The Impact of Harmonization on NDT in Canada

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Abstract

The ISO 9712 standard recently completed its’ 5 year review and balloting of proposed changes. In 2012 it will once again be considered by the CAN/CGSB 48/2 Committee for adoption as CAN/CGSB 49:9712 standard with or without modification. Once adopted it would be used by the Natural Resources Canada NDT Certifying Agency (NRCan CA) for the administration and delivery of Canada’s NDT certification program.

This paper describes some business and economic factors relevant to the standard, the changes resulting from the update, and their potential impact on NDT technicians and their employers.

Introduction

The ISO Technical Committee 135 Subcommittee 7 (TC135/SC7) drafted the first ISO 9712 standard in the 1980’s and it was approved as an ISO standard in 1992. Three years later the Canada General Standards Board (CGSB) 48/2 committee for NDT certification adopted ISO 9712 as CAN/CGSB 48-9712 and it has remained a standard of choice for NDT personnel certification in Canada since that time. This was not a one-time decision; changes and updates resulting from the review of ISO 9712 in 1999 and 2005 each received consideration by the CGSB 48/2 committee to confirm that ISO 9712 would continue to be adopted as Canada’s standard for the qualification and certification of NDT personnel. In 2005 the NRCan NDT Certification Agency issued some Rules of Implementation ¹, ostensibly to align CAN/CGSB 48-9712 with the context of the NDT certification program in Canada.

In 2011 the ISO 9712 standard was reviewed again, and the resulting changes were balloted and accepted as of May 2012. The changes are very important in that they reconcile the differences between ISO 9712 and EN 473. EN 473 is a CEN standard issued in 1993. Although similar, it had enough differences from ISO 9712 that the two standards could not be used interchangeably. The last round of changes to ISO 9712 resulted in a harmonization of the two standards, the eventual publication of EN ISO 9712, and the withdrawal of EN473. This now allows ISO 9712 to be truly described as a “harmonized” international standard.

Harmonization and World Trade

Canada has been a member of the World Trade Organization (WTO) since 1995. The WTO deals with the global rules of trade between nations. Its main function is to ensure that trade flows as smoothly, predictably and freely as possible.

As shown in Figure One, since the 1970’s Canada has for the most part, enjoyed a positive balance of trade, the recent exception being some negative results due to the effects of the world debt crisis that are creating unsettled global economic performance. A positive trade surplus is usually good for a country because it means it is selling more than it is buying, which is what most profitable businesses hope to do.

Figure One – Canada Balance of Trade: 1976 – 2012

Source: Trading Economics ³

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The point of harmonizing trade between countries is to become a more competitive trading bloc by following agreed rules to resolve conflicting regulations, eliminate unnecessary differences in products and services or to improve the efficiency of cross border movement of goods and services. Since 1994 Canada’s federal government has negotiated 11 free trade agreements with other countries, the most recognizable being the North American Free Trade Agreement (NAFTA) between Canada, the United States and Mexico. With respect to Canada and the United States, Bloomberg reported in 2011 that “The two countries have the world’s largest two-way trading relationship, reaching almost C$600 billion ($613 billion) in 2009.” At the time of writing Canada also had another 15 free trade negotiations underway, and other Foreign Investment Promotion and Protections agreements were in force with 24 countries. It is reasonable to conclude that while harmonized trade agreements may seem confusing or questionable at times, their overall long term net effect on Canada cannot be described as negative or inconsequential, it is overall positive as evidenced by the balance of trade.

**Regulatory Harmonization**

Some high risk business sectors that fall under regulatory oversight have taken it upon themselves to address harmonization when their technical area crosses borders. For example, the World Nuclear Association has published a report “The Benefits Gained through International Harmonization of Nuclear Safety Standards for Reactor Designs”. At the time of its’ publication Canada was represented on the WNA by Atomic Energy of Canada Ltd. (AECL). The report describes significant economic and safety advantages arising from the WNA harmonization effort.

Transportation safety is another important regulatory area with examples of harmonization. A 2007 report “The Railway Safety Act Study Pertaining to Canada-U.S. Harmonization” stated that “There is a complex and continuous dynamic that drives this harmonization of the Canada and the United States regimes and that will continue to advance it because there are so many factors impelling it. They include:

- It is necessary for the unimpeded flow of trade
- The industry has a 140-year history of close integration.
- Canadian and United States railways operate to a degree in each other’s countries.
- The Canadian railways have a mindset that, operationally, the border does not exist, in that they now see themselves as North American carriers.
- The industry has always had a history of interchanging traffic, which has promoted and indeed necessitated harmonization.
- The industry has always been highly organized, with associations, supplier groups and other ancillary bodies that have created an array of standards and procedures that permeate the day-to-day life of the industry.
- The industry draws on a largely common pool of equipment suppliers.

With very little modification, the points above could be argued in favour of a harmonized NDT standard, service industry or workforce.

As another example, Transport Canada has been working since 1999 on Canadian Aviation Regulation (CAR) 521, the stated purpose of which is “…to clarify Transport Canada Civil Aviation (TCCA) regulatory requirements, and to harmonize Transport Canada’s regulatory structure with the United States Federal Aviation Agency (FAA) and the European Aviation Safety Agency (EASA).”

**Harmonization and ISO Standards**

ISO is self described as “The world's largest developer and publisher of International Standards.” It is a network of the national standards institutes of 163 countries, one member per country, with a Central Secretariat in Geneva, Switzerland, that coordinates the system. ISO is a non-governmental organization that seeks to bridge public and private sectors. On the one hand, many of its member institutes are part of the governmental structure of their countries, or are mandated by their government. On the other hand, other members have their roots uniquely in the private sector, having been set up by national partnerships of industry associations.
The Standards Council of Canada (SCC) has represented Canada as a member country of the International Standards Organization (ISO) since 1972. Committees and sub-committees work on developing new standards and to revise and update existing standards. When creating and approving standards ISO provides member countries an equal voice on the basis of “1 country, 1 vote”. For a country of 35 million people, on a pro-rated population basis Canada contributes to and supports standard development work on a par with countries with larger populations or economies. 

In the same way as the purpose of the WTO is to enable trade between countries, ISO states that standards make the development, manufacturing and supply of products and services more efficient, safer and cleaner, and also facilitate trade between countries, making it fairer. Searching the Internet with the keywords “conformity assessment harmonization” will return many examples of projects and standards for harmonizing or improving conformity assessment in many technical disciplines. 

The concept of harmonization was approved by SCC’s Council in 1972. One of the primary objectives of this initiative was to encourage standards development organizations (SDOs) in Canada to move towards the adoption of recognized international standards as a basis of national standards whenever Canadian practices and conditions permit. In September 2011 the SCC was cited as a key stakeholder in a cross-border harmonization plan with the United States. In January 2012 the SCC released the CAN-P-1005 procedural document on granting and maintaining harmonized standards. Overall it is reasonable to conclude that standards harmonization is neither a novel nor radical idea limited to exceptional situations; on the contrary in the world of standards development harmonization is a mainstream concept that should be routinely considered when developing a national standard or adopting an international standard. 

Canadians have always played an important role in developing and maintaining the ISO 9712 standard. Although the United Kingdom and United States each served for a short time as the Secretariat of the ISO TC135/SC7 subcommittee to develop ISO 9712, when Canada assumed the role it soon chaired the first SC7 meeting in Ottawa in 1983.

As shown in Figure Two, effective participation is needed within a ‘standards development framework’ to ensure that NDT stakeholders and shareholders from Canada support the ISO TC135/SC7 subcommittee, the CGSB 48/2 committee and the NRCan Certification Agency. Timely communication and information updates have been used to inform people about the progress of standard development work and any significant changes that may affect Canada. 

**Figure Two** - Standards Development Framework

The Harmonized ISO 9712 Standard

Over the last 17 years harmonizing ISO 9712 with EN473 was a very elusive goal for the ISO TC135/SC7 committee. Having finally achieved this and if adopted again as the CAN/CGSB 48-9712 standard, the NRCan certification program will have to be modified to consider the following: 

1. Personnel recertification by written and practical examination is required at regular intervals. 
2. Certification exam candidates will need a certain percentage of on-the-job practical experience hours prior to challenging practical certification exams. 
3. The period of time for a candidate to successfully complete certification examination is reduced from 5 years to 2 years.
4. The allowance for simultaneous experience from working with more than one NDT technique allowance is limited.

Given the current economic conditions and the demographic effects of the boomer generation that promise to accelerate retirements in the next 5 years, the potential effects of these changes, either individually or as a whole, may not be easily discernable. For example, if the introduction of the harmonized ISO 9712 standard to Canada was followed by a decrease in the number of CGSB certified technicians, would it be reasonable to ascribe the decrease to just the effects of the recertification requirement, or to just increasing retirements, or to just NDT technicians seeking employment abroad or in other occupations? If a decrease happens, it is more likely to be due to a combination of these effects, and probably others. The exact impact of any one variable on the overall certification and employment situation will be very difficult to isolate and quantify.

Some information that provides insight into workforce trends is available from the federal government Human Resources and Skills Development Canada (HRSDC) through its’ National Occupational Classification (NOC) system. It is a reference for occupations in Canada that defines occupations and maintains statistics to forecast and understand workforce changes. Within NOC the major group 22 classifies technical occupations related to natural and applied sciences. Subgroup 226 lists “Other technical inspectors and regulatory officers” and a further subgroup having code 2261 defines “Non-destructive testers and inspection technicians”. A list of 61 job titles used for NOC 2261 is provided along with descriptions of the main duties and employment requirements.

Each year, the Strategic Policy Research Directorate (SPRD) of the HRSDC produces a detailed 10-year national labour market forecast. Forecasting models are used to identify likely trends in labour supply and demand for occupational distribution of employment. A key objective is to identify any imbalances that could develop or persist over time. The most recent report cites information from the Statistics Canada Labour Force Survey. As shown in Figure Three, the Service sector (where many NDT jobs are present) has outperformed growth for ‘all industries’ and the ‘goods producing sector’. The Service Sector is commented on as being “far less sensitive to the effects of economic downturn.”

**Figure Three** - Employment Growth by Industry, 1987 – 2005 (Index 100 = 1987)

Additional workforce projection information specific to NOC 226 (inspectors) is further provided by the HRSDC Canadian Occupational Projection system (COPS). The projection for 2011 to 2020 for occupational subgroup 226 ‘Other technical inspectors and regulatory officers’ which includes NDT inspectors and testers states: “Over the 2006-2008 period, this occupation experienced strong employment growth, while its unemployment rate increased slightly. The unemployment rate was still relatively low, at 3.1% in 2008. The average hourly wage increased at a slower rate than the occupational average, but it was already high in comparison to occupations requiring the same skill level. According to key labour market indicators, the number of job seekers was sufficient to fill job opportunities in this occupation”. As shown in Figure Four, the COPS projection for the period 2011 to 2020 is: “For Other Technical Inspectors and Regulatory Officers,…job openings are expected to total 31,311. It is expected that 27,914 job seekers will be available to fill these job openings.”
NDT Technicians for a World Market

The burgeoning increase in world trade activities and a desire for the better development and mobility of an NDT workforce suggests an interesting question: “Should Canada plan to exceed its’ internal workforce requirements and develop additional NDT capacity to take advantage of employment and business opportunities outside the country?” Such a plan would require a thorough understanding of the existing capacity to train, certify, and fully develop experienced and skilled NDT technicians. Published data for the last 10 years suggests that Canada has the capacity to add approximately 1000 new NDT inspectors every 10 years.18

Federal Immigration Minister Jason Kenney has announced plans for Canada to attract younger and more skilled immigrants to Canada,19 which allows these questions to be asked:

1. “Could Canada see an influx of NDT technicians certified to ISO 9712 from other countries?” and,
2. “Could Canada become a net exporter to other countries of NDT technicians certified to ISO 9712?”

These questions are admittedly difficult to answer when a shortage of NDT technicians is both anecdotally admitted by employers and evidenced by the available data. However, one acknowledgment of the international scenario is provided by Mohawk College in Hamilton, Ontario: it is planning to increase the number of applications it will consider from international students for registration in its’ full-time 2 year co-op NDT program. When promoting and selling the NDT program abroad, the adoption of the harmonized ISO 9712 standard by Canada could be a selling point for international students motivated to study and find employment as NDT technicians in Canada or in their home country.

Summary

This paper reviews the concepts of trade and standard harmonization and discusses the potential impact of a harmonized ISO 9712 Standard on Canada. It is obvious that changes are forthcoming that may affect the NDT inspection workforce in Canada.

Analysis of trade, economic and employment data suggest that Canada should prepare to put a harmonized ISO 9712 standard to good use so as to minimize the impact on the existing workforce. Business opportunities could arise from having a mobile NDT inspection workforce that can use Canadian NDT certification to work across provincial and international borders. After 50 years of standards development and occupational development of the Canadian NDT workforce, now is a good time to use the harmonized ISO 9712 standard to stimulate improvements to the quality and quantity of NDT personnel in Canada.

Looking ahead, the future will be created by those who grasp the implications of what is happening today, and work to ensure that tomorrow becomes what it should or could be. Canada has the potential and opportunity to be a world leader in training, certifying and developing highly skilled NDT technicians. It should embrace the harmonized ISO 9712 standard and act accordingly.
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APPENDIX

Figures Provided in the Paper
**Figure One** - Canada Balance of Trade

![Canada Balance of Trade Graph](image)

**Figure Two** - Standards Development Framework

![Standards Development Framework Diagram](image)
**Figure Three** - Employment Growth by Industry, 1987 – 2005 (Index 100 = 1987)

![Employment Growth by Industry, 1987 – 2005](chart.png)

*Source: Statistics Canada, Labour Force Survey*

**Figure Four** - Projection of Cumulative Job Openings and Job Seekers over the Period of 2011-2020 (for NOC 226)

![Projection of Cumulative Job Openings and Job Seekers](chart2.png)

*Source: Canadian Occupational Projection System (COPS)*