RSIO

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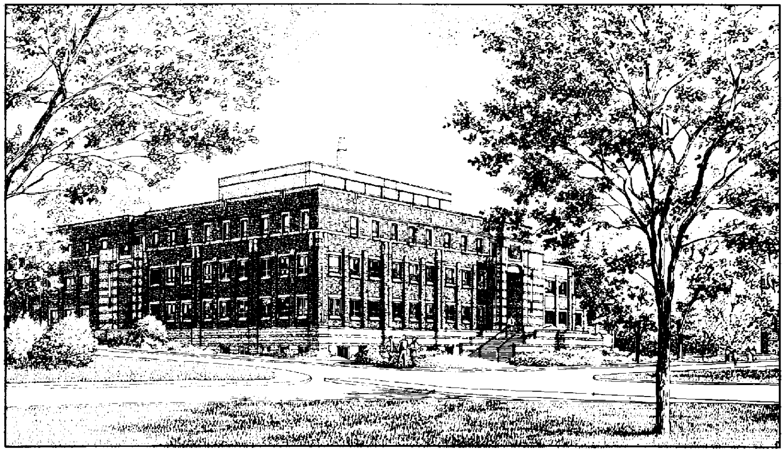
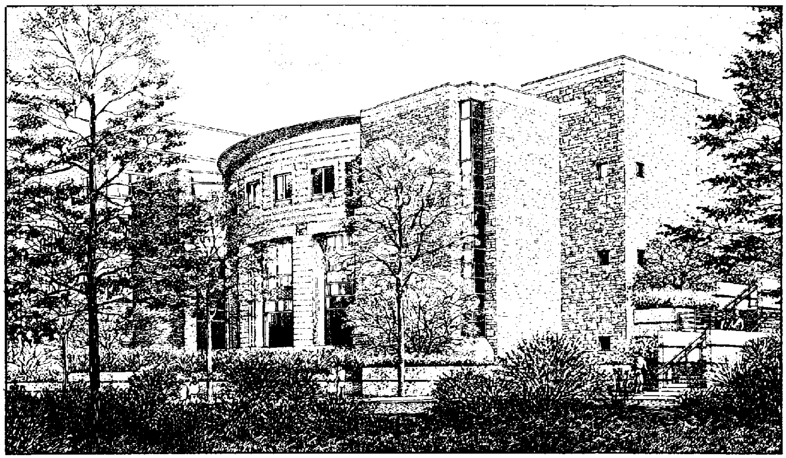
SCIENCE GOES CONCRETE AT UWO





Come September of next year, University of Western Ontario students will have two new science buildings on campus, both constructed in reinforced concrete.

Work began this March on the new 6 689 m^2 science building and a 6 317 m^2 science library, both three storey, masonry clad buildings. About 800 tonnes of reinforcing steel are being supplied to the London, Ontario project.

The reinforced concrete design provides for flexibility in the future, says project architect Gordon Robinson. He describes the two buildings as being "simple, flat slab construction" with "large, square bays" which can accommodate changes in how the buildings are used as the university's needs change. To achieve the large bay areas, columns are sited only at the perimeters.

Low floor-to-floor heights (3.84 m), achieved easily with reinforced concrete design were necessary to allow a physical linking to existing buildings with similar floor heights. The new science building will be linked by a third-floor bridge to the third floor of an adjacent Biological and Geological Sciences Building.

In what construction manager Stan Lataszak calls a "unique application," reinforcing steel was welded to a huge (18.3 m long) double I-beam in the new science building. The beam provides for clear space in the lecture hall by transferring structural loads of upper elements to other parts of the building. The beam had to be encased in concrete for fireproofing.

Epoxy-coated rebar for corrosion-resistance is being used in areas such as exterior stairways and planters.

Architect: Moffat Kinoshita Associated Inc.

Structural Engineers: Carruthers & Wallace Ltd.

General Contractor: Ellis-Don Limited

SITE INSPECTION — SELLS TILT-UP

Jack Arbess, President of Gulfstream Contractors, was confident that Spirax Sarco Canada would select him to build their new Canadian head office. The only uncertainty lay in the choice of construction method.

For some time Arbess has been an active proponent of tilt-up construction - a method whereby wall panels are cast in a horizontal position on a floor slab and then tilted into final vertical position by mobile cranes. He believes it is a superior method of construction for several reasons including speed of construction, cost, design and architectural flexibility.

Arbess suggested the people at Spirax Sarco Canada take a good look at the many benefits of tilt-up construction, explaining this system would provide them with solid, impact-resistant walls which minimize maintenance and enhance security and fire safety. The deciding factor was a first-hand demonstration.

"I took them to see a few buildings we've done using tilt-up. That's what really sold them," explains Arbess.

Construction of this 2-storey office building with a 6 metre rear warehouse section began in late March. Although lengthy rain delays interrupted work in May, the 4 000 sq. m. structure was ready for occupancy in August.

Reinforcing steel was used extensively in all panels, particularly in the more complicated, recessed spandrel panels at the front of the building. The total quantity of rebar amounts to 27 tonnes.

Arbess is unreserved in his praise of tilt-up construction and believes speed of erection is undoubtedly its most attractive feature. Since the walls are load bearing, perimeter steel was not required. "On a building this size, I would have needed a 40-man crew for brick and block. It probably would have taken three months to complete it. Instead I had a six-man crew and had it up in six weeks. You can't beat that."

Owner: Spirax Sarco Canada Ltd.

Design Build Contractor: Gulfstream

Structural Engineer: William Leung & Associates

Architect: Atkins Architect

CONCRETE KEEPS AQUATIC CENTRE AFLOAT

The Lois Hancey Aquatic Centre in Richmond Hill is a public water sport and amusement facility built of reinforced concrete. It includes a 31.8 metre by 31.8 metre pool room, a 55.4 metre water slide, a tot's pool, and a rain cloud that makes thunder and lightning. The project was designed by A.J. Diamond, Donald Schmitt and Company Architects and Planners.

During the course of the bidding review process, the general contractor, Maple Engineering and Construction Canada Ltd., suggested a cost effective change. Instead of structural steel heavy plate girders and welded wide flange beams that spanned the pool roof, the firm suggested poured-in-place concrete beams.

"The structural steel was eliminated and poured-in-place beams used instead," says Phil Smith, Maple's project manager.

"This resulted in a three percent savings on the total contract value which brought the project within budget."

The choice of concrete for the main design was never in doubt says Greg Colucci, project architect. The north wall of the project abuts a 12.3 metre hill and is partly used as a retaining wall. The structural concept is such that the floor, roof, and structural frames on the side walls all work together to hold up the massive amount of earth.

In addition, by choosing concrete, the architects were able to achieve the aesthetic values they were striving for in the project design. Through the incorporation of plastic liners they were able to get a mirror-like finish on the 9.3 metre high column in the centre of the pool room.

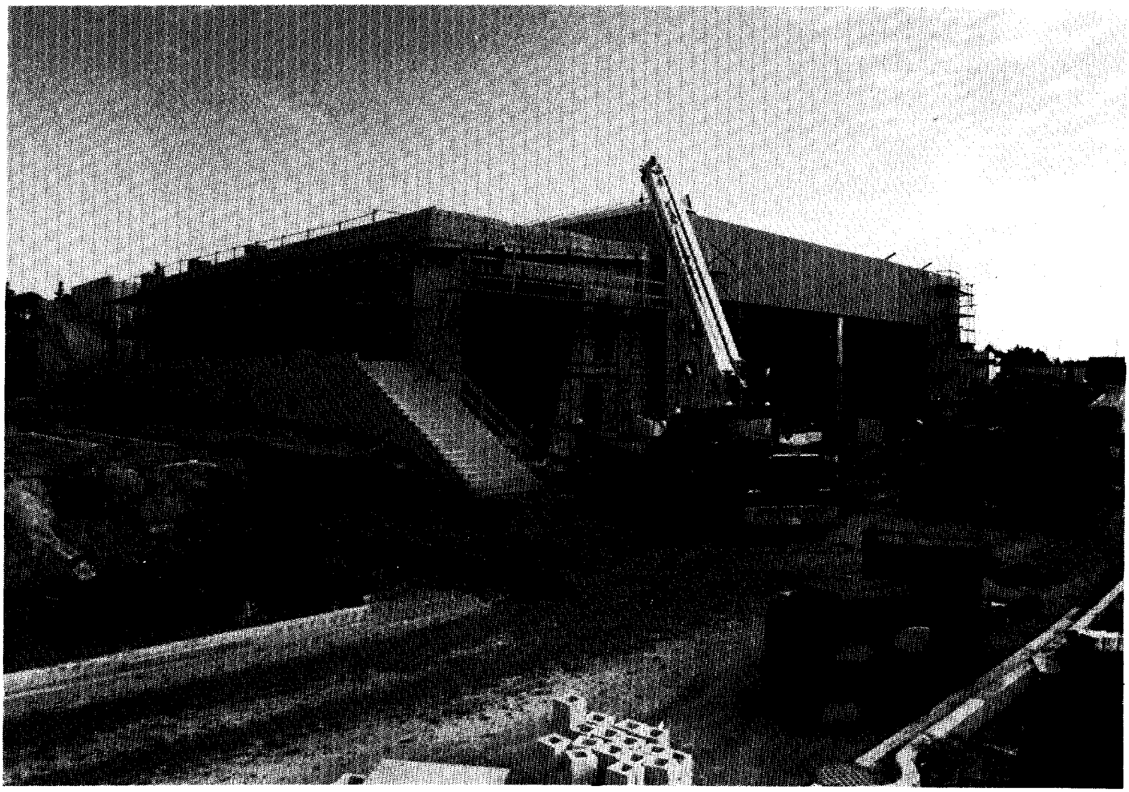
Similarly, the architects used architectural concrete to produce an undulating effect on the ceiling of the change room area.

There was one distinct challenge when placing the rebar adds Colucci. Because of the high levels of humidity in the centre (close to 70 percent), tolerances on placing the rebar to ensure adequate concrete cover were a lot tighter.

Architect: A.J. Diamond, Donald Schmitt and Company Architects and Planners.

Structural Engineer: Blackwell Engineering Limited

General Contractor: Maple Engineering and Construction Canada Ltd.



ECONOMICAL REINFORCED CONCRETE CONSTRUCTION

SUGGESTION #2: REPEAT BAR SIZES AND LENGTHS

In many instances of reinforced concrete construction repetition can have far-reaching advantages and savings. Many bars can be a few centimetres longer or shorter while still meeting design requirements.

BENEFITS:

- **FABRICATION** —
  Fewer lengths of bars are fabricated, decreasing set-up time for shearing and bending operations. Bundling operations are also reduced and shipments are loaded with greater capacity.

- **PLACING** —
  Most repetition in the field reduces the learning curve and improves placing efficiency. Fewer bundles improve field sorting and storage.

- **RESULT** —
  In addition to a much more economical structure, repetition enhances a familiarity that discourages costly mistakes.

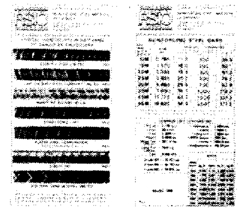
WATCH FOR!

The next in the series of ***RSIO Case History Reports.*** This one will feature CBC's Broadcast Centre Development Project.

Read how reinforced concrete plays an important role in vibration isolation.

RSIO PUBLICATIONS AND DESIGN AIDS

Manual of Standard Practice
- Industry Practices for Estimating Fabricating Detailing Placing
- Nationally accepted standard



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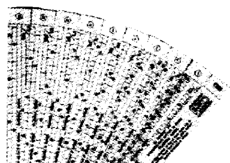
PC 2 – Rebar Identification
– Mill Markings
PC 3 – Bar information standard hooks and laps



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- 36 different scales on 9 plastic laminated strips

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