



“YorkU’s concrete stories”

LESSONS LEARNED

York University, founded in 1959, is Canada's third largest university in Canada with approximately 55,000 students enrolled in full time, part-time, post graduate and executive education within ten faculties and the executive learning centre. In addition we have 5,000 in a joint Seneca-YorkU programs housed in the Seneca@York and TEL complex.

Current Capital Construction Projects that commenced in 1999 (1.6 million SF of new space) and it is expected to continue until 2006-2007. The capital building program is worth approximately \$450 million dollars for proposed capital projects and renovation projects.



These projects include:

Computer Science and Engineering Building;
Arboretum Parking Garage (600 cars and office space);
The Schulich complex (which include the Schulich School of Business;
and the Executive Learning Centre;
The Student Services Parking Garage (1362 cars);
Student Services Centre Office Building);
TEL;
Pond Road Residence (410 beds);
Accolade Projects;
one more residence is in the horizon

GREEN = RESPONSIBLE

“Meeting the needs of the present without compromising the ability of future generations to meet their own needs”

(World Commission on Environment and Development 1999)

What we consider before we build ?

look at the big picture

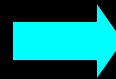
- how will the investment meet the needs?
- how will it benefit the existing infrastructure?
- how will it benefit the existing urban fabric?

assess the needs

- what to do with the existing facility
- what to put into the new facility
- how to connect to existing facilities

The Hannover Principles (prepared for Expo 2000) by William McDonough

1. sustainable co-existence
2. recognize interdependence
3. respect relationships
4. accept responsibility
5. create safe and durable objects
6. eliminate waste
7. rely on natural energy flows
8. understand the limitations of design
9. seek constant improvement and knowledge



York University's Sustainable Capital Projects Principles 2000

1. set high standards
2. expand/complement existing amenities
3. interconnect to existing buildings
4. consider construction practices
5. consider maintenance
6. improve operations
7. control consumption
8. identify constraints
9. explore innovation
10. be flexible

York U's Mandate

For Capital Projects

- **BUILD TO LAST**
100-YEARS MINIMUM
- **BUILD EFFICIENTLY**
Na 55% MINIMUM
- **BUILD TO CHANGE**
renovate, reuse, recycle

York U's FACILITIES DEVELOPMENT

Principles For Capital Projects

- **DESIGN EXCELLENCE**
- **COST EFFECTIVE/COMPREHENSIVE
APPROACH TO MEET SPACE NEEDS**
- **USE PROVEN/TESTED MATERIALS
AND METHODS**

York U's FACILITIES DEVELOPMENT

Principles For Capital Projects

- ➔ • **EXPLORE INNOVATION**
(by testing/inspection and monitoring initiatives)
- **USE CANADIAN**

Why did we re-think concrete?



Why re-think concrete?

- the production of 1 ton of Portland cement generates 0.86 tons of CO₂ emissions
- GTA has Fly ash type 'C' (North Ash) available via train to concrete plants locally



Why not?



HVFA as a cement substitute provides:

- Excellent strength gain results
- 7 days testing results exceed 28-day requirements
- Cheaper product
- Canadian product

How to make it happen?

CLIENT LEADERSHIP

Set-up a Collaborative design/construction team effort is mandatory

- **Architectural supporting vision**
- **Structural engineers**
- **Testing Engineers and Laboratory**
- **Construction Management**
- **Subtrade – formwork**
- **Subtrade – concrete supplier (plant management)**
- **Strict controls on the fly-ash product**

“YorkU’s concrete story”

Part 1

the Computer Science Building



“YorkU’s concrete story”

the Computer Science Building

Client commitment – time/money/legal

the idea from the architects

**Peter Busby and Adrian DiCatri
Busby Associates & Architects Alliance
Architects in Joint Venture**

the commitment from the structural consultant

**David Gray
Yolles Partnership Inc.**

“YorkU’s concrete story”

the Computer Science Building



“YorkU’s concrete story”

the Computer Science Building

air-tight construction documents

With no escape clauses

the right Contractor

David Smith

Ellis Don Corporation

the right Subtrade

Ontario Redi-Mix Concrete

Testing Laboratories

Davroc Testing Laboratories Inc.

“YorkU’s concrete story”

the Computer Science Building



“YorkU’s concrete story”

the Computer Science Building

Some Facts:

7,000 m³ of 50% fly-ash/cement concrete mixes
which represented approximately 100% of the total concrete
of the structure

“YorkU’s concrete story”

the Computer Science Building





“YorkU’s concrete story”

LESSONS LEARNED

with the Computer Science Building

How to make it happen?

Architect must provide a complete vision

Consultants must commit to the research and the risks

Builder must ensure that the intent is maintained

Client must be prepared to overcome all obstacles



“YorkU’s concrete story”

LESSONS LEARNED

with the Computer Science Building

What is needed to be done?

Technical expertise

Constant monitoring of documents, contracts and construction

Climatic Controls during construction

Occupants (Users) education and buy-in



“YorkU’s concrete story”

LESSONS LEARNED

with the Computer Science Building

What did not happen...

There were no cost increase

There were no compromises with the Design Intent

There have been no additional operational costs

“YorkU’s concrete story”

Part 2

the Schulich Complex: SSB - ELC



“YorkU’s concrete story”

Part 2

the Schulich Complex: SSC



“YorkU’s concrete story”

the Schulich Complex

the idea from the client
retained Davroc Testing Laboratories
Test Computer Science Structure 12 months post construction
(Carbonation and Rapid Chloride Permeability Tests)

the commitment from the structural consultant
Chris Andrews Carruthers Wallace Ltd.
Andy Kaminker Carruthers Wallace Ltd.

the reluctant architect

“YorkU’s concrete story”

the Schulich Complex

air-tight construction documents

With no escape clauses

the right Contractor

Don Griffith

Vanbots Construction Corporation

the right Subtrade

Kenaiden- James Dick supplier

StructForm-Hardrock- Dufferin Concrete supplier

Testing Laboratories

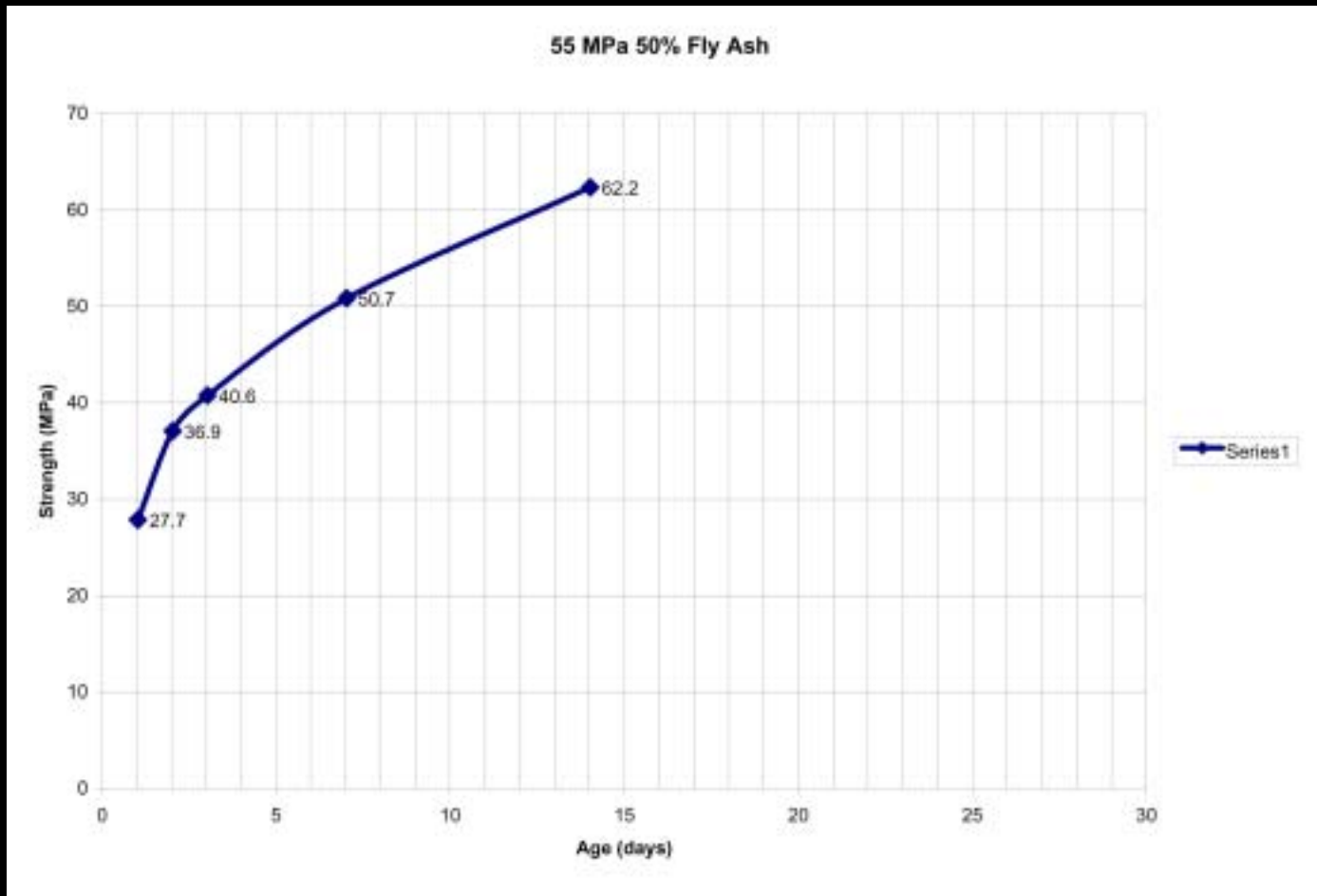
Davroc Testing Laboratories Inc.

“YorkU’s concrete story”

the Schulich Complex

Some Facts:

SSB project	100% -25% slag/cement concrete mixes
ELC project	90% - 50% fly-ash/cement concrete mixes 10% - 25% fly-ash/cement concrete mixes
SSC Parking project	100% – 25% slag/cement concrete mixes
SSC Office project	90% - 50% fly-ash/cement concrete mixes 10% - 25% fly-ash/cement concrete mixes



55 MPA results September 8, 2002 for the Executive Learning Centre provided by Andy Kaminker Carruthers Wallace Ltd.

“YorkU’s concrete story”

the Schulich Complex: SSB - ELC



“YorkU’s concrete story”

the Schulich Complex: SSB - ELC



“YorkU’s concrete story”

the Pond Road Residence



“YorkU’s concrete story”

the Pond Road Residence

The Client: **“Green Concrete” a Project Standard**

The Architects: **Adrian DiCatri, Architects Alliance**

Structural Consultant: **Shahe Sagharian, Halsall Consultants Ltd.**

Construction Documents: **With no escape clauses**

The Right Contractor: **Gian Fortuna, Kenaiden Contracting Ltd.**

The Right Sub-trade: **Ontario Redi-Mix**

Testing Laboratory: **Davroc Testing Laboratories Inc.**

“YorkU’s concrete story”

the Pond Road Residence

Some Facts:

6,200 m³ of 50% fly-ash/cement concrete mixes
which is approximately 98% of the total concrete required
for the 410-unit residence building

AND

100% radiant in-slab heating and cooling mechanical system

“YorkU’s concrete story”

the Pond Road Residence



“YorkU’s concrete story”

the Pond Road Residence



“YorkU’s concrete story”

the Pond Road Residence



Some Interesting By-Products

Consultants that are part of our process tackle it as a learning experience that allows them to expand their client base in the future;

Contractors that are part of our projects become “construction specialists and can expand their ability to handle complexities;

Subtrades become known for being able to deliver new products and get repeat business;

New markets and new material supply chains for a Canadian product are established;

Institutional projects can be the case studies to encourage commercial developments to follow the lead;

You can change the construction industry one project at a time – and have an impact;