

# Scotiabank Conference Centre at Scotia Plaza – Toronto, ON, Canada

## Project overview

MAPEI's carbon-fiber-reinforced-polymer (CFRP) materials were used to structurally strengthen four levels of the Scotia Plaza tower to accommodate a new conference center for Scotiabank. *Carboplate™ E 200* pultruded carbon fiber plate played an important role in reinforcing the floor on the conference center's second-floor level.



## Project information

<b>Project category:</b>	Commercial – Bank
<b>Period of construction:</b>	2015
<b>Year of MAPEI involvement:</b>	2015
<b>MAPEI coordinators:</b>	Lee Cuthbert and Jason Zeppieri
<b>Project owner:</b>	Scotiabank
<b>MAPEI distributor:</b>	Structural Contracting
<b>Original designer:</b>	Quinn Dressel Associates
<b>Architects:</b>	B+H Architects/Quinn Dressel Associates
<b>General contractors:</b>	Turner Construction Company/PCL Constructors, Inc.
<b>Concrete-restoration contractor:</b>	Structural Contracting
<b>Photographer:</b>	Bryon Johnson
<b>Project size:</b>	10,000 sq. ft. (929 m <sup>2</sup> )



## MAPEI products used

- *Carboplate E 200*
- *Carboplate E 250*
- *MapeWrap™ Primer 1*
- *MapeWrap 11*
- *MapeWrap 31*
- *MapeWrap C Uni-Ax 300*
- *MapeWrap C Uni-Ax 600*
- *MapeWrap C Fiocco*
- *Planibond® EBA*
- *Topcem™ Premix*



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## Conference center reinforced with MAPEI's *Carboplate* and *MapeWrap* products

Scotia Plaza is located at 40 King Street West in the center of Toronto's financial district. The 68-story office building houses Scotiabank's corporate operations and includes a banking center on the main floor and concourse level. The concourse level is part of the Toronto PATH system, a 19-mile (30-km) long walkway that provides underground shopping, dining and entertainment in an environment independent of above-ground weather. The garage level is situated below the concourse.

In the planning for two years, a project to develop a banking conference center on the second-floor level of the Scotia Plaza tower came to fruition in 2015. Quinn Dressel Associates, an Ontario engineering firm, designed the project, which includes structural-strengthening beams in the ceiling of the garage level, the concourse level (that houses the bank's vault) and the main floor.

On the second-floor level, a new concrete surface was poured over corrugated steel plates to cover the open atrium and provide extra space for the conference center. Beams in this area were structurally strengthened, and the entire existing floor on this level needed reinforcement to increase the live load capabilities to greater than 50 lbs. per sq. ft. (22,7 kg per m<sup>2</sup>) – a requirement of the building code for the conference center.

### MAPEI products on the jobsite

MAPEI's carbon-fiber-reinforced-polymer (CFRP) composite systems were used in the two phases of the project.

Phase one was carried out by general contractor PCL Constructors, Inc. For the structural-strengthening work, PCL employed Structural Contracting, who worked with MAPEI to special order **Carboplate E 250**, an ultra strong custom carbon fiber typically used in the aeronautical industry. *Carboplate* products are pultruded carbon fiber plates used to strengthen load-bearing members in buildings where their structural systems have been modified due to new architectural requirements or change in use.

*Carboplate E 250* was applied on the horizontal overhead surfaces of support beams on the garage-level loading dock area and on the concourse level where the bank vault is located. Access and security were very tight in this area, as armored trucks were loading and unloading currency on a strict schedule.

*Carboplate E 250* was bonded to the beams with **MapeWrap 11**, a thixotropic epoxy putty. *MapeWrap 11* was applied over a layer of **MapeWrap Primer 1** to the concrete beams. *MapeWrap 11* was also used to cover the backs of *Carboplate E 250*, creating an exceptionally strong bond when *Carboplate E 250* was set in place.

The vertical surfaces of the support beams were covered with **MapeWrap C Uni-Ax** and **MapeWrap 31** epoxy resin using the dry-layup application method. *MapeWrap C Uni-Ax* products are high-strength uni-directional carbon fiber fabrics with high modulus of elasticity for use in the reinforcement of load-bearing elements.

The vertical surfaces were also supported with **MapeWrap C Fiocco** anchors. These anchors are a cord made from mono-directional high-strength carbon

fiber, which are used particularly for flexural and shear strengthening. Holes were drilled in the upper part of the concrete beam at a 45-degree angle, and the corded end of each anchor was embedded in the holes with *MapeWrap 11*. The splayed end of the anchor was secured to the surface with an additional layer of *MapeWrap C Uni-Ax* and *MapeWrap 31*.

On the main floor and second-floor level, general contractor Turner Construction Company also used MAPEI's CFRP products. On the ceiling of the main floor, **Carboplate E 200** was used on the horizontal overhead surfaces of the beams supporting the second floor.

On the second floor itself, 22,966 ft. (7 000 m) of *Carboplate E 200* was applied with *MapeWrap 11* and *MapeWrap Primer 1* in a side-by-side layout to cover the entire existing floor (10,000 sq. ft. [929 m<sup>2</sup>]). This extensive use of structural strengthening was employed to ensure support for added live load due to the large number of attendees and their equipment that would fill the conference center during conventions and meetings.

After *Carboplate E 200* was applied, the area was primed using **Planibond EBA** high-modulus epoxy bonding agent with sand broadcast. Then, **Topcem Premix** screed mortar was applied to achieve a 1.5" (3,8-cm) topping over *Carboplate E 200*.

The most amazing thing about this project is that all of the work was accomplished in one month. The support of the MAPEI representatives and many of the MAPEI operations and technical departments brought the needed products to the project on schedule.

