



City of Port Moody

Report/Recommendation to Council

Date: January 28, 2019
Submitted by: Councillor Hunter Madsen
Subject: Recommendation to Reduce Local GHG Emissions by Requiring Portland-Limestone Cement in All Future Construction within Port Moody

Purpose

This report asks staff to assess the feasibility of requiring all future civic and private construction in Port Moody to use Portland Limestone Cement or Contempra in place of conventional cement, considering the potential benefit in reducing greenhouse gas emissions in support of the City's climate-action priorities.

Recommended Resolution(s)

THAT Council direct staff to report back with an assessment of the benefits, costs, feasibility, and implementation steps that would be required for the City to require that Portland-Limestone Cement (or its enhanced variant, Contempra) be used wherever cement might be called for in any future civic/public projects or private construction within the City of Port Moody, per the report dated September 28, 2019 from Councillor Hunter Madsen titled Recommendation to Reduce Local GHG Emissions by Requiring Portland-Limestone Cement in All Future Construction within Port Moody.

AND THAT staff's assessment include consultation with the Cement Association of Canada, regional cement providers, and a selection of construction firms that would be affected by this change.

Background

The City of Port Moody plans to redevelop several large downtown neighbourhoods (e.g., Coronation Park, Moody Centre TOD) and support substantial new projects elsewhere that are expected to increase the city's resident population by +50% by the year 2041. These massive densification efforts will be heavily dependent on construction with cement, a component of building concrete whose use contributes an estimated 5% to greenhouse gas (GHG) emissions worldwide.

On May 15, 2019, our Council passed an official declaration of "climate emergency," setting an ambitious goal to reduce overall greenhouse gas emissions in Port Moody by 45% by the year 2030 and sanctioning a list of substantive actions that our City would undertake to achieve that goal, including a commitment by 2030 to "reduce the carbon content of new buildings and construction projects by 40% (compared to 2018)."

Toward that end, this report identifies a significant opportunity for the City to meaningfully advance its GHG-reduction efforts as our city undergoes re-development, deploying a well-researched and widely accepted advance in construction-materials technology that is endorsed and recommended by the Cement Association of Canada, that is manufactured locally in British Columbia in ample quantities, that is widely available and can be deployed by builders in place of conventional cement at little or no incremental cost, and that promises to reduce the GHG's embodied in concrete by approximately 10%.

While the City of Vancouver has, for some time now, required the use of Portland-Limestone Cement (PLC) in the construction of its public buildings in order to reduce GHG emissions, the City of Port Moody has an opportunity to take the initiative as a climate-action leader by becoming the first municipality in Canada to call for PLC use in private construction as well. If staff's assessment supports this initiative, Port Moody can provide a new standard and model for bylaw-implementation that integrates reduced-GHG cement in place of conventional cement in all future construction.

Discussion

The Cement Association of Canada (C.A.C.), an industry advocacy group, has provided the following overview of the Portland-limestone cement opportunity to reduce greenhouse-gas emissions:

Why replace conventional cement with Portland-limestone cement or Contempra? Cement is an essential ingredient in concrete, the indispensable construction material that is literally the universal foundation of modern communities: even wood-based buildings today are almost always built atop concrete foundations, and virtually all dense tower and multi-floor construction is concrete-intensive.

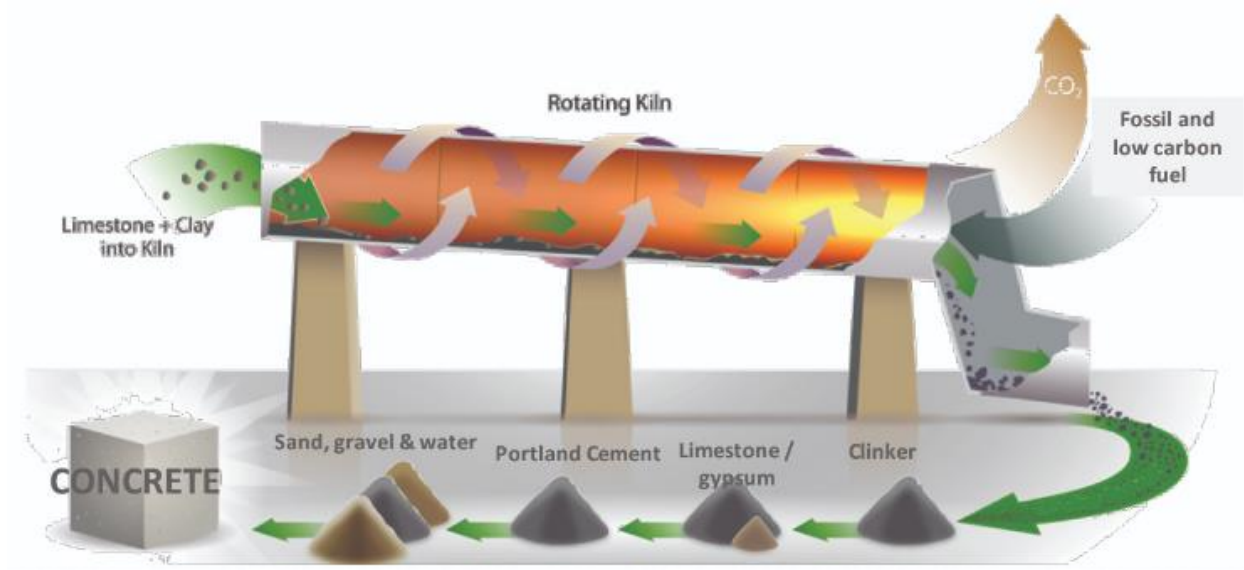
Contempra is a new form of cement, produced by an improved process based on so-called Portland-limestone cement, that has been shown to reduce carbon dioxide emissions from the cement manufacturing process by 10% while still producing concrete of comparable strength and durability to concrete produced with regular cement. Contempra is recognized under the name Portland-limestone cement (PLC) in CSA cement and concrete standards. Introduced in the Canadian market in 2011, Contempra reportedly accounts already for nearly 50% of the domestically produced cement that is consumed in British Columbia.

This uptake seems likely to accelerate as more developers, builders and infrastructure decision makers specify carbon-reduced cement for their projects, leading to potential GHG reductions of up to 900,000 tonnes annually nationwide. According to the C.A.C., this is equal to saving over 347 million liters of gas. Or planting 23 million trees. Contempra updates the established advantages of concrete as a construction medium — safety, sustainability, durability, resiliency, versatility and energy-efficiency — by making it also more suitable for low-carbon built environments.

Contempra's 10% reduction in CO₂ emissions occurs during the cement manufacturing process. While Portland-limestone cement may contain up to 5% limestone added later in the kilning process, which conserves on heating energy and reduces GHG's, Contempra involves the further step of intergrinding regular clinker — the main conglomerate ingredient in cement —

with up to 15% limestone. Clinker is the energy intensive component in cement. The clinker used to make Contempra is the same clinker that is used to manufacture regular Portland-limestone cement. Reducing the clinker content of cement in this way by adding finely ground limestone further reduces the amount of emissions associated with its manufacture.

How are Portland-limestone cement and Contempra manufactured? All cement begins by feeding limestone and clay into kilns fired together at extremely high temperatures, and the heating energy (which is mostly fossil fuels today, but potentially biosolids in the future) that is required to transmute these elements generates substantial release of greenhouse gases. The Portland-limestone cement process reduces the overall amount of kiln fuel required because it feeds a percentage of the limestone into the compound, unfired, at a later stage in the process, creating a cement that performs as a construction material just as well as conventional cement does, and yet requires less fuel to create.



Contempra's manufacturing process involves an additional step, modifying the clinker (the gravelly mixed material) and limestone proportions before the final grinding takes place. The limestone, being a softer material, is ground finer than the clinker. However, both the clinker and the limestone in Contempra are ground finer than in regular Portland cement. The particle size and the particle size distribution in Contempra cement has a significant positive impact on the properties of the final product — concrete. This process of achieving the proper size and distribution of particles in Contempra cement is commonly referred to as “optimizing” the cement.

GHG-reduced Contempra and PLC are fully market-competitive alternatives that are ready for universal industry adoption. The C.A.C. advises that Contempra is:

- Currently priced about the same as conventional cement. (Note that the major cement manufacturers in Ontario, which include local B.C. manufacturers LeHigh and LeFarge, have all co-signed a letter affirming that there is no additional cost to the use of PLC versus general-use cement.)

- Manufactured in ample quantity today by the lower mainland's two primary cement makers, Lafarge (in Richmond) and Lehigh Hanson (in Delta), which have indicated that they can readily increase production as needed to meet market demand.
- Already in active use among 135 “ready-made” concrete facilities throughout B.C. and 17 pre-cast concrete producers.

Climate-action leadership means taking the next logical step to advance safe and competitive local building practices in defense of our climate. Port Moody has committed itself to take bold actions to fight climate change. This proposed introduction of a requirement to use either PLC or Contempra in future construction within our city appears to be one GHG-reduction initiative that can be implemented relatively quickly and easily with minimal disruption to construction methods and costs. The report directs staff to investigate this opportunity and report back on the feasibility and timeline for implementation.

Other Options

- 1) THAT the report dated September 28, 2019 regarding Recommendation to Reduce Local GHG Emissions by Requiring Portland- Limestone Cement in All Future Construction within Port Moody from Councillor Hunter Madsen be received for information
AND THAT public and private construction in Port Moody be permitted to continue deploying conventional cement that, at the discretion of the builder, contributes a higher level of destructive greenhouse gas emissions to our atmosphere.
- 2) THAT staff assess the feasibility of requiring PLC or Contempra cement only in public projects, not in private construction.

Financial Implications

To be determined: implementation of this initiative may entail some expense related to industry consultation, bylaw modification, and industry communication.

Communications and Civic Engagement Initiatives

If adopted, City may choose to communicate to the public regarding this climate-action initiative and the rationale for undertaking it.

Council Strategic Plan Objectives

Council's approved Strategic Plan for 2019-2022 calls upon Council to

- “Provide leadership in climate change by thinking globally and acting locally.”
- “Respond and adapt to climate change through planning and policy development.”
- “Address global climate change with local actions.”

Attachment(s)

1. Climate Emergency Declaration – Report by Councillors Amy Lubik and Meghan Laht (May 15, 2019)
2. Contempra Fact Sheet – Cement Association of Canada

3. Contempra™ and Portland Limestone Cement and Their Use in Lower-Carbon Intensity Cement
4. Environmental Product Declaration – GU (General Use) and Portland Limestone Cements

Report Author

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