

Property Report

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CONSTRUCTION MATERIALS

Two buildings, two cities, one problem

Suspect marble panels, first in Chicago, now in Toronto, could be a result of climate change, some suggest

BY GREG McMILLAN

Twenty years ago, one of the tallest skyscrapers in Chicago, known then as the Amoco Building, was found to have a deteriorating marble facade, with cracking and bowing of panels. Owners ended up replacing more than 44,000 panels at a cost of more than \$80-million (U.S.) at the time.

Last month in Toronto, the tallest skyscraper in Canada, First Canadian Place, had a marble panel on the building's facade break loose, dropping more than 50 storeys and temporarily closing roads in the city's financial district.

The owner, Brookfield Properties Corp., says it has enlisted the assistance of facade specialists and a geologist to investigate and will not speculate on a cause.

"I am not aware of the Amoco Building situation in Chicago," said Melissa Coley, vice-president of investor relations and communications at Toronto-based Brookfield. "We have taken care of any immediate risk and safety concerns. We are not prepared to comment more at this time, until all our studies have been completed."

But striking similarities between the two buildings and the spectre of climate change offer a cautionary tale for Brookfield.

Later renamed Aon Center, the Amoco Building was built in 1972 and utilized the same type of marble that was used in the construction of First Canadian Place, which was completed in 1975. The panels, about 3.5 centimetres thick, came from Carrara, Italy.

Aon Center now has a replacement facade made up of five-centimetre-thick granite panels from Mt. Airy, N.C. Michael Scheffler, an engineer and senior consultant with WJE Associates Inc., said the Chicago-area firm was brought in to investigate the Amoco Building facade in the late 1980s after one marble panel was found to be "bowing."

WJE went on to develop recommendations for the building, and Mr. Scheffler said the entire facade replacement was done "before anything fell off" the skyscraper.

Among the WJE findings:
)) Testing revealed the marble panels had lost about 40 per cent of their original strength;
)) Loss of strength was found to be a result of 16 years of exposure to heating and cooling cycles;
)) Laboratory-accelerated weathering testing estimated that the marble panels would



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First Canadian Place in Toronto, left, and Chicago's Aon Centre were designed with facades incorporating the same kind of marble.



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Michael Scheffler,
WJE Associates

lose about 70 per cent of their original strength after 26 years of exposure;

)) Structural analysis revealed panels could not support design wind loads with the strength loss.

Once the problem was determined, all panels were braced with straps until a new facade was designed and put in place in the late eighties and early nineties, said Mr. Scheffler, who has been involved in more than 600 investigations of deterioration and distress in buildings.

He stressed that climate variations played a significant factor in the breakdown of the marble panels' effectiveness.

"We found that the use of thin marble in an environ-

ment that experiences a lot of temperature variation and moisture is not good," he said. "The marble came from Italy. Well, Italy is not Chicago or Toronto. What worked well in Italy did not work so well here."

A Canadian structural engineer, who requested anonymity, said situations such as First Canadian Place and the Amoco Building are not design flaws, but more likely based on a lack of knowledge about the materials at the time of construction.

"In these cases, the possible infiltration of rainwater into panels and the potential for it to see many cycles of freeze and thaw over the years may have the same effect as we see on our roads. Higher wind forces on upper floors would also put stresses on the cladding and in the case where a defective or weakened panel was concerned, could help loosen it."

The effect of climate change cannot be underestimated, he added.

"Climate change is probably allowing more frequent and more dramatic temperature variations to occur in regions that normally see less of this," he said. "Personally, I believe

that climactic data must now be followed more closely in order to adjust to the changes as soon as possible and determine what kinds of inspections and maintenance must be done to various structures and cladding before it becomes problematic."

While it was decided to replace the marble on the Amoco Building, that fate is not necessarily in the cards for First Canadian Place.

Depending on the strength of the marble and the design, the panels and their connections to the building's subsurface may have sufficient strength to support loads prescribed by the local building code, Mr. Scheffler said.

If the marble's strength is determined to be insufficient, remedial work, such as installing supplemental anchors may be required, if they can adequately engage the structural elements behind the panels, he said. Other factors to consider for this repair would be the cost and aesthetics, he added.

Jim Laughlin, Toronto's deputy chief building official, said Brookfield has confirmed that routine and frequent inspections of the marble cladding by professional engineers had been done prior to the First

Canadian Place incident and the company has assured that enhanced monitoring and maintenance will continue.

He said the City of Toronto has a property standards by-law that requires landlords to maintain their buildings in good repair, structurally sound and free from loose or unsecured objects and material.

"An order to remedy the unsafe condition was issued and we have been monitoring the progress of the repairs to ensure the building is safe," Mr. Laughlin said.

He said the city would be obtaining an engineer's report from Brookfield on the remedial action taken at First Canadian Place, as well as what measures it will undertake to prevent future occurrences.

Prominent Toronto developer Harry Stinson said he considers Brookfield to be a highly respected and competent building manager.

"If it [falling panel] happens again, it won't be because of the neglect of that company," Mr. Stinson said. "... If you look at the odds, look at the sheer scale with thousands and thousands of these tiles ... it is rather surprising there aren't more examples."

Special to The Globe and Mail

Realty stock monitor

Biggest one-week gainers

	Jun 8 close	Weekly change	Volume '000
Dundee REIT	\$45.40	+13.6%	3,941.2
Sterling Centrecorp	\$1.43	+4.4%	7.2

Biggest one-week decliners

	Jun 8 close	Weekly change	Volume '000
CAP REIT	\$19.24	-6.8%	820.6
Homburg Invest Inc.	\$5.58	-7.0%	272.1

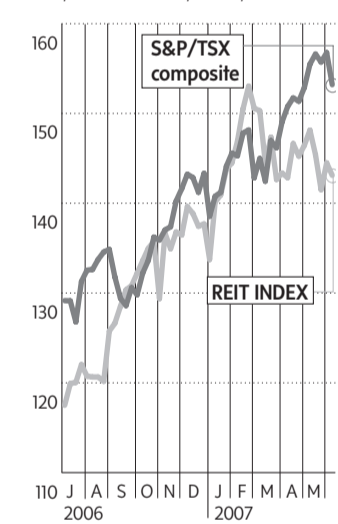
REIT watch*

	Jun 8 close	Weekly change	Y-to-d total return
Allied Prpt.	\$22.76	-1.0%	0.1%
Artis	\$17.40	-0.1%	9.1%
Boardwalk	\$44.99	-0.4%	10.5%
Calloway	\$26.12	-3.5%	-3.1%
CAP	\$19.24	-6.8%	6.0%
CHIP	\$16.20	-0.6%	11.2%
Chartwell	\$15.41	-4.1%	13.7%
Cominar	\$23.19	-0.9%	5.3%
CREIT	\$31.92	5.5%	3.2%
Crombie	\$14.05	-0.7%	10.7%
Dundee	\$45.40	13.6%	19.8%
Extendicare	\$16.75	-2.0%	18.5%
H&R	\$23.95	-1.2%	1.8%
Hunfingdon	\$2.48	-0.4%	12.9%
InnVest	\$13.34	-3.1%	0.1%
InterRent	\$5.10	1.2%	-2.1%
IPC-US	\$13.12	-2.9%	8.9%
IPC-US (S.U.S.)	\$12.40	-2.1%	19.9%
Lanesborough	\$5.20	-1.0%	-7.9%
Legacy	\$13.71	-2.1%	45.5%
Morguard	\$13.99	-6.2%	4.5%
Northern Prpty	\$25.19	0.8%	-7.8%
Primaris	\$18.67	-1.7%	1.5%
Retro. Mid-Mkt	\$6.26	-1.9%	22.8%
RioCan	\$24.99	-3.6%	1.6%
Royal Host	\$7.42	-1.7%	17.4%
Scott's	\$10.54	-0.6%	6.1%
Whiterock	\$12.55	-2.1%	-2.1%

* All REIT unit values and corresponding calculations are on a fully paid basis

S&P/TSX indexes

INDEX, WEEKLY CLOSE, JAN. 1, 2005 = 100



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GREATER TORONTO AREA

Sector	Municipality	Address	% Transferred	Price	Unit Price	Parameter
Office	Mississauga	6800 Campobello Rd.	100%	\$2,450,000	\$190	per sq. ft.
Retail	Aurora	444-446 Hollandview Tr.	100%	\$17,900,000	\$366	per sq. ft.
Industrial	Brampton	1555 Clark Blvd.	100%	\$7,383,225	\$75	per sq. ft.
Industrial	Mississauga	5835 Coopers Ave.	100%	\$3,050,000	\$100	per sq. ft.
Apartment	East York	50 Thorncliffe Park Dr.	100%	\$4,325,000	\$75,877	per unit
Apartment	Scarborough	833 Kennedy Rd.	100%	\$3,952,000	\$73,185	per unit
ICI Land	Mississauga	Danbro Cr.	100%	\$4,268,000	\$747,985	per acre
ICI Land	Halton Hills	15216 Steeles Ave. W.	100%	\$7,700,000	\$198,951	per acre

GREATER CALGARY AREA

Sector	Section	Address	% Transferred	Price	Unit Price	Parameter
Office	Calgary-SE	Deerfoot 17	100%	\$5,000,000	\$78	per sq. ft.
Retail	Calgary-SW	4822 Centre St. S.W.	100%	\$3,200,000	\$168	per sq. ft.
Industrial	Calgary-SE	5375 68th Ave. S.E.	100%	\$4,900,000	\$145	per sq. ft.
Apartment	Calgary-NW	1634 18th Ave. N.W.	100%	\$918,000	\$153,000	per unit
ICI Land	Calgary-SW	633 10th Ave. S.W.	100%	\$5,430,000	\$14,557,641	per acre

GREATER VANCOUVER AREA

Sector	Municipality	Address	% Transferred	Price	Unit Price	Parameter
Office	Delta	11861 88th Ave.	100%	\$3,800,000	\$158	per sq. ft.
Industrial	Richmond	Unit 115, 13900 Maycrest Way	100%	\$1,200,000	\$168	per sq. ft.
Apartment	Vancouver	1540 Burnaby St.	100%	\$3,750,000	\$170,455	per unit
Hotel	Burnaby	Hilton Vancouver Metrotown	100%	\$40,448,952	\$142,929	per room
ICI Land	Surrey	15535 28th Ave. & 2909 156th St.	100%	\$3,700,000	\$934,343	per acre

Source: RealNet Canada Inc. (www.realnet.ca)
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 Reid Stephens* or Stuart Elder*

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