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Case History Report

Shopping Mall

Reinforced Concrete Switch Saves Time and Money on Shopping Mall

Faced with the combination of late delivery dates and unexpectedly high prices for structural steel, the co-owners of the new $80 million "The Promenade" shopping mall near Toronto abruptly switched to a reinforced concrete structure, even though the steel design had been completed. This prudent mid-course correction ensured on-time enclosure of the building at a cost which proved to be less than the best steel proposal.

A reinforced concrete clock tower in the centre court contains a computer controlled carillon.

Reinforced concrete tender saved 10% over the lowest structural steel tender.

Reinforced Concrete Saves 10%

The preliminary estimates for a structural steel frame had been acceptable, however upon calling tenders the costs were significantly higher than expected. The subsequent cast-in-place reinforced concrete tender was *10% below the lowest structural steel tender.* Had the structural steel framing been used, it would have added about 3% to the total cost of the project.

Simultaneous erection of portions of two floors allowed early starts for other trades.

Concrete Eliminates 6-Month Delay

Equally disturbing to the co-developers was that the best structural steel proposal quoted completion of erection 2½ months *behind the deadline for building enclosure*, the end of December, 1985! Because the complex had to open by August 1986 to attract consumers shopping for their fall and winter needs, such a delay could have penalized retailers by as much as 6 months of sales. Deferring the opening until spring would have been prohibitively expensive.

Reinforced Concrete — Money and Schedule Saved

Countering this "double dose" of bad news, the principal sectors of the reinforced concrete industry responded with a workable, affordable structural alternative. On site at the time, expediting a lower portion of the building, they offered lower costs and an assured structural completion date of December 1st, 1985 — adequate to keep this fast-track project "on track". Other savings were expected from earlier work starts by several trades following directly after the concrete construction.

Lively Mall

Crescent-shaped "The Promenade", enclosing 900,000 sq. ft. of gross building area, is anchored at its ends with major Sears and Eaton's department stores. The mall itself contains about 220 shops on two different levels, and professional Health, Medical and Dental, and Administrative offices on a third. The focal point of the complex is the Centre Court, featuring a cast-in-place *reinforced concrete clock tower, equipped with a computer-controlled carillon*, and emerging animated figures to signal the quarter hours.

Adaptability Eases Redesign

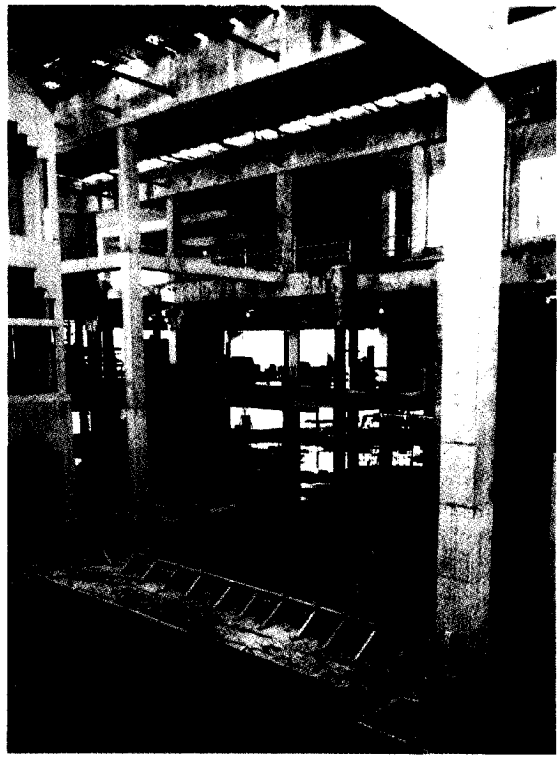
The original structural design of the mall was intended to make the most efficient use of a steel frame. It was not ideally suited for an optimum performance reinforced concrete structure. However, to save time by repeating its dimensions in the redesign, the engineer proved *that a concrete frame can successfully be substituted for structural steel, without altering the essential design parameters of the building.* These included building height, and structural member performance relating to loads, spans, depths of section, and the framing grid.

Structural completion of concrete was 3½ months faster than a comparable steel frame ensuring enclosure for winter.

Concrete was successfully substituted for structural steel without altering the design parameters.

Demanding Parameters No Deterrent

In the basic 20 ft. by 40 ft. bay grid, the 24 in. steel beams and the 6 in. deep steel deck and concrete floor slabs were replaced by a 30 in. deep by 40 ft. long continuous reinforced concrete beam and floor slab system spanning the 20 ft. direction. For certain repetitive long spans, the beams were haunched to provide the most efficient and economical concrete section. At the roof elevations, a total of 17 skylights were framed in conventionally reinforced beams, providing clear-spans up to 60 ft., with a maximum depth of section of 5 ft. 7 in.

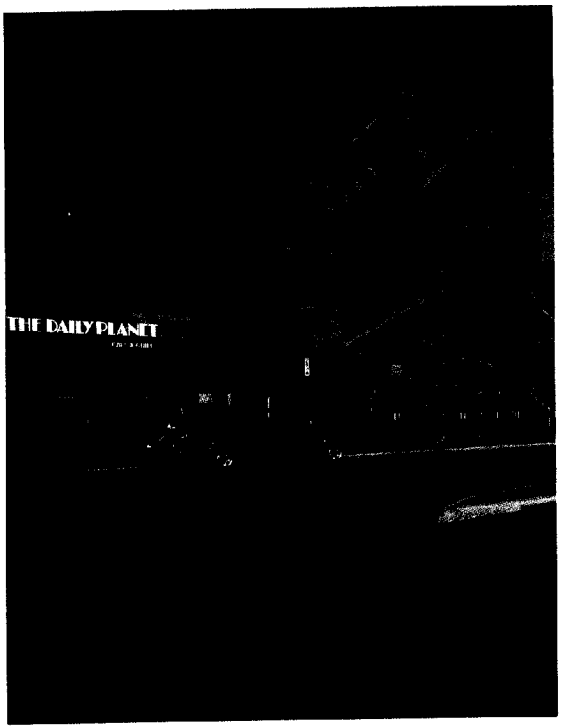


Construction Advantages Speed Work

Supplementing its wide range of design capabilities, reinforced concrete also offered a number of other construction cost and time-saving benefits. Separate fireproofing of structural steel members and placing concrete floor slabs over metal deck were eliminated. By forming and placing the concrete in tiers *(simultaneous erection of portions of two floors)*, completed sections could immediately be turned over to the mechanical and finishing trades. This enabled them to make earlier work starts, and speed completion dates.

This lively mall encloses 900,000 sq. ft. and contains 220 shops as well as professional services and offices.

The Reinforced Concrete Industry reacted quickly to save up to 6 months in the opening of "The Promenade".



Reinforced Concrete — Expanding Role in Structural Framing

On "The Promenade", the reinforcing steel subcontractor, reflecting the considerable capabilities of the industry, demonstrated a quick reflex to extraordinary demands. When paired with the concrete-forming subcontractor, the two firms proved that with only minimal structural redesign, cast-in-place reinforced concrete can be compatible with low-rise buildings, traditionally framed in structural steel. Had the structure originally been designed for the most efficient concrete grid, savings would have been even greater.

Credits

Owners: The Cadillac Fairview Corporation Limited, Toronto
The Glen Group, Toronto
Architect: Crang and Boake Inc., Toronto
Structural Engineer: Jablonsky Associates, Toronto
Construction Manager: The Jackson-Lewis Company Limited, Toronto

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