CONCRETEBC
YOUR SOURCE FOR CONCRETE SOLUTIONS

A Low Carbon Concrete Future

Use These 5 Low Carbon Levers Today.

Concrete is the most used building material in the world.

It is the material that forms **the backbone of our modern world** and has so dramatically improved the quality of our lives, it is hard to realize how much this material is integrated with how we work, live, laugh, and play every day.

It offers durability, strength, resilience, safety and so much more in buildings and infrastructure all around you.

The concrete industry in British Columbia, Canada, and around the world, is taking action to actively and openly address our industry's global-warming challenges with goals of net-zero carbon by 2050 with important milestones in 2030.

So as we all accelerate together on this journey, we're pleased to share that there are:

Lower Carbon Concrete Levers Already Available Today...

and that together we can put into action when you're asking:
"so what can I do now to reduce the carbon intensity of my concrete right now?"

Embrace Performance Specifications 1

If you want the best in concrete technology with the lowest available carbon footprint working for you - following CSA's Performance-Based Specifications approach is critical.

This is so important to low carbon development, it bears repeating:

We can **ONLY get both PERFORMANCE and LOW CARBON ADVANCEMENT via PERFORMANCE-BASED SPECIFICATIONS**.

How to drive this critical change?

Indicate the long term hardened properties and the short-term construction properties needed for placing & finishing by specifying:

- The performance property required,
- The test method for evaluation,
- And the minimum and/or maximum allowable acceptance value

Delete "age-old" prescriptive concrete specifications which do nothing but limit performance and advancement.

Don't hesitate to reach out to Concrete BC for support in unlocking immediate Performance & Lower Carbon value in your projects today.

Specify Carbon Reduction Goals 2

Specifications need to indicate to all parties that carbon reduction is a critical design factor & project goal.

The concrete industry is advancing in this regard - with more EPDs than any other building material!

Currently, Concrete BC, in partnership with the National Reasearch Council of Canada, is developing a regional industry-average EPD for British Columbia for 18 of the most commonly-used concrete mixes.

At a project level

When all parties are clear on project start times, construction methods, external weather demands, and performance needs like early strength development, set a Pre-Construction meeting to specifically talk about carbon reduction optimization and let the low carbon collaboration begin.

Don't forget re-carbonation

Leverage re-carbonation. The Intergovernmental Panel for Climate Change (IPCC) report released in August 2021 reported: "The uptake of CO_2 in concrete infrastructure (carbonation) offsets about one half of the carbonate emissions from current cement production." In addition, the Global Cement and Concrete Association (GCCA) says that "A practical estimate of the global carbon sink provided by all concrete is 25% of the process CO_2 emissions released during cement production".

Allow Low Carbon Raw Materials

3

Outdated Prescriptive Specifications are inadvertently increasing the carbon intensity of concrete.

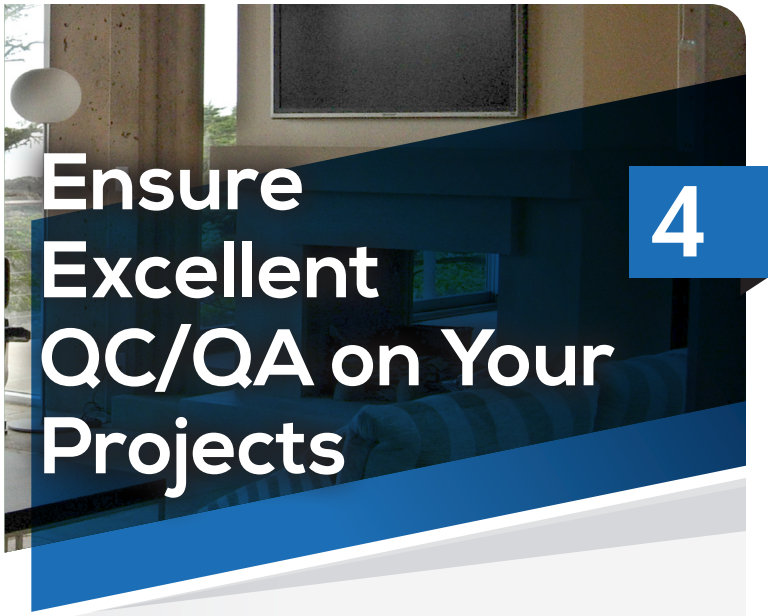
Ensure your specifications are updated to current versions of CSA, using performance-based standards, and allow use of a full suite of CSA-approved lower carbon raw materials.

Taking these actions will **immediately unlock notable carbon savings while meeting your performance needs.**

For more than a decade, the cement industry has been producing Portland Limestone Cement (CSA Type GUL) as a replacement to General Use (CSA Type GU) cement. While this material has the same performance properties as GU cement, its carbon intensity is 10% lower and it is used in a straight 1 to 1 replacement.

If you are working with outdated specifications that prescriptively states only GU cement can be used on your project, you have just taken a major carbon reduction off the table before the project even starts.

Similar issues exist with artificially low prescriptive limits on the use of Supplementary Cementing Materials such as slag and fly ash which can offer dramatic CO_2 reductions. Antiquated prescriptive limits on SCM replacement values hurt your project and the planet, and hamstring the contractor and concrete producer when it comes to offering the best in Performance and Carbon Reduction mix design optimization.



Ensure Excellent QC/QA on Your Projects

4

Did you know that poor concrete testing practices can lead to significantly over-designed concrete mixes on your projects?

That's right.

Poor cylinder practices cause cylinders to break lower than actual strength. The biggest culprit is often incorrect site cylinder storage practices. When concrete testing practices NOT in line with CSA standards are tolerated on a job, concrete producers often have no choice but to over-design their concrete mixes to make up for poor testing practices.

And the reality?

Poor non-CSA-conforming testing practices = overdesign = more cement = more carbon.

If a concrete producer has a good quality control process and a history of consistent test results for a mix design, the overdesign can be relatively small, say 4 to 5 MPa for 30 MPa concrete. But if quality control or quality assurance testing is poor, then the overdesign can be much higher; 8 MPa or higher for 30 MPa concrete.

Lower overdesign means lower cementitious materials content. For example, going from 8 MPa to 5 MPa overdesign would likely require 30 kgs less cementitious material, potentially a 10% decrease in embodied CO_2.

Ensuring proper testing practices = Avoiding unnecessary carbon in your concrete!

Consider Innovative Materials & Evaluation Methods

5

Do your specs consider the use of:

The latest in admixture technology (which often reduce cement content needs)

- Innovative lower-carbon materials
- Innovative carbon technologies
- In-situ performance monitoring solutions

These levers have the potential to reduce over-designing of concrete mixes and are worth a discussion with Concrete BC or local producer to see how they can be leveraged to achieve your low carbon concrete goals.

Partners in Action

The Canadian Cement and Concrete sectors are partnering with the Government Of Canada to drive Canada on a global-leading journey to NetZero Carbon:

"Through this partnership… we are helping to make Canada a global leader in green concrete"

– The Hon. Francois-Philippe Champagne, Minister of Innovation, Science & Industry

Canada's strengthened climate plan, A Healthy Environment and Healthy Economy Plan, as well as Budget 2021, identify the cement and concrete sector as a key contributor to Canada's net-zero future. This partnership and the resulting roadmap, will position Canada's cement and concrete industry to become a global leader in low-carbon cement and concrete production and related clean technologies.

With a potential to reduce over 15 megatonnes of GHGs cumulatively by 2030, and then ongoing reductions of over 4 megatonnes annually, the objectives of this partnership are to position Canada's cement and concrete industry as a competitive global leader in the production of, and technologies related to low-carbon cement and concrete.

EPDs – The Concrete Industry is Committed to Transparency & Carbon Goals in Specifications

Did you know that there are over 22,000 EPDs available for concrete-based products?

The concrete industry has more product-specific EPDs than any other industry by far. In the ready-mixed concrete industry we believe to reduce our carbon footprint, we must first commit to transparency and know what is our existing carbon intensity.

As such, Canadian Ready Mix Concrete Association (CRMCA) created a Canada-wide Industry Average EPD including 18 most commonly-used concrete mixes following required EPD-generation protocols that was issued in January 2017. (Available for download from Concrete BC's website: https://concretebc.ca/wp-content/uploads/2017/08/CRMCAEPD20170317.pdf).

In the past 2 years, in efforts to accelerate to a lower carbon concrete future, Concrete BC and the Cement Association of Canada have been working closely with the National Research Council to address the needs of both designers and contractors when it comes to EPDs. In early 2022, stay tuned for the release of a regional Industry-Average EPD for ready-mixed concrete in British Columbia with the benefits of:

- Accounting for variations including weather, raw materials, and more
- Better local inputs for more accurate life cycle accounting by everyone on the construction team
- More supportive of expanded development of concrete plant-specific EPDs
- A concrete producer calculator that uses each region's dataset to allow for rapid Type II EPDs to assist in mix design optimization discussions

To be the first to know when this valuable EPD is released, along with other critical lower carbon concrete tools, please follow Concrete BC on LinkedIn,Facebook and/or Twitter.

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