

Overview of a CRN Common Approach

Background

At the National Public Safety Advisory Committee (NPSAC) meeting on November 7, 2016, Angela Coke, Deputy Minister at Ontario Ministry of Government and Consumer Services specifically mentioned the Canadian Registration Number (CRN) process as an item that has been identified by Ontario's Red Tape Challenge, as being burdensome to business. Deputy Minister Coke noted that currently each province and territory separately approves and registers the design of boilers or pressure vessels¹. Therefore, before a boiler can be used across Canada its design must be registered by all 13 provinces and territories.

NPSAC members discussed the issue and agreed to explore the development of a common approach for the CRN. Ontario's Technical Standards and Safety Authority (TSSA) and the Alberta Safety Codes Council, who then actively engaged the Alberta Boilers Safety Association (ABSA), agreed to lead the process, with a common approach to be presented at the spring 2017 meeting. The Standards Council of Canada (SCC), as the NPSAC secretariat, agreed to provide policy support to TSSA and ABSA.

CRN Current System and rationale for a common approach

What is a CRN?

'CRN' is a Canadian Registration Number issued by a regulatory authority in Canada for the design of an item of pressure equipment whose design has been accepted for registration. Design registration is the administrative outcome of the process of design review. Design review involves the technical and administrative review of pressure equipment design documents to determine if the design complies with the specified design code and that it meets requirements specific to the jurisdiction of the regulatory authority performing the review and registration. The main safety objective of the design review is to verify that equipment built to the design may be operated safely within the maximum rated design conditions, pressure and temperature.

¹ These concerns do not apply to custom design and built items, that is an item which is manufactured and supplied to a specific site only.

What are the benefits of design review and registration?

The design review and registration process provides technical and administrative benefits to public safety. The primary benefit is technical, arising from independent technical review and compliance verification of pressure equipment design prior to it being built and used. If pressure equipment is to be operated safely, it must be built correctly, and in order to be built correctly, it must first be designed correctly. Independent design review is not unique to Canada. While independent design review is not typically a United States requirement, it is a requirement in many other countries.

The technical review process often finds design deficiencies. In fact, in Alberta and Ontario, just under one half of designs reviewed are initially not accepted for registration because of deficiencies. Some deficiencies are quite serious that if left unchecked could result in equipment being built that does not provide adequate in-service safety performance. The cumulative effect of many small errors has been shown time and again to result in major errors, sometimes with very serious consequences. Design review reduces safety risk by identifying design deficiencies that can be corrected before the item is built. Therefore, complete elimination of this regulatory enforcement tool in order to reduce business burden is not considered a viable option. The current system is however recognized to be somewhat inefficient and significant improvement options are being explored.

There are a couple of administrative benefits for design review and registration. For industry, they can fabricate as many items under a design registration as they wish. For the regulatory authority, this information becomes vital when the regulatory authority needs to investigate an accident involving failure of pressure equipment. Design documents are also very useful when the pressure equipment needs repairs years after construction. Experience has shown that the regulatory authority records are often the only source of this documentation and has therefore proven to be a useful reference for industry.

What does a CRN look like?

The CRN is an alpha numeric code outlined in part 1, Clause 4 of standard CSA B51-*Boiler, pressure vessel, and pressure piping code*. The alpha numeric code (i.e. the CRN) is a standardized system of identifying a registered design and has been implemented by all jurisdictions across Canada. The CRN is marked on the design documents and is also marked on pressure equipment and construction documents to indicate the design is registered. The marking informs users that the design is registered, where the registration is valid, and in the case of fittings, the type of item. A CRN is assigned to a design by the first regulatory authority that registers the design. Subsequent registration by other regulatory authorities is indicated by the placement of

that jurisdiction's assigned number or letter to the right of the decimal in the CRN. A manufacturer may generally build any number of items to a registered design.

A CRN looks like this A0528.1234567890YTN , where "A0528" is a sequential number. The digits to the right of the decimal represent the jurisdictions with the allocations as specified in CSA B51. The jurisdiction indicators start with BC at 1 and run east, then north. When approval has been completed in all jurisdictions, the suffix past the first registering jurisdiction would collapse to "C": A0528.1C.

What is the problem?

There are no concerns identified with the safety objectives of the CRN system. The problem that has been identified is the CRN system is burdensome to industry because designs of pressure equipment must be currently approved and registered in each province and territory for it to be used in that jurisdiction. In part, there is concern of inconsistency among the regulatory authorities in processing design registrations as well as a lack of reciprocal recognition of design review and registration. The design submitter may be required to do different things for different jurisdictions. Process delays exacerbate industry frustration.

What is the root cause of the problem?

One of the underlying root causes is the fragmented regulatory landscape. Pressure equipment is regulated at the national level in many countries outside North America. In Canada, each province and territory has its own pressure equipment safety legislation. Each regulation could have different administrative and technical requirements. Jurisdictions have developed specific expertise based on their unique industries. Where there is a gap in requirements in the technical codes and standards, jurisdictions with specialized technical expertise will be quick to fill this gap which unfortunately may be seen as unique requirements for that jurisdiction. There is not an abundance of opportunity to share information about designs that may be reviewed and registered in multiple jurisdictions. The Association of Chief Inspectors Technical Committee (ACI-TC) is a national forum to share and discuss design information but this may not be timely enough for a specific design as they meet annually.

All jurisdictions adopt CSA B51 and the ASME Boiler and Pressure Vessel Code, the two primary sources of technical information for pressure equipment designs, but the differences in regulatory requirements can result in differences in how the technical codes and standards are applied. For example, the minimum boiler size that is exempt from a regulation may be different from one jurisdiction to another.

In addition to potentially different regulatory requirements, there may also be differences in the design review process that tends to create inconsistency of results. The scope of design review may vary among regulatory authorities from purely administrative to very technical. Thus a design may be registered on the basis of minimal technical review by one regulatory authority, but fail on a more detailed assessment in another jurisdiction.

What is the scale of the CRN registration program?

The following data from nine jurisdictions, is an indicator of the scale of the CRN program, and the distribution of design registration activity by jurisdiction.

CRNs issued in the 5 year period 1 January 2012 to 31 December 2016

	Fittings	Boilers and Pressure Vessels	Total
AB	9114	21560	30674
SK	1673	6301	7974
MB	2849	2350	5199
ON	6599	5889	12488
QC	2710	981	3691
NB	3336	2042	5378
NS	2016	1755	3771
PE	2577	1502	4079
NL	3273	1701	4974
Total	34147	44081	78228

What is the scale of the problem?

As the above data indicates, there is a large number of design registrations occurring. The problem however is specific to designs of pressure equipment that require multi-jurisdictional approval. This would affect companies that design and build or use mass-produced pressure equipment. Mass-produced pressure equipment involves mostly fittings, and to a lesser extent boilers and pressure vessels commonly built for “stock” ready for a user to purchase and put into service. Mass-produced pressure equipment is commonly offered for sale and used in multiple jurisdictions which is distinctly different from pressure equipment that is custom engineered for a specific installation.

There is lack of data to accurately quantify the number of designs that are registered in multiple jurisdictions across Canada. Four jurisdictions, (Alberta, Saskatchewan, Manitoba and Ontario) were able to provide data that showed the total number of designs registered in the 5 year period (1 January 2012 to 31 December 2016) and the

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number of those that had already been registered in another jurisdiction. Based on this information it is likely that at least 20% of the total boiler and pressure vessel designs and 30% of the total fitting designs reported are registered in more than one jurisdiction.

BPV	44,081 x 20% = 8,816
Fittings	34,147 x 30% = 10,244
Total	19,060

How can the inconsistencies be resolved?

What initiatives have previously taken place?

In 1996, the Association of Chief Inspectors, comprising all Canadian Chief Boiler Inspectors (howsoever titled), entered into an agreement on reciprocal recognition of design reviews for registration.² The agreement set out the basic framework for reciprocity of design review. It is a good concept, but has not been a complete implementation success. Concerns arise among design reviewers, mostly due to the sort of situation described above where a design was registered in one jurisdiction, and when it was submitted to the second regulatory authority, deficiencies were found.

It should be noted that an organization known as ACI Central (ACIC) was formed under the leadership of the former Chief Boiler Inspector of PEI in the late 1980s. It is a not-for-profit organization that provides design reviews for the participating jurisdictions. Currently Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick, Nunavut, Yukon, and the Northwest Territories all use the services of ACIC for design reviews. Following the review by ACIC the design is registered in each of the jurisdictions where the submitter requested registration. It is noted that ACIC handles a smaller volume of designs compared to Ontario and Alberta, and that technical staff at ACIC are trained on the differences in the member jurisdiction legislation. It is understood this model works well for the participating jurisdictions.

Since ACIC was created, other initiatives had taken place. Quebec has an agreement with CSA for fitting design registration. For a period of time, Manitoba and Saskatchewan also participated in this arrangement.

In the early 2000s, a major national initiative was undertaken to develop a registration system such that technical reviews could be handled simultaneously by those jurisdictions, or their delegates, and managed administratively through a nationally recognized organization that was selected to be the CSA. Although it was successfully accepted by all jurisdictions with the assistance and support of NPSAC, the system

² This was the second of two agreements. The first agreement was for fitting designs and the 1996 agreement was for boilers and pressure vessels.

failed an informal review by the Competition Bureau, and was terminated as it was deemed to be in possible contravention of the *Competition Act*,

Currently, Alberta and Ontario offer administrative services to assist applicants to obtain multiple jurisdictional approvals. Once an applicant completes a registration in these two jurisdictions, requests can be made by the applicant for assistance to obtain approvals in other jurisdictions. Although this is to assist with industry burden, it is not a solution.

TSSA and ABSA Common Approach proposal

Aligning a regulation takes time; in the interim, improvements can be made by identifying differences and working to eliminate them at the program level within the parameters of existing regulations. While there is potential for more structured regulatory solutions, this paper focuses on a pragmatic response and is meant to provide additional context to inform NPSAC discussions. The document may be further supplemented at a later date. Based on past national experiences, and with the larger volume of design registrations processed by Ontario and Alberta, the pragmatic approach would suggest the greatest gain can be made by harmonizing the CRN process and approach between these two jurisdictions.

Based on the background already covered, it has been demonstrated that regulatory authorities are able to work collaboratively as demonstrated by the 1996 ACI Agreement. The Agreement provided a basic framework, but lacked the feature of standards for design review and qualifications of personnel. Having uniform processes, and equal personnel qualifications, provides very good rationale and justification to accept reviews done by others. The concept would be for the design to be reviewed and registered first in the province where it is first intended to be used or manufactured. Any subsequent registration would be based on an administrative review. A quality assurance process would be developed to audit a sample of designs that were registered based on technical review by other jurisdictions to provide ongoing monitoring for consistency of process implementation.

TSSA and ABSA are proposing a common approach to design reviews. In an effort to be responsive and timely, this proposal is what we feel is under our control and what we can address. This 'CRN Common Approach' would be supported by three pillars;

- Agreed Design Review Process
 - A standard process for reviewing designs will be developed. It will establish the criteria for reviewing a design for acceptance to register

(issue a CRN), and would include checklists to ensure consistency of reviews. The checklists would initially be developed for typical (common) pressure vessel and fitting designs, eventually phasing in more complex design checklists once initial harmonization occurs.

- Agreed Baseline Qualifications of Design Reviewers
 - A standard for qualifications of persons that perform technical reviews of designs will be developed. It will establish the base education, experience and certification requirements for design review personnel. Mutual recognition of qualifications is a core pillar that will provide assurance of expertise that can be mutually relied on.
- Framework Agreement
 - Multi-jurisdictional agreement will need to be signed to provide a high level framework for jurisdictional collaboration regarding standards and regulation interpretation, shared resources, mutual assurance of public safety, industry support, and promoting a pan-Canadian approach.

Moving Forward

TSSA and ABSA can work together and with other regulatory authorities to develop standards for mutually acceptable standards for design review and qualification of personnel, and can implement these measures within their existing governing legislation. The CRN Common Approach process can work for designs of pressure equipment that are not impacted by jurisdiction-specific requirements. These are technical requirements in the legislation that the administering organizations cannot just overlook.

NPSAC Support

We are seeking NPSAC member endorsement to support this initiative in principle. A Memorandum of Understanding (MOU) will be drafted for signature between ABSA and TSSA for the development of the three pillars.

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Next Steps

With NPSAC support of this initiative in principle, a draft document outlining the common approach and its implementation will be prepared to share with ACI for comment.

Ontario and Alberta will conduct early stakeholder engagement on the proposed approach (i.e., are stakeholders in agreement?) and will collectively provide a progress update to NPSAC in November 2017. Both provinces will also further explore what the framework and key elements of the proposed agreement may look like.