

The Revay Report

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In 1970 Stephen G. Revay founded a small consulting company in Montreal. Initially the firm provided typical project management services. Their contractor clients had other ideas; and soon Revay and Associates Limited was also filling the new niche market of preparing construction claims. Over the last forty years the company has become a leader in the construction claims industry and has blazed trails in offering project management, risk management and claims avoidance services; all provided by fifty construction professionals in five offices across Canada and one in the United States. This growth would not be possible without the loyalty and support of our clients. Thank you for your continued patronage. All of us at Revay and Associates Limited look forward to continuing to build business relationships with past, present and future clientele.

The Pitfalls of Incomplete Contract Documents

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The signing of a contract with incomplete drawings and specifications is a source of significant risk for owners, general contractors and trade contractors. For all parties to a construction contract, incomplete contract documents at the time of awarding a contract substantially increase the risk of major cost overruns and project delays.

Incomplete contract documents invariably lead to claims from contractors for extension of time and additional compensation. When owners have tight budgets or are reluctant to pay more for a project, a dispute results. The dispute leads to further increased costs, as senior management of the various parties get involved attempting to resolve issues, frequently with associated legal costs.

This Revay Report addresses the subject of incomplete contract documents, the causes, impacts and recommended best practices for reducing or eliminating the consequences of inadequate contract documents.

Role of Consultants

The role of architects and engineers (often referred to as the “consultant” or “design consultant” in construction contracts) is determined by the contract between the owner and the architect or engineer in traditional design-bid-build delivery systems. In addition

to the role defined in the contract, architects and engineers are also required to abide by a professional standard of care. In all the work done for the client, the architect or engineer owes a duty to exercise the skill, care and diligence which may reasonably be

expected of a person of ordinary competence, measured by the professional standard of the time¹.

Owners and contractors must realize that the consultant’s duty to the owner does not mean that drawings, specifi-

cations or other contract documents issued by them will be free of errors and omissions. A consultant is required to exercise reasonable skill, care and diligence as currently practiced in the profession. The question is at what point do the number of changes to the contract resulting from design errors and omissions become unacceptable?

The typical method of allowing for errors and omissions is to include a design contingency in the owner's budget. An allowance of 2% to 5% may be appropriate for new construction whereas a contingency of 10% to 15% may be required for renovation projects. Additional design and construction contingencies may be required for a renovation, especially where the ability to investigate existing conditions is limited or prevented by the owner for operational reasons.

In recent years, owners and contractors have become less accepting of errors and omissions by consultants. Owners recognize that they may not recover the full cost of a change resulting from an error or omission by the consultants and contractors recognize that errors and omissions can lead to significant delays and disruptions to the planned schedule of work.

Expectations of Owners

There is a growing trend for owners to stipulate that a construction project is to be built on a "fast track" basis; in other words, starting construction prior to the design being 100% complete. On the surface, this is understandable from a financial perspective; the sooner a project starts generating revenue, the greater the return on investment. At the same time, owners expect the project will be built within budget and on time and have high expectations of their consultants. Owners expect that the consultants will commit their needs to paper and issue contract documents with minimal errors and omissions, not always recognizing that to expect perfection from a consultant is not reasonable. In the decision of the Canadian National Railway Co. vs Royal and Sun Alliance Insurance Co. of Canada, Judge Binnie states that "as there is inevitably a gap between the current

state of engineering art and omniscience, a standard of perfection in relation to all foreseeable risks is too high"².

Expectations of Design Consultants

Design consultants expect that the owners know what they want and can communicate all of their needs to the consulting teams. However, most owners do not have extensive design and construction experience in-house and rely on the expertise of the consultants to assist them in defining the performance requirements of the project and their implementation.

Design consultants also expect owners to make quick decisions. When owners lack the required expertise, they are often slower in making decisions and the designers are then squeezed for time to finalize and issue the design documents.

Expectations of Contractors

In providing a price, contractors expect that the contract documents are complete and reflect the project requirements, and that any changes, errors or omissions from the documents will lead to a change order with commensurate adjustment to both the contract price and duration.

As the bidding is done in a competitive environment, contractors and their subcontractors are reluctant to add various contingencies and allowances to their tendered price, fearing that they will not be successful as low bidder. While the design may have taken several months to complete, the contractor is often unfairly expected to verify the consultants' drawings and specifications for deficiencies or completeness during a much shorter bidding period. To remain competitive, a contractor should be able to rely entirely on the contract documents, and its price reflect the scope of work outlined in the documents alone, even if the contract is loaded with exculpatory clauses.

Causes of Claims

Revay and Associates and other researchers have conducted studies

to determine the common causes of significant claims on contracts. The results seem to be consistent from study to study.

Revay's study encompassed 175 industrial, commercial, institutional and heavy engineering construction projects which, on average, had claims amounting to 30% of the construction value³.

Four of the major causes for claims were:

- Inadequate site and/or subsurface investigation prior to starting the design
- Starting design efforts too late and /or unduly limiting the cost of engineering and design
- Calling for bids with an incomplete set of drawings
- Endeavouring to complete the design through shop drawing review.

The common feature of all these projects was hurriedly and incompletely prepared bid documents, giving rise to design changes, extra work, and quantity fluctuation during the project.

Many owners would argue that even such a high premium can be justified as long as the facility starts earning revenue on the scheduled date. Unfortunately, experience does not support such an argument. The analysis of 145 projects out of the total 175 (i.e. the projects for which appropriate information was available) revealed that nearly all of them suffered significant delays, notwithstanding any attempted acceleration. The average delay was 5.69 months, representing nearly a 50% overrun in the average planned duration. Had the owners spent four to five months more in investigating, planning and designing these projects than they actually did, they would have saved at least 20% of the actual cost even had they paid approximately 50% more to their designers⁴. It is safe to state that the ultimate cost of the project would be significantly lower if owners allowed more time to the design consultants to

complete their design with the required rigour.

In 2003 the Construction Owner's Association of Alberta (COAA) in partnership with the Government of Alberta undertook a benchmarking initiative with the Construction Industry Institute (CII). In analyzing thirty-seven mega projects⁵ it was found that the percent of engineering completed prior to the start of construction was the common factor that impacted project cost, project schedule and construction productivity.

In a study published in the International Construction Law Review, authors Kumaraswamy and Yogeswaran⁶, found that the source of the most frequent claims and those of greatest magnitude are:

- Unclear documentation
- Inadequate documentation
- Inadequate site investigation
- Late or inadequate instructions
- Changes initiated by the owner and consultant.

As shown in the above studies, the seeds for most construction claims have been sown prior to awarding a construction contract, primarily as a result of incomplete contract documents.

The above can be mitigated by a more thorough design prior to construction. Additionally, constructability reviews and design coordination are two more ways that the impact of incomplete contract documents can be minimized.

Constructibility reviews

Constructability reviews that could minimize construction problems are not usually performed after the design is completed as the pressure to get the tender documents out for bid is intense.

The Construction Industry Institute defines constructability as "the use of construction knowledge and experience in planning, design, procurement and field operations to achieve overall project objectives". Similarly "buildability" is defined as the extent to which the

design of a building facilitates ease of construction. The benefits of a constructability or buildability review can include: reduced construction cost, less interferences, shorter construction times and fewer claims.

Constructability reviews are most effective when performed prior to completion of the design. Owners must realize that decisions or changes made after construction begins are more difficult and more costly to implement.

While the benefits of constructability reviews are recognized, they are seldom employed. The reasons are the lack of construction experience in the design team, the absence of guidelines to assist designers in evaluating constructability, the inability to obtain contractor input at the design stage due to bidding practices, the lack of a champion of the constructability process on the part of the owner and the consultant, the objective of minimizing costs at the design stage and the desire to put a shovel into the ground as soon as possible (fast track).

Design Coordination

To avoid confusion, design coordination responsibility should be spelled out in the contract documents. However, this is rarely done satisfactorily which creates an atmosphere of uncertainty and mistrust. While it is often expected that the designer will provide direction to the various trades through the design documents, in reality, trade contractors are frequently instructed through the design documents to produce trade coordination drawings showing locations of major pieces of equipment and services to reveal interferences between various pieces of equipment. The question becomes who is responsible for coordinating the various design disciplines?

The answer is based on economics and it needs to be addressed early in the design process. Is it more cost effective to:

1. Have the design team review areas of potential interference and present additional details on the drawings showing appropriate dimensioning as opposed to having

designers simply allocate general areas for architectural, mechanical and electrical components

2. Have an outside construction expert review the drawings at the time they are issued for tender to discover constructability issues
3. Prepare CAD drawings in three dimensions that show the relationships and interferences of structural, architectural, mechanical and electrical components
4. Have a group of senior trade superintendents and general foremen from the general contractor/construction manager and each of its subcontractors meet on a regular basis to resolve the interferences and inadequacies of the design?

Impact of Inadequate Contract Documents

If the contract documents are inadequate or incomplete, the most serious impact is an abundance of changes to the work. Changes come about as a result of:

- Additional requests from the owner by way of added / changed scope
- Errors and omissions on the drawings and specifications leading to revisions
- Unforeseen or hidden conditions on site which should have been identified through earlier investigations
- Lack of essential coordination to identify and eliminate design conflicts.

While a few changes may have a negligible impact on labour productivity, a large number of changes can have a major impact on labour productivity as well as creating significant delays to the project. These losses in labour productivity and the resultant extended duration of the project usually lead to claims for additional compensation.

In previous Revay Reports we have outlined some of the studies that have been used to calculate the damages resulting from a large number of changes⁷.

lbbs, the author of several studies on changes, not only reaffirmed that project change is disruptive and detrimental to labour productivity, but also that if changes are necessary, they should be recognized and incorporated as early as possible⁸.

Owners should not expect to obtain changes to a project at the same price as if those items were included in the original contract. Not only may the labour cost be higher, but materials purchased in smaller quantities may cost more, equipment may have to be returned to the site for a shorter period of time, and the project may have to be extended with its associated indirect costs. The most cost effective solution is to minimize the number of changes, and ensure contract documents are complete when a contract is signed.

Best Practices for Owners

1. Owners need to recognize there is an implied warranty that the drawings and specifications that they provide to the contractors as part of a contract are accurate, complete and buildable and that the contractor is not responsible for the consequences of defects in the plans and specifications.
2. In the context of a traditional design-bid-build delivery, the owner should not skimp on the front 10% of the project costs (architectural and engineering) at the expense of the latter 90% of the project (construction).
3. Consider design-build as a means of project delivery where the owner feels that close control of the design is not essential. As the designer and the contractor are on the same team, external decision making is minimized resulting in fewer delays and disruptions. However if the owner cannot clearly and completely communicate its requirement to the design-builder, then this process will be fraught with changes, delays and also result in claims⁹.
4. If the design is less than 80% complete at the time of tender, rather than proceeding with the traditional design-bid-build delivery system, consider using the construction management at risk and partnering approach. With the construction manager being part of the owner's team, he can issue tender packages and trade contracts as portions of the design are completed, resulting in fewer changes and delays. Partnering can improve communication and provides for a shortened process of decision making, thereby reducing the probability of delays and disruptions. This process results in a higher probability of completion in the required time frame, however, it may not eliminate or even reduce claims, particularly if the construction documents are faulty or incomplete.
5. Where parts of a facility cannot be included in the contract due to delay of part of the financing, the tender document should be divided into alternatives to establish a base price and the pricing of future alternatives when financing permits. This advises the contractor and sets into the contract the exact circumstances under which portions of the project will proceed, and maintains the competitive pricing for additional work without it having to be priced as a change to the contract.
6. Include in the consultant's contract that a representative of the consultant be available (preferably located on site) to respond to requests for information, resolve issues and recommend or approve changes quickly. The ability of a contractor to achieve the contracted schedule is facilitated by the owner and its representatives providing timely responses to submittals, requests for information and change orders.
7. If the project is large (say greater than \$100 million), request a peer review of the design for errors and omissions. Owners have to recognize that the design of a facility is not an exact science, and simply allowing a contingency for design errors and omissions may not be the most cost-effective approach. It is more cost-effective to find errors and omissions before a contract is awarded than to have them treated as changes later.
8. If the project is large, request a constructability review to ensure the work can be built in the sequence and manner portrayed by the designer. Recognize that this is not normally an expertise developed in house by design consultants.
9. Owners should require a review of the drawings and specifications prior to the tender stage by their operating and maintenance personnel to ensure there is sufficient space to service equipment and that the new facility will achieve its intended purpose. Note that not all operating and maintenance personnel are familiar with engineering drawings and specifications. As such, detailed explanations and/or three dimensional CAD sketches from the consultants should be made available.
10. Owners should demand that consultants provide 100% complete contract documents at the time a contract is tendered. If necessary, cash allowances should be well defined.
11. Value engineering can be a mixed blessing. Generally, the intent is for the contractors to provide suggestions to reduce the cost of a project. If it is performed after a contract is awarded, it could delay the "issued for construction drawings" and the project as the consultants will have to verify that the proposed solution will work and is indeed cost effective. A subsequent claim for delays could outstrip any cost savings.
12. There is a movement by large owners, particularly in the USA, to require the use of Building Information Modelling (BIM). These systems have been able to identify weaknesses in design documents and provide methodologies to track the resulting changes. While this may be costly at the outset, 3D models could prevent costly changes and delays during construction.
13. In resolving claims and disputes resulting from incomplete contract

documents, most contracts require the consultant to perform the first adjudication of an issue. When the claim results from design errors and omissions in the contract documents, the consultant is in a conflict of interest position and has no incentive to be fair to the contractor and award it proper compensation in view of its relationship with its own insurance carrier. The result is a dispute between the contractor and the owner with possible litigation costs. A better approach may be for the owner to use a third party neutral who has both knowledge and experience in the construction environment to provide an independent opinion on issues that arise during construction¹⁰.

14. The use of “exemption”, “exculpatory”, “exclusion” or “limitation of liability” clauses to prevent a contractor from recovering costs due to incomplete contract documents may not be considered as being fair by the courts, and may therefore be either unenforceable or interpreted to the benefit of the contractor. This should be taken into consideration when drafting a contract¹¹.

Best Practices for Designer Consultants

1. Consultants need to define the project in clear and easily interpreted terminology. Generally, when ambiguities exist in the contract documents, the courts have ruled against the author of the documents.
2. Some consultants are reluctant to recommend change orders, approve shop drawings, or respond to requests for information because it can be interpreted as recognizing that the contract documents were unclear. The carriers of errors and omissions insurance often advise consultants to not admit to any errors or omissions. Consultants need to be reminded that as licensed professionals, they have a duty to act impartially and delaying decisions and information will result in additional costs to the owner and possibly delay the project completion.

3. If a problem arises and the consultant is not able to provide a solution, consultation with the team, in particular the affected trade contractor, may result in the most cost-effective solution without necessarily sacrificing performance of the project for the owner.
4. To protect themselves in case of potential litigation, architects and engineers are adding more exculpatory clauses to contract documents to make up for incomplete design documents. Statements in supplementary conditions to supply and install contracts (such as CCDC 2) that require the contractor to build a facility in accordance with all design codes irrespective of what is shown on the drawings and specifications suggests an insecurity about the design. Moreover, this practice is not guaranteed to protect the designer in litigation.
5. When consultants have been asked why incomplete documents are issued for contracts, the usual response has been that the fees are not adequate to do a complete job. Designers should be cautious that commercialism does not replace professionalism.

Best Practices for Contractors

Prior to signing a contract, the following is recommended for contractors.

1. At the time of tender, if the contract language or contract requirements are not clear or are conflicting, ask for clarification. Differing interpretations of the contract documents during construction will simply lead to disputes.
2. Contracts with unfair clauses will ultimately lead to financial losses which will not be fully recoverable, even if addressed by the courts. Be on guard for disclaimers about incomplete plans, incomplete site and soil reports as well as other data furnished about the site, or requirements to install as per the drawings and specifications as well as meeting specific performance criteria.

3. Be mindful of contract clauses requiring the contractor to investigate existing or hidden conditions promptly and issue a claim for additional compensation within the allowed time as per the notice provisions of the contract. Ensure that the timeframe is reasonable and achievable.

After a contractor is awarded a contract and finds that the construction documents are incomplete, it should document, communicate and record problems. The contractor needs to implement proper procedures outlined in the contract, or at a minimum do the following:

1. If a contractor discovers that specific owners and/or designers are less capable of providing complete contract documents, or buildable drawings and specifications, it should prepare for above-average impacts on labour productivity and the resulting need to issue and defend claims.
2. As soon as a problem is perceived, provide written notice to the owner or its representative. Some jurisdictions have held that recovery cannot be made without written notice when it is a requirement of the contract. Contractors need to appreciate that giving notice to an owner is not only a contractual obligation but it also provides the owner an opportunity to assist in resolving the cause of an excusable delay or to take steps to minimize any further losses and future claims. In addition, our experience has been that contractors obtain better results if they communicate and negotiate during the course of construction rather than waiting until the end of the project.
3. Prepare a proper Critical Path Method (CPM) schedule that is feasible, update it monthly and ensure site personnel are in agreement with the sequencing of the work. Actual progress must be monitored. Not adhering to a planned schedule can result in labour and equipment productivity losses. In addition, make sure a detailed as-built schedule is prepared as the project progresses.

- These schedules can then be used to explain delays and determine causation of the additional costs.
4. Many contracts contain change order procedures and pricing guidelines that provide for a complete and exclusive remedy for the contractor in the event of changes, including those for incomplete or inaccurate design documents. At the start of a project, the contractor should explain to the owner how it will meet the contract requirements for changes and agree on what cost items will or will not be included in the pricing.
 5. Be aware of constructive changes i.e. changes caused by the owner or its consultant, which are not acknowledged as changes. For example, changes made through revisions to the shop drawings which have cost implications which could have or should have been included in the contract design documents.
 6. When the number of changes begins to affect productivity, the contractor may want to attempt to include in its pricing any anticipated impact or loss of productivity costs resulting from the changes. When impact costs are excluded by the consultant, the contractor should issue a letter of objection as soon as possible. Failing to include such costs, failing to issue a letter of objection or failing to provide notice may preclude any remedy at the end of the project.
 7. The contractor should be open to working collaboratively with the owner's team to develop solutions that avoid claims or mitigate damages incurred.
 8. On-site monitoring of actual progress is becoming more common as it provides a better case for presenting loss of productivity claims to arbitrators and courts as well as owner's claims consultants. More importantly, monitoring actual progress of the various trades working on site can provide an early warning of problems¹². Both owners and contractors can mitigate damages or losses if problems are identified early.

Conclusion

In 1992, the founder of Revay and Associates Limited stated at a conference that "the only way to avoid disputes and/or claims is either to eliminate or at least reduce significantly the opportunities for cost overruns, such can be achieved only with better prepared and more comprehensive bid documents."¹³

There are no revolutionary suggested practices in this report, simply some logical fundamentals for achieving the schedule and cost objectives of a project. The most critical of the requirements is having drawings, specifications and other parts of the contract documents as close to 100% complete as possible at the time of executing an agreement or a contract. If 100% is not achievable for one reason or another, then budget contingencies must be adjusted, an alternative type of contract should be considered, and the contract documents must make provision for fair and equitable adjustments to the time and price in the contract as changes are issued. Otherwise, the spectre of claims and potential litigation loom on the horizon to the peril of all parties involved in the contract.

- ¹ McLachlin, Beverley M. and Wilfred J. Wallace, *The Canadian Law of Architecture and Engineering*, Butterworth-Heinemann, 1987, p.97
- ² Judgments of the Supreme Court of Canada, Canadian National Railway Co. vs Royal and Sun alliance Insurance Co. of Canada, 2008 SCC66, 20081121 Docket 32062
- ³ Revay, Stephen G., *Can Construction Claims be Avoided?*, CIB UMIST Conference 1992, Manchester, England, Building Research and Information, Vol. 21, Number 1, 1993
- ⁴ Ibid
- ⁵ The Alberta Report – COAA Major Project Benchmarking Summary, Construction Owners Association of Alberta, February 2009.
- ⁶ Kumaraswamy Mohan M. and Kumaru Vogeswaran, *Significant Sources of Construction Claims*, The International Construction Law Review, Vol. 15, January 1998
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- ¹¹ Mackay, Michael, *The Enforceability of Exclusion Clauses in Cases of Fundamental Breach of Contract*, Construction Law Letter, Vol. 26, No.1, September/October 2009
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- ¹³ Revay, Stephen G., *Can Construction Claims be Avoided?*, CIB UMIST Conference 1992, Manchester, England, Building Research and Information, Vol. 21, Number 1, 1993

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