

Technology

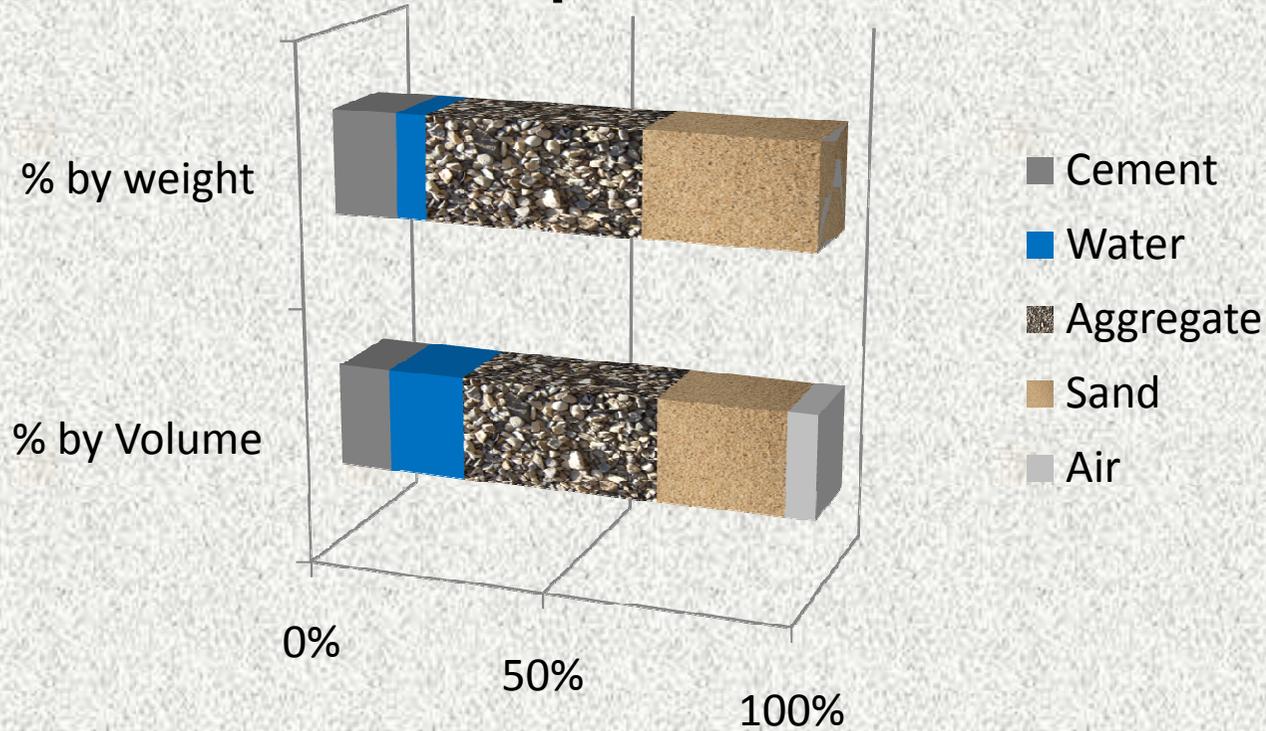


Materials

Solutions

Intelligent Concrete Design

Concrete: Proportion = Performance



Critical Factors

Cement Quality

Water Quality

Water Cement Ratio (W/C)

Mix Design (Materials & Gradation)



Calcium Silica Hydrate



WHAT IS ICD?

Intercellular Cement Densification (ICD)

optimized cement hydration and pozzolanic reaction with $(\text{Ca}(\text{OH})_2)$

“The PMT sample exhibits...an 80% relative increase in the abundance of hydrated calcium silicate (tobermorite), and a 57% relative decrease in the observed concentration of calcium hydroxide (portlandite)....”

microstructure effectively eliminates migration of gas or liquid

“...the average diameter of the intercrystalline voids within the control sample is estimated to range between 3-6 μm , approximately twice the size of the mean pore diameter reported for the PMT sample...”

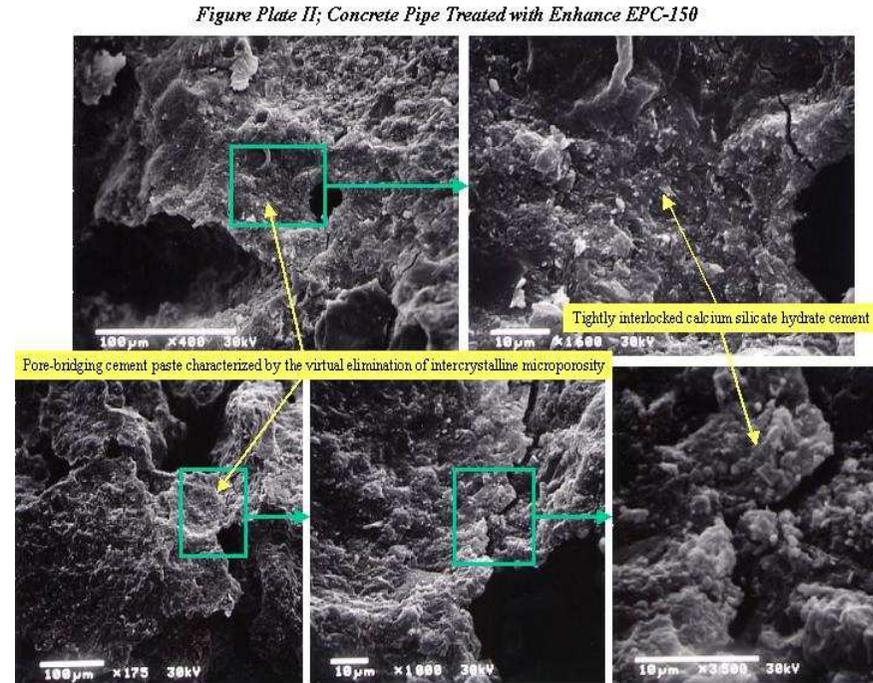
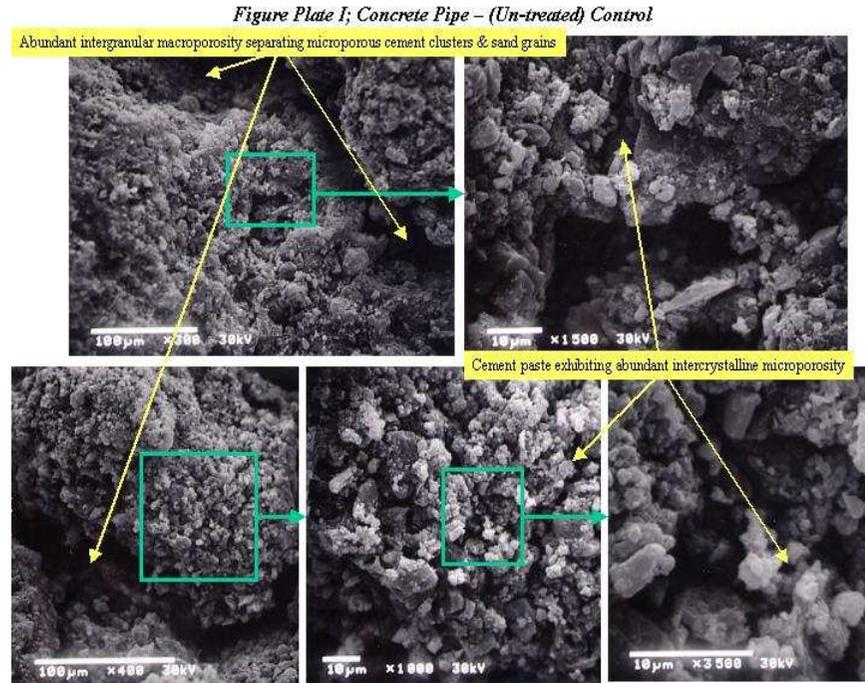
“... (PMT) concrete ... is essentially impervious to the transmission of water in an aqueous state ...”

Intelligent Concrete Design

SEM Evaluation: Proof Positive

Control

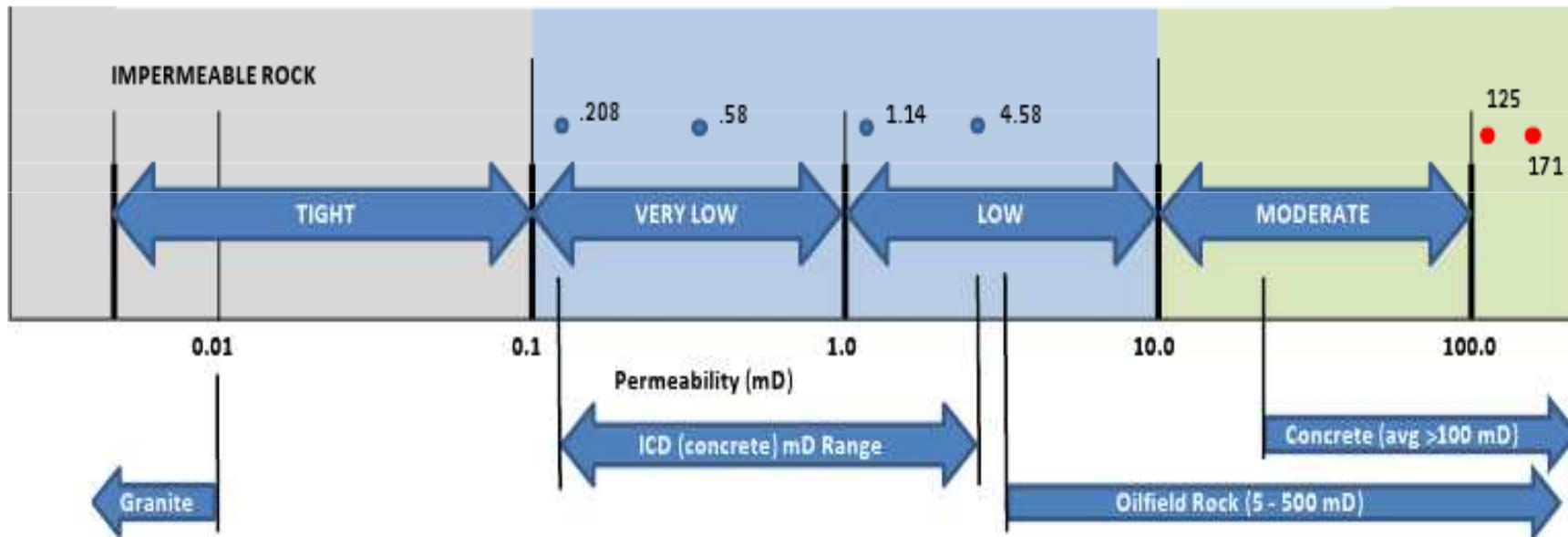
ICD



“We have never seen this duplicated in any other concrete ... a remarkable advance in the state of the science of concrete technology”

T. Murphy, PGeo.

Concrete & Rock Permeability (millidarcys)



Managing Water for Better Concrete

Control = 0.4 W/C; 171 md

Enhance PMT = 0.4 W/C; 1.14 md

Enhance PMT = 0.5 W/C; 0.58 md

Enhance PMT = 0.6 W/C; 4.58 md

Increased water ... lower permeability!

Products & Services

CONCRETE
CELLULAR
MORTAR
PLASTER
SHOTCRETE
And more ...



MIX DESIGN & MATERIALS

Cement, Aggregates, SCM ...

PRODUCT MFG & SUPPLY

ICD Technologies and more ...

CONSULTING

Testing, Projects, Training, QC ...

ICD

PMT (admix)

EPC (topical)

ESC (surface)

Enhance Lab Services / R&D



NORMAL WEIGHT CONCRETE



Properties:

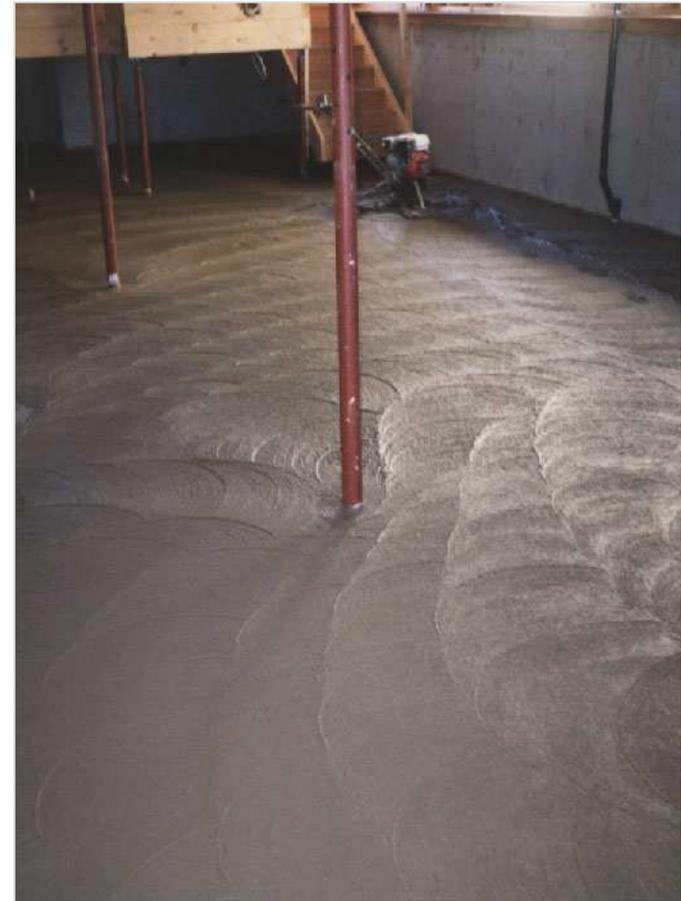
ASTM C494 Type S

> 90% permeability reduction

Curing / shrinkage advances

Hydration / water management

PMT (integral)



PMT (hydration catalyst)

CELLULAR CONCRETE

Properties:

- 400 - 800 kg / M
(concrete; 2,400 kg)
- 0.5 - 2.0 MPa
(PMT + 20-50%)
- Thermal Insulation
- Load Bearing
- Void Fill



PMT (integral)

ENGINEERING and P2P



PMT (integral)

SHOTCRETE



Corps of Engineers , 2009



A new V-Ditch Spec
Finishing Shotcrete

Only with PMT!

PMT (integral)

1 Technology / 3 Applications

Integral (PMT)



Topical (EPC)



Injection (EIF)



PMT (integral)



Condo Project, 2007

PMT (integral)

08:00

09:00

10:00

11:00

12:00

13:00

A Closer Look



Protecting the Environment



Salt Storage, 2008

PMT (integral)

1,000 cu M in 11 hrs

P2P Spec (PMT/EPC)

*Lowest ICD
permeability*

to date:

0.208-0.406md



Samples for QA

Precast Modular Salt Barns

PMT (integral)



Alberta Transportation Ministry
2009



PMT (integral)

Novatel, 1997



Glenmore Reservoir HazMat Catch basins, 1997



2 Patented Designs



PMT (integral)



PMT (integral)

Canada Trust Building, 1999



PMT (integral)

EPC (topical)

ESC (topical)

Chief Tomat Elementary, 1998



PMT (integral)

EPC (topical)

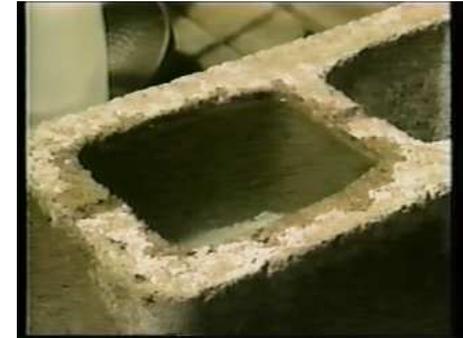
Glenrosa Junior High School, 1997

Re-Hydration Treatments (EPC)

EPC (topical)

- Cement based chemistry
- Topical application
- Environmentally friendly (water-borne)
- Non-membrane forming
- Renewable, long term treatment
- Not subject to UV
- Compatible with Sealers (if desired)

ICD: Fast & Effective



No Sealer or Membrane

Dry Breathable Block

EPC (topical)

Low, medium and high porosity solutions.

1. Water-based
2. Easy to use
3. No cure required
4. No down-time

Use any non-atomizing application method.



EPC (topical)



EPC (penetrating hydration catalyst)

Infrastructure Problems: Pipe



Failed in 22 years!

100 Yr rated AWWA Pipe

"not fit to be put in the ground"

Sulfate soils take a bite out of 1,050 mm feedermain.



EPC (topical)

Fast reacting EPC driving moisture from cracks within minutes.



EPC (topical)

EPC treated surfaces are typically ready for use or handling within 1-hour for pipe or Precast filed parts.

Calgary International Airport (YYC)
Cooling System Reservoir
2005



EPC (topical)

Out of sight, out of mind ...

500,000 gal. concrete cooling fluid reservoir.

Loss of >4.0 cu M per day due to concrete permeability.

Interior treated with Enhance EPC; joints and cracks serviced.

Trained Enhance crew ; completed in 3-days, at 45% of next closest bid.

Tested (no volume loss); restored to full service.

Industrial Applications

Leaking Sanitary Cistern



40 ft; 12 ft dia.; water @ 22 ft
Desiccated with EPC
Cavities Injection Repaired
Joints Epoxy Sealed



Before



After

EPC (topical)

Mining

Proficiencies:

Flowable Fills

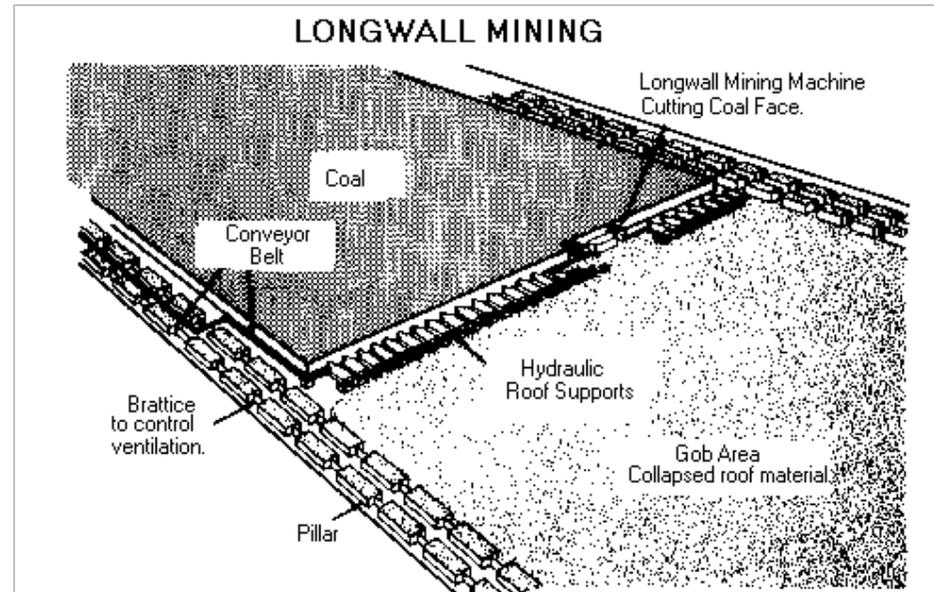
Specialty Shotcrete

Structural Concrete

Seals & Roads

Cellular Concrete

Unique Pumping Applications





Surface Prep - Critical

EPC Solves 20 Yr Moisture Problem!

Why Re-Hydration?

- Utilize dormant cement
- Resist binder (cement) & structural deterioration
- Resist moisture transmission & penetration
- Improve insulation properties & lower energy costs



Ernie Starr Arena

EPC (topical)

Positive & Negative Water Contact

Before



After



EPC (topical)

Coatings in all Climates

32-years Exposed to the Elements



EPC (topical)



Pressure wash
EPC treatment
R&R joint sealants
Apply 10-yr exterior coating

Building Solutions

Saturated, Deteriorated & Condemned!



EPC treatment
Pointing repairs
Stucco resurface
Elastomeric coating

EPC (topical)

PMT (integral)



Full restoration only with EPC!



EPC (topical)

Olympic Plaza, 2002

Moisture Protection



ESC (surface-oriented protection)

ESC (surface)

Calgary School Board
Carma Developers LP
H&H Commercial Stucco

ICD: Solutions to Water Problems



Leaks
Everywhere!



Underground Parking, 2008

EPC treatment
Void & tie-hole fills
Crack injection

EPC (topical)

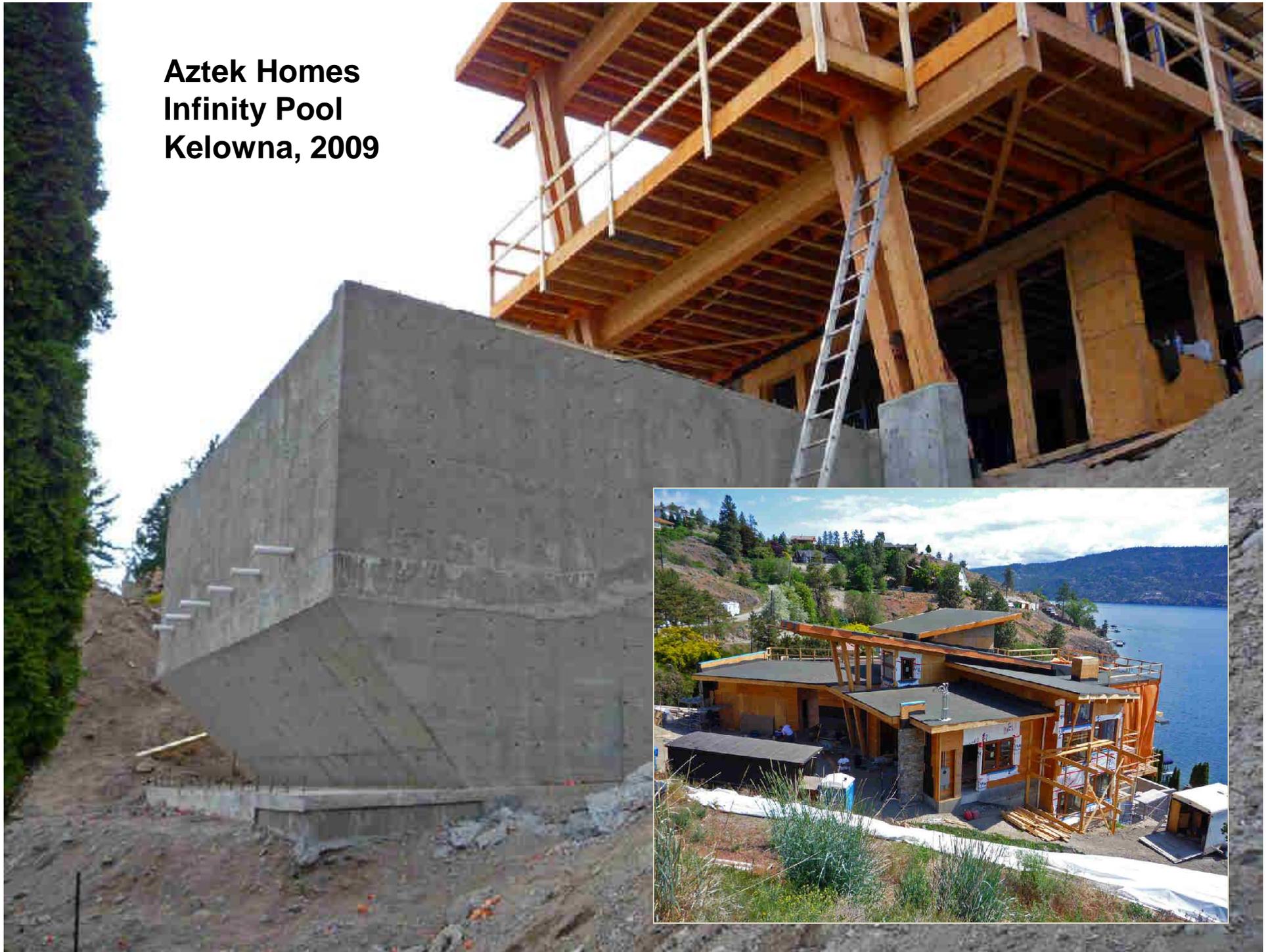
ICD helps Slabs, Decks and Floors





Port O Call Hotel, Water Park, 2009

**Aztek Homes
Infinity Pool
Kelowna, 2009**



RESTORE FOUNDATIONS



REMOVE LAITANCE



CLEAN & TREAT



REBUILD & REINFORCE



READY FOR DEVELOPMENT

Enhance ICD (Canada) Inc.

Mix Design

Materials

ICD

Consult

Supply

Tech

PMT (integral)

EPC (topical)

ESC (surface)