support the continuous improvement of the project life-cycle, and the making of good business decisions. Empirical information is the most fundamental project planning resource available. With a corporate wide knowledge management system, the ability to effectively support project development becomes possible. The knowledge system facilitates effective analysis, development and application of historical project performance information to the development of company growth projects. Although vitally important, justification of time and resources to support the process of project data collection, cleaning, and organization, can be a significant challenge for many organizations. This article will review the methodology that has been used by a pipeline company to develop and implement a project knowledge management system. The project plan, required resources, and the data collection process will be reviewed along with challenges and lessons learned. This article was first presented at the 2010 AACE International Annual Meeting as OWN.09.

18 **Control and Audit Devices for Claims Management**

Alexia A. Nalewaik, CCE FRICS

Construction projects temporarily bind together parties with competing objectives and a common goal. The result is a situation characterized by high potential for conflict, changes and claims. The skills of the quantity surveyor, auditor, and project controls are invaluable to claims management and resolution. This article discusses claims avoidance as an organizational objective, using the implementation of project controls and audit tools to address and focus efforts on minimizing the occurrence and impacts of claims through internal controls, accurate record-keeping, contract administration, and change management methodologies. This article was first presented at the 2010 AACE International Annual Meeting as CSC.S12.

Control and Audit Devices for Claims Management

Alexia A. Nalewaik, CCE FRICS

Abstract: Construction projects temporarily bind together parties with competing objectives and a common goal. The result is a situation characterized by high potential for conflict, changes and claims. The skills of the quantity surveyor, auditor, and project controls are invaluable to claims management and resolution. This article discusses claims avoidance as an organizational objective, using the implementation of project controls and audit tools to address and focus efforts on minimizing the occurrence and impacts of claims through internal controls, accurate recordkeeping, contract administration, and change management methodologies. This article was first presented at the 2010 AACE International Annual Meeting as CSC.S12.

Key Words: Audits, bids, claims, construction, contracts, cost, projects, records and schedules

The nature of the typical construction project is such that the parties to various contracts (owner, contractor, and other entities) progress from project inception to completion, while at the same time endeavoring to satisfy their own (often competing) objectives. The result is an industry and situation characterized by high potential for conflict; history indicates that only the most rare of projects is completed without changes or claims.

In this contentious construction environment, where change can be expected and even anticipated, project controls and audit best practices can be applied and used as powerful and effective techniques to reduce and possibly even prevent claims. This article discusses claims avoidance as an organizational objective, using practical tools to address and focus efforts on minimizing the occurrence and impacts of claims through the application of internal controls, accurate recordkeeping, audit, and change management methodologies.

Defining Claims

What is a claim? A construction claim is a demand for additional compensation sought by one or more of the parties to the construction contract, often because of a disagreement regarding the validity of all or part of the request. The nature of the claim can involve almost any aspect of the construction project, and can

originate through either party to the contract (typically the contractor or owner). The claim can reflect occurrences at any phase of the project, from the very beginning to closeout.

The approach to managing claims and the forensic assessment of claims are similar in nature to the change management process; the claims process and analysis are necessary when outstanding issues cannot be resolved as a change order and instead escalate to become a dispute. Similarly, an unapproved change order or portion of a change order may, if equitably unresolvable through discussion and negotiation, escalate to become a claim.

How best, then, to manage claims? When do the efforts to avoid and manage claims begin? Because the construction contract governs the project, change planning begins when budget and schedule are contractually agreed to and approved for the scope of work. The focus on claims control should thus begin at the start of the project, when policies, procedures and workflow are designed.

Contract Administration

During the bidding and contracting phase, the construction contractor typically develops and acquires supporting documentation for their bid, such as a detailed estimate, quotations from and correspondence with subcontractors and vendors, a detailed (and possibly cost-loaded) construction schedule, cash flow analysis, calculation

of expected profit, assumptions regarding overhead and burdens, and more. "This documentation helps determine what was in the bidder's mind when he/she planned the work," [1], and thus is invaluable to both parties in the event of a claim. Because this information illuminates the contractor's intent and approach to conceiving the project, especially the anticipated cost of the project and time required to complete the project, some owners may require contractors to have their bid computations and documentation held in escrow for the duration of the project.

It can be said that the construction contract is the single most powerful document of the project; among other things, it defines the key parties to the contract, delineates their rights and obligations, establishes the methodology for contract administration, sets the payment terms, and clarifies allowable/unallowable expenditures.

"The contract spells out the rules of the project. It explains how work will be accomplished, the roles and responsibilities of the parties, the methods to handle change, and how to resolve disputes [2]." Often, the terms and components of this powerful and legally binding document can be used to determine the viability of a potential change order or claim, because the change management and claims procedures agreed to by parties to the contract also become contractual requirements, establishing the project expectations for documentation, reporting, timeliness, and action.

The contract can be the least understood document of the project, yet elements of the contract are applicable and relevant to the work performed by every member of the project team.

The contract is more than just signatures, a start and finish date, and a dollar value. Various aspects of the bid package become a part of the document, often as contract addenda. "The perception of a contract as a legal document only – a piece of paper with the heading "contract" and terms and conditions on it – is too narrow and can be dangerous. It may lead people to overlook project plans, schedules, work

scope definitions, technical specifications, drawings, etc., all of which are typically part of contracts" [3]. Although these documents are, in a sense, grafted to the legally-worded and authorized (signed) contract and terms and conditions, they are no less binding.

Too often, team members neglect to read the contract in detail until some problem transpires. The best practice is for each party to the contract read the document and have prepared a contract brief to itemize pertinent terms of the contract and addenda. Auditors also often create a contract brief prior to conducting an audit. A contract brief is a summary, typically two or three pages, that captures the key governing clauses of the contract. Unique terms of the contract, especially those that deviate from standardized contract forms, should also be noted. The contract brief can be used as a handy reference as the project progresses and questions arise, and may even serve to deflate potential change orders and claims before they reach fruition, by highlighting and clarifying the requirements for change order and claims submittals.

If a party to the contract wishes to change any part of the contract, including the addenda, that modification will require the contract itself to change, resulting in either an amendment to the existing contract or the dissolution of that contract and issuance of a new one. Any change forms, in effect, a new relationship between the two parties. A change order may have an associated cost, or may reflect only a change in wording or attachments.

Project Records

It has been said that, "it is the contractor's responsibility to prove the merits and quantum of the claim [1]." Assuming, for the purposes of this article and argument that the claim was brought by the contractor, it then also follows that it is the responsibility of the opposing party (presumably the owner) to disprove the claim. How to do that? By amassing enough "ammunition" in the form of project records.

Contract administration and diligent recordkeeping are paramount to the success of the project and defenses against change orders and claims, and so

should commence at project inception. "Memories fail, witnesses disappear, and without undisputable evidence, even honest, well-intentioned parties in a claim can find themselves negotiating from a position of weakness [4]." Without adequate documentation, the party making the claim may be unable to adequately substantiate the request, or the party defending against the claim may be unable to dispute it. Proper contract administration and project recordkeeping are the responsibility of all parties to the contract, not just the owner or project/program manager.

The benefits of good record-keeping include but are not limited to:

- establishing cost and schedule baselines;
- documenting progress;
- empowering decision-makers and stakeholders;
- providing an audit trail;
- creating a foundation for claims management;
- determining causality and assigning accountability;
- increasing early visibility of change;
- enabling revision control; and
- capturing project history and event sequence

The need for accurate and comprehensive project documentation cannot be emphasized strongly enough. "Project documentation provides a history of events, actions, and inactions during the execution of contract work. Project documentation reflects the parties' intention and performance during the contract. Documentation assists in establishing entitlement and provides proof of damages, which increases the bargaining position [2]." Good documentation can be used to support or disprove a claim; lack of documentation can derail a claim, complicate the calculation of damages, and/or cause the resolution to take longer than necessary. Should disputes become claims and legal proceedings commence, each and every project document has the potential to be of legal significance. Recordkeeping should thus err on the side of comprehensiveness.

The following records are examples of those that should be included in a project filing system:

- The estimate upon which the budget is based, and supporting documents;
- The contract;
- The bid package and bid records;
- Planning documents;
- Correspondence;
- Meeting minutes;
- Daily records;
- Project status reports;
- Progress photos or webcam feed;
- Plans, specifications, and other technical information;
- Quality control/quality assurance records;
- Safety records;
- Inspection and testing reports;
- Baseline schedule and schedule updates;
- Procurement/purchasing records;
- Cost and financial reports;
- Change orders and supporting documents;
- Punchlists;
- Closeout and warranty documentation;
- Payment applications and supporting documents; and
- Payroll and personnel records.

Project records should be stored, labeled, and categorized to facilitate retrieval and reference at a later date; all documents necessary to provide a traceable historical record of the project should be captured.

Document controls should occur at the time of document receipt or creation; no project manager should need to sift through piles of old documents (or electronic files) at the end of the project in search of a known key piece of information or, worse, in the vague hope that some sliver of useful information may be found.

By capturing information about issues as they occur, and reporting trends that surface the risk that an issue may be triggered, the project team will have available to them the data about and proof of root causes of change, thus improving their ability to defend against claims.

All project documents should include notations regarding the source (person or company), date (date received, date created, or date modified), purpose, and relevance of (or conclusions drawn from) the document.

If cross-referencing is possible, this should also be done. These notations are another part of an auditors' toolkit, appropriated as a project management best practice. Because team member turnover is not uncommon, and claims may be addressed months or even years after the incident, it is likely that a review will be conducted by individuals who were not personally involved with the project at the time of the relevant events.

Succinct descriptive information included on the documentation will enable the claims team to quickly develop an understanding of what data is available to support or disprove a claim, effectively diminishing the loss of historical knowledge and strength of the files.

Cost and Schedule Records

Although all project documentation is important, the basic nature of a claim focuses on damages, which are most simplistically characterized as a (positive or negative) cost or time impact. Time effects are then calculated, through various methodologies, as a cost impact. Thus, cost and schedule records from the project are often the most helpful and relevant documents available. Because the project controls team maintains and validates the cost and schedule data and reporting, the cost engineer can have valuable input and substantial influence in claims avoidance and analysis.

At project inception, the project team should develop key controls and policies and procedures relevant to cost management and change order approvals. Once those procedures have been established and applied in practice for a short period of time, workflow can be validated, source documents identified, and sample reports generated.

As an adequate sample of documentation becomes available for testing, the project cost accounting system should be reconciled with the financial accounting system and

contractor's records to identify any gaps in data capture or other sources of errors.

"If the reliability of the systems and reports is questioned, then this could lead to the arduous task of validating and summarizing the underlying originating documents ... [such as] time cards and other labor records, purchase orders, invoices, and receiving documents for materials and supplies, subcontracts and agreements, as well as other important documents [5]."

In other words, the project team must ensure through careful, detailed and periodic reconciliation that the systems themselves cannot be used to confound the analysis or potentially disprove the claim. The systems should allow a push and pull of data, and be integrated and maintained in real-time with current data, with an appropriate amount of detail. Throughout the project, status reports should be readily available to stakeholders, with supporting documentation generated immediately (at the touch of a button, without data manipulation) in the anticipation or event of a claim.

The electronic systems used to manage the project must produce reliable cost data on-demand, and provide early visibility of trends and risks. By providing timely and relevant information to decision-makers, corrective action can be taken immediately to keep the project on track and document events. Because of this, project controls and associated policies and procedures are the strongest internal control components of a project, and the reliability of the systems is of paramount importance.

Even after ensuring the accuracy of the project controls, financial and project management systems, the level of sophistication of the document management system (and ability to retrieve information) may affect the justification for damages or link to causation.

Cost and schedule data alone is not enough to support or disprove a claim; other project records can be just as valuable because they serve to document the timeline and history of the project, and other situational

information including intent, which would be otherwise indeterminable.

The Auditor's Role

The audit universe has traditionally focused on strengthening internal controls and systems to assure financial accountability and prevent fraud, by demonstrating that transactions are formally authorized and accurately reported. In the construction project universe, the scope of accountability includes procedures (internal controls), compliance (contractual and statutory), and political (stakeholder) issues.

Traditional control-based systems can be effective in an environment where tasks are repetitive and predictable. However, the construction environment is considerably less stable, such that it is not feasible to create detailed procedures and controls to cover all possible eventualities.

Audits are an integral part of any construction project. "Right to audit" language varies from contract to contract, typically providing the owner with a restricted or unrestricted right to audit operations, contracts, projects, programs, and expenses during the contract term, and for a specified period following final payment on the contract. Although the clause is most often invoked when changes or claims arise, an audit of the systems at project inception can be performed to assess the reliability and relevance of costs and reports from the cost control system.

The auditor should conduct a detailed review of the inputs, outputs, workflow, written policies and procedures, and systems-based controls, ensuring that the processes enable expenditures to be reviewed in as much detail and to the greatest depth possible.

The auditor should ensure that procedures require approvals for expenditures (including the use of allowances and contingency), complete supporting documentation, and review of cost charges against both funding source requirements and contract language. An initial reconciliation between the project management software and financial system can validate that the reporting includes all costs incurred by both the construction team and the owner, and establish a

mapping by which reports from the two systems can be periodically run and discrepancies corrected.

By validating the systems and reviewing expenditure and change controls, an audit at the time of contracting (or shortly thereafter) can establish the accuracy of the reporting and the baselines for cost and schedule, against which all change will be measured.

The project may also benefit from continuous auditing, instead of periodic (most often annual) auditing. The majority of construction audits involve the ex post process of collecting data at a single point in time, yet performance is not a discrete event and the built environment continuously evolves (from project inception through construction to completion and operations), which results in annual audit reports becoming outdated almost as soon as they are issued.

In this environment, a blend of traditional systemic and continuous substantive evaluation may well be needed, including the auditor as a member of the project team. Without a real time evaluative/audit role, opportunities for improvement would otherwise have to wait for the next audit cycle rather than seizing the opportunity in real time and effecting immediate improvement.

Claims Presentation and Review

Essential to resolving claims is the ability to prove the cause and sequence of events, and entitlement. For the claim or portion of the claim that has been deemed valid, support must be provided for the amount requested. While testimony is valuable, documentation typically carries greater weight.

Records may be obtained from the contractor, the owner, or other third parties (such as the architect, or other consultants). But documentation alone is not enough. Quality of the data and presentation of the facts also matters. "It bears repeating—the game can be won or lost based on the amount and quality of the preparation [2]."

In reviewing the cost data, diligence is the key. Here again, audit skills are useful. Cost records should be reviewed in as much detail as possible, and each

dollar spent traced to its source (as should be done with the review of each and every monthly payment application and change order). While supporting documentation is typically readily accessible for direct costs such as labor, materials, equipment, and reimbursable expenses, the paper trail is longer and deeper for hard-to-prove items (such as productivity, escalation, burden, small tools, and more), requiring greater effort for thorough review.

The review process itself can determine the outcome of the claim, even before negotiations begin. The analysis typically includes examination of provable contract history (pertinent to cause and effect), and an interpretation of the documented facts, credible cost support, wording or intent of the contract, and relevant circumstances (such as funding source restrictions, or applicable laws). As with the review of change orders, the goal of the evaluation is to obtain and present compelling evidence to support or disallow the claim.

Many construction claims involve factual disputes and differing versions or perceptions of the truth; the objective for each side is to gather enough data to create a convincing argument, while ensuring that the data is free of technical errors that would result in dismissal of the claim. Data as a "silver bullet" is not enough; human nature and vague contract terms and documentation allow interpretation of the facts.

Careful review and presentation of claims data is essential in proving or disproving any claim. Should errors be found or elements of the claim determined to be invalid, this may cause the remainder of the claim (while potentially legitimate) to be reviewed more stringently with the premise or assumption that additional errors are likely.

In the construction environment, change and claims can be expected. Project management best practices such as internal controls, diligent recordkeeping, systems validation, and data accuracy can be effective techniques to manage claims.

The focus on claims control should begin at the start of the project, when the contract is agreed to and policies and

procedures are designed. As the single most powerful document of the project, the contract must be well understood and frequently consulted; to this end, a contract brief can be created and used as a handy reference by team members. Contract administration and diligent recordkeeping should commence at project inception, as good documentation can make or break a claim.

Every project document has the potential to be of legal significance; in order to render project files as useful as possible, all records should include succinct descriptive notations regarding their source, date, purpose and relevance.

Cost and schedule records from the project are likely to be referenced and relied upon; if the reliability of that data (or associated systems) is questioned, the data can be rendered useless. An audit and reconciliation of systems can be performed to assure the accuracy of reports. Presentation of the data is also important; the compiled evidence must be factually correct and free of technical errors that might result in dismissal of the claim.

The skills of the quantity surveyor, auditor, and project controls are invaluable to claims management and resolution. By applying best practice methods from these fields, the project team can elevate the avoidance and management of change and claims to the level of organizational objective, with a focus on minimizing the occurrence and impacts of claims. ♦

REFERENCES

1. Harmon, K.M., and B.M. Stephan. *Claims Avoidance Techniques: Best Practices for Contract Administration*. **AACE International Transactions**. AACE International, Morgantown, WV, 2001.
2. Werderitsch, A.J., and J.E. Krebs. *Claims Avoidance—A Project Management Primer*. **AACE International Transactions**, AACE International, Morgantown, WV, 2000.
3. Haapio, H. *Contracts and Lawyers: Friends of the Project*. Retrieved Jan. 16, 2010, International Cost Engineering Council www.icoste.org.

4. Jergeas, D.G. *Claims and Disputes in the Construction Industry*. **AACE International Transactions**, AACE International, Morgantown, WV, 2001.
5. Harris, J.W. *Cost Validation Methodology: New Systems Implementation*, **AACE International Transactions**, AACE International, Morgantown, WV, 2004.

RECOMMENDED READING

1. Barnard, P. D. *Staking Your Claim: Effective Claim Resolution*. **AACE International Transactions**, AACE International, Morgantown, WV, 2005.
2. DiDonato, S.L. *Alternate Methods to Resolve Contract Disputes: Approaches to Effective Prevention, Management, and Settlement of Construction Contract Claims*. **AACE International Transactions**, AACE International, Morgantown, WV, 1993.
3. Douglas III, E.E. *Start Your Project the Right Way*. **AACE International Transactions**, AACE International, Morgantown, WV, 2002.
4. Field, D.D., M. Harvey, and J. Spittler. *Organizing the Negotiation Process: Techniques and Factors to Consider When Negotiating Lump Sum Changes on Behalf of the Owner*. **AACE International Transactions**, AACE International, Morgantown, WV, 1993.
5. Findley, D.A. *Construction Claims Preparation Under ADR*. **AACE International Transactions**, AACE International, Morgantown, WV, 1997.
6. Nalewaik, A.A. *Applying Internal Controls Skills on Construction Projects*, RICS Americas: www.ricsamericas.org, 2009.
7. Nalewaik, A.A. *Change is the Only Constant*. **AACE International Transactions**, AACE International, Morgantown, WV, 2010.
8. Nalewaik, A.A. *October Construction Audit—An Essential Project Controls Function*. **Cost Engineering**, AACE International, Morgantown, WV, 2007.
9. Nalewaik, A., and L. Eisenberg Spring. *The Value of Continuous*

Program Assessment – A Construction Owner’s Perspective. **Construction Brief**, RICS Americas, New York, NY, 2010.

10. Nalewaik, A.A., and J.E. Witt. *Challenges in Reporting Project Costs and Risks to Owner Decisionmakers*. **AACE International Transactions**, AACE International, Morgantown, WV, 2009.
11. Wallwork, J.W., T.S. Sinacore, and E. Schatz. *Electronic Databases for Claims Analysis*. **AACE International Transactions**, AACE International, Morgantown, WV, 2006.
12. Zack, J.J. *Practical Dispute Management*. **AACE International**

Transactions, AACE International, Morgantown, WV, 1994.

ABOUT THE AUTHOR



Alexia A. Nalewaik, CCE FRICS, is with the QS Requin Corporation. She completed in July a term as Vice President-Administration on the

AACE International Board of Directors. She can be contacted by sending e-mail to: nalewaika@earthlink.net

AACE Headquarters Office Moves to New Location

The AACE International Headquarters office moved to a new location in July. Please be aware that our new mailing address is:

AACE International Headquarters
1265 Suncrest Towne Centre Dr
Morgantown, WV 26505-1876
U.S.A.

Our phone, fax, website, and email addresses have remained the same.

MOCA SYSTEMS™
Expertise. Technology. Results.

Energy and Sustainability Management

Capital Budgeting and Programming

Sustainable Planning and Design

Program and Construction Management

Capital Asset Management

www.mocasystems.com