

SOS

202

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ECOSMART Foundation

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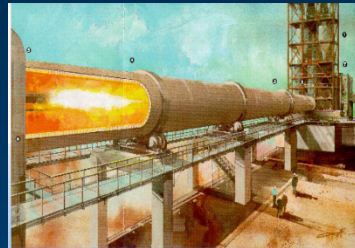
A Concrete Contribution to the Environment

EcoSmart™ Foundation

Not-for-profit organization created in 1999.

Supported by the Government of Canada.

Introduce technology innovations that reduce GHG emissions - for example in concrete.



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One tonne Clinker, one tonne CO₂

50% Process
40% Fuel
10% Electricity,
Transportation



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CO2 Emissions from Cement

World

- Total emissions: 2 Gt_{CO2}/ yr

China

- About 1 Gt_{CO2} /yr or 50% of world Total
- 40 Mt_{CO2}/yr increase

New GHG reduction target for China: 40 ~ 45% by 2020

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Reduction Strategies

1. Decrease energy intensity
 - diminishing returns
2. Increase the use of alternative fuel
 - only biofuels for CC offsets
3. Increase the use of SCM (*)
 - pre-blended at the plant
 - added in the concrete mix

(*) Supplementary Cementing Material

The logo for ECOSMART, featuring the word "ECOSMART" in a bold, sans-serif font. The "E" and "C" are green, while "OSMART" is white. A green underline is positioned beneath the "S". The background of the logo is a close-up photograph of a concrete surface.

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EcoSmart Concrete Objectives

To minimize GHG “signature” of concrete
by optimizing replacement of Portland cement with SCM
while improving or maintaining

- Cost
- Performance
- Constructability

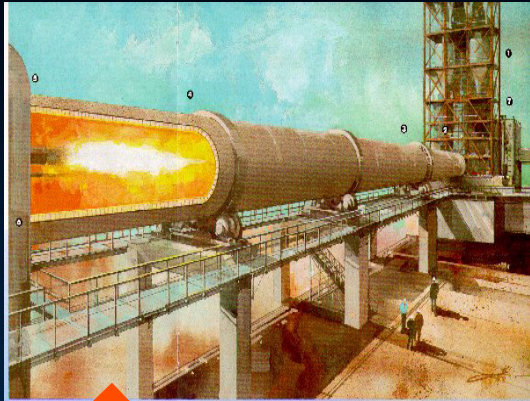


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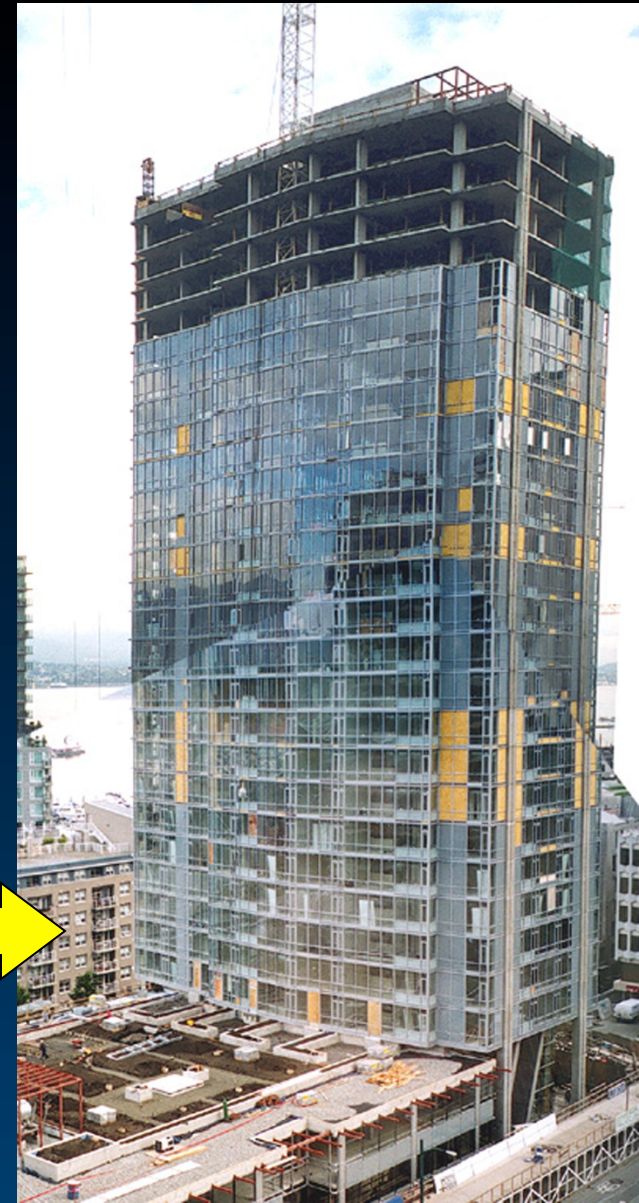
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SCM Concrete



1-X%

X%



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SCM: Zero (or low) GHG

Metakaolin



Fly ash



Natural pozzolan



Slag



Case Studies

How much SCM replacement can be achieved, what effect on:
Cost – Performance - Constructability

As experienced by

Supply

Cement manufacturers , ready-mixed concrete producers, SCM producers / suppliers

Design

Developers & owners, architects, structural engineers, Material engineers & test labs, code officials

Build

Contractors, Sub-trades (concrete placers, finishers, form installers)

Learning by doing



50% FA

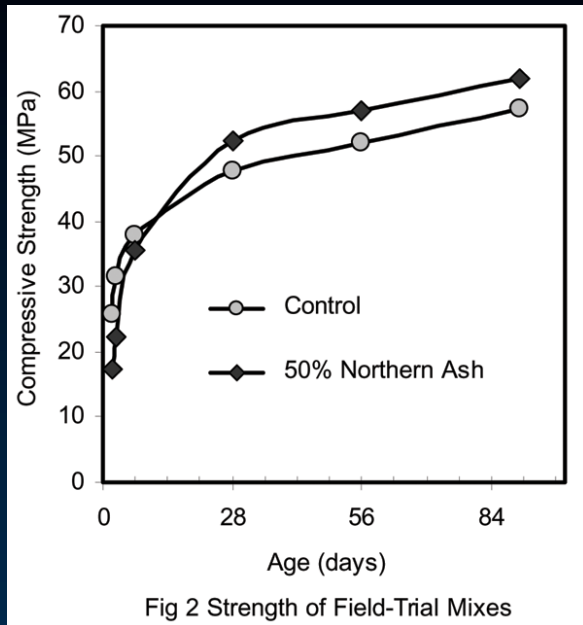


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York University Computer Science



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Seymour Water Filtration Plant

	% FA	Mpa @56d
Footings	55	30
Mass Fill	55	25
Walls and columns	40	30
Exterior Slabs	35	30
Interior Slabs	35	30
Beams	40	30
Lean Concrete	50	10

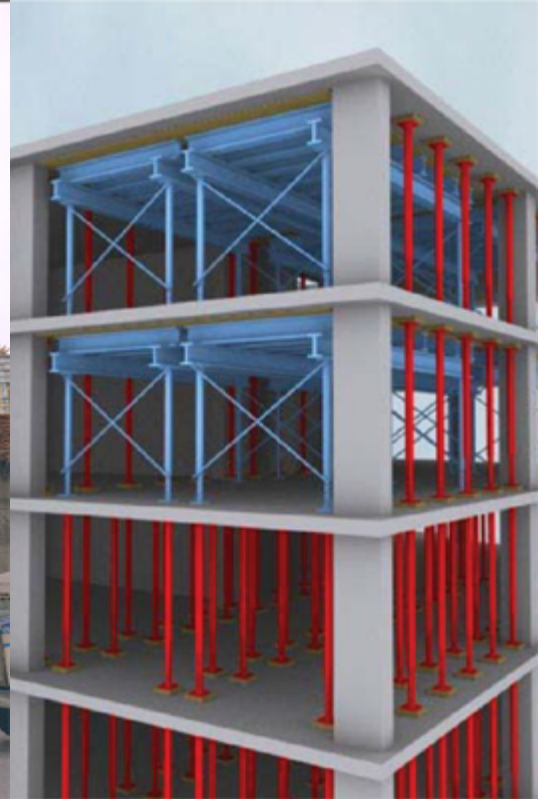


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Optimization



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Skytrain Station



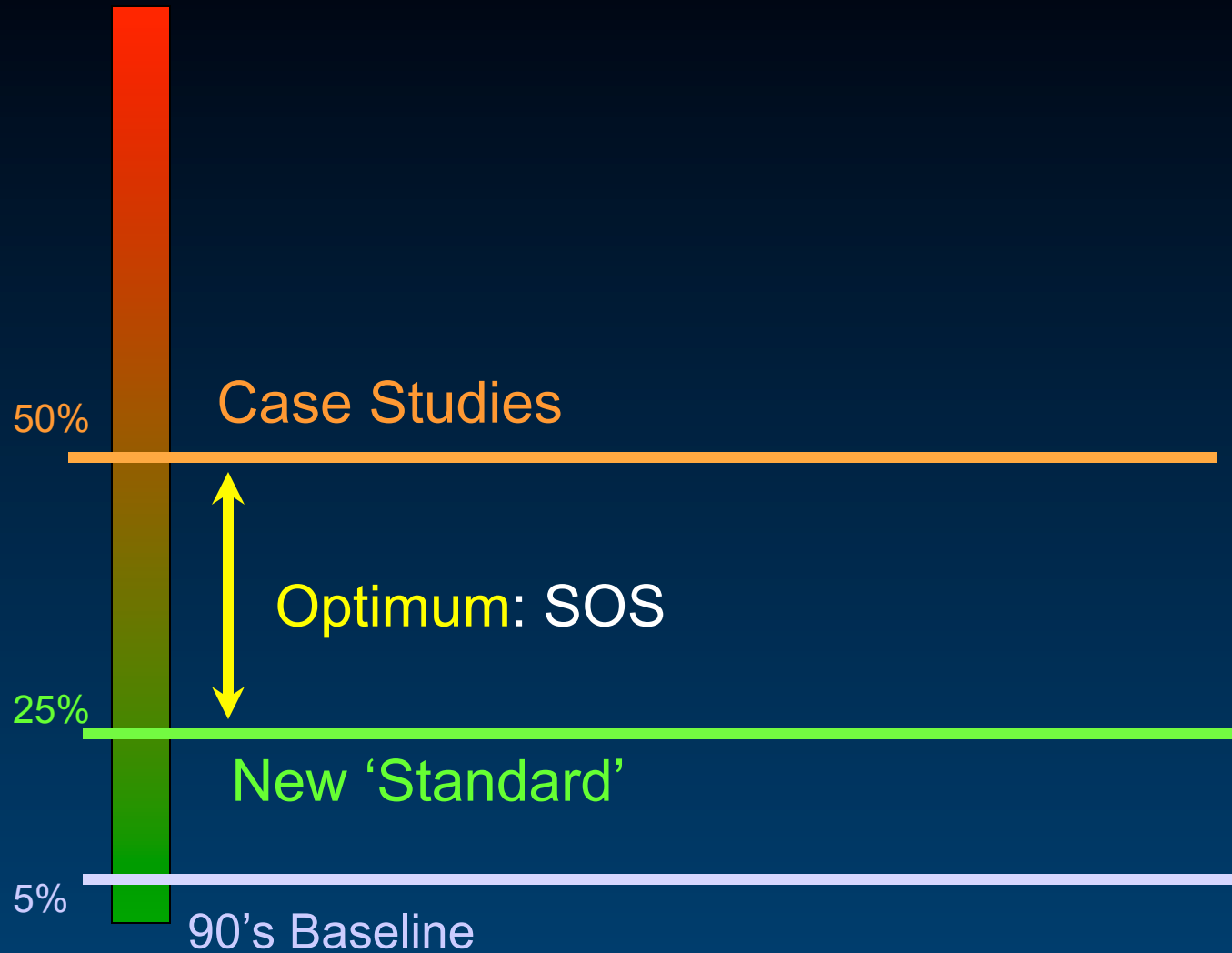
30% fly ash in pre-cast

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Replacement levels



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Parameters + Decision-makers

Material

Type of SCM: FA, GGBFS, SF, other
Cost, Availability, distance

Technical

Type of element: slab, walls, footings, ..
Strength: Stripping, 28d, 56d
Durability, resistance to scaling, exposure
Curing, carbonation
Heat of Hydration
Standards, liability

Construction

Placing, finishing, forms, curing
Setting time: Stripping and finishing
Architectural aspect : Color, texture, finish

Environment

GHG Signature
Waste reduction
Expected lifespan

Supply

- Cement Manufacturers
- Ready-Mixed Concrete Producers
- SCM producers / suppliers

Design

- Developers
- Architects
- Structural Engineers
- Material engineers & test labs
- Code officials

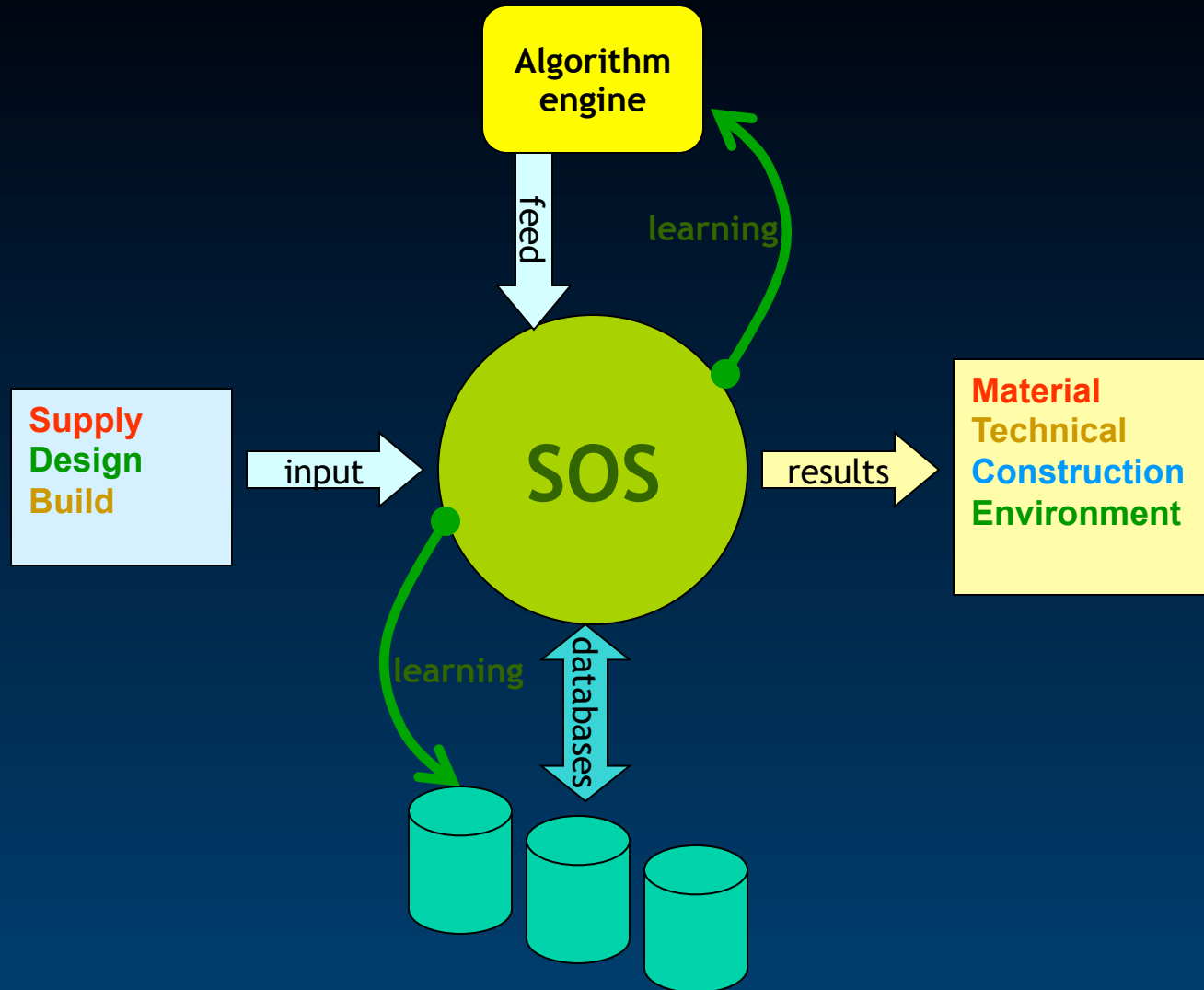
Build

- Contractors
- Sub-trades: Concrete placers

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SOS in Summary

- Web-based software, user oriented
- “Policy tool” for helping users to make better decisions when specifying or using concrete
- Support for increased use of SCM and reduction of GHG signature of concrete
- Repository of hard data and soft guidance



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Consortium

Project Manager	EcoSmart
R/D	BCIT, SIMCO Technologies
Architect	Busby Perkins + Will Architects
Developer	Windmills, Masdar (TBD)
Material Engineering	AMEC, Levelton, Golder
Contractor	Graham
Structural Engineering	Halcrow Yolles, RJC
Cement / Slag	Lafarge, Lehigh (Heidelberg), CSPA
Concrete	Unibeton (UAE)
Governments	NRC, Public Works Canada, Metro Vancouver, Environment Canada

Budget: 3,800,000 CAD\$

50% Government / 50% private

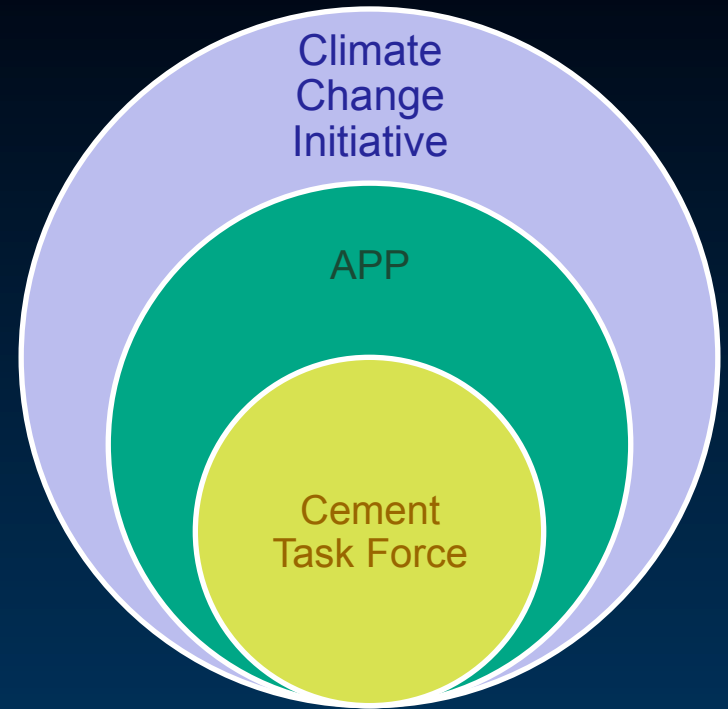
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Asia Pacific Partnership

- Climate Change Initiative
- Asia Pacific Partnership
 - 7 countries: US, China, Canada, India, Japan, Australia, S. Korea
- Cement Task Force
 - all major cement companies involved, including Lafarge
 - Develop partnerships
 - Transfer technologies
 - Share knowledge



China-Canada MOU on Climate Change



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EcoSmart APP Program

Create a partnership in China based on NA Model

Adapt SOS to China

- new database and info specific to China
- link to local suppliers and building professionals
- demonstration projects



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THANK YOU

More information: www.ecosmart.ca



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