

## Importance of IMPACT

by Steve Revay



The main theme of this issue is Impact. Like many words, Impact has several meanings. In physics (and in collision insurance claims) "impact" relates to "the single, instantaneous blow of a moving body when it meets another body".

Again, "Impact Costs" in a construction claim refer to the ripple effect of costs which originate from one or more isolated problems and then spread unabated through the project like ripples across a pond. These additional impact costs exceed a billion dollars annually in Canada — upwards of 2% of the total construction volume. Much has been written about the legal aspects of impact costs but the main problem relates to the widespread inability of contractors to calculate and prove their losses. In the accompanying article I have endeavoured to address the main factors in this difficult but potentially financially rewarding task.

Another "impact" causing widespread concern is that of the impact which government policies, programs and practices have on the day-to-day activities and decisions of Canadian business and professional organizations across the country. As a consequence, most national associations of standing have either their head office or a branch office in Ottawa in order to be close to federal government offices. Similarly, most major firms have found it desirable to have a liaison office in the National Capital Region to obtain speedy information on policy trends, regulations, business opportunities etc. and to ensure that their interests are expressed. As a practical interim step, many organizations use the services of consultants familiar with the Ottawa Scene on a part-time basis. Such arrangements are described by Don Chutter, RAL's Ottawa Bureau Chief.

Also reported on in this issue is RAL's activities in the United States, which have led us to incorporate there as "Revay & Associates LTD". We trust that the new firm will make its own modest impact on the U.S. construction and surety scenes.

## IMPACT COSTS — The Validity and Calculation of Costs Related to Reduced Productivity

by S.G. Revay, President,  
Revay and Associates Limited

Most construction contracts entitle the contractor to additional compensation for changes in the contract, not only for the basic costs related to the extra work but also for "impact costs" — those related to changes in the duration of the contract and to losses of productivity due to the changes in the work. The calculation of costs associated with extended duration or acceleration is quite straightforward. The calculation of productivity losses, however, requires very careful analysis and observance of ground rules in order to be accepted by owners, arbitrators or the courts. This article deals with the main issues involved in this contentious area.

Owners traditionally have been reluctant to pay for losses in productivity (efficiency) due to contract changes on the grounds that the losses experienced by contractors were caused by underestimating or the acceptance of risks pursuant to the specific terms of the contract. In support of this position, Owners like to point to the imprecision of the methods Contractors use to calculate impact costs. It is not unusual, in fact, for contractors simply to claim their loss on the contract without attempting to relate the overrun to an act or omission by the Owner.

Whether or not impact costs are compensable depends on the particular contract (i.e. entitlement) and the history of the project (i.e. causation). Many articles have dealt with the legal aspects of impact costs but the main problem — the Owner's resistance to recognizing the validity of impact cost claims — arises out of the Contractors' inability to calculate and prove their losses, rather than from the interpretation of the contract provisions.

These terms vary, but often impact costs resulting from changes, late or inadequate supply of information, active interference on the part of the owner or his agent, different sub-surface conditions from those indicated, or acceleration are compensable under the contract. On the other hand, impact costs

due to strikes, adverse weather and shortages of labour, material or equipment are usually among the risks assumed by the Contractor. (These examples are by no means complete).

### Productivity Losses

Productivity, in the context of impact costs, is the measure of the efficiency of a person or group doing what he or they ought to be doing at a given time and place. Similarly, loss of productivity is the decrease in the efficiency of that person or group due to a specific cause or causes.

Labour productivity is governed by their skill and the attitude vis-à-vis the assigned tasks. Skill, for all practical considerations, can usually be considered as constant for the duration of the project.

With regard to the attitude or motivation of labour, efficiency can suffer as a result of the changes in the work and thereby contribute to impact costs. Also, if the changes result in increased difficulty in executing the work because of altered design or job conditions, the Contractor's planning and resource allocation will be affected and costs increased.

Until quite recently, impact cost was equated to productivity losses resulting from overtime, overmanning, congestion, stop-and-go operations or adverse weather. The quantification of these losses generally followed published tables developed by either trade associations (e.g. National Electrical Contractors Association) or by large buyers of construction services (e.g. the U.S. Army). However, such tables represent averages and any given job may be substantially affected by its conditions. Also, the tables may become invalid because of changes in conditions such as standard working hours. More importantly, usually there is more than

(Continued overleaf)

ROUTE TO/OR FILE: _____	

one "demotivator" and their impact on each other is indeterminate.

The above shortcomings led to a search for a more reliable determination of impact costs, notably by the Office of the Chief of the U.S. Corps of Engineers and the U.S. Armed Services Board of Contract Appeals (ASBCA). The latter developed guidelines currently used by the Administrative Tribunals and Federal Courts in the U.S.A. These were stated as follows by the ASBCA in the **Fermont** case, handed down on February 20, 1975:

### Guidelines

"There could be at least three different approaches to quantum. One would be to show the costs of particular actions that were taken in order to accelerate the work and that would not have been taken otherwise, or which is equivalent, the reasonable estimated cost of performing without the acceleration, compared with the actual cost with the acceleration (which of necessity would require identification and reasonable costing of specific acceleration action actually taken)...

...A second would be a total cost or modified total cost approach, based on a comparison of actual costs with the bid estimate, perhaps with adjustments for any underbidding or any causes of cost-growth not attributable to the acceleration. Appellant has not invoked precisely this method, either, and indeed it is frowned upon by the Board and Court of Claims, and is adopted only when other more reliable methods of computing costs are unavailable and the reliability of the supporting evidence for a total cost approach has been substantiated...

...The third method, which appellant has chosen, is to compare the actual cost of performing without the acceleration (i.e. fabricating the first set of articles) with the actual cost of performing with the alleged acceleration (i.e. of fabricating the second set of articles)..."

This "third" method of quantification has, in subsequent decisions, been defined as the classical approach and called the "**differential method**" of cost calculation.

It should be obvious that this method of quantification satisfies both the governing legal principles (e.g. **Victoria Laundry v. Newman**, or, **Ranger v. Great Western Railway Company**), and the hard realities of construction.

More specifically, it allows one to measure the difference between the actually "impacted" productivity and what the productivity would have been save and except for the impact under consideration. This "unimpacted" productivity is frequently called the "**Normal**" productivity, because it is representative of the level of productivity the

Contractor, under normal conditions, could have maintained for the duration of that particular job. It incorporates, therefore, losses in productivity resulting from either the inherent shortcomings of the Contractor, or the risks assumed by him under the governing terms of the contract. Simply stated, it is "**normal**" productivity for that Contractor for that specific project.

However, one must be careful to compare only "like" operations. In order for the differential method to be acceptable, one must demonstrate that:

1. The unaffected items (having the normal productivity) are representative both in complexity and method of execution of the items which were impacted by the causes under examination;
2. The difference between the actual productivity (or cost) of the impacted items and the normal productivity (or cost) resulted solely from the causes under examination;
3. All items analyzed must have been impacted by the cause in question;
4. The normal productivity (or cost) of the unaffected items is supportable and is valid, allows for all applicable risks and/or inherent shortcomings of the Contractor, and represents a sufficiently large percentage of the item(s) of work under examination to yield reasonable confidence in the comparison.

The cause-and-effect relationships prescribed by these guidelines is seldom obvious and a considerable amount of investigations is often needed to draw even preliminary conclusions. Impact cost analysis will always be subjective and generally will involve an "after-the-fact" calculation. The starting point, in all instances, ought to be an examination of the productivity history of the operation (or job) in question.

### Recommended Procedures

- Look for work activities which have been affected by some impact during the project. This can be accomplished by plotting the periodical productivity of both the suspected individual operations and the entire job on a time scale. Contractors who maintain weekly or monthly cost and progress records should not have much difficulty in doing so, but others must first establish their most likely progress from the available records. (Firms which report progress as a function of expended man-hours or as a percentage will find that their figures are often suspect).
  - Measure progress by converting both quantities and percentages to "earned" man-hours. This is done by expressing the accomplished work in commensurate budget man-hours. For example, if
- (Continued on overleaf)

0.75m<sup>2</sup> of formwork per man-hour is estimated and 750m<sup>2</sup> achieved during a month, 1000 man-hours have been earned. An added advantage of this method is that the cumulative productivity of many different activities (e.g. formwork, placing re-bars and concrete) may be analysed.

- Calculate the ratio of the earned man-hours to the corresponding actually expended man-hours. This provides the productivity achieved by the contractor during the period under examination. A ratio of less than one usually represents better than estimated productivity and vice versa.
- Work with cumulative values in order to smooth out inexplicable, short-term surges or let-downs. A significant change in the slope of the given trend will indicate the existence of impact.
- Take time to prepare and evaluate the graphs of the various activities and/or the job as a whole. For example, if the earned man-hour curve and the actually expended man-hour curve run parallel for a while but there is a sudden change in the slope of either one, with the other following in a less pronounced manner, the activity is being accelerated or delayed.
- Compare productivity histograms of different but related activities. If a similar break can be seen in them, then one should look for a specific identifiable cause. If the similarity is less pronounced, there may be many overlapping causes, such as a great number of relatively minor design changes.
- Analyse each activity separately with respect to its normal productivity and loss. This may reveal that various changes impact different activities to a lesser or greater extent. If some activities are affected by design changes throughout the project, establish their "normal" productivity by reference to related but unaffected activities.

A contractor is usually well advised, in considering the chances of ultimate success, to adopt a not totally "clean" period as normal. ("Clean", in this context, means free of Owner-caused impacts). This may mean that he assumes liability for some Owner-caused productivity losses but it yields a more real-life basis. Similarly, in order for the "normal productivity" to be supportable, the Contractor ought to maintain cost and progress records in a format that allows the tracing (i.e. audit trail) of the course data to the final report.

Also, it must contain all of the cost components (e.g. direct labour, supporting crews, indirect labour etc.) which are included within the impacted cost. For it to allow for applicable risks, adjustments should be made if required for strikes, inclement weather, shortages etc. in order to ensure that both the normal and impacted periods are affected proportionately by them. Further adjustments may be in order if the Contractor changed his supervisory or overall management.

Other refinements may be necessary in order to meet the criterion that the normal productivity figures "yield reasonable confidence in the comparison." This is a judgment call by someone with detailed knowledge of the job and of the construction process. Statistical sampling techniques should not be used because the selection of the normal periods and/or normal code of accounts is deliberate rather than random in nature. Just as tender estimates tend to be more reliable in total than in detail, a combination of related accounts usually yields more reliable results in calculating normal productivity than single accounts.

In summary, impact calculation is an art more than a science and the reliability of the result varies in proportion to the experience of the analyst and the adequacy of the available source information.

The above is a condensed version of an article published in Vol. II, Part I, **Construction Law Reports**, Carswell Legal Publications, Agincourt, Ontario, Canada.

---

## Claim Count

RAL's expertise as Construction Claims Consultants is reflected by the present workload of either preparing for contractors or reviewing for owners and others a total of 80 claims having a face value of \$450 million. Of these, 65 are related to Canadian projects distributed in all 10 provinces.

In total, RAL has been involved in approximately 900 construction claims, large and small, at home and abroad, since the firm was established in 1970. Those claims which were prepared by RAL also often include on-site scheduling and cost control. Moreover, some of the mandates have call-

ed for progress and cost monitoring for virtually the entire project life.

## CT4 in China

An agreement has been entered whereby the CT4 Project Management and Productivity Control System software package described in the last issue of the Revay Report will be translated into Chinese. A project management centre will be set up at the University of Tianjin and the system implemented by the construction organization for this city of 7 million. A joint venture will distribute the system elsewhere in the People's Republic of China. CT4 has previously been marketed in Hong Kong and Singapore.

## RAL Services

Revay and Associates Limited perform a wide variety of services to Owners, Consultants and Contractors. A couple of project examples are illustrated on this page — one the Institute of Fisheries and Marine Technology in St. John's and the other the Complexe Gouin-Langelier in Montreal.



### COMPLEXE GOUIN-LANGELIER Montreal, Quebec

**Owner:**

Les Immeubles Blumal Inc.

**Project Manager:**

Baker Daigle, RAL Vice-President

**Design Consultants:**

Boutros & Pratte Inc.,  
Architects

Marc Denis Claude, Bellier  
et Associés  
Structural Engineers

B.L. Côté & Associés,  
Mechanical and Electrical  
Engineers

Marcel Notz,  
Landscaping Architect

**Size of Project:**

\$10 million

**Anticipated**

**Completion Date:**

June 1, 1986



### NEWFOUNDLAND AND LABRADOR INSTITUTE OF FISHERIES AND MARINE TECHNOLOGY ST. JOHN'S, NEWFOUNDLAND

**Owner:**

Government of Newfoundland and Labrador, Department of Public Works

**User-Client:**

College of Fisheries (Newfoundland and Labrador Institute of Fisheries and Marine Technology)

**Project/Construction Manager:**

Tekcon Management Limited, St. John's, Newfoundland

**Prime Consultants:**

The BAE Group (Bond Architects and Engineers Limited), St. John's, Newfoundland

**Estimating, Scheduling and  
Cost Control Consultants:**

Revay and Associates Limited, Montreal, Quebec, headed by Vice-President Regula Brunies (in sub-contract with Clarkson Gordon)

**Size of Project:**

\$42 million

**Official Opening Ceremony  
of Institute:**

October 28, 1985

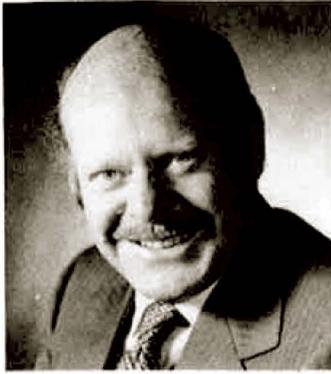
## SURVEYS, SURVEYS...

Over the past dozen years RAL assignments have included surveys at the rate of over one a year. These have all involved questionnaires, interviews, the tabulation and analysis of data, and the preparation of reports.

Half of them have been nation-wide in scope and all but a few involved the preparation of the questionnaire and of mailing and interview lists. The clients have been government agencies or associations and in one instance the survey was jointly sponsored by a federal department and a national association.

1985 examples were both commissioned by Canada Mortgage and Housing Corporation. The first was a supplementary survey to that conducted by RAL previously on a proposed "National Building Materials Evaluation Service" for Canada. The second, just getting under way, relates to "Builders' Technical and Management Needs". In this case RAL is acting in association with the Coopers & Lybrand Group.

## RAL PROFILE



**Don Chutter**

RAL Ottawa Bureau Chief Don Chutter has been part of the Ottawa Scene and engaged in Industry-Government Relations all of his working life. Accordingly, the assignments in the Ottawa Bureau since it opened in 1977 have focussed on government relations as well as on RAL's main stock in trade as Management Consultants in the construction sector.

Upon graduating from the University of Toronto with a 1st Class Honours MBA, Don joined the Canadian Construction Association in Ottawa and rose to become its General Manager, a position held for 22 years. During this time the membership increased tenfold and the staff from four to 23; annual interviews with the Federal Cabinet instituted; activities in the fields of labour relations, taxation, training and education, public relations etc. expanded; and a program of industry unity launched by a Construction Industry Associations Conference opened by the Prime Minister. In addition to liaison with legislators and public officials in Ottawa, participation in annual cross-country tours involved meetings with Provincial Cabinets, member associations, media etc. throughout Canada. He was made an Honorary Life Member of CCA in 1977.

Since joining RAL, his industry and government contacts have been further expanded by assignments for companies and associations in various industries and for federal agencies and departments; by active participation in advisory bodies - e.g. a member of the Executive Committee of the National Building Code; Co-chairman of the Construction Sector Committee in the Metric Commission; and a member of the Construction Sector Consultative Committee; by the conduct of national surveys; by the operation of a variety of seminars; and by speaking at national conferences. His four-year assignment as part-time Executive Director of the Construction Industry Development Council concluded with the publication of "Canada Constructs".

## COST-SAVING COPING WITH OTTAWA

by Don Chutter

"The Ottawa Maze". "Disneyland-on-the Rideau". "Confusion City". These are among the more polite names accorded to our national capital and reflect some of the frustrations experienced by those in attempting to cope with the Government of Canada.

It is baffling enough for Canadians but additionally so for visitors from the U.S.A. and other countries.

Yes, the Canadian Federal Government is large; its organizational structure and operating procedures complex; and its bureaucracy in Ottawa (notwithstanding decentralization and staff cuts) bewildering in size, stratas and apparent ambivalence and isolation. Long-standing practices can change over-night.

And yet executives have come to realize more and more that the Federal Government's policies and programmes can have a vital influence on their day-to-day business decisions and future profitability. It is therefore essential with respect to a company's strategy, planning, growth and even survival for it to have a comprehensive picture of pertinent government policies, personalities, business opportunities, regulations and likely future developments that may affect, favourably or detrimentally, the company's operations.

### Resident Representation

Accordingly, most national business associations and professional societies of consequence have their headquarters or a branch office or some form of resident representation in Ottawa-Hull in order to facilitate close communications with federal departments and agencies. (There are ten columns of "Associations" in the yellow pages of the Ottawa phone book). A basic service of these groups is to inform their members of new regulations or other government developments impacting on their operations in addition to representing their general interests to the Government of Canada.

Don was the first in Ottawa to receive the "Certified Association Executive" designation and subsequently served on the Certification Council of the Institute of Association Executives. He is a past president of the IAE Ottawa Chapter and in 1982 chaired the Institute's committee developing a Government Relations study outline. Currently he is a director of the Ottawa Construction Association, vice-president of the local chapter of the Project Management Institute and a member of the Arbitrators Institute of Canada. His latest published article is on "The Construction Industry" in the Canadian Encyclopedia.

Many organizations, however, wish to have a more personalized supplementary service which will both promote and protect their interests. This may involve more visits to Ottawa-Hull but how does one approach an organization as large as the federal government? Which offices are involved? Where are they located? Who makes the decisions? At what level(s) should the matter be dealt with? What are the most effective approaches? These and many other factors can combine to make such visits (or contacts by telephone or letter) time-consuming, expensive, frustrating and unproductive.

A good many major firms have established their own corporate liaison office in the National Capital Region. Others have found it to be sufficient to engage the part-time services of a local consultant who is familiar with the Ottawa Scene. Still others do both.

### How to choose a Consultant

Government Relations Consultants vary greatly in size, services and scope. They range from large shops in expensive offices to single consultants operating out of their own homes. Some will limit their services strictly to consultations in their own offices, while others will make the rounds of government offices and represent clients in person, prepare submissions, and provide a company or association identity and a local address. Some consultants are knowledgeable in a range of topic areas and have widespread contacts whereas others tend to specialize in one area (e.g. taxation, environment etc.), product or department, or perhaps political contacts.

In selecting a government relations consultant, an organization should be satisfied that there are no conflicts of interest with other clients. Assurance should also be given that the new client won't be given token attention as one of many other clients, but that the consultant has both the time and interest in providing effective Ottawa representation. It goes without saying that the consultant's reputation must reflect well on the client. Credibility in this regard is often reflected by the award of assignments such as surveys or studies by federal agencies to a consultant because of his or her contacts in and knowledge of a certain sector.

RAL provides a comprehensive package of business and government liaison services in the National Capital region. These arrangements have the distinct advantages of flexibility and absence of a sizeable financial commitment, plus economy — the services of experienced personnel are available for a nominal amount on a cost-sharing basis with non-competing organizations. Fees are on an assignment or retainer basis. The cost entailed is quickly offset by savings in time and travel expenses, expedited replies and more effective representation.

## RAL Opens U.S. Office

During the past decade Revay and Associates Limited has had an ongoing United States involvement — either with major U.S. contractors with respect to their overseas projects or on behalf of Canadian and European construction companies with contracts in the USA. In addition, RAL personnel have been engaged under permit to carry out a number of assignments in the United States for U.S. organizations.

All of which prompted RAL to incorporate in the United States in order to better service clients in that country. "Revay & Associates LTD." is located at 18 East Tomstead Road, P.O. Box 751, Simsbury, CT. 06070; 203/651-4148. The office is managed by William A. (Bill) Webb, a long-time Surety Claims Attorney with Travelers Indemnity Company in near-by Hartford. Senior Consultants Dermod Wood, M.A.S.C.E. and Don Hicks, have been assigned to the new company. Both have had extensive experience in the United States and on international projects.

Revay & Associates LTD. primarily offers services in the areas of scheduling, estimating, construction claims and surety claims but will have back-up for the full range of RAL consulting services from the parent company.

**The Revay Report** is published by Revay and Associates Limited, a national firm of Management Consultants and Construction Economists specializing in the Construction and Government Relations Sectors. Contents may be reproduced; with a credit as to source appreciated. Your comments and suggestions for future articles are most welcome.

Edition française disponible sur demande.



**WILLIAM A. WEBB**



**DERMOD WOOD**



**DON HICKS**

### U.S. Track Record

RAL's involvement in U.S. projects has ranged from industrial plants and a nuclear power project to high-rise and institutional buildings and from subways and a monorail to a precast, prestressed, segmented bridge. Its work with U.S. contractors engaged on international contracts has been related to projects in Algeria, Hong Kong, Indonesia and the Republic of South Africa.

RAL Associates have also been active in U.S.-based professional societies. President Steve Revay and Vice-President Regula Brunies have both been designated as Certified Cost Consultants by the American Association of Cost Engineers. Regula has also served as President and Chairman of the Project Management Institute and is a member of the Advisory Board for the first nationally accredited Master of Project Management course (University of Western Carolina). Papers have been presented by RAL Associates at national U.S. conferences of the AACE, PMI, Society of American Value Engineers and National Institute of Building Sciences.

### Profiles

Bill Webb graduated from the University of Virginia Law School in 1948 and entered the Travelers Claims Office in Richmond. He switched to fidelity and surety claims in 1951 and was transferred to the head office in Hartford in 1957. His main territory as a Surety Claims Attorney was the North Central States but claims involving clients who contracted for work outside of their region took him to other sections of the USA and to

Canada. He completed 33 years with the Travelers upon his retirement last year and since then has been acting as a surety claims consultant, while at the same time serving as an officer in local church, school and community organizations.

J. Dermod Wood, MASCE, graduated from Sandhurst and then in 1965 from Sheffield University in civil and structural engineering. His construction experience spans four continents. For the past ten years he has also specialized in the development and application of computerized systems for project management.

Don Hicks graduated in 1952 from Queen's University, Kingston, in civil engineering. His 30 years with Bechtel Corp. included 8 in the USA and 7 on overseas contracts in a variety of positions including Claims Manager, Contracts Manager and Construction Manager.

## AUSSIE CONNECTION

Revay and Associates Limited has entered into an association with Minson & Associates of Melbourne, Australia, with respect to the provision of client services. Minson & Associates is headed by James H. Minson who, after graduating in civil engineering at Melbourne, moved to Canada where he worked as Resident Engineer on a Ferry Terminal and subsequently with Revay and Associates for about a year. From Montreal he proceeded to Stanford for his M.Sc. in Construction Engineering and Management. This was followed by considerable experience on major projects in Canada before he returned to his native Australia.

## CONTACT INFORMATION

Please visit [www.revay.com](http://www.revay.com) for more details.  
To subscribe to the *Revay Report*, [click here](#).