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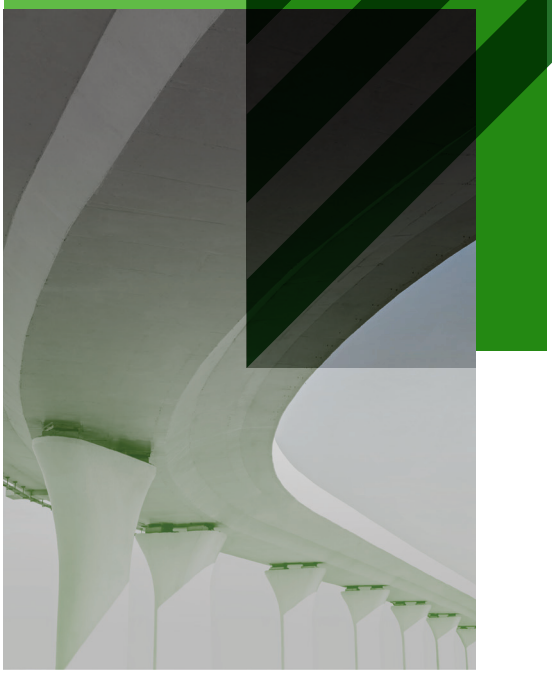
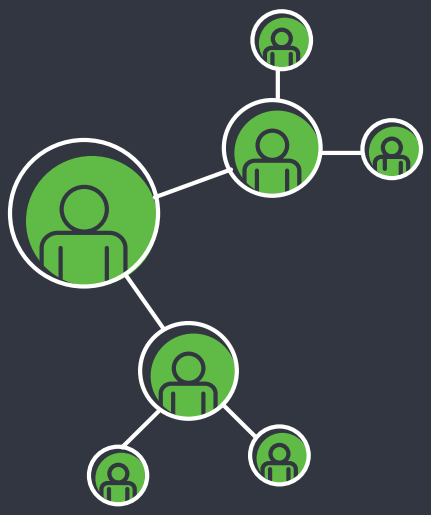
THE LOCAL VOICE OF CONCRETE

Concrete is the world's most used material after water and is the most used man-made product on the planet. Concrete is more than just a building material:

- It defines our history through infrastructure, providing the foundations for human societies that have lasted millennia, and telling the story of where we have been.
- It defines our present; it provides homes and offices, it connects communities, it encourages trade, it provides energy and clean water, it enables the delivery of services such as health care and education.
- It will define our future through resiliency to climate change events, carbonation, and through innovations like 3D printing, ultra-high-performance concrete, translucent concrete, photocatalytic concrete, and many more state-of-the-art approaches to sustainable buildings that will ensure we build for life.





The concrete and cement industry in Alberta supports:

- 34,000 jobs (direct and indirect)
- $16 billion in economic impact (direct, indirect, and induced)

We are engaged and investing in Alberta communities through local jobs

Words like cement and concrete often are used interchangeably but they are different:

- Cement is an ingredient of concrete.
- Concrete is a mix of aggregates (sand and gravel or crushed stone), paste (cement and water), and admixtures

Another way to look at it is, cement is the flour and concrete is the cake.

WHY CHOOSE CONCRETE

CONCRETE IS LOCALLY PRODUCED

Typically within 160km of a project site, using local resources. This greatly reduces the environmental impact of shipping building materials to the project site over long distances.

CONCRETE IS 100% RECYCLABLE

Crushed concrete can be used as an aggregate in concrete, or as a foundation or backfilling for many applications, for example, road base.

CONCRETE IS INNOVATIVE

While cement is produced using an energy intensive process, it only represents a small portion of a concrete mixture (10 to 15 per cent), and supplementary cementing materials can replace a portion of cement in the concrete mixture.

In addition, the cement industry is making great strides through reducing its carbon footprint, from industrial efficiencies to Portland-limestone cement, to low-carbon fuels, to carbon capture technologies – making concrete one of the most innovative and low carbon building products available.

CONCRETE FEATURES MANY BENEFITS IN THE BUILT ENVIRONMENT

LIFE CYCLE COSTS

The **COST OF CONCRETE CONSTRUCTION IS COMPARABLE TO WOOD FRAME CONSTRUCTION**. A comprehensive cost estimate was conducted for a typical four-story, 100,000 square foot apartment building using costing data for Calgary, AB.

WOOD FRAME CONSTRUCTION COST	CONCRETE CONSTRUCTION COST
$16,246,633	$16,341,755 (+ 0.6%)

Concrete structures offer a level of serviceability over other materials that **REDUCES THE COST OF OWNERSHIP** over the lifecycle, including the cost of bringing structures back into use after a major disruption.

INSURANCE COSTS ARE SIGNIFICANTLY LOWER for concrete buildings during both the construction and operating phases than for buildings constructed with combustible, moisture-sensitive materials.

According to the Insurance Bureau of Canada (IBC), in 2018 insured damage for severe weather events across Canada reached $1.9 Billion. For every single dollar paid out in insurance claims for homes and businesses, IBC estimates that Canadian governments pay out $3 to recover public infrastructure damaged by severe weather.

Studies have found that for every $1 spent on hazard mitigation measures, $6 in future disaster costs can be saved.

OPERATIONAL EFFICIENCY AND CARBON PERFORMANCE

Carbon emissions from buildings are overwhelmingly associated with the operation of those buildings – primarily heating and cooling. A building's materials (initial embodied energy) represent as little as 4% of a building's climate change potential. Concrete is a material with **HIGH THERMAL MASS** capacity, which absorbs temperature variations and in turn enables significant energy savings of up to 8% compared to other building materials. A high-efficiency long service life structure will virtually negate the environmental impact of initial embodied energy.

Through a process called **CARBONATION**, concrete exposed to the air absorbs carbon dioxide from the atmosphere and is a significant storehouse of carbon dioxide – so much so that if this reabsorbed CO2 were included in greenhouse gas accounting statistics it would have a substantial impact on net emissions tallies.

Taking a whole-life cycle performance into account, concrete has a **LOW CARBON FOOTPRINT** thanks to its durability, its resilience, its thermal mass effect, its recyclability and its carbonation.

Incorporating the use of Portland-Limestone Cement reduces CO2 emissions by 10% compared to traditional cement, yet produces concrete of equivalent strength and durability.

Concrete dampens sound, which contributes to a **QUIET LIVING ENVIRONMENT** – particularly important for residential buildings in urban areas, protecting residents from noise pollution.

HIGH THERMAL MASS

CARBONATION

LOW CARBON FOOTRINT

QUIET ENVIRONMENT

DURABILITY AND RESILIENCE

Concrete is **RESILIENT IN THE HARSHEST OF ENVIRONMENTAL CONDITIONS**. It is strong enough to resist impacts, strong winds, blasts and natural catastrophes like earthquakes, tornadoes and floods (concrete does not swell, warp or rot when wet).

Concrete is **DURABLE IN ALL ENVIRONMENTS**, maintaining a finish resistant to damage from direct exposure to fire, rain, hail, UV rays, airborne pollutants and weathering conditions associated with the harshest environments. Concrete has high albedo, meaning the light-coloured surface of concrete reflects heat, whereas dark surfaces absorb heat and cause the problematic urban heat island effect.

MATERIAL SELECTION IN THE BUILT ENVIRONMENT

Construction and operation of buildings are a large source of greenhouse gas emissions. All building materials have their place in the built environment but need to be evaluated with a transparent and unbiased approach.

Efforts by the wood industry have been made to promote the greater use of wood, most notably that long-lived wood products can act as a carbon storage medium during and following their active service lives.

The fact is that much of the greenhouse gas emissions from wood production are not counted; this challenges assumptions that wood construction materials are lower carbon than other construction materials, such as concrete and steel.

Evidence from new Canadian research performed by the International Institute of Sustainable Development (IISD) shows that wood's role in reducing greenhouse gases has been overstated leading to flawed conclusions for Canadians, and less effective climate change policies and approaches.

The IISD research confirmed that Lifecycle Cost Assessment (LCA) is the best approach for analyzing the carbon cycle in the built environment and reducing emissions. However, current practices ignore emissions from "biogenic carbon", which could represent up to 72% of the lifecycle emissions of wood products.

FACTS ABOUT WOOD CONSTRUCTION

Deforestation has played a significant role in contributing to climate change. Future management of forests will play a large role in any future efforts to mitigate the effects of global climate change:

- Old-growth forests in the Pacific Northwest store more carbon per unit area than any other biome on our planet. Due to their far greater carbon storage, logging and conversion of these forests, the associated carbon debt could take up to two centuries to repay. Old-growth forests are a non-renewable resource and store far more carbon than young forests.
- Even before a piece of lumber enters the built environment, it represents a small fraction of the initial carbon that was stored in the living tree from which it was produced. Only 15% of carbon stored in a live tree is stored in the final wood product. The timber industry transfers most of the carbon in the forest to the atmosphere as logging slash, mill waste, and processing emissions.
- To build an 18-story, 180,000 square foot cross laminated timber (CLT) building requires over 17 acres of wood. In the process, 11,533 metric tonnes of CO2 is released.
- Clear-cutting trees is the source of 12% of the world's gas emissions.

Benefits of Concrete Pavement :

- A road made of concrete provides the potential for cost savings when lifecycle costs are considered, and almost always provides significant savings on maintenance costs. Over a 50-year period, a concrete road requires only a third of the maintenance of an asphalt road.
- Concrete pavements require 66% less energy and 73% less base material (stone, sand and gravel) than asphalt pavements.
- Concrete's light colour and natural reflectance brightens roads, parking areas and sidewalks, reducing exterior lighting requirements at night by up to 24%. In addition, concrete pavement keeps communities cooler by reducing the urban heat island effect.
- Concrete roadways are made from local materials supporting Alberta jobs.

Concrete uses 66% less energy and 73% less aggregate than asphalt

Lower lighting requirements by over 24% due to better light reflection

Are made from local materials, supporting Alberta jobs

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