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*By **Stephen G. Revay***

...I know
The past, and thence I will
assay to glean
A warning for the future,
so that man
May profit by his errors,
and derive
Experience from his
folly..."

Percy Bysshe Shelley (1792-1822)
"Queen Mab"

Many philosophers and statesmen shared this sentiment long before and after Shelley, starting with Confucius approximately in 500 B.C., but nobody expressed it more eloquently.

With the new century approaching, many would like to look into the future and predict its design. The construction industry is no exception. One would be, therefore, justified to examine its past. Not many among us are more qualified for this task than Don Chutter who, before joining us in 1977, was for 22 years the General Manager of the Canadian Construction Association which he joined in 1946 upon gaining an MBA from the University of Toronto. In addition to his duties as our Bureau Chief in Ottawa, he remained an active player in the industry through membership in various associations. Don retired at the end of September and the lead article of this issue is his parting message.

I would like to take this opportunity to thank Don both personally and on behalf of our colleagues for his excellent service and wish him a long, healthy and happy retirement.

This issue is also a milestone for us and we are looking at our future. You may have noticed that we have reverted to our original name and logo. On September 30, we closed an employee buy-out and are pleased to confirm that we are now a 100% employee owned firm. We believe that our new structure will provide increased independence in approach and conclusions, permitting us to better serve our clients. Our separation from Stanley was accomplished in total harmony and I believe that the synergies we have developed will bear fruit in the future.

In the meantime, we will continue to serve our clients with renewed enthusiasm and vigour.

The Changing Face of Construction

A half-century perspective suggests that "change" is the operative word in construction and that the rate of change is accelerating. Conclusion: practitioners must adapt or stagnate or perish.

Conventional wisdom may contend that construction is somewhat medieval in its operations, using traditional skills, materials and methods. It's true that many of those used today had their origin centuries or millennia ago — but, if so, that reflects their on-going efficiency and economy.

Actually, though, the construction process has been downright dynamic. If you need proof, try building to a set of plans and specifications that are a decade or two old! The chances are that some of the design concepts have been superseded and that quite a few of the specified materials aren't available any more.

These changes are even more dramatic if the review covers the post-war period of a bit more than a half-century. In recent years the pace of change has accelerated. The lesson to be learned from this as the industry faces the new millennium is that its members must learn to adapt even more quickly than in the past if they and their companies are to survive, let alone thrive.

Construction's evolution has not been perceptible on a daily basis, but look at how it has changed in the relatively short period of fifty years!

CONSTRUCTION PROGRAMS

A large backlog of construction projects deferred because of the Depression and World War II kept the industry hopping in the post-war years. Material and labour shortages were limiting factors. The "record volume" of 1947 was estimated by Statistics Canada to have had a value of $617 million. Notwithstanding a very large measure of inflation in the interim, 1997's program valued at some $115 billion represents a substantial physical increase.

This is also demonstrated by statistics on the number of construction workers. The Canadian Labour Force Survey was established in 1947. That year the number of construction workers was 224,000. In 1997 the number had grown to 747,000. A further increase is expected for 1998. And, because of modern pre-fabrication, less on-site labour is now required per million dollars of construction than in the past.

Moreover, the size and complexity of individual projects have greatly increased.

Just think of the array of skyscrapers that have changed Canada's city skylines, the massive electric power projects, the CN Tower, the Trans-Canada Highway, the St. Lawrence Seaway& Power Project, the string of northern radar stations, Expo '67, Olympic Games installations, large-scale housing developments, the Skydome, tar sands and offshore oil and gas developments, petrochemical plants, transcontinental and marine pipelines, the Confederation Bridge — the list goes on and on.

Within these larger overall programs, there have been substantial shifts. The market demands for housing, roads, commercial construction, hospitals, educational facilities, pipelines, factories, power projects etc. have risen and fallen dramatically during short periods of time. Some regions boomed while others suffered. Some traditional markets declined, while new "niche" or "boutique" markets flourished. Renovation work (often requiring different skills and organizations) increased in importance.

All of which meant that construction companies had to respond quickly to changing demands for construction services and perhaps move to new locations in order to maintain or expand their business. Examples of specific changes in the industry follow.

CONSTRUCTION CONTRACTS

To the horror of lawyers, many construction contracts in former times were oral and entered into with a handshake — even on sizeable jobs — or the written contract followed construction completion. This practice still exists but diminished as more and more business was conducted with "strangers" and as the hazards of liability increased.

The widespread war-time use of "Cost Plus Fixed or Percentage Fee" contracts for construction work carried over into the post-war period. However, the easing of materials shortages and the market demand for firm prices led to the general use of "Stipulated Price" or lump sum contracts and sub-contracts. Unit Price contracts provided for vari-

ations in quantities and materials but also related to firm prices.

Subsequently, Construction Management contracts became increasingly popular. In turn, Design-Build contracts now outrank them in use. Other variations include Project Management contracts; EPC and EPCM (manage-engineer-procure-construct) contracts in industrial construction; and lease-back/purchase and BOOT contracts whereby the contractor or developer builds, owns and operates the facility for a number of years before title is passed to the ultimate owner. A common element of all these types of contract (other than Construction Management) is that the contractor takes on additional responsibilities such as design, finance and operations. Firms wishing to compete for these types of contract must expand their expertise and resources accordingly.

CONTRACT DISPUTES

The reduced use of Cost Plus contracts, the inclusion of onerous one-sided contract provisions, and the increased number, size and complexity of construction projects combined to generate disputes between the contracting parties. The claim and dispute resolution phase frequently exceeded all three of the concept, design and construction phases.

New skills often became necessary in claims avoidance, claims strategies, and claims settlement for contractors to survive. The president of one large general contracting company stated publicly that, as CEO, 25% of his time was spent in court or preparing for litigation.

The expense, time and effort involved in litigation or large arbitration cases in turn led to policies designed to minimize their use. Many contracts now include provisions for dealing with contract disputes in lieu of or prior to litigation. Many forms of "Alternative Dispute Resolution" (ADR) have been devised — e.g. conciliation, mediation, arbitration, mini-trials, Contract Review Panels etc. — with the same objective.

"Partnering" agreements and the appointment of Project Referees are designed to ensure that contract disputes are dealt with promptly during construction before they fester into large-scale claims. Although not all disputes are so resolved, these procedures are frequently effective in coping with most of them.

Again, it behooves all construction executives, design professionals and owners to be familiar with these procedures and to adjust their past practices where necessary.

TENDERING PRACTICES

The award of public works contracts was traditionally a matter of "political discretion". Contractors who won the bidding competition could well face another contest with respect to the contract award. The Government of Canada agreed in the post-war period to open its construction tenders publicly, although only on a limited basis — i.e. the tender amounts were read out and only the name of "the lowest bidder and probable contractor" was identified.

Some governments did not call tenders but merely awarded contracts. When procedures were changed and public tender calls took place and bids opened in public, some construction firms had to adjust quickly if they wished to stay in business. One provincial road builders' association, for example, was called upon to present a crash course in estimating — a skill that its members had not previously honed.

Public works tenders traditionally have had to be accompanied by some form of bid security inasmuch as bidding is open to anyone. Prime Minister Diefenbaker introduced the use of surety bonds on federal projects. These are now the preferred security on publicly- and privately-financed projects alike. Contractors have accordingly had to submit financial records to surety firms in addition to their friendly bankers. The maintenance of "bondability" has become a business necessity.

Public tender openings ensured "the sanctity of bidding" to prime contractors, but not to sub-contractors. During the 1950s bid shopping and peddling became so rampant that electrical and mechanical contractors in Central Canada called a bidding strike and declared that they would only bid to architects. The latter, however, declined to accept trade contractor tenders and an impasse resulted. Out of this came a CCA "Code of Good Practice" covering contractor-subcontractor relations and a recommendation that Bid Depositories be established where the local industry so favoured.

In due course, bid depositories were set up in all major centres across Canada and provide trade contractor bidders with "the sanctity of bidding". Their advent also affected how many firms operated and, in Western Canada especially, introduced detailed trade definitions and extensive regulations concerning the submission, receipt and rejection of trade contractor tenders.

LABOUR RELATIONS

The negotiation of collective agreements with locals of the building trades unions has a long history in Canada, especially in the non-residential building construction sector. After the lifting of war-time price and wage controls, collective bargaining resumed. As the economy became more buoyant, series of strikes, trade after trade, region after region, were experienced with the result that the industry was closed down for lengthy periods and considerable "whipsawing" of agreement provisions took place. In order to provide more stability, legislation was introduced to require province-wide bargaining on an industry or at least a trade basis.

During the prolonged recession in the 1990s there has been a marked increase in the number of non-union/"open shop"/"merit" contractors. In addition, unionized contractors have frequently been permitted by union business agents to exercise the "accommodation" clause in collective agreements whereby — in order to meet the competition of non-union firms — they are permitted to forego payments for certain fringe benefits. Any adjustments in the agreements have been relatively minor.

The larger construction volumes in some regions are now being accompanied by strikes and increased union memberships. It could be that non-union contractors and their project managers may again have to be well versed in the regulations governing union certification of their employees. Similarly, a greater focus on labour-management relations and on corporate structure options may be required of construction executives.

BUILDING CODES

Fifty years ago, most sets of municipal building by-laws in Canada were out-of-date and incomplete. Indeed, some centres (including sizeable ones such as Moncton) did not even have a building code. Building designs might be accepted in one jurisdiction but be rejected in neighbouring municipalities. Manufacturers could not achieve large-scale production economies because of limited markets imposed by building codes.

Gradually, however, more and more municipalities adopted a version of the model National Building Code of Canada produced under the auspices of the National Research Council. Major progress was achieved when most provinces took back the authority to issue building regulations previously delegated to municipalities, and adopted the National Building Code wholly or very substantially. As a result, there is a very high degree of uniformity in building codes across Canada.

The 1995 edition of the National Building Code is currently being converted to an objective-based (performance) code. The present prescriptive provisions will remain as an acceptable design solution but alternatives will also be acceptable so long as they meet the stated objectives. Construction firms (especially those offering design-build services) will have to be more innovative in order to take full advantage of the greater future flexibility in building codes.

Moreover, as municipal building inspection budgets continue to be reduced, it is likely that greater responsibility for adherence to the building code will be transferred to members of the construction industry. For example, designers and contractors may have to certify that the project has been designed and built in accordance with the Code.

TECHNOLOGY

Construction is a technology-based industry and the greatest changes in its operations in the post-war years have been technological. A vast array of materials now in common use did not exist 50 years ago — e.g. plastics. Plastering and lathing have given away to drywall. The pre-fabrication of components, assemblies and entire structures has now greatly replaced work formerly done on-site. One home builder recently stated that he had not purchased dimension lumber for years — just engineered wood products.

Mechanization has also radically changed construction work, particularly in the engineering sector, but also on building sites. Whereas the industry typically closed down

in most regions for the winter months, wintertime construction technology now permits year-round construction activity. The opening up of the Northern Frontier has been associated with a new realm of construction technology for building on permafrost.

Some of the new technologies used globally were "Made in Canada" — e.g. flying forms. Others were imported. Members of the industry must keep up to date in order to be competitive. No doubt the most dramatic technological development in recent years is that of computerization. Design work, estimating, scheduling, progress controls, production machinery, tender calls, transmission of drawings, document retrieval etc. have quickly augmented the earlier computer uses for accounting and word processing.

Construction directories now list information concerning fax numbers, e-mail and websites in addition to "snail mail" addresses and telephone numbers. Construction "help wanted" advertisements commonly stress that candidates must be computer literate. Construction executives brought up with slide rules or calculators must now become adept with computers or hire those who are, in order to be competitive.

ENVIRONMENTAL AND CONSERVATION CONSIDERATIONS

A generation ago, members of the construction industry were blissfully unaware of the need for "environmental protection", "energy efficiency" and conservation practices. In urban areas waste from construction sites was the largest single commodity in garbage dumps. On isolated projects it was the general practice to leave all of the waste on-site, including equipment whose return transportation was deemed to be too costly. The solution to industrial air pollution was to build higher chimneys.

No longer! A host of environmental protection regulations impact on every project and on many construction operations — e.g. asphalt plants. Electricity utilities, instead of spending large sums on new power generating plants and transmission lines, are conducting conservation campaigns designed to reduce the demand for electricity.

Conservation now plays a large part in the selection of construction materials. The National Energy Codes, although not mandatory, are widely followed. The R-2000 Program for more energy efficient housing has been augmented by the C-2000 Program for commercial construction. Niche markets have been developed by firms undertaking to enable Building Owners to save on their energy costs.

Environmental protection regulations have caused many construction projects to be delayed, altered, or cancelled. Manufacturers have learned the value of "environmentally friendly" marketing. Sales of insulated windows and of insulation products have soared. Awareness can therefore be a critical factor in a company's operations, either negatively or positively.

EMPLOYERS' ORGANIZATIONS

In 1947 the construction employers' associations were comprised of the CCA, affiliated local "Builders' Exchanges" in principal cities, and some trade or specialty contractors' associations (e.g. those representing master plumbers, house builders or road builders). A major role played by the local Exchanges and trade contractors' groups was labour negotiations. The National House Builders' Association (now the Canadian Home Builders' Association (CHBA)) had just been formed.

Subsequently their number and representation expanded greatly. The CCA spearheaded the formation of provincial industry-wide construction associations and road builders' associations. Provincial Construction Labour Relations Associations were established to deal with province-wide collective bargaining. More and more specialty groups formed associations to promote their particular interests and to deal with their particular concerns. In keeping with the times, the National Association of Women in Construction (NAWIC) has branches in major cities.

LESSONS LEARNED?

Car drivers must focus on the road ahead but they must also look backwards in the rear view mirror. A review of the past half-century of construction in Canada is mainly most gratifying. The programs have been an amazing achievement, carried out often in isolated locations, inhospitable terrains and extreme climatic conditions. Members of the construction industry are, in the truest physical sense, "The Builders of Canada".

But there have been some noteworthy exceptions. Some lessons have yet to be learned.

1. **Education and Training.** Canada has relied unduly on immigration for the supply of skilled workers in the construction trades. This source has very largely dried up. Apprenticeship covers only a fraction of those entering other than the licensed trades. Is there a danger that construction will become a low skill, low wage industry that will not attract those with desirable attributes?

Considerable progress has been made in the development of construction courses at the community college/technical institute level. Also, a number of universities have of late offered construction-related courses and/or have established Construction Chairs. In some cases, there are industry-university liaison committees dealing with curricula, awards, employment etc. but these are the exceptions.

Construction is a people industry — people are its primary and most valuable resource. In general, however, most firms and associations seem to be content to leave the education and training of their principal asset to others.

2. **Research and Development.** The bright spot in the Canadian construction research scene occurred in 1947 with the establishment in the National Research Council of its Division of Building Research. Now the Institute for Research in Construction, it is Canada's leading construction research establishment.

Most Construction R & D in Canada is funded by owners (e.g. governments, hydros) and manufacturers. Budget cutbacks have reduced the total activity below previous levels, low as they were. Major laboratories operated by manufacturers in Sarnia and Vancouver have closed down. Within the total, construction research activities at universities funded by the Natural Sciences and Engineering Research Council and by industry may have increased but, again, may be the victim of future budget cuts.

Scientific Construction R & D by the on-site industry has been negligible. The National Construction Industry Development Foundation was established to fund economic, human resources, and technical research in the early 1970s but surrendered its charter within a few years because of lack of financial support.

More recently a CCA Task Force recommended a comprehensive Research and Technology Transfer program funded by a small payroll assessment. The report was approved but not implemented. Even if more buoyant conditions return and R & D budgets restored, it is apparent that only incremental increases in the relatively small Construction R & D program can be expected unless some new, widely-based funding mechanism is established.

3. **"Standard" Construction Contract Forms.** The "Canadian Standard Forms of Construction Contract and Sub-Contract" published by the Canadian Construction Documents Committee (CCDC) or the CCA are misnomers in that they are actually only used in a minority of cases.

Some Supplementary General Conditions or revisions to the standard forms may of course be desirable to meet the requirements of a particular project. However, revisions which reverse the provisions in the standard contract forms are all too common. Although some public and private owners use the standard forms without any evident difficulty, many seem to consider it essential to produce their own contract documents which contain different conditions than those carefully negotiated by CCDC members and endorsed by their constituent bodies.

Within the industry itself, many of the larger general and trade contractors have their own sub-contract forms for use with their respective sub-contractors. Again, these documents typically contain provisions not consistent with the "standard" CCA sub-contract forms.

In some countries the acceptance of a non-standard contract form by a contractor can lead to severe sanctions. While such measures would be foreign to our open, competitive business system and voluntary association memberships, there is considerable scope for increased use of the "standard" documents and promotional efforts to that end.

4. **Industry Unity and Government Relations.** Canada is a far-flung nation and the achievement of National Unity has often proven to be elusive. The construction industry similarly operates in many disparate regions and is comprised of differ-

ent sectors and specialty groups. Industry Unity has also been difficult to achieve.

The industry came closest to doing so in the decade prior to the middle of the period under review. Construction associations had been organized to promote the industry's national policies at the provincial level. The CCA-sponsored Canadian Construction Associations Conference in 1965 had Prime Minister Pearson as the keynote speaker. It was attended by representatives of virtually every association in the construction sector and they hammered out which association(s) should be responsible for which industry issues at which levels.

The CCA's 1967 Canadian Centennial project was an exhaustive Construction Labour Relations Inquiry, guided by a labour-management steering committee and conducted by top-flight consultants. The resulting Goldenberg-Crispo Report set the scene for greater stability in labour-management relations across Canada.

A second Associations Conference was held in 1970. Delegates endorsed a proposal that there be a National Construction Industry Development Fund, to be supported by legislation, to finance Research and Development projects. A Foundation was established to administer such a fund and federal seed grants were received to cover its administration and initial research studies in the interim period.

Industry Unity was physically demonstrated at the annual CCA interview with the Federal Cabinet. The front rank of the delegation consisted of the elected heads of the CCA, RAIC, Association of Consulting Engineers of Canada, CHBA, Canadian Manufacturers' Association, and Construction Specifications Canada and the chairman of the Construction Industry Development Council. All of these bodies had endorsed the industry's brief.

However, the momentum that had been gained was allowed to wane, the Foundation was disbanded and the established consultative committees between leading national bodies became dormant.

Industry Unity is an important factor in influencing governments. The industry no longer has built-in representation or knowledge as in the past. The federal cabinet included for many years Right Hon. C.D. Howe, a leading consulting engineer who knew the industry and many contractors intimately. Again, in the early post-war years, the federal Labour Minister was from a building trades union, the Public Works minister had been in the Nova Scotia construction industry, and an Alberta building supply dealer was also in the cabinet. In provincial cabinets the Highways Minister was often a road builder. Many municipal councils included contractors and construction union officials.

In the past, the federal government recognized four employer groups for representation in advisory councils, delegations etc. (the Canadian Manufacturers' Association, the Canadian Chamber of Commerce, the CCA and the Railway Association of Canada). Now, construction has slipped in relative importance and there has been a growth industry in the establishment of new national associations covering all economic sectors. As a consequence, members of advisory councils are now mainly appointed as individuals.

Canada Mortgage and Housing Corporation has a statutory mandate to help to improve house building efficiency, and has an extensive research program (much of which is recommended by the CHBA). There is no counterpart of support for the non-residential construction sector. Other industries such as agriculture, manufacturing, mining and forestry have government departments with research, capital grants and marketing programs to assist in their development, but not construction. The budgets of the Ontario Building Industry Strategy Board and the federal Construction Industry Development Council came to an end.

In short, non-residential construction lacks an advocate in the government structure. Recent federal Deputy Ministers of Public Works are appointed as managers and have no construction backgrounds. The Department has been merged with the huge Department of Supplies and Services. Whereas associations were previously primarily proactive on construction and public policy issues and legislation, they are now largely responsive to immediate needs.

What is the linkage between industry unity and government relations? Industry unity enhances economic and political clout. And if governments become less important in the future and cannot be looked to for industry support programs, it will be all the more vital for the construction industry to be unified, well funded, and capable of attending to its longer-term needs.

CONCLUSION

Economic Growth. Employment. Competitiveness and Profitability. Environment. Productivity. Markets — Domestic and Foreign. Capital Investment. Taxation. Training and Education. Computerization. Technology. Research and Development. All of the main concerns affecting the Canadian economy are especially manifested in the construction program.

All of which suggests that the construction industry will continue to play its integral role in the new millennium. Its share of Canada's GNP may decline as the economy further matures and there may be relatively more future emphasis on repair and renovation work, but construction will remain a leading economic activity and indicator throughout the country.

Who dares to predict how, during the next half-century, the construction process will continue to evolve or where the industry's future markets will be located? The chances are that the brightest opportunities will be seized by those risk-taking entrepreneurs who are the most innovative and flexible, who best serve the owners' interests, and who are the best financed and technically advanced. Survival and progress will go to those who are best able to adapt to changing conditions.

By D.C. Chutter

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