

News on the Block

Canadian Concrete Masonry Producers Association
Region 6 of the National Concrete Masonry Association
CCMPA Building Strength

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Welcome to the latest 2017 issue of News on the Block. We welcome your feedback and story suggestions — please send them to: info@ccmpa.ca.

Durability, and its Place in the Building Code

Written by Gary Sturgeon, B.Eng., MSc., P.Eng.

Contrary to what many building owners, designers, and contractors might believe, there exist no explicit requirements for durability for environmental separators in the building code, that is, explicit requirements for that period of time in service over which a material, component or assembly must perform without major maintenance or repair. In fact, the term "durability" is rarely found in the building code, and if used, is typically found within a non-mandatory appendix note. And in literature, there exists a nuance between the definitions of "durability" (ability to perform over a period of time) and "service life" (the actual period of time of acceptable performance), and thus, service life includes for inherent durability and planned maintenance and repair.

Part 9 of the building code, "Housing and Small Buildings", is a highly prescriptive-based Part of the code. The actual service life for a prescribed solution is implied and not stated, be it for an above-grade assembly such as a masonry veneer system (or any other cladding system) or roofing system, or a below-grade assembly (such as a foundation). The length of time that a prescribed solution will perform acceptably will be a consequence of its inherent resistance (durability) to the effects of loads that are imposed upon it (for example, its freeze/thaw resistance), and the magnitude of the imposed loads (for example, the intensity, frequency, and duration of precipitation to which it is exposed), and its maintenance. Although exposure to moisture is not the only cause of deterioration to elements in buildings, it is the principal agent associated with nearly all mechanisms of deterioration. So for a given solution prescribed under Part 9, the actual service life of an included material or component in an exterior separation oftentimes will be a result of severity of moisture loads to which it is exposed in service. The magnitude of moisture load is affected by the macro-environment [the geographical location of the building, and the location of the element on the building (elevation and height], and by the micro-environment (precipitation runoff, and condensation from air leakage and vapour diffusion). So, for a chosen solution under Part 9, the implicit resistance is "fixed", and the service life of the particular solution is not a "constant" for all exposures and building uses, and it is assuredly not quantitatively stated under Part 9. The "degree" of durability is largely unknown.

Part 5 of the building code, "Environmental Separation", is fundamentally objective-based and contains no prescribed solutions. It is perhaps the most performance-based Part of the building code. It applies to buildings that are greater than 4 storeys in height or greater than 600 m2 in area. The designer is required to minimize and control the entrance of water into the building separator; and the materials, components and assemblies forming part of the separator are required to resist mechanisms of deterioration as needed to achieve the required performance. By way of note, Part 5 references CSA S478, "Guideline on Durability in Buildings". Use of S478 is therefore not mandatory, and moreover, S478 is not a standard for design and rather, is a guide. As its Foreward explains, S478 contains a set of recommendations to assist designers in creating durable buildings…it provides a framework within which durability targets may be set and suggests criteria for specifying durability performance of buildings in terms that are commonly used…it contains generic advice on the environmental and other design factors that have an impact on the durability of building components and materials…and it identifies the need to consider initial and long-term costs, maintenance, and replaceability in the selection of materials and components. The Guide serves largely as a basis for conversations about durability and service life between the designer of a building and the owner. Within Part 5, there are no stated minimum time periods (years) for the service life of a building or for an environmental separator and its included elements, or stated processes that must be followed to identify or achieve an acceptable service life for separating elements.

Since the early 1990s, there has been a strong willingness by the Standing Committee for Part 5 to include mandatory requirements for "durability and on-going performance", but there has been a stronger reluctance on the part of the Canadian Commission on Building and Fire Codes to include such requirements. At the time, the transition to objective-based codes was seen as an opportunity to include much-needed requirements understanding the magnitude of costs to the built environment caused by maintenance and premature failures.

Until recently, there were extensive challenges associated with including quantitative performance criteria to provided acceptable levels of durability. Including such requirements would demand sources of climate data, accepted calculation procedures, prescriptive installation provisions, and referenced material and installation standards, all in a consistent design format. It is now believed that the current state-of-the-art understanding is sufficiently advanced to permit inclusion for durability in the building code. And "climate change" and its effects have become a new initiative for inclusion of such requirements.

As a consequence, the Part 5 Standing Committee is now re-examining its ability to include for explicit durability requirements. Moreover, it has recognized that the on-going development of performance-based requirements, and in particular, performance-based requirements for protection from precipitation and air leakage, are intimately linked to "durability" and "service life". These transport mechanisms serve as principal sources of moisture load on separator elements. Their quantitative limits for durability/service life must be based upon the objectives of structural and health safety, which are in turn, intimately linked to resistance to mechanisms of deterioration and their effects which are time-dependent. Part 5 Working Groups are currently examining these inter-relationships. In this code cycle, the Part 5 Standing Committee will submit a position paper to the Canadian Commission on Building and Fire Codes stating its case for the development and inclusion of mandatory durability requirements in the 2025 National Building Code. In a companion effort, CSA is currently redeveloping CSA S478 to produce a state-of-the-art standard. An intention is to provide a mandatory reference to this standard in 2025 National Building Code.

Durability and prolonged service life are iconic performance characteristics of masonry. CCMPA actively participates in the monitoring and development of durability requirements in both Part 5 and CSA S478. On-going updates of the work on durability and service life will be provided in upcoming CCMPA newsletters.

Alberta Paskapoo Sandstone was used on the exterior of many historical structures in Alberta. The service life of highly exposed, ornate elements is relatively short compared to that of units manufactured from other more "durable" building stones and exposed to similar environments. Its resistance to freeze-thaw damage is comparatively low.

Surgery leads to gift from Canadian Concrete Masonry Producers Association

After a Ryerson engineering professor's surgical navigation technology helped in the removal of their executive director's brain tumor, CCMPA members elected to direct this year's annual philanthropic support to Ryerson University.

Photo taken by: Jae Yang

If there was something fortuitous in de Souza's otherwise unfortunate situation, it was connecting to the care of Dr. Yang. In addition to being a neurosurgeon, Dr. Yang is also a Canada Research Chair in Bioengineering and Biophotonics at Ryerson University. His ability to think as both engineer and surgeon led to him to co-found

7D Surgical, a radiation-free optical imaging technology for surgical navigation that enables surgeons to perform delicate procedures in the repair of spinal injuries and the removal brain tumors. All with superior accuracy, speed and safety. The company has received multiple grants and investments—including support from the Ryerson Angels Network and FedDev Ontario—and has approval from both Health Canada and FDA approval for use in hospitals in Canada and United States.

Paul Hargest, President of CCMPA and Hargest Block Ltd, says "Having experienced firsthand through our own executive director the successes the team has had, we are delighted to support Ryerson University in their ongoing research to assist in the development of equipment and procedures involved in brain surgery."

"The members of CCMPA continually work to add value to our communities by creating disaster resilient, environmentally friendly products," adds Hargest. "The membership also undertakes to support many organizations annually with financial, in-kind and material contributions to enrich the lives of those less fortunate."

CCMPA Raffle winner

Brian Davidson
Construction Elevator Mechanic

The Raffle Tickets were sold to raise money to support the CCMPA Charity of choice. The winning ticket won a $2500 Air Canada Gift Certificate which was donated by Boehmers Block and CCMPA.

CMDC major announcement

Written by CMDC Staff:
Bennett Banting, Ph.D., P.Eng.
Joe Wierzbicki M.A.Sc., P.Eng.

There have been some major announcements recently regarding successful research applications at McMaster University, Dalhousie University, University of Alberta and University of Windsor; all in the last few months. CMDC staff will be providing CCMPA and its members with much more detailed updates on these specific projects over the coming year. But for now, we thought it would be of interest to highlight the current state of research being supported by CMDC and CCMPA.

Shown in Table 1 is a summary of the most recent research projects (since 2015) that have gained approval. Each of these research projects utilize various government granting agencies (NSERC, OCE, Mitacs) to leverage CCMPA's cash contributions, made from your levy fund, as well as in-kind contributions from CMDC staff, typically in the form of masons and technical support.

Table 1. Recent Leveraged Research Grants (2015-Present)

University	Industry Cash	Industry In-Kind	Government Grant	Total Value
McMaster	$250,000	$250,000	$720,000	$1,220,000
Waterloo	$250,000	$250,000	$400,000	$900,000
Windsor	$108,000	$100,000	$132,000	$340,000
Carleton	$250,000	$250,000	$415,000	$915,000
Dalhousie	$200,000	$220,000	$315,000	$735,000
Concordia	$200,000	$200,000	$400,000	$800,000
Alberta	$100,000	$100,000	$200,000	$400,000

Each of these projects are 4-5 years in length, with the dollar values given spread over that time period. As a snapshot, we can look at what these most recent projects entail in total research value.

Table 2. Summary of Research Funding Sources for University Projects

	Industry Cash	Industry In-Kind	Government Grant	Total Value
5 Year Total	$1,358,000	$1,370,000	$2,582,000	$5,310,000
2018	$281,600	$284,000	$536,400	$1,102,000

As noted in Table 2, over the life of these projects, we were able to generate excess of $2.5 Million in government grants for our university researchers. This increases the quantity and quality of research and graduate students. Below are the approximate number of graduate students we can expect from these 7 projects alone.

Our industry needs to ensure that we have a pool of talented and qualified personnel who can fill all types of positions at design firms (EIT, engineer, associate and principal) as well as support those who can continue with academic and research pursuits of concrete block masonry (professors, researchers, codes and standards members, specialized consultant etc.). With these projects we have a rich distribution of all levels of highly qualified personnel being trained as noted in Table 3.

Table 3. Overview of Highly Trained Personnel as a Result of Current Research Projects

PostDocs	PhDs	MASc	BEng	Co-op
3	15	26	26	5

Notably, since CCMPA and CMDC's partnership was formalized in 2013 as the Canadian Masonry Research Council, in-kind contributions, government grants and therefore Total Research Value have all increased while levy fund cash contributions have remained relatively flat. Shown in Figure 1 is a plot of the distribution of research funds (excluding local initiatives, small projects, endowed chairs or unleveraged one-off projects) since 2010:

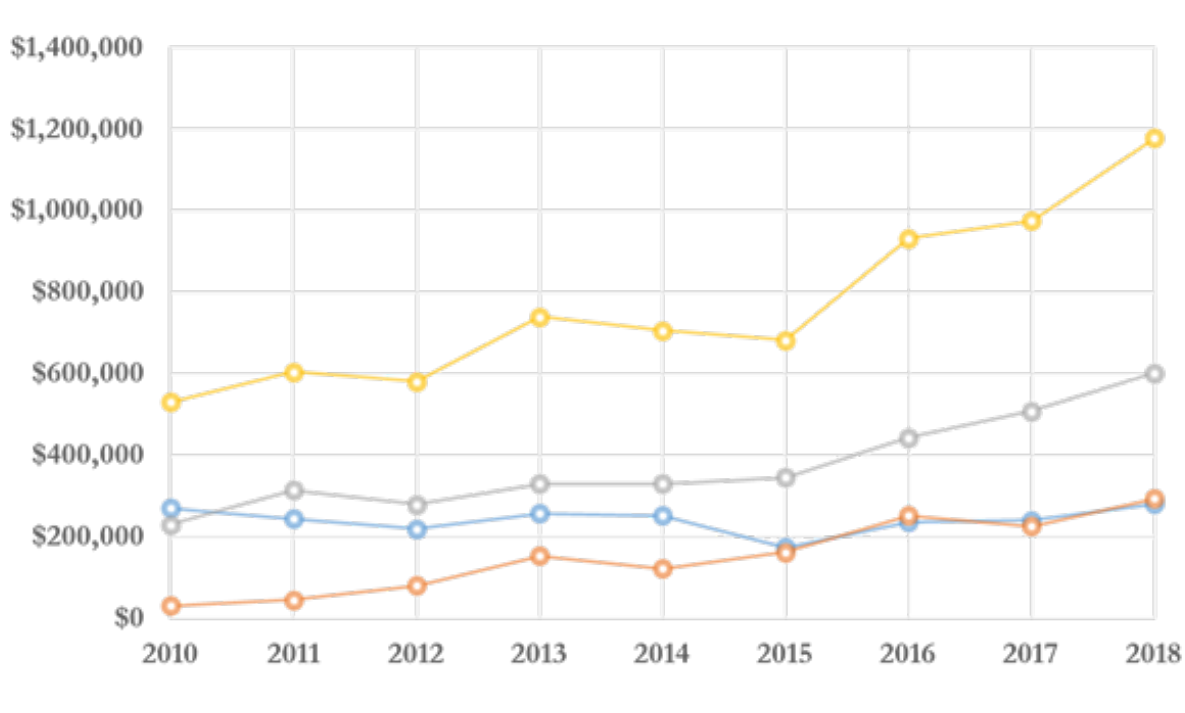


Figure 1. Distribution of Research Funding Sources 2010-2018

Our impact as an industry can be measured by the total research value (the sum of all industry and government contributions). This figure has more than doubled since 2010, despite the fact that levy fund commitments have barely changed. Without CCMPA and CMDC operating as a partnership this type of return and leveraging would simply not be possible. The masonry industry is relatively small compared to other materials, like concrete or wood, but as long as we can keep this type of harmonization we will always be able to 'punch above our weight' when it comes to research.

CCMPA Annual General Meeting

Hello,

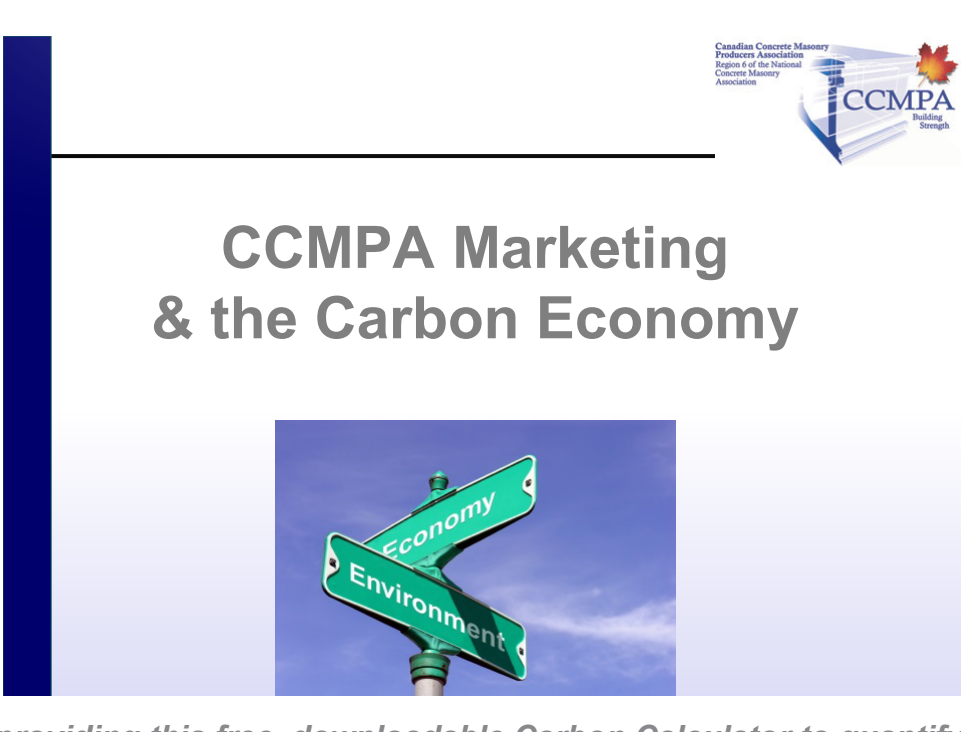
Once again, CCMPA had a successful Annual General Meeting and an amazing fundraiser. We also had a lot of fun.

At this time, CCMPA and especially me, would like to thank you for your generous support of the Annual General Meeting (sponsorship of dinner beverages, raffle prize, reception, cart beverage sponsors, transportation, golf prizes, Golf Trophy, Auction items, Guest speaker and the Golf Hole Sponsorship, Raffle Ticket Fundraising and Donations for the Ryerson Biomedical Research regarding brain tumours. A donation of $8.000.00 was made to Ryerson University on Monday by CCMPA. November 13th 2017 (more details will follow in the upcoming newsletter).

We look forward to the 2018 AGM. So I will be in touch again!

Best regards,
Marina de Souza

Carbon Calculator



For years, designers have been making the decision to specify concrete masonry wall assemblies in their designs for user comfort, safety, superior resistance to disaster/fire/mould, acoustic benefits, and operational energy-efficiency – among other things.

Now you have the opportunity to choose concrete masonry wall assemblies for carbon transparency. The Canadian Concrete Masonry Producers Association is providing this free, downloadable Carbon Calculator to quantify the carbon footprint of your designs.

For more information, please visit;
http://ccmpa.ca/resources-publications/ccmpa-carbon-calculator/

CCMPA—Sharing "The Facts" through Social Media

We know you are busy.

We know there is an infinite amount of information out there on construction and building materials.

We know that you are challenged every day to make better design, economic, and environmental decisions when it comes to building design and construction.

We want you to have easy access to The Facts about masonry construction in Canada.

Proudly announcing the following CCMPA Social Media sites:

Facebook: Canadian Concrete Masonry Producers Association

https://www.facebook.com/Canadian-Concrete-Masonry-Producers-Association-1646398105375227/

LinkedIn: Canadian Concrete Masonry Producers Association

https://www.linkedin.com/company/canadian-concrete-masonry-producers-association/

Twitter: CCMPA@CCMasonryPA

https://twitter.com/CCMasonryPA

Start following us today!

Any questions, suggestions, concerns about these new sites may be directed to: thefacts@ccmpa.

Ho, ho, ho!

Christmas Luncheon – Friday, December 15th 2017 –

Where: Marriot International Plaza Hotel – Mississauga, ON

ICON Expo & NCMA Annual meeting

When: Wednesday February 6th – 9th, 2018

Where: Indianapolis, INDY

CCMPA Members Meeting

When: Wednesday, May 9th & Thursday, May 10th 2018

Where: Victoria, BC

CMCA Annual Meeting

When: Thursday, May 10th – Saturday, May 12th 2018

Where: Victoria, BC

DROP US A LINE

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