

By Steve Revay



*Within the last six months, I attended three meetings organized by the Canadian Construction Association where advantages and disadvantages of ISO 9000 were discussed. If one can generalize in these matters, then the consensus among the attendees was to adopt a go slow approach, mostly because of a fear of the unknown. Much has been said and written in recent months about ISO 9000 but very little relating to the construction industry. Is ISO 9000 applicable at all to contractors or is it another attempt to place additional administrative burden on the industry?*

*We have decided to proceed with certification because we have convinced ourselves of the benefits that may accrue from such a certification. To help others make a decision, the lead article of this issue, written by Tony Howton of the Quality*

*Project Services Ltd. (QPS) and our Peter Maidment, describes the background of international acceptance and the implementation of ISO 9000.*

*This joint venture with QPS has two purposes. The first is to assist RAL with the certification process; the second is to provide joint assistance to the construction industry.*

*ISO 9000 is a quality management system and its most important purpose is to impart confidence both to the purchasers of services offered by a particular organization and to the management of the organization itself. To the purchasers because they wish to be assured that their needs will be consistently met and to the management because the quality management system ought to help reduce faulty workmanship and thereby reduce the cost of correcting deficiencies.*

*There are those in our industry who argue against the general implementation of ISO 9000 because of its inherent administrative burden (i.e. increased paperwork). It is true that the system demands the upkeep of an audit trail, but it is not any different than the requirements of Z-*

*299 and the construction industry has learned to live with them. ISO 9000 is an internationally recognized version of Z-299 and is, in fact, less stringent than the requirements of Z-299. The underlining philosophy on which any quality management system is founded is to force the seller of the service, e.g. the contractor, to assume responsibility for quality without reliance on the interventions of the purchaser's inspectors. What is wrong with that?*

*There are three main considerations to be reviewed to determine an organization's need for a certifiable quality assurance program:*

- 1. Is certification of the company required by national or international codes or regulations?*
- 2. Are your customers/clients demanding evidence of an acceptable quality assurance system?*
- 3. Does it make sound business sense to establish a quality assurance program?*

*This article, hopefully, will help answer the above questions.*

## IMPLEMENTING ISO 9000 IN THE CONSTRUCTION INDUSTRY

### 1.0 INTRODUCTION AND OVERVIEW OF ISO 9000

The ISO 9000 International Standards for Quality Management are widely accepted as the basis for quality both nationally and internationally by consumers and producers worldwide. By 1979 quality issues were coming to the fore and although there was a significant proliferation of various standards and guidelines, much inconsistency was noted. This

inconsistency caused acceptance problems when these standards and guidelines were implemented, particularly in international and global trading.

In 1979, The International Organization for Standardization, based in Geneva, Switzerland, set up Technical Committee ISO/TC 176. This committee was charged with the responsibility of developing a quality system that would be acceptable for use globally by ensuring conformance

and consistency to the manner in which quality principles and practices could be applied.

The resulting ISO 9000 series of quality standards first published in 1987 brought harmonization on an international scale, and their adoption by many world trading nations has enhanced the credibility of the ISO quality system. The two major features that have become clearly recognized as benefits from the program are firstly, the adaptability

and ease of implementation of these quality assurance programs. Secondly, the adoption of a uniform system for the certification of a user's Quality Assurance Systems meets the growing need for international standardization and recognition.

The ISO standards are reviewed and updated using a systematic process that ensures the continuing upgrading and suitability of the ISO 9000 Quality Management Systems.

Some key milestones of note over the years are: Canada's adoption of the ISO 9000 series in June, 1991; the European Common Market's (ECM) adoption of ISO 9000 effective January, 1992; the first major revisions to the ISO standards and guidelines which were issued in June, 1994.

Adoption of ISO standards in Canada has been relatively slow to date. By November 1994, only 1,048 Canadian companies had registered ISO programs. This represents about 1.5% of the worldwide registrations which totaled 70,517. Globally, there has been an increase of 51% over the previous year, with a 26% increase in the number of countries (from 60 to 76) having ISO registered companies. The United States has 5,007 companies registered a 164% increase over the previous year.

Although the rate of registrations is increasing in Canada (69% over the previous year), major buyers of goods and services have only recently indicated their interest in applying ISO standards to their supply contracts. It has been only about a year since the federal department of Supply and Services started advising their supplier community that ISO certification will be a future requirement. In the fall of 1994, the Province of Quebec announced that it is expecting potential suppliers of goods and services to gradually phase in quality programs that will meet the requirements of the applicable ISO 9000 standards. A number of major corporations in Canada have made similar initiatives.

## 2.0 CONSIDERATIONS REGARDING ISO 9000 CERTIFICATION

A recent publication of Conseil International du Batiment titled *Quality Management in Construction - State of the Art Reports from Thirteen Countries* provides an overview of the quality management activities in international construction. The report reviews various areas which impact on project construction to ascertain the state of quality in each country. It also provides a good indication of the general areas from which the requirement for quality assurance programs can arise, as well as some of the problem areas in implementing quality assurance/management systems on a construction project. The following comments provide a brief summary of the report's findings pursuant to those criteria as well as some additional views of the authors.

**Governmental Policies & Governmental Clients.** The general trend is that government agencies are introducing quality management systems in support of their activities. In all thirteen countries, most government agencies are introducing pre-qualification or tender requirements that require quality assurance activity on construction projects. The specification for all project work to comply with a quality management standard is increasingly becoming a requirement.

As these comments indicate, not only is there an increasing requirement for ISO 9000 certification to be considered for work internationally, but also as previously indicated, various departments of the Canadian government are moving in the same direction. Provincial and municipal governments are expected to follow, as indeed the Province of Quebec has already announced.

**Non-Governmental Clients.** The thrust for quality assurance in construction appears to be from major financing organizations such as Insurance and Super-annuation funds or industrial leaders, and Housing Corporations. The main requirement appears to be site work oriented to ensure compliance with contract specifications and to avoid problems at a later date for the building or project as well as to avoid litigation. It is important to note that many clients have little understanding of the

Quality Management Systems (QMS) which they specify. Further, most clients currently do not have established QMS internally, although they require it from their suppliers. This situation creates significant problems for suppliers attempting to provide such clients with goods and services in accordance with a QMS.

Therefore, construction industry clients must themselves have internal QMS if the project design/ supply/ construction QMS is to work properly.

**Building Regulations.** In general, the report finds that quality assurance is not specifically referenced within the country's Building Codes/ Regulations. The construction industry should be aware that it will not always be the case, as governments are generally interested in reducing the costs of building construction while achieving a known level of quality. Certainly, imposing quality assurance requirements as part of the Building Code/Regulation achieves this end.

**Environmental.** The report states that there appears to be little impact of quality assurance on environmental precautions, although some identify the application of quality management systems as the right mechanism. Environmental requirements appear to be embraced in Laws and Regulations which do not involve the use of quality management systems.

It appears that this situation will change rapidly in the next few years, as ISO is currently developing environmental quality assurance standards and guidelines which will be established in 1996. When adopted, these will have a significant impact on project construction practices and costs.

**Health and Safety.** In general, all countries have laws and regulations that impose mandatory requirements for adopting health and safety requirements in the construction process. However, some countries view health and safety as an isolated activity, not associated with quality assurance at all. Others view quality management as a mechanism to apply health and safety requirements and are integrating the two activities.

It is the authors' perception that in the long term, the latter situation will prevail and construction companies will have to address their health and safety programs in the context of their construction quality assurance program.

**Insurance.** Insurance generally is viewed as a necessity in the event that failure may occur. Therefore improved confidence in the manufacture of products and construction methods may result in reduced premiums. Generally, this principle appears to be being applied according to the report. It is identified that insurance rates are better for those firms that operate through a Quality Management System.

It is not difficult to believe that there could come a time when insurance may become prohibitively expensive or indeed become unavailable for those companies who do not have certified quality assurance programs.

**Accreditation.** Many countries have now adopted ISO 9000 as the quality management standard for certification. The EN45000 series has also been adopted as the standard for the establishment of accreditation bodies. Each country has an accreditation body which licenses certification entities. In Canada, the accreditation body is the Standards Council of Canada (SCC), which has to date licensed about 10 certification entities. Note there are a couple of certification organizations not licensed by SCC operating in Canada. Some specialist certification entities have been established for product certification. Reciprocity agreements, memoranda of understanding and other agreement types have been drawn up at the certification body level to facilitate the exchange of certificates which will enable the free passage of certified products/services. This means that construction organizations which are accredited to ISO 9000 in Canada basically have this accreditation recognized in other countries who are also members of the ISO community.

**Architects & Technical Consultants.** Although, the internal development of quality management systems (QMS) to provide support to

architectural and technical practices appears to be dogged by the misconception that QMS infringes on professional competence, both architectural and technical practices are starting to apply QMS to their activities in varying degrees. The provisions of model quality systems and QMS development guidance documents is being provided by professional and trade associations in a number of countries. Quality systems and project/administration control systems have been developed and are in use in most countries.

In Canada, a number of major engineering organizations either have obtained or are in the process of obtaining certification to ISO 9000, as they realize that it is rapidly becoming a market requirement. This in turn means that they will tend to specify such certification for all suppliers of goods and services (including construction labour) on projects in which they are involved.

**Sub-Contractors.** The development of quality assurance programs or QMS in subcontractor organizations is being forced by contractual requirements imposed by clients and subsequently by the main contractors. This process, however, currently is limited and generally restricted to the higher technological trades where quality requirements are more essential to a project's outcome.

**Manufacturers/Suppliers.** Certification to ISO 9000 in this category is quite widespread as perhaps would be expected. However, this appears to be concentrated in traditional, well established industries or those which are export market led.

**Suppliers/Wholesalers.** This area of activity demonstrates the weakest aspect of the application of Quality Assurance. Supplier awareness is usually through contact with quality assured manufacturers in the normal chain of supply. The reluctance of suppliers to provide certificates of conformity is evident in some countries.

**Quality Consultants.** There appear to be few quality consultants active within the construction industry and

many of those are linked with management consulting practices. These consultants provide a wide range of support to clients including awareness courses, assessment courses and quality system development services which generally appear to embrace the ISO 9000 standard requirements. Other quality assurance services include TQM and assistance to achieve ISO 9000. Norway has already established a regional network of quality consultants assisting "contractors clubs" to develop and implement quality systems. An increase of quality consultants within the field of construction is bound to occur once the industry as a whole embraces the quality concept more fully.

**Conclusion.** As the foregoing indicates, the marketplace will impose increasing pressure on most suppliers of goods and services to become certified, but until all the "players" in construction projects have established quality management programs, many quality problems will remain unresolved.

### 3.0 INITIATION OF AN ISO PROGRAM

When the decision, in principle, has been made to implement an ISO program, a number of processes need to be undertaken to define the scope of work, layout an acceptable and achievable timetable and calculate the cost and staff time commitments required to achieve the company's goal of quality recognition. In short, the implementation of an ISO program must be treated just like any other project.

An announcement, signed by the President or COO of the company, should be published which ought to contain the following key points:

- A policy statement affirming the company's dedication to developing and implementing a certifiable quality system that will meet the applicable ISO Quality Standard.
- A definition of the authority and responsibility for managing the implementing of the program.
- A solicitation for input and support by all company staff and

employees to ensure the project is successful.

The company then has two options to pursue. First, company personnel can be selected and sent on ISO training courses covering the introduction, documentation, implementation and internal auditing practices. In time, these people can become the leaders in developing and implementing the ISO program. The second option, which if dealt with in a careful manner (i.e., Caveat Emptor), can be more advantageous. This is to use the services of a recognized consultant with the appropriate experience and qualifications. The depth of knowledge provided by an external consultant will:

- expedite the start-up of the development process;
- focus the effort on the required key ISO elements and development activities;
- ensure the results produced by the quality team will meet the ISO standards;
- furnish proper interpretation of the ISO standards and guidelines (to the uninitiated, they can be very confusing).

Thus, saving both time and money as well as avoiding wasted effort and scepticism in the program.

In these initial stages, it will be necessary to develop an overall scope of work and a realistic work plan to identify the required internal resources, and to establish a preliminary estimate for the project. When these first steps have been taken, the company will then be in a position to develop an Authorization For expenditure for the project. Once the AFE is approved by executive management, directives for project kickoff meetings can be issued.

#### **4.0 ISO 9000 PROGRAM IMPLEMENTATION**

The process of building a certifiable quality assurance program is well laid out in various articles and publications. Many books have also been written on the subject. Although these provide guidance, the fact is, every company or organization has many unique differences which must

be considered. Judgement decisions on the many possible implementation routes to take are key to successful project implementation. The experience factor is critical in selecting the most appropriate route. The individual leading the project must be a person with strong organizational and motivational skills. He/she will need to have a good understanding of project management together with team building and leadership skills. Planning, scheduling, resource allocation and estimating will be needed to track progress and keep senior management informed on what resources are required to keep the project on track.

The most effective way to bring a quality assurance program into daily use and acceptance by the management and staff is to select those elements from the chosen ISO quality level that will have an immediate effect in improving the companies operation. Areas for implementation should be selected from operations that are acknowledged to have problems. The staff should be provided with hands on experience as to how the quality program will benefit them. The more the staff are involved in the process the quicker the acceptance of change will be within the organization.

It is not an objective of the ISO program to change the way a company does its business, but rather to focus on what is done and how effectively it is carried out, i.e., how well does it meet client expectations. A completed quality assurance program will provide the system by which a company's performance is monitored, recorded and tracked. Once in place, it clearly highlights problems and faults in the system and day to day operations in a way that will enable appropriate action to be taken.

#### **5.0 ISO CERTIFICATION COST CONSIDERATIONS**

In developing the cost estimate for the development, implementation, and certification of your quality assurance program, there are many things to be taken into consideration including:

- Level or category of quality program;
- Size of company (employee headcount);
- Field of business or product; Status of company operating procedures;
- Selection of certifying body/certification authority fees;
- Quality assurance consultant costs as applicable;
- Quality assurance training courses for staff;
- "Non-productive" time for staff/employee input and development of the program.

All of the above will influence the cost of the program to the company. However, although these may appear to have financial consequences for the organization, the cost of not establishing such a program may have a much greater financial significance in the long term.

### **6.0 ISO 9000 IMPLEMENTATION PITFALLS AND RISKS**

**Lack of Active Management Participation.** The most significant risk to be considered is the acceptance and total approval of executive and operational management of the need for a quality management program. Experience has shown that in many situations, while management may have determined that the company shall implement a quality assurance program, they have mistakenly delegated total responsibility down to the staff. Without the active support, input and involvement of executive and line managers, the program is guaranteed to fail. This is because the ISO 9000 quality system is a management system which requires the full involvement of management in its day to day application.

It is a fact that everybody is responsible for quality, from the President/COO down to the site gatekeeper. All involved must accept specific responsibilities for quality. However, the final responsibility for quality must remain at the very top. The abdication of responsibility by senior management is the most serious problem encountered in the application of companies' quality assurance programs. Recognizing

this up front and dealing with it in the early stages of the project should minimize the problems in this area.

**Failure to Maintain Priority.** The second most significant risk, failure to maintain priority, is also commonly encountered. This situation occurs when during the course of developing the program, the company becomes so busy with contracts and revenue work that staff are redirected onto revenue work and the quality assurance program becomes sidelined. Besides delaying the schedule, those working on the program see the management change of priority and lose interest in the project. While there may never be a good time to carry out a quality assurance project, there is always a right time to do it.

**Insufficient Experience.** Another risk is the development of the program's scope of work when insufficient experience is used in identifying what has to be done. There are many factors to be reviewed and considered to develop a clear and complete scope of work. As with any project, this front-end work is critical to both defining the proper perspective of the program and successfully implementing it.

## **7.0 BASIS FOR RAL IS DECISION TO CERTIFY TO ISO 9002**

There are two main reasons behind RAL management's decision that RAL should become certified to ISO 9002:

**Market Requirements.** As already indicated, it is apparent that our market is rapidly moving to require ISO 9000 certification, both at a national and local level. Internationally, it is virtually a given that an organization is certified. To minimize the overall cost of this effort, it was decided that the RAL Calgary office would become certified first, with the other offices following suit as required. It is intended that the other RAL offices will use the efforts of the Calgary office as base to expedite their certification process.

Note that various sub-units of any company can become certified to ISO 9000 individually, although the certification only applies to that sub-unit. Further, ISO allows each sub-unit to certify to different standards as are dictated by the type of business activities pursued. For example, one branch may be certified to ISO 9002 because it only supplies construction services, whereas another branch would be certified to ISO 9001, because it also provides engineering design services.

**Improve Effectiveness.** To ensure that the cost of ISO certification is a worthwhile investment, RAL is using the process as an opportunity to improve the cost effectiveness of its

internal processes as well as improve client interaction. This is consistent with RAL's long term objectives of increasing the level of client satisfaction and the ratio of value of our clients' gains to dollars expended for our services. In short, RAL perceives that ISO certification is the most cost effective step towards achieving our commitment of providing higher levels of service to our clients in the most effective manner.

While it may be an organization's goal to obtain ISO 9000 certification only for marketing purposes, it should realize the limitations to this approach to certification. First, there is no attempt to reduce internal costs and increase the level of service through improving the effectiveness of internal processes. Therefore, the recovery of the investment cost is strictly limited to the increased revenue derived from work awarded because the organization is ISO certified. Second, such programs rapidly lose their meaning and the procedures increasingly fall into disuse. Thus maintaining certification becomes an increasingly difficult process in the longer term.

If further information is desired, please contact RAL's Calgary office either Stephen O. Revay at Tel. (403) 777-4900 or Fax (403) 777-4903 or Stephen.

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