AP2K 2007 Dissemination Project
Final Report

For the project:
"Dissemination Of Information
Dealing With the Use of SCMs in Concrete"

Prepared for Natural Resources Canada

by

EcoSmart™ Foundation

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Table of Contents

INTRODUCTION 3
BACKGROUND 3
PROJECT PURPOSE & OBJECTIVES 3
PROJECT ACTIVITIES 4
1) Identification of Target Groups 4
2) Development of Content and Messages to be Disseminated 5
3) Organization of a Series of Consultative Focus Group Meetings 5
4) Other Issues and Recommendations on Improvement of SCM Use 6
4.1 Position and concerns 7
4.2 Increased SCMs acceptance 7
4.3 Recommendation on Improvement of SCM use 8
5) Publication of the Project Results 9
6) Conclusions 9

Appendices:

A – Project Advisory Committee Members
B – SCM Basics Document
C – NRCan SCM Presentation
D1 and D2 – Regional Concrete & Cement Specifications Across Canada
E1 – Consultative Meeting Notes
E2 – Consultative Meeting Participants

INTRODUCTION

In late 2006 the Government of Canada, through Natural Resources Canada, commissioned the EcoSmart Foundation, with the support of an industry-government advisory committee to disseminate information on the use of supplementary cementing materials (SCMs) in Canada.

Dissemination of SCM information was carried out through the development and distribution of an brief yet informative "SCM Basics" document and a series of consultative meetings with key industry and government stakeholders in nine cities across Canada in which formal presentations were given and stakeholder feedback received.

BACKGROUND

The Minerals and Metals Program of Action Plan 2000 (AP2K) under the Supplementary Cementing Materials (SCM) program area had the objective of increasing awareness of the benefits of SCMs both in terms of Green House Gas (GHG) reduction potential and performance of concrete. It is believed that the program, together with industry course of action and other market forces resulted in increased use of SCM in concrete, displacement of Portland cement and therefore GHG reduction.

However, members of the advisory committee have identified the need to communicate to key stakeholders the results achieved when dealing with the use of SCMs in concrete and to receive feedback from industry and government officials to improve overall acceptance across Canada. The dissemination project was created to ensure distribution of current information on the use of SCMs to a range of stakeholders, particular those who perceive greater barriers to use. As the dissemination activities occurred consecutively with those from a related SCM assessment project – also contracted to EcoSmart by Natural Resources Canada – it should be noted that advantage was made of synergies when possible.

The project advisory committee was comprised of representatives from the Cement Association of Canada (CAC), Association of Canadian Industries Recycling Coal Ash, (CIRCA), Canadian Ready-Mixed Concrete Association (CRMCA), EcoSmart Foundation, National Research Council (NRC), Natural Resources Canada (NRCan), Environment Canada and Public Works and Government Services Canada (PWGSC). See **Appendix A** for details on individuals on the Advisory Committee.

PROJECT PURPOSE & OBJECTIVES

The purpose of the project was to communicate to key stakeholders the results achieved when dealing with the use of SCMs in concrete and to receive feedback from industry and government officials to improve overall acceptance across Canada.

The project sought to achieve the purpose through two objectives:

- Increasing acceptance of SCM use among stakeholders.

- Developing a better understanding of stakeholders' position and concerns.

Expected benefits of the project included:

1) Development of a better understanding of current industry position with respect to the use of SCMs in concrete.
2) Development of messages that clearly summarizes achievements.
3) Collection of feedback from key players of the industry.
4) Creation of an opportunity to increase confidence in the technology and/or address any particular issue industry might have in implementing the SCM technology.
5) Development of recommendations on how to improve future directions of the SCM program.
6) An increase in overall awareness of the success of dealing with the use of SCMs in concrete.

Summary of Project Activities

The project objectives were achieved through the following activities:

1) Identification of target groups in Canada, amongst key players of the cement, Ready-mixed concrete, construction industry and federal, provincial and municipal agencies
2) Development of content and messages to be disseminated
3) Organization of a series of consultative focus group meetings across Canada with identified target audience
4) Assessment of remaining issues in implementing the technology and develop recommendations on how to improve future directions of the SCM program
5) Publication of the project results on the web sites of the project partners: EcoSmart and Natural Resources Canada/CANMET

PROJECT ACTIVITIES

1) Identification of Target Groups

Target groups and individuals for direct consultation and dissemination were primarily identified by recommendations by three consultants sub-contracted by EcoSmart to attend, document and assist with the setting up of meetings with "key stakeholders" in the scope of the project. These groups included the cement, ready-mixed concrete, and construction industries, as well as federal, provincial and municipal agencies across Canada. Within these groups key decision makers whose influence can be critical to the increased use of SCMs were identified.

Other target groups were identified through research and discussions with the project advisory committee. Through this process, it was determined that the groups targeted for inclusion in the assessment of SCM use in Canada, should also be targeted in the dissemination activities. These groups include:

- 2002 survey respondents

- Members of advisory committee organizations (eg. CIRCA, CAC, CRMCA)
- Other related industry associations (eg. engineers, architects, contractors, developers, Canada Green Building Council (CaGBC), Canadian chapters of American Concrete Institute (ACI), Canadian Standard Association (CSA) Committee A23.1 and A3000)
- EcoSmart Foundation contacts from related projects (eg. SOS, EcoSmart Concrete, seminar attendees)
- Municipal, provincial and federal government departments (particularly transportation & public works)

2) Development of Content and Messages to be Disseminated

It was determined that the dissemination process would be most successful if it included a variety of approaches. Personal, professional and regional differences among targeted stakeholders meant that receptivity toward information in the same format would be unlikely. Therefore, content and messages were developed to include three methods of dissemination: a 2-page "SCM Basics" or "SCM Primer" document, direct audio-visual presentations, and in-person focus group discussions.

An intensive consultative process with the project advisory committee led to the development of the "SCM Basics" document. This 2-page document was intended to provide a brief overview of the key issues concerning SCMs as well as a list of other current organizations and resources available to provide further information. The format was kept simple to ensure readability and easy distribution through a variety of methods (email, website, print, etc). The SCM Basics document was uploaded to the website of the Government of Canada's Green Cement website (see: http://www.scm.gc.ca/primer.html) as well as the EcoSmart Concrete website (see: http://www.ecosmartconcrete.com/facts_scmbasics.cfm). Links to this information was also sent out with email messages announcing the SCM survey. SCM Basics hard copies were also distributed at the consultative meetings across Canada. See **Appendix B** for the SCM Basics document.

In addition to the 2-page fact sheet, Nabil Bouzoubaa of CANMET disseminated more comprehensive SCM information through presentations in each consultative meeting. These presentations were tailored to each region and outlined properties, current practices, benefits and limitations of the use of concrete incorporating SCMs. Regional specifications was also a key part of the presentations. See **Appendix C** for the presentation and **Appendix D1 and D2** for regional specifications.

After each presentation, open discussion took place on a variety of SCM related issues, depending on the knowledge, interests and concerns of the meeting participants. In each case, the EcoSmart and CANMET representatives were able to immediately respond to any questions and concerns with specific and relevant information.

3) Organization of a Series of Consultative Focus Group Meetings

Upon the recommendation of the advisory committee, five main cities were targeted for the meetings: Vancouver, Calgary, Toronto, Montreal and Halifax. An

additional five cities were selected to be included if possible: Quebec City, Ottawa, Winnipeg, Regina and Edmonton.

Meetings with individuals from industry and government took place in all five of the primary target cities as well as in four of the secondary cities. Locations covered were: Vancouver, Calgary, Edmonton, Winnipeg, Toronto, Ottawa, Montreal, Quebec City and Halifax. Severe scheduling constraints meant Regina could not be included.

Eighteen meetings were held with individuals from industry and government in nine cities across Canada. Attendance at each meeting ranged from one to eighteen people and a total of seventy-eight people, including meeting consultants and advisory committee representatives, were directly consulted in this way.

Project representatives included: Michel de Spot of EcoSmart, Nabil Bouzoubaa of CANMET and where possible, representatives of the Advisory Committee and contracted meeting consultants.

Schedule of Consultative Meetings

Date	City	# of mtgs	Organizations represented at meetings
Tue, Mar 6	Winnipeg	3	Manitoba Infrastructure and Transportation; City of Winnipeg; Wardrop
Wed, Mar 7	Calgary	1	Breakfast meeting with various industry attendees
Thur, Mar 8	Edmonton	2	Stantec, City of Edmonton
Mon, Mar 19	Toronto	3	City of Toronto; Ontario Ministry of Transportation; Trow
Tue, Mar 20	Ottawa	2	City of Ottawa; CPCI Ottawa
Wed, Mar 21	Quebec City	1	Quebec Ministry of Transportation
Thur, Mar 22	Montreal	2	Hydro Quebec; City of Montreal
Fri, Mar 23	Halifax	2	Breakfast & lunch meetings with various industry & government attendees
Mon, Mar 26	Vancouver	2	Breakfast meeting with various industry attendees; teleconference with BC Ministry of Transportation
		Total # of consultative meetings:	**18**

See below for a summary of findings and **Appendix E** for details of the meetings, participants and meeting consultants.

4) Other Issues and Recommendations on Improvement of SCM Use

4.1 Position and concerns

Most of the organizations met are perceived as very conservative toward the use of SCMs. The current specifications of some of these organizations do not allow the use, for example, of fly ash in some structural elements that are exposed to external environment, or limit its use to 15 to 25% and only during warmer season, usually between May and September. The main reasons given by representatives from these organisations with regard to the conservative attitude are summarized as follows:

Technical barriers and concerns:

- Increased setting times
- Delay in strength gain
- Scaling
- Curing
- Finishing difficulties due to lack of bleed water
- Lack of skilled labourers/placers/finishers with SCM concrete' experience.

Policy barriers and concerns:

- Performance specifications are perceived as counterproductive with regard to increased use of SCMs.
- CSA standards are perceived as not severe or not complete regarding concrete incorporating SCMs.

Economic barriers and concerns:

- Lack of financial savings using SCMs
- Concerns over increased costs associated with delays in setting times and strength gain.
- Cost related to transportation.

Other barriers and concerns:

- Regional availability of SCMs
- Concerns over future availability of fly ash if coal fired plants are restricted over environmental concerns
- Variability of sources and its effect on concrete performance
- Scheduling issues: timing of budget and project approvals limiting potential activities and products used (eg. A municipal budget approved in July often means that construction can not commence until September, reducing the amount of fly ash that can be used in colder weather)
- Negative past experience affecting current views on SCMs
- Potential aesthetic issues (eg. colour inconsistencies)

4.2 Increased SCMs acceptance

Although the above barriers and concerns still exist, most of the organizations consulted have shown openness toward the use of SCMs, and some are actually planning to increase the use of SCMs and to loosen their specifications. These changes in attitude are mainly driven by the following:

- Environmental benefits (GHG reductions, LEED points, sustainable aspect)
- Technical benefits (workability, cracks reduction, ASR, sulphate resistance, service life and Coulomb values)
- Economic benefits (some of the organisations believe that the use of fly ash will reduce the cost of concrete without affecting its performance)
- Other reasons include:
    - Examples of success in other jurisdictions increases confidence in the use of SCMs
    - Standards and specifications support the use of SCMs (CSA and provincial specifications such as OPSS)
    - Trust in fly ash in blended cement from the plant (standardized vs individual variable mixes from ready-mix suppliers)
    - Ability to have two mixes, adjustable by season

4.3 Recommendation on Improvement of SCM use

The following are recommendations arising from the consultative meetings regarding future activities in a variety of areas to increase the appropriate use of SCMs in Canada.

Communication & Education:

- Provide greater overall education and marketing among the public and all industry stakeholders to increase SCM acceptance and use
- Increase in the number of workshops, seminars and demonstration projects to promote SCMs.
- Create more accessible updated information for all stakeholders on durability, uses, benefits, costs, and impacts on construction schedules
- Educate focused on the builder and finisher sectors, such as demonstrations at the finisher trade schools
- Put greater emphasis on the use of appropriate levels of cement replacement where there is a real advantage over a “one level fits all” solution
- Publicise SCM successes and share positive case studies with a wide range of stakeholders

Program & Policy:

- Encourage the supply side of industry to get more involved in sustainability
- Promote the use of blended cements
- Address mistrust of ready-mix suppliers and liability/warranty issues
- Standardize the 56 days strength target in particular harmonize CSA and LEED in this respect.
- Promote use of seasonal mixes (Winter - summer)
- Improve curing through contract items, site checks and finishing procedure

Research & Development:

- Develop further testing (including test sections), field experience, case studies, research and demonstration projects

- Facilitate an integrated process as the quality of the final product depend of a system with many players (an objective that the EcoSmart's SCM Optimization System - SOS project will aim at).
- Implement quality assurance and quality control of SCM and make it accessible to the users.
- Develop more measurable performance lab-tests.

Standards & Specifications:

- Standardized specifications for SCM Concrete
- The practice of the ready-mixed industry to not reveal mix designs (CSA performance specifications) seems to be counter productive to the effective use of SCMs.
- CSA should be more stringent on high volume SCMs exposed to scaling
- LEED needs to be clarified to eliminate misconceptions and confusion on points gained by reducing Portland cement in concrete through the use of SCMs

5) Publication of the Project Results

The results of the project will be published on the websites of the project partners, EcoSmart and Natural Resources Canada/CANMET, upon approval of the final report.

6) Conclusions

The purpose of this project was to communicate to key stakeholders the results achieved when dealing with the use of SCMs in concrete and to receive feedback to improve overall acceptance across Canada. Information exchange through a series of consultative meetings complemented the findings of an online SCM survey conducted through a separate assessment project, also contracted to EcoSmart by Natural Resources Canada during the same period.

Content and messages developed for dissemination included a 2-page "SCM Basics" document and direct audio-visual presentations delivered through both the online survey and at the consultative meetings. However, the great value of the project was the communication that took place within the consultative meeting discussions. It was this open dialogue on the use of SCMs that provided the project partners (representatives of EcoSmart, CANMET and the Advisory Committee) the opportunity to target information on SCMs to each organization consulted and to directly respond to questions and concerns put forth by meeting attendees.

Feedback received during the meetings focused on current levels of acceptance and use, barriers to increased use, influences of market forces, and attitudes and concerns of stakeholders.

While there are still many barriers and misunderstandings about the proper use of SCMs, acceptance levels have increased in recent years and even many of those traditionally resistant are becoming more open to such technologies. Those who are already successfully using SCMs believe more should be done to increase

acceptance and use. Many of those with concerns about SCMs would like better information and resources and responded favourably to those disseminated in the meetings. Only a few stakeholders are rigidly resistant to considering SCMs.

Greater education, training, tools, research and clarification of policies and standards are a few of the areas where improvement could be made. This study thus achieved its goal to disseminate current and useful information on the use of SCMs and receive feedback from stakeholders to improve overall acceptance across Canada.