Implementing a Quality Management System for the Canadian Hydrographic Service

Mike JOHNSTON, Canada

ABSTRACT

Implementing a Quality Management System for the Canadian Hydrographic Service (CHS) demanded commitment, direction and a team of motivated, dedicated people with a penchant for thinking in terms of process in order to achieve the goals assigned. That goal was to move from a long-standing philosophy of product-driven, end-of-line quality control to a process-driven, quality assurance model inherent in a "quality organization". In order to bring about a cultural change, work began in 1999 to design, develop and implement a Quality Management System.

The introduction of an ISO 9001:2000 Quality Management System has allowed CHS to realize the beginnings of that cultural change.

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1   INTRODUCTION

1.1 Impetus for Change

Implementing a Quality Management System (QMS) for the Canadian Hydrographic Service (CHS) demanded commitment, direction and a team of motivated, dedicated people with a penchant for thinking in terms of process in order to achieve the goals assigned. Work began in 1999 to design, develop and successfully implement a QMS in order to ultimately bring about cultural change. This change would be based upon moving from a long-standing philosophy of product-driven, end-of-line quality control to a process-driven, quality assurance model inherent in a "quality organization".

To achieve this elevated level of excellence, the team of CHS individuals, in concert with a quality consultant from BRI, International focused their talents to design, develop and implement an effective QMS. By definition, to "implement" means to "put into practical effect" or "a means of achieving an end; an instrument or agent". [Houghton Mifflin Company, *2000*]. This definition helps to explain the scope of the journey undertaken by CHS. It is the implementation of the QMS that has given CHS its "change agent"; an instrument to effect change within the organization; a systematic way of managing the business of quality thus allowing CHS to adopt a mindset focused on quality.

2   DESIGN AND DEVELOPMENT OF A QUALITY MANAGEMENT SYSTEM

2.1 The Beginning – What are Standards?

Standards are documented agreements containing technical specifications or other precise criteria. These are to be used consistently as rules, guidelines, or definitions of characteristics to ensure that materials, products, processes and services are fit for their purpose. International Standards contribute to making life simpler, as well as increasing the reliability and effectiveness of goods and services.

Certain fundamental standards among firms are required to prevent conflict and duplication of effort. For example, the standards activities of government departments serve, in part, to meet national standards needs. Nevertheless, one specialized standardizing organization is needed to coordinate the diverse standardization activities of many different types of organizations and promote general acceptance of basic standards. [Encyclopædia Britannica, 1994-2002]

The international body that serves this function is the International Organization for Standardization (ISO). ISO is a worldwide federation of national standards bodies from

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approximately 140 countries. It is a non-governmental organization established in 1947, in Switzerland, to develop common international standards in many areas. The mission of ISO is to promote the development of standardization and related activities in the world with a view to facilitating the international exchange of goods and services. Additionally, ISO fosters developing cooperation in the spheres of intellectual, scientific, technological and economic activity. [International Organization for Standardization, 2002]

2.2 Introduction to the ISO 9000 Family

The term ISO 9000 is used to cover a family of standards, which is referred to under this generic title for convenience. It refers to a set of quality management standards that act as a control for quality. It can help both product and service oriented organizations achieve high standards of quality that are recognized and respected throughout the world. Its members come from over 120 national standards bodies. ISO first published its quality standards in 1987, revised them in 1994, and then republished an updated version in 2000.

The ISO 9000 family currently includes three quality standards:

− ISO 9000:2000 – Quality Management Systems – Fundamentals and Vocabulary
− ISO 9001:2000 – Quality Management Systems – Requirements
− ISO 9004:2000 – Quality Management Systems – Guidance for Performance Improvement.

ISO 9001:2000 presents requirements, while ISO 9000:2000 and ISO 9004:2000 present guidelines. All of these are process standards and not product standards.

The ISO 9000 family is primarily concerned with "quality management". The standardized definition of "quality" in ISO 9000 refers to those features of a product or service that are required by the customer. "Quality management" means what the organization does to ensure that its products conform to the customer's requirements. ISO 9000 concerns the way an organization goes about its work, and not directly the result of this work. In other words, it concerns itself with processes, and not directly related with products. Nevertheless, the way in which the organization manages its processes will affect its final product. In the case of ISO 9000, it is going to affect whether or not everything has been done to ensure that the product meets the requirements of the customer.

3   MAPPING THE ISO 9001:2000 STANDARD ONTO CHS

Once the design work began, it was evident that the QMS must meet the requirements specified by ISO 9001:2000. Both ISO 9000:2000 and 9004:2000 were used as guidelines for reference. In order to map the ISO 9001:2000 Standard onto the CHS business model (see Diagram 1), a Gap Analysis would be required. The Gap Analysis detailed exactly what was necessary in order to meet the 9001:2000 Standard. It helped to identify any gaps that existed between the Standard and the existing business model or processes. Once the gaps were identified, steps were taken to fill those gaps. This served to comply with the Standard, but also helped to improve the overall performance of processes within the organization.
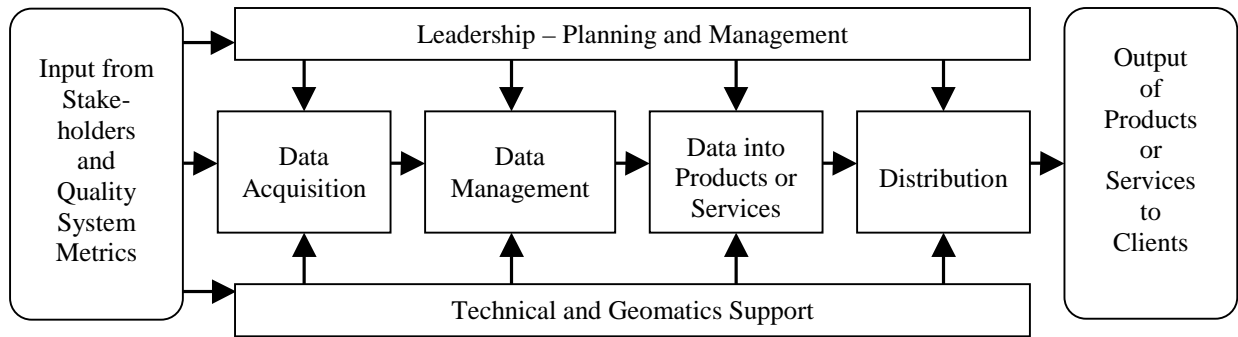
Diagram 1: CHS Business Model

The ISO 9001 Quality Management System follows the process approach. The Standard has been designed and organized to follow a logical process flow, similar to how one would normally do something. The beginning steps are initiated with a plan, followed by carrying out the plan, then checking and analyzing what was done. Finally, an improvement would follow based on any weaknesses found. The ISO 9001 System Model (see Diagram 2) helps to explain this concept. A process is a series of actions that result in an outcome. When all processes are combined, a system has been developed that must be managed. The system must be managed in order to achieve the organization's goals. Diagram 2 shows the management system and processes that are part of the quality management standard. [Arter, D. and Russell, J.P., 2001]
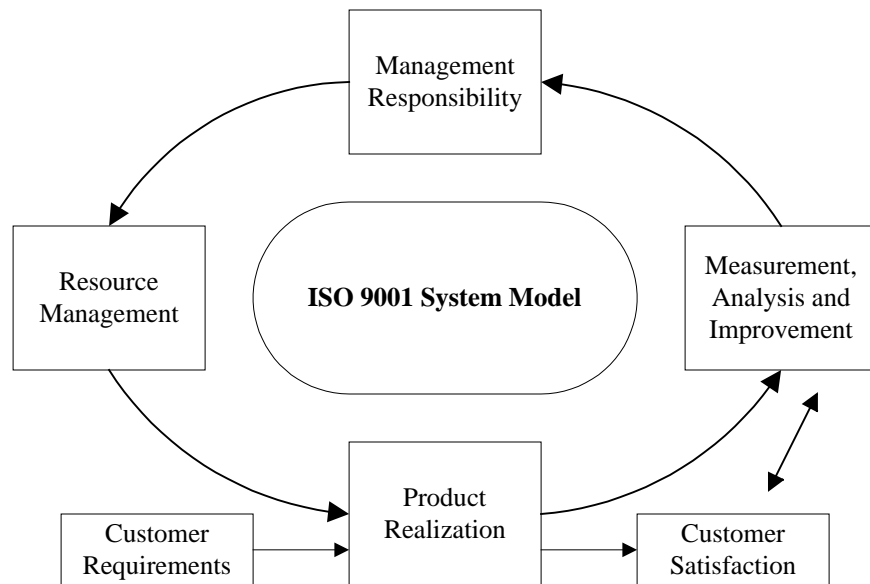

Diagram 2: The ISO 9001:2000 System Model

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4   THE QUALITY MANAGEMENT SYSTEM (QMS)

4.1 Generic Management System Standards

The vast majority of ISO standards are highly specific to a particular product, material, or process. ISO 9000 is known as a "generic management system standard". By definition, the term "generic" means that the same standards can be applied to any organization whatever its product, including whether the product is actually a service, in any sector of activity. The term "management system" refers to what the organization does to manage its processes and activities. To be efficient and effective, the organization must manage its way of doing business by "systemizing" it. This ensures that nothing important is left out and all employees are clear about the roles and responsibilities everyone has for doing what, when, how, why and where.

"Management system standards" provide the organization with a model to follow in setting up and operating the management system. This model incorporates features that experts in the field have agreed upon as representing the state of the art. A management system that follows the model, or "conforms to the standard", is built on a firm foundation of state-of-the-art practices. ISO's management system standards now make these successful practices available for all organizations.

4.2 The CHS Quality Management System

CHS has designed a Quality Management System (see Diagram 3) that strengthens the national components of the business while accommodating the unique characteristics of the regional offices. National documentation has been developed for all of the organization's business activities. Regional documentation has been developed for all of the core production processes. In the outline below, the umbrella and the pillars have been identified as national documentation while the processes from administration to technical support are of a regional nature. A goal of continual improvement is to migrate to best practices in all organizational activities.

The simple quality model of Plan–Do–Check–Act (PDCA) has been transposed onto the Quality Management System in both practice and theory. This simple PDCA model exemplifies what CHS will continue to internalize as a base philosophy for all of its activities. It reinforces the need for adequate planning, consistent process, and a routine practice of review with appropriate action.

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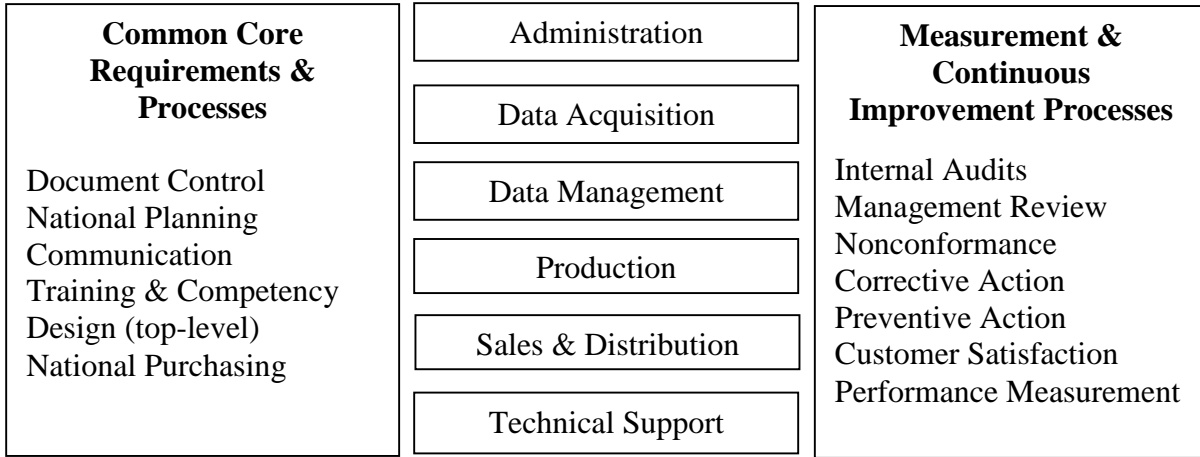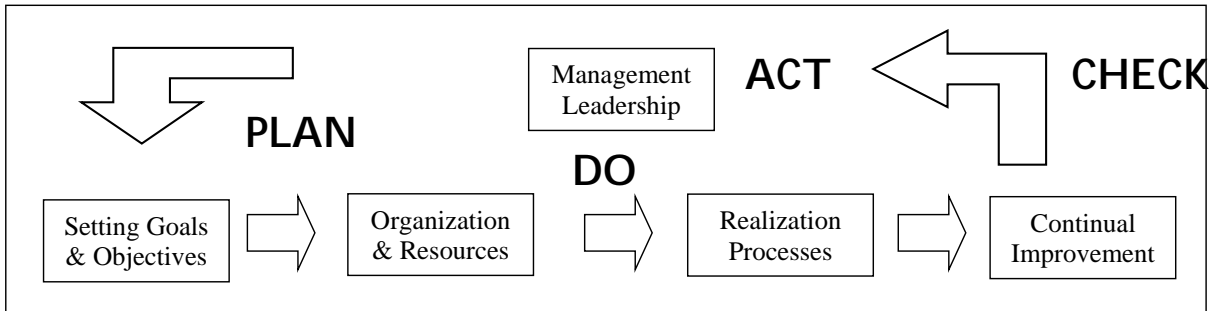| Overall Quality Policy and Structure |
|---|
| Introduction, Quality Policy, Organization Chart – senior management and standing committee structure, Quality System Framework - responsibility and authority summary |

Common Core Requirements & Processes	Administration	Measurement & Continuous Improvement Processes
Document Control National Planning Communication Training & Competency Design (top-level) National Purchasing	Data Acquisition Data Management Production Sales & Distribution Technical Support	Internal Audits Management Review Nonconformance Corrective Action Preventive Action Customer Satisfaction Performance Measurement

Diagram 3: CHS Quality Management System

5 IMPLEMENTING A QUALITY MANAGEMENT SYSTEM FOR THE CANADIAN HYDROGRAPHIC SERVICE

The CHS Quality Management System was officially implemented on January 1, 2001 culminating in 2 years of intensive effort. During the design and development stage, fourteen key steps were identified that CHS needed to consider in the scope of the project.

1. Identify the goals. The setting of goals helped to define the overall scope of the quality management system. Some of the goals identified answered questions relating to increasing efficiency and potential profitability, achieving customer satisfaction, reducing costs and liability, improving the communication and morale of the organization, and consistently meeting the requirements of clients and stakeholders for producing products and services.

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2. Identify what others expect of you and the Quality Management System. What were the expectations of the stakeholders, suppliers, customers and end users, and the Canadian government?
3. Review the ISO Standard and supporting literature. A variety of publications and supporting literature were available to help introduce and familiarize people with the Standard and quality management systems.
4. Assemble a team and agree on a strategy. Responsibility for the QMS rests with senior management, so it was vital that senior management of CHS were prepared and committed to the development and deployment of the Quality System.
5. Apply the ISO 9000 family of standards and guidelines to your quality management system.
6. Train team members and employees. Various training courses were offered to help staff increase their overall understanding of quality management systems, the potential benefits of such systems and how they should run.
7. Obtain a consultant. Independent consultants offered the advice, knowledge and experience on how to best implement the Quality Management System.
8. Obtain a registrar. The registrar is a third party assessor of the Quality Management System. The registrar will assess the effectiveness of the QMS and ascertain whether it meets the Standard.
9. Develop a quality manual. The quality manual is a high-level document that outlines the scope of the business, what the intentions are of the business, how the Standard will be applied and how the business operates.
10. Develop supporting documentation. This supporting procedural documentation outlines what we do. It describes what we do, in what order and to what standard.
11. Implement the Quality Management System. Key to remember is the importance of communication and training. During the implementation of the quality system everyone must be made aware of, and operate to, the procedures identified in the Quality Manual and collect records that demonstrate that we are doing what we said we were doing.
12. Consider a pre-assessment audit. The purpose of the pre-assessment was to identify areas that may not be operating to the standards. Conducted by BRI, International, this allowed the opportunity to correct errors, and plug gaps before the registration assessment.
13. Obtain registration.
14. Continual assessment and improvement.

6 IMPROVEMENTS FROM IMPLEMENTING A QUALITY MANAGEMENT SYSTEM

6.1 Continual Improvement

6.1.1 Maintaining the Benefits

Most users obtain measurable benefits early in the process of deploying a quality management system in their organization. These initial benefits are generally due to improvements in their organization and internal communication. The benefits must be strengthened through effective internal auditing and management review of system performance. Like all systems, it either improves or becomes less effective; it does not

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remain static. When you adopt ISO 9001:2000, you must strive for the satisfaction of your customers and the continual improvement of your quality management system. Continual improvement is a process of increasing the effectiveness of your organization to fulfill your quality policy and the quality objectives. ISO 9001:2000 requires that you plan and manage the processes necessary for the continual improvement of the quality management system. ISO 9004:2000 provides information that will be helpful in going beyond ISO 9001:2000 to improving the efficiency of operations. The organization should obtain data from various sources, both internal and external, to assess the appropriateness of the quality system goals. This information can also be used to improve the performance of the processes.

6.1.2 Harmonization – Adopting Best Practice

Harmonization will result in increased efficiency, reduced costs and redirected resources. The adoption of a best-practice ideology can have a significant impact on increasing efficiency in process and reducing overall costs. The existence of tools within the quality system allow for the maintenance and continual improvement of the system. Preventive and corrective action, internal audits and performance measurement are all used to help make systemic changes to the achievement of a continually improving organization.

6.1.3 Internal Audits

An internal audit is an examination of the records and documents of the organization by auditing specialists other than those responsible for their preparation. As one of the four main critical components of an effective QMS, an examination of the internal operations for quality is required. Audits examine the operations against certain standards of performance including the ISO 9001 Standard and any potential performance measurement programs in place.

CONCLUSIONS

Over the past three years, the Canadian Hydrographic Service has embarked upon a journey to design, develop and implement an effective quality management system based on the ISO 9001:2000 Quality Standard. The CHS was successful in the identification of clear goals that were based upon a sound vision that quality should exist, and does exist, throughout the organization. The change of moving from a long-standing philosophy of product-driven, end-of-line quality control to a process-driven, quality assurance model inherent of a "quality organization" has become evident in the short period the system has been implemented. It ensures that quality is built-in at all levels of the organization and the collection of processes is effectively managed based on the principles and requirements outlined in the QMS.

Future endeavours for the CHS will look at strengthening the measurement aspect of the system to measure and monitor performance more effectively. The design and implementation of statistical techniques to assist in the measurement, analysis and improvement of the system is to be studied. Statistical tools such as cause-and-effect diagrams, control charts, histograms, Pareto charts and scatter diagrams all merit further investigation.

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BIOGRAPHICAL NOTES

The Canadian Hydrographic Service is a branch within the Science Sector of Fisheries & Oceans Canada. CHS is responsible for the collection, publication and distribution of navigational information, nautical charts, Sailing Directions and water level information in Canada's coastal waters, Great Lakes, St. Lawrence Seaway, and major navigable waterways.

Mike Johnston is the regional project coordinator for the development and implementation of the CHS Quality Management System. Mike works from the Central & Arctic Region office of the Canadian Hydrographic Service.

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