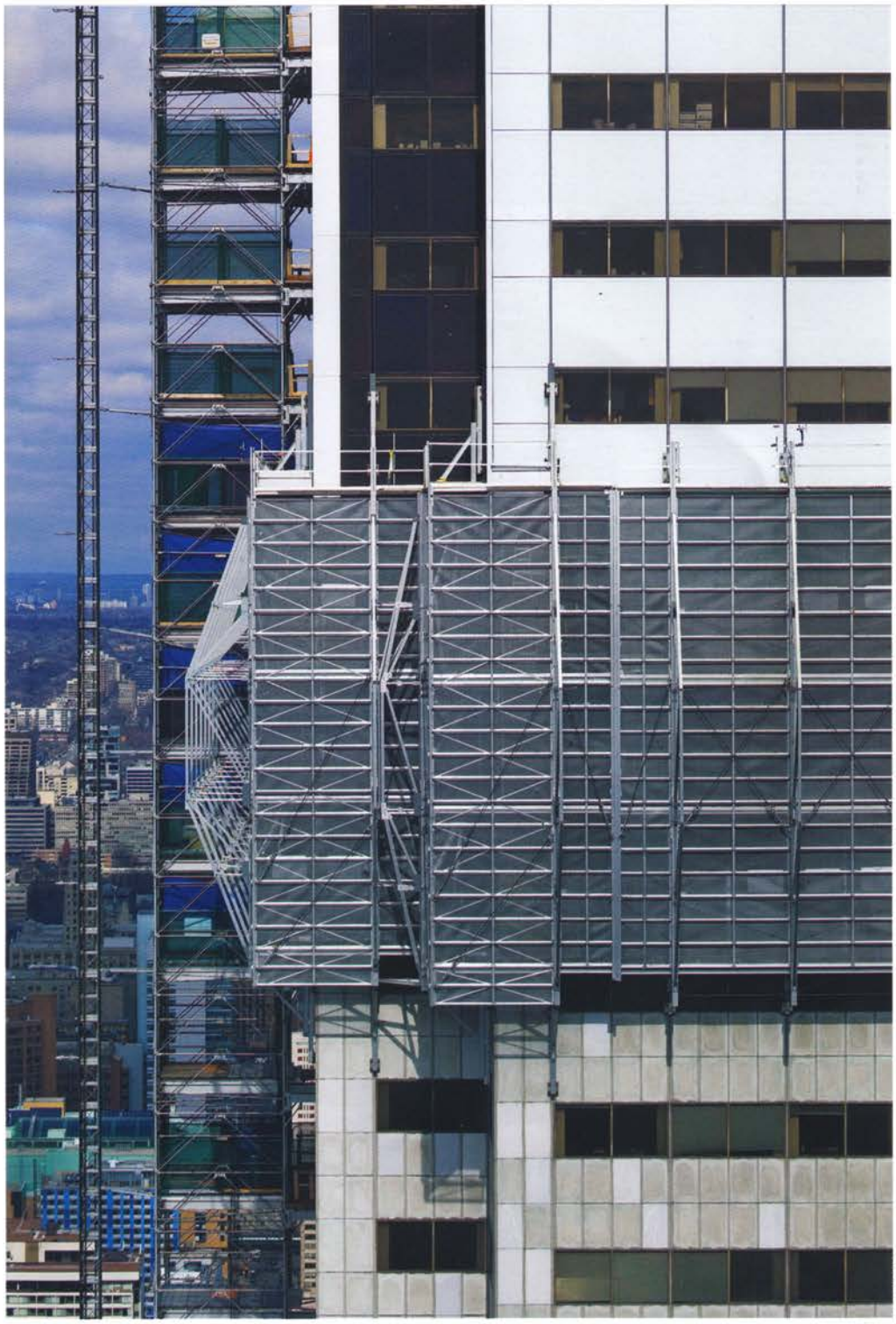
NO STONE UNTURNED

THE HERCULEAN TASK OF REPLACING OVER 45,000 MARBLE PANELS ON TORONTO'S ICONIC FIRST CANADIAN PLACE WAS MADE FAR MORE EFFICIENT THROUGH EFFECTIVE PROJECT MANAGEMENT AND PLANNING.

TEXT IAN CHODIKOFF

Since it was completed in 1975, First Canadian Place has stood as a symbol of Toronto's dominance in the financial industry in Canada. Today, the 72-storey, 2.4-million-square-foot office building remains the operational headquarters of the Bank of Montreal, and houses a large percentage of the city's top law, brokerage and finance offices. But the Type A tenants began to lose their faith in this Class A office building in May 2007 when one of the tower's stone panels loosened and tumbled 50 storeys to the street below—miraculously, nobody was hurt. This incident triggered a plan of action initiated by the building's desperate owners that resulted in an extensive $100-million energy retrofit and a complete recladding of what remains Canada's tallest office building.

Almost by definition, a skyscraper represents the embodiment of a client or client group's desire to dominate a city skyline with a symbol of corporate fortitude. Furthermore, when a skyscraper is complete, it often becomes a zeitgeist building—representing the latest in technological, economic and cultural achievements of the day. A few of the better-known skyscrapers completed over the past 80 years that have captured the imagination of the public include: the Empire State Building in New York City, the John Hancock Center in Chicago, the 30 St Mary Axe Building (formerly known as Swiss Re and informally known as the Gherkin) in London, and the Burj Khalifa in Dubai. All of these skyscrapers certainly pushed the limits of the building technology of their times, and they all will eventually require significant upgrading if they haven't already undergone costly refurbishments. For example, the retrofitting of the 1931 Empire State Building approached $550 million when it was completed in 2011. It is expected that the owners' investment will pay for itself in less than five years. High energy prices, evolving legislation to reduce greenhouse gas (GHG) emissions, and competitive real estate markets represent huge incentives for building owners to upgrade older properties. We can certainly expect that after 30 to 40 years, most high-rise buildings will require upgrading of mechanical equipment and the replacement of at least some building materials. This was the case for First Canadian Place (FCP).



TOM ARBAN

ABOVE THE CUSTOM-DESIGNED SUSPENDED ELEVATED PLATFORM HAS PROVEN TO BE INSTRUMENTAL IN RECLADDING FIRST CANADIAN PLACE IN TORONTO. THE NEWLY INSTALLED CLADDING CAN BE SEEN ABOVE THE PLATFORM.

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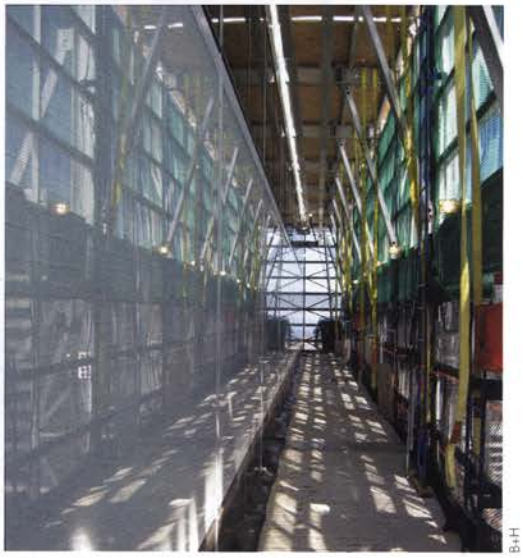

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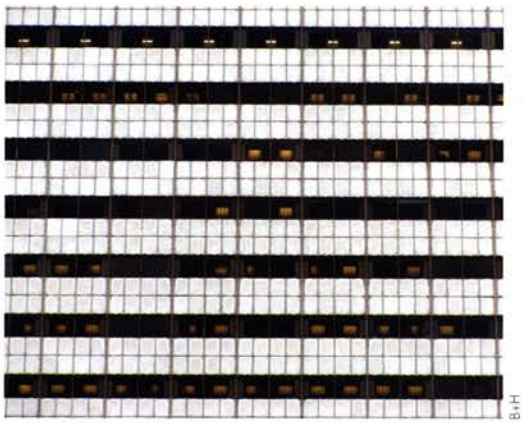
ABOVE, CLOCKWISE FROM TOP LEFT THE ORIGINAL MARBLE CLADDING; THE ORIGINAL SEALANT, INSULATION AND STONE PANELS ARE REMOVED AND REPLACED WITH THE NEW CLADDING ASSEMBLY; THE NEW UNITIZED PANELS ARE INSTALLED; THE GLASS PANELS AS THEY ARE LOADED INTO POSITION. **BELOW, LEFT TO RIGHT** AN AERIAL VIEW OF FIRST CANADIAN PLACE WHEN IT OPENED IN 1975; AN ELEVATION OF THE ORIGINAL MARBLE PANELS. **BOTTOM, LEFT TO RIGHT** THE FIRST OPTION OF THE FRIT PATTERN; A SECOND, DENSER FRIT PATTERN DID NOT RESPOND WELL TO CHANGING LIGHT CONDITIONS; THE FINAL FRIT PATTERN SELECTED FOR THE RECLADDING OF THE BUILDING.

PANDA ASSOCIATES



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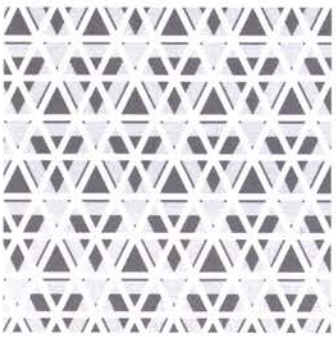

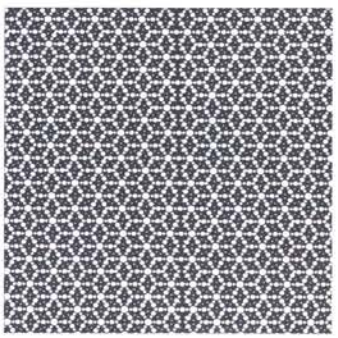

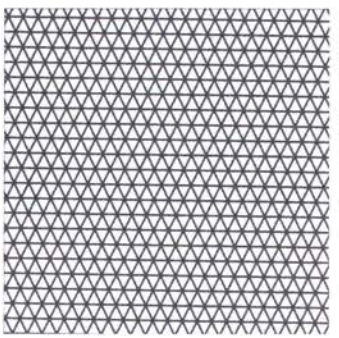

FCP was designed by architect Edward Turrell Stone, and the Toronto firm of B+H (then known as Bregman+Hamann Architects) were the architects of record. Stone happened to be the same architect responsible for another well-known skyscraper also clad in white marble and incorporating a similar tubular steel-frame structural system—the Standard Oil Building in Chicago which, at 83 storeys, was the fourth-tallest building in the world when it was completed in 1973. A year after the building opened (its name changed to the Amoco Building and it is currently known as the Aon Building), one of the marble slabs detached from the façade and crashed into the roof of a nearby building. Stainless steel straps were hastily added to hold the slabs in place until 1990 when all 43,000 of its Carrara marble slabs were replaced with granite. The final cost associated with the retrofit was well over half the original price of the building.

After the single panel fell off of FCP in 2007, Brookfield Office Properties, the owners of the property, commissioned numerous studies to determine the necessary steps that should be taken to replace its 45,000 panels, which were invariably stained and distorted in both concave or convex patterns, the result of many harsh winter freeze-thaw cycles and increased wind pressures caused by the proliferation of subsequent high-rise buildings in the downtown core over a 30-year period. Notwithstanding the deterioration of FCP's marble cladding, the construction of the building itself was very sound. Although a high-performance glazing replaced the original vision glass, the metal window frames were in near-perfect condition.

One of the greatest challenges of the FCP renovation project was to keep the building operational during the replacement of the exterior cladding, and to mitigate any inconvenience or disruption to the tenants. The building's marble panels were replaced with 5,625 white fritted or tinted glass panels designed with the engineering assistance of Brook Van Dalen & Associates. Each glass panel weighs 453 kilograms, whereas each marble panel weighed around 90 kilograms. However, one new glass unit replaces four marble panels and four glass panels, so the building has experienced considerable weight loss. Halcrow Yolles conducted much of the pre-construction engineering, including a study to determine if the building would naturally rise from its foundations as a result of its lighter mass. With the foundation firm, this was not the case.

Because of the iconic importance of FCP to Toronto's skyline, considerable effort was made to ensure that the glass panels had a similar complexity in depth and colouration as the original white Carrara marble panels. Once removed from the site, the discarded panels were used in a variety of applications such as aggregate for con-

crete, roadway construction, and a few kitchen and bathroom renovations across the city. The B+H architect team, led by principal in charge Douglas Birkenshaw, project director Kevin Stelzer, and project manager Bronwyn Sibbald, met this challenge, and went even further by improving the building's slender profile by placing tinted glass panels at the corners to accentuate the sharpness of the new cladding.

A vitally important element to the project's success was the $23-million custom-designed and built suspended elevator platform—a singularly important piece of engineering that contributed to the saving of over 1.3 million hours of labour, thereby hastening the project's timeline. This 15-metre-tall three-storey platform weighing 113,000 kilograms is constructed of standard off-the-shelf aluminum and steel components so that the structure could be broken down and used for future applications. The platform is constructed in 14 separate sections and is capable holding up to 160 workers at a time. It takes roughly three days for 80 workers to remove the marble panels on the lower floor of the platform and to subsequently install the new panels. When viewing the platform up close, it appears to be incredulously suspended from the building by attaching itself to narrow skate-like metal clips inserted into the window-washing slots on the exterior of the façade.

Once the marble panels, existing sealant, stone, and panel support brackets are removed on the lower level, special carts transfer the old material to the elevators. The upper level of the platform is where the new glass panels are installed. Each panel is hoisted onto a steel monorail running the entire circumference of the platform. As soon as the panels are in place, they are hooked onto a secondary monorail positioned closer to the building where they appear to be effortlessly lowered into position and installed. The procedure was finessed to a fine art, largely due to EllisDon's construction management experience. In fact, the entire construction site was particularly well designed to stockpile material and establish a system for the loading and unloading of special carts to remove the marble and install the new curtain wall. The double-decker loading platforms above Adelaide Street were even designed to accommodate the removal of snow from the upper platform, and is a further testament to the foresight of the design and construction team.

Construction for the retrofit began in November 2010, managing to reach the podium by the end of December 2011. The entire process of upgrading FCP's cladding and building systems enabled the owners to take this building into the 21st century while quietly reviving a tired icon that emerged when Toronto overtook Montreal as the financial capital of Canada. **CA**

LUCA VISENTIN, B+H

ABOVE A SECTIONAL DRAWING OF THE SUSPENDED ELEVATED PLATFORM ILLUSTRATES HOW THE PLATFORM SYSTEM IS ATTACHED AT THE MIDDLE LEVEL BY TIE-IN STRUTS BOLTED TO TEMPORARY BRACKETS. WINCHES ON THE ROOF SUSPEND THE SYSTEM FROM ABOVE AND MOVE IT DOWN THE FACE OF THE BUILDING USING SLOTS RESERVED FOR THE WINDOW-WASHING EQUIPMENT. WHEN THE PANELS HAVE BEEN INSTALLED, THE TIE-IN STRUTS ARE REMOVED AND THE ENTIRE STRUCTURE MOVES DOWN ONE FLOOR. **BELOW, LEFT TO RIGHT** TIME-LAPSE CAMERAS RECORD THE PROGRESS OF CONSTRUCTION.

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