BUILDING CONCRETE INTO LEED CANADA – NEW CONSTRUCTION

In December 2004, the Canada Green Building Council (CaGBC) released its version of the Leadership in Energy and Environment Design® (LEED®) rating system. LEED Canada-NC (new construction) 1.0 is an adaptation of the U.S. system, reflecting Canadian environmental attitudes and economic conditions and referencing the country's legislation, standards and government programs.

LEED is a rating system used to evaluate a building's environmental performance. As with its U.S. counterpart, LEED Canada allows projects to earn points for environmentally responsible actions taken throughout the building process in 5 key categories: sustainable sites, water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality. As a sustainable material, all concrete products can play an important role in attaining LEED certification for projects seeking recognition for their green building strategies.

The adoption of LEED for new construction by federal, provincial and municipal governments across Canada, including Public Works and Government Services Canada suggests that LEED is here to stay its use will continue to grow.

Although the use of supplementary cementitious materials such as flyash and slag in concrete is the most commonly known means of reducing its environmental impact, what is not commonly recognized is concrete's ability to make a significant contribution towards water efficiency, energy and atmosphere, materials and resources as well as the indoor environmental quality categories within LEED. In fact, a concrete project can earn from 13 to 23 of the required 26 points for base-level LEED certification.

A prime example of how concrete can make such a significant contribution is through the product's inherent heat storage capacity (thermal mass) that can be leveraged to reduce the HVAC equipment size in a building. All concrete products can actually help to moderate indoor temperature extremes and reduce peak heating and cooling loads, thus reducing the overall energy required to heat and cool the building and making concrete an excellent solution to achieve energy and atmosphere LEED points.

Below you will find a summary of how the use of cement and concrete products can contribute to your LEED Canada-NC project. This list essentially offers a summary of the possibilities. Detailed information on each of these applications can be found on the Cement Association's website at: www.cement.ca or at www.sustainableconstruction.ca. Please contact the CAC for its complimentary CD Guide to Sustainable Design with Concrete to enhance your next green building project.

Securing LEED® Points with Concrete

Sustainable Sites		Points
Credit 3	Redevelopment of Contaminated Sites	1
Credit 5.1	Reduced Site Disturbance, Protect Open Space	1
Credit 5.2	Reduced Site Disturbance, Development Footprint	1
Credit 6.1	Stormwater Management, Rate & Quantity	1
Credit 7.1	Heat Island Effect, Non-Roof	1
Energy and Atmosphere		**Points**
Prerequisite 2	Redevelopment of Contaminated Sites Minimum Energy Performance required	
Credit 1	Optimize Energy Performance	1-10
Materials and Resources		**Points**
Credit 1.1	Building Reuse, Maintain 75% of Existing Shell*	1
Credit 1.2	Building Reuse, Maintain 95% of Existing Shell*	1
Credit 2.1	Construction Waste Management, Divert 50%	1
Credit 2.2	Construction Waste Management, Divert 75%	1
Credit 4.1	Recycled Content, Use 7.5% (post-consumer plus _ post-industrial)	1
Credit 4.2	Recycled Content, Use 15% (post-consumer plus _ post-industrial)	1
Credit 5.1	Regional Materials, 10% Extracted and Manufactured Regionally	1
Credit 5.2	Regional Materials, 20% Extracted and Manufactured Regionally	1
Credit 8	Durable Building	1
Innovation and Design Process		**Points**
Credit 2	LEED Accredited Professional	1
Project Totals		**23***

*Points for Building Reuse cannot be obtained on the same project as those for new construction.

As indicated in the chart above, concrete projects provide a solid starting point from which your building can achieve LEED certification.

LEED GREEN BUILDING CERTIFICATION LEVELS

LEED Certified	26 – 32 points
LEED Silver	33 – 38 points
LEED Gold	39 – 51 points
LEED Platinum	52 – 70 points

CEMENT, CONCRETE PRODUCERS CALL ON FEDS TO MAKE INFRASTRUCTURE NATIONAL PRIORITY

Representatives from the Canadian cement and concrete industries met with Members of Parliament from all parties and all regions on Parliament Hill on October 25 to lobby for significant, long-term and permanent funding for sustainable infrastructure.

Strategic investment in infrastructure will facilitate greater commerce, trade and tourism while lowering the cost of doing business. Furthermore, investment in modern, durable infrastructure will enable and facilitate the kind of transformative economic change envisioned by the Government of Canada's Project Green.

"Governments shouldn't just invest in infrastructure, but should invest in infrastructure that lasts longer, performs better and allows more people and goods to travel more efficiently and cost effectively," says Alan Kreisberg, president of Western Cement, Lafarge North America Inc. and chair of the Board of the Cement Association of Canada. "Furthermore, leveraging infrastructure investment can and should play a critical role in enhancing energy efficiency and reducing emissions of greenhouse gases."

Noting that the Minister of State (Infrastructure and Communities) is already linking infrastructure and sustainability issues, the cement and concrete industries confirmed support for this approach, provided a sound decision-making framework, such as Life-Cycle Assessment (LCA), supports it.

With Canada's infrastructure deficit now pegged at $60 billion and growing, and given the associated opportunities, the industry urged the federal government to demonstrate to Canadians that infrastructure is a national priority.

"Recent polls show infrastructure ranks among the top priorities for Canadians," says Ron Schimpf, manager, Lehigh/Inland Medicine Hat, Alberta and president of the Canadian Ready-Mix Concrete Association. "If the federal government intends to address Canada's infrastructure gap, the Minister of State for infrastructure should have a full-time seat at the Cabinet table."

Cement is the critical ingredient in concrete and more concrete is used in construction than all other materials combined. Canada's cement and concrete industries contributed more than $6.6 billion to the Canadian economy in 2004 and employ more than 26,000 Canadians from coast to coast.

NEW CANADIAN STANDARD A3000-03

The 2003 edition of CSA A3000, Cementitious Materials Compendium, was consolidated into two product and three testing standards.

The first edition of the A3000 compendium, published in 1998, began consolidation of test methods contained in Standards A5, A8, A23.5, A362 and A363. Redundancies and inconsistencies were eliminated and the test methods were compiled into a new CSA A456 series.

With the second edition of the CSA A3000 compendium the consolidation is complete (see box). Changes in CSA A3001 – Cementitious Materials Portland Cements—Changes in CSA A3001-03 include new nomenclature for portland cements: two-letter descriptive type designations (see Table). The former Type 20 cement was split into two types by intended use; MS for moderate sulfate resistance and MH for moderate heat of hydration. Blended Hydraulic Cements—The nomenclature for blended hydraulic cements has been modified to a three-letter descriptive designation to address its equivalent performance to portland cements with up to three supplementary cementing materials (see Table).

Upon request, the designations for blended cements can also provide information on the composition of blended hydraulic cements. The designations then follow the form: BHb-Axx/Byy/Czz, where BHb is the blended hydraulic cement type, xx, yy, and zz are the supplementary materials used in the cement in proportions A, B, and C respectively. Covered supplementary cementitious materials include ground granulated blast furnace slag (S), silica fume (SF), natural pozzolans (N), and fly ash (Classes F, CI, and CH). Class F, CI, and CH fly ashes are low (less than 8% CaO by mass), medium (between 8% and 20% CaO by mass), and high calcium oxide (more than 20% CaO by mass) contents, respectively.

Blended Supplementary Cementing Materials—Blended SCMs are designated as BMb and have reporting requirements similar to blended hydraulic cements.

Summary of Additional Changes
Other points of interest in the new A3000-03 include:

- Provisions are given for blended hydraulic cements consisting of a portland cement and up to three supplementary cementing materials and blended supplementary cementing materials containing up to three components
- A provision has been included for the testing of processing additions when slag, fly ash, or natural pozzolans are present
- The C3A limit for MH and MS (A3001-98 Type 20) has been revised to 8% maximum, similar to ASTM C 150 Type II
- The maximum silica fume content of blended hydraulic cements has been increased to 15%
- A definition for hydraulic cement has been added: hydraulic cement is defined as either a portland cement, a blended hydraulic cement, a mortar cement, or a masonry cement
- The uniformity requirements clause has been modified to clarify that the uniformity requirement is intended for the predominant product
- Annex C has been added to explain the changes to the nomenclature of portland and blended hydraulic cement types
- Annex D has been added as a guide for the evaluation of alternative supplementary cementing materials for use in concrete CSA A3000-03 is available in English and French and can be obtained at www.csa.ca.

For more information please contact:
Richard J. McGrath, Cement Association of Canada
+1.613.236.9471, Ext. 212
rmcgrath@cement.ca
www.cement.ca

CSA A3000-03 Cementitious Materials Compendium

- CSA A3001 *Cementitious Materials for Use in Concrete*
  supersedes A5 (Portland Cement)
  A23.5 (Supplementary Cementing Materials)
  A362 (Blended Hydraulic Cement)
  A363 (Cementitous Hydraulic Slag)
- CSA A3002 *Masonry and Mortar Cement*
  supersedes A8 (Masonry Cement)
- CSA A3003 *Chemical Test Methods for Cementitious Materials for Use in Concrete and Masonry*
  supersedes A456.1 (Chemical Tests)
- CSA A3004 *Physical Test Methods for Cementitious Materials for Use in Concrete and Masonry*
  supersedes A456.2 (Physical Tests)
- CSA A3005 *Test Equipment and Materials for Cementitious Materials for Use in Concrete and Masonry*
  supersedes A456.3 (Material and Equipment)

This story is reprinted with permission from the Cement Association of Canada (CAC) and the Portland Cement Association (PCA). Richard J. McGrath, P. Eng. is CAC's national director, codes and standards, engineered structures, based in the Ottawa headquarters, and can be contacted at Tel: 613-236-9471, Ext. 212, or email: rmcgrath@cement.ca.

Table: Type Designations for Canadian Portland and Blended Hydraulic Cements

New type designations, CSA A3001-03			Previous type designations		U.S. type designations	
cement	cement	Type descriptions	cement	cement	C 150	C 1157
GU	GUb	General use hydraulic cement	10	10E-x	I	GU
MS	MSb	Moderate sulphate-resistant hydraulic cement	20	20E-x	II	MS
MH	MHb	Moderate heat of hydration hydraulic cement	20	20E-x	II	MH
HE	HEb	High early-strength hydraulic cement	30	30E-x	III	HE
LH	LHb	Low heat of hydration hydraulic cement	40	40E-x	IV	LH
HS	HSb	High sulphate-resistant hydraulic cement	50	50E-x	V	HS

Examples:

MS—portland cement (with no supplementary cementitious materials) for use when moderate sulfate resistance is required.

GUb-30F/5SF—general use blended cement containing 30% by mass Class F fly ash (F) and 5% silica fume (SF).