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The What and Why of Project Documentation

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In every construction organization, be it large or small, a policy should be established regarding accurate and complete documentation on every project from the pre bid stage of estimating to final project completion. Documentation can take many forms and ideally serves to substantiate what occurred during the life of the project. Revay and Associates is often asked about the nature and extent of documentation that should be kept. Recently Revay was retained by the Ontario General Contractors Association (OGCA) and Ontario Road Builders Association (ORBA) to develop a one day training course on the subject of construction documentation, of which elements are presented in this Revay Report. This course has been accredited by the Canadian Construction Association (CCA) for attendees applying for a Gold Seal Certificate (GSC) designation.

This Revay Report is divided into two parts; the first deals with the importance of project documentation, and the second provides insight into the types of documents that make up a comprehensive project record.

Importance of Project Documentation

There are three primary reasons to maintain comprehensive records:

1. Good Project Management

The importance of a healthy cash flow goes without saying. It is therefore necessary to understand what documents are required to get paid in a timely manner.

The contract will normally list the documents to be included with progress billings. These may include a statutory declaration such as CCDC 9A or 9B, test reports, work schedules and other documents. Additionally, at the beginning of a project, project managers should inquire about unwritten practices which can help ensure prompt payment, such as submission of progress applications to the consultant for review prior to formal submission of invoices.

Keeping appropriate records will substantiate any request for payment in the case of extras. The file for a change should include the change order, change directive, original and revised quotations, time, material and equipment sheets, minutes of negotiations, contemplated change order from the consultant, emails requesting or confirming the work, site instructions from the consultant, requests for information, and other information related to the time when the change was executed. The failure to find relevant documents at a later date could lead to non-payment or the inability to justify a request for additional costs.

Work Schedules

While the preparation of schedules requires a manager to plan a project and formalize the intended sequencing and interdependencie of various activities to achieve contract completion, it is also critical that these schedules be regularly updated. Updates should include the percent complete for each activity as well as a forecast of the remaining work. A properly updated schedule should[1]:

- Determine which activities are behind or ahead of schedule and the necessary adjustments
- Determine if the project will meet the required completion date
- Provide a basis for adjustments or corrective action necessary to achieve the completion date or a revised target date, and
- Provide a record as to why the completion date could not be met

Productivity Monitoring

Labour productivity can have a major effect on the profitability of a project. Measuring productivity provides the opportunity to correct problems arising from both internal and external causes in a timely fashion[2].

While it is recognized that most accounting systems can provide direct costs and labour hours expended on a weekly or monthly basis, an actual measurement of physical progress on site or in the fabrication shop is the key element necessary to evaluate productivity. Unfortunately, contractors rarely record the actual measurement of physical progress although they should.

Data for Future Projects

Project documentation can provide data to assist in estimating, planning and scheduling future projects.

2. Contract Close-Out

Substantial Performance of the Work

From a contractor's perspective, the objective of achieving Substantial Performance is often to recover holdback funds. In advance of applying for Substantial Performance, it is advisable to request a pre-takeover meeting with the owner and its consultants to verify requirements that may not be detailed in the specifications. In addition to completion of the work as per the definition of Substantial Performance in the Construction Lien Act, other typical requirements for Substantial Performance are:

- Commissioning and balancing reports
- Turnover of operation and maintenance manuals
- Labels on all systems and equipment
- System demonstration and training of owner's employees
- Demonstrations to authorities having jurisdiction
- Occupancy permits, and
- Formal application for Substantial Performance

The owner may retain partial funds from the total holdback until outstanding deficiencies are corrected, or withhold funds that it feels would be required to have the deficiencies corrected by others if the contractor did not complete the contract.

Total Performance

Generally, the specifications will provide a list of close-out documents required to achieve Total Performance. Again it is advisable to meet with the owner and its consultants to verify requirements for Total Performance. Typical requirements are:

- Turnover of spare parts
- Completion of deficiency correction
- Provision of as-built marked up drawings
- Turnover of warranties
- Final statement of accounting
- Final change orders agreed and issued
- Final invoice issued, and
- Agreement on document ownership and retention in storage

3. Support of Construction Claims

In addition to maintaining a neat, up to date and well organized record keeping system as part of the day-to-day routine, all contractors must be aware that some aspect of the construction project could end up in a claim situation. Further, the contractor must bear in mind that the successful resolution of the claim depends on his ability to present it in a convincing fashion and to support his position with the proper documentation.

The detail and general character of such records, and the cost to maintain them, depend largely on the complexity of the contract work involved. However, it must be understood that construction claims can be virtually impossible to support without proper project documentation. Further, field personnel must be properly trained to thoroughly understand what, how and when to document the files.

When a dispute proceeds from prevention or avoidance by the project manager to third party neutral evaluation, mediation, arbitration or litigation, the costs increase significantly and the parties' ability to control the outcome decreases substantially.

The Toronto Construction Association recently issued a poster stating: *"Buildings are born on paper: on plans, in specifications and even sometimes on the back of napkins. Buildings also die on paper: incomplete tenders or contracts, poor estimates, incomplete drawings, unpaid claims, rejected work, disputed change orders, unsubstantiated back charges, liquidated damages, arbitration, litigation and sometimes – lots of red ink. Proper documentation and standardized paper flow procedures and processes coupled with regular communication between all parties will make your projects run more smoothly and assist in achieving a profitable bottom line. Clearly, the Old Masters knew what they were talking about when they said, He who has the best paperwork wins!"*

In a claim situation, good documentation is imperative in order to:

1. Convince the other party of:
   a. Contractual entitlement to a contract adjustment
   b. The damages or losses as quantified are real and reasonable
   c. Which party caused the problems based on the facts demonstrated by the project documents, and
2. Obtain an equitable adjustment of the Contract Price and Contract Time
3. Avoid arbitration and litigation

One of the great advantages of daily records is that they provide an account of observations and evaluations by key personnel in the form of a business record. If and when a dispute comes to trial, a *"regularly kept business record"* is generally admissible as an exception to the hearsay rule and can provide a valuable evidentiary foundation for the claim.

For a claim to be effective, it must meet

the requirements of entitlement, causation and reasonable damages. Facts supporting each portion of the claim must be validated with documentation that may be discoverable if a claim proceeds to arbitration or litigation. Contemporaneous project documentation can establish the facts supporting a cause and effect relationship between the alleged actions or inactions of the other party and the damages incurred.

Frequently, causation and quantification can be best described using graphic forms such as schedule and productivity analyses. If accurate construction schedules are maintained, the compensable delay period can be determined using a forensic delay analysis technique such as the impacted as-planned analysis,colapsed as-built analysis, or windows analysis (sometimes referred to as the snapshot method)[3].

Claims for loss of productivity of labour or equipment can be calculated using the following methods: total cost, industry studies, and the measured mile / differential method.

While the total cost method is the easiest to calculate, it is also the least accepted and subject to several challenges. Industry studies can provide guidelines for estimating, but as they do not relate to the project under consideration, they are easily challenged. The most accepted method, the measured mile, requires not only good accounting data, but also contemporaneous recording of progress measurements on site.

Record Keeping Protocol

It is recommended that all contractors establish simple but complete record keeping and reporting procedures with forms and examples for use by the project team. This ensures both consistency and adequate collection of information. This section of the report outlines the types of records that are typically maintained on well-documented projects and provides guidance on good record-keeping practices.

- Follow Good Basic Record Keeping Practices

Start with clear, concise writing. Describe issues, items to be clarified and extra work so that someone unfamiliar with the topic will understand. Be consistent; use the same terms to avoid confusion.

When referring to earlier discussions, note the date, individuals involved, and general or specific discussions and agreements. References to written documents, however, need only identify the document in a precise and clear manner.

Identify and report all important information. Record completion of major milestones, the start and finish of scheduled activities and any significant variations from plan.

- Use Rapid Written Communication

Confirm verbal communications in writing. Fax or email copies of any mailed correspondence to ensure that the owner's representative, designers, subcontractors or vendors receive it immediately. Use speed memos and request for information (RFI) forms to communicate with the owner's representatives in the field. Verify that superintendents are using the forms to request information or to confirm directives and that copies are submitted to the office.

- Identify and Date all Documents

Require project personnel to initial, title and date all documents, including hand written notes of telephone conversations, calculations, etc., in order to identify who created the document. The title or description of the document helps to explain what the document refers to and places the information in context. The date is essential to establishing a chronology. Without a time context, a fact or statement of understanding or position may be meaningless. Date all signatures on contracts and change orders to identify when the parties agreed to the terms and conditions, which may become crucial to a claim. Furthermore, all documents should be date stamped upon reception.

- Establish Filing Procedures

Set up a coded filing system for project files and publish it for all personnel with access to the files. Cross file documents by referencing topics or claim issues. A routing slip or stamp facilitates review of incoming and outgoing documents.

- Implement New Technology

Project specific websites allow project participants to communicate instantly, access schedules and CAD drawings, maintain RFI and submittal logs as well as post or view digital photographs. Websites can be custom created or built using a commercial package with built-in menus, forms and routines.

Types of Project Documentation

The standard classifications of project documentation generally consist of the following, but can be added to, depending upon the special circumstances of any given project:

1. *Time Records*

Accuracy in charging time to cost codes is essential and compliance must be verified by the superintendent and payroll clerk. Some foremen are averse to writing any more than the essential, and do not break the contract work down into the proper cost codes. It is important that foremen know what cost codes to use and what comprises extra work. Cost codes should be set at the beginning of a project and remain the same throughout.

2. *Superintendent's Daily Reports*

Field superintendents' daily reports are commonly accepted as being more reliable than documents prepared by office personnel. The superintendents actually observe and supervise the work and are generally inclined to be accurate and complete. However, for various reasons some superintendents do not maintain complete records. Even when records are maintained, problems might be exaggerated or understated. Either tendency should be discouraged.

The failure of field superintendents to comment on impacts and problems in diaries and daily reports can result in the rejection of claims; therefore, superintendents should record all impacts. Managers should verify that all recorded information excludes inappropriate comments or posturing. When noting problems, superintendents must state whether the problems are actually impacting the work or sim-

ply threatening to do so in the future. Otherwise, the comments may be used by the owner to prove non-excusable delay or concurrent delay.

3. *Original Schedule, Schedule Updates, Short Interval Schedules and Progress Reports*

Project schedules should be prepared using the critical path method (CPM) or bar charts on smaller projects. The master schedule should be marked weekly with a status line. In addition, monthly updates should be generated, and compared with the original or target schedule.

4. *Photographs and Video*

The regular and frequent use of photography to document the project files is an important tool for the contractor. Photographs establish the actual conditions of the project construction at a given time prior to the work being covered up. A photographic record can preclude allegations based on hearsay, and can be preserved as potential evidence in the settlement of disputes.

Photography should depict:

- Construction progress
- Technical and specific details
- Types of materials
- Installation methods
- Site conditions –

  before and during the project
- Damages to installations

Each photograph should identify:

- Time, date, month and year
- Project title
- Photograph description
- Direction of camera
- Name of photographer
- Photograph number

5. *Minutes of Meetings*

Schedule weekly job site meetings with field superintendents, foremen and all active subcontractors, and weekly or monthly meetings with the owner's representative and key subcontractors. Several short meetings are more effective than one long meeting; a tight focus on the agenda is key in this regard.

The contractor's representative should be prepared to document the following:

- Date and time
- Location
- Name and employer of each person in attendance
- Topics discussed
- Conclusions reached
- Important statements made and the name of the person making same
- If other reports are prepared from handwritten notes, the original notes should be kept for the permanent job records

Minutes of meetings prepared by other parties should be verified to ensure accuracy. Discrepancies should be communicated immediately.

6. *Correspondence and Transmittals*

For successful communication, correspondence must be clear and concise. Each letter should be limited to one topic with a clear reference line. Unless absolutely necessary, correspondence should not exceed one page.

All correspondence from any party involved should be serial numbered with a different letter prefix to indicate the source of the letter; this greatly simplifies referencing correspondence.

A correspondence log is a necessity. Retain copies of all correspondence in to/from files as well as a copy in the appropriate subject file (i.e. concrete, soils, windows, claim, etc.) When a potential claim is identified, an issue file should be set up and copies of all relevant correspondence posted therein.

Transmittals must be dated and must clearly describe attachments. Unless unusually voluminous, staple all attachments to the file of the transmittal.

7. *Facsimiles*

Faxes save time over letters in preparation and transmittal and usually get a quicker response. Follow up with a printed copy only if needed or if attaching something physically transmitted.

Fax all correspondence to the owner's representative, designer, subcontractors and vendors. If using a fax modem in your computer, you can compose and transmit printing a hard copy for your files.

8. *Email*

Email has become a very prevalent form of correspondence, and is usually read on a priority basis. File printed copies of all incoming and outgoing emails.

Care must be taken in the drafting of email. According to the legal community, both current and deleted email is "producible" if and when you, as a contractor, are engaged in litigation[4].

9. *Requests for Information (RFI)*

Request for Information (RFI) forms are used for obtaining clarification on the project design drawings or other issues. RFI forms should be issued to all field superintendents. Ensure that they are being used to request clarifications or to confirm oral questions and are recorded in a log.

RFIs should ask clear questions and reference the appropriate specification sections or drawing details. If a timely response is critical, note the consequences of a late reply. Forward relevant responses to all affected subcontractors and vendors.

10. *Extra Work Orders*

Force account work is directed extra work without a price agreement, due to either undefined scope or inability to negotiate price, and is paid on a time and material basis. The work is documented daily on preprinted forms, which are signed by both the contractor's superintendent and the owner's representative.

When all work is complete, the labour and equipment hours and materials used are priced, subcontractor charges are added and costs are subtotalled, marked up and paid as a change order.

Force account forms can also be used where the work is not clearly acknowledged as extra work. In such a case, it may be better to title the form a "Work Order Form". The use of a preprinted form, the title "Work Order" or "Extra Work Order" instead of a change order request, as well as the assumption that the work is reimbursable may avoid disputed entitlement.

11. *Change Order Files*

A separate file should be set up for each issue as soon as it is identified as a potential extra work item. Start with the document first identifying the change. This may be a notice of change letter, RFI, request for proposal from the owner's representative, architect's supplemental instruction or other document. A complete file includes sketches by the designer or the project team, requests for proposals from the owner, completed extra work order forms, the change order request with all supporting documentation, correspondence and other negotiation records, force account records and copies of cost reports with the cost code(s) assigned to the change, etc.

Extra work files simplify change order request and claims preparation, especially if a brief narrative is prepared for each that notes the background, summarizes conversations and other unwritten communication, references supporting documents, and includes computation of delay and costs.

12. *Information Logs*

Information logs are essential to effective change management as they fulfill the following functions:

- Tracking of submittals, requests for information, change order proposals, etc. to determine when action is needed to correct problems and prevent delays
- Communicating the status and importance of administrative actions to the owner's repre sentative, designer, subcontractors and others
- Providing basic information needed to prepare claims for late submittal review, impact from multiple design errors and omissions, late response to requests for information, etc.

Information logs can be created using a spreadsheet, word processing software, database management software, or a commercial package. All event dates should be recorded there: reception from the subcontractor or vendor, submittal to the owner, return from the owner, and forwarded to the subcontractor or vendor. Information to be entered includes a clear descriptive title for the item, the specification section and drawing number or detail affected, the location on the project, the initiator and the resolution.

It is most effective to maintain the following logs:

- Submittal Schedule Log

Submittal schedules are crucial to materials control and must be established on all projects. They identify all required submittals (such as shop drawings), who is to prepare them, due dates, and where they are described in the specifications. Require subcontractor submittal schedules within 30 days after notice to proceed, as their preparation often reveals designer errors or material availability problems.

- Request for Information (RFI) Log

RFI logs track requests for clarification. They should record the RFI number, a title/description, date initiated, initiator, response date, summary of response, impact, further action if required (e.g. change order), the change order request number, if one is submitted, and a comment if appropriate.

RFI logs can be a powerful indicator of design and administration problems – by the sheer number, the time lapse from initial question to resolution, the relative importance of the issue, and especially by their impact on the schedule. Exclude trivial issues from the RFI process; they cause the owner's representative and designer to downplay future requests and degrade the value of the information for preparing a claim.

- Change Order (CO) Log

Change order logs are essential for tracking the link between an RFI issued by a contractor, to the issuance of a proposed change notice by the owner's representative, to the issuance of a change order. It is crucial to document this timeline, as it becomes very valuable in supporting a contractor's claim for extended duration costs based on slower than reasonable administration of changes by the owner's representative.

13. *Cost Accounting Reports*

Cost accounting reports should include weekly labour reports comparing actual productivity (units of work in place per labour hour) and unit cost with budgeted productivity and unit cost. They should also include monthly cost comparison reports by cost category that compare actual unit costs with budgeted unit costs and general ledger reports with detailed transaction and other reports as required.

14. *Contract Documents*

Maintain a master copy of the plans and specifications with all addenda and changes posted. Save copies of superseded drawings, specification sections, designer's field sketches, drawing issuance logs from the designer, etc.

Maintain a separate set of as-built drawings with all changes from the design drawings marked in red. These are normally turned over to the owner at the end of the project. Additionally, maintain copies of all subcontracts, purchase orders, bonds, insurance certificates, etc.

15. *Shop Drawings and Other Submittals*

Maintain copies of all submittals including stamped shop drawings, along with the schedule submittal log described in Section 12. Review and approve subcontractors' shop drawings before submitting them to the owner's representative.

16. *Other Records*

Other records that should be maintained include pre-bid documents, estimate and bidding files, other pre-construction documents (e.g. regarding bonding), field records such as delivery tickets, safety reports, accident reports, weather records, and documents received from subcontractors or the owner, etc.

17. *Subcontractor Records*

Improved subcontractor recordkeeping will facilitate the documentation of change orders and improve the subcontractor's recovery for extra work. It will help avoid problems with unpaid subcontractors who don't perform or default on their contract.

Require subcontractors to submit daily subcontractor reports similar to the daily superintendent's reports and obtain their input into the schedule. Require a submittal schedule, updated monthly, with material delivery dates prior to their first progress payment. Late delivery of subcontractor materials is a frequent cause of project delay but can usually be avoided by close tracking of submittals and material procurement.

18. *Reports to Company Management*

Improved communication between field personnel and company management is essential. Managers need to receive copies of many of the above records, in addition to formal management reports. Management reports should be submitted monthly with the monthly cost accounting reports and progress payment request. Brief weekly reporting is recommended if company managers do not perform weekly site visits. One or two pages are usually sufficient for most projects.

CONCLUSION

The key to successful claims presentation and resolution requires the contractor to understand, in detail, the factual issues of the claim, and to be aware of and take into consideration the many pitfalls, both factual and legal, that must be dealt with and overcome in order to prevail.

Through the use of proper documentation, specifically in the areas of scheduling, costing, and record keeping, a judge or arbitration panel will be more easily convinced of your entitlement to the claim. However, it must be remembered that documentation alone will not ensure your success; it will take a concentrated effort on your part to present the facts in a most comprehensive and convincing manner.

** Any views expressed in this article are those of the authors and may not necessarily reflect the views of the company.*

1. Additional information regarding scheduling and monitoring can be obtained from the Revay Report, Vol. 19 No. 3, October 2000, "Scheduling & Monitoring for Successful Projects" (available at www.revay.com).

2. Additional information regarding monitoring job site productivity can be obtained from the Revay Report, Vol. 19 No. 2, May 2000, "Monitoring Job-Site Productivity" (available at www.revay.com).

3. Additional information regarding data required for a proper delay analysis can be obtained from the Revay Report, Vol. 13 No. 2, June 1994, "Delay Analysis Revisited" (available at www.revay.com).

4. Additional information regarding emails can be obtained from the Revay Report, Vol. 24 No. 1, April 2005, "E-mail – an Emerging Risk in Construction" (available at www.revay.com).

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