



# MAPEI FRP SYSTEM STRENGTHENS MONTREAL RECYCLING STRUCTURE



In Montreal, Quebec, residential recycling is an important part of the city's environmental efforts. Five companies collect and deliver 125 to 150 truckloads of recycled materials to Rebutts Solides Canadiens (RSC) each day. The city of Montreal owns the recycling facility, but the actual management of the facility is entrusted to a private company, Group Tiru.

Together with the city of Montreal, Group Tiru invested several million dollars between 2000 and 2001 to standardize and upgrade the sorting center. Then, in 2008, extensive work was conducted to allow the treatment of collage materials at RSC and to increase the annual capacity of the center to more than 248,020 U.S. tons (225,000 metric tons).

On the first floor of the recycling center, RSC workers sort the paper, metal, plastic and other materials into separate piles, using conveyors, sorters and other heavy equipment. Once the materials have been sorted, they are dumped via openings in the concrete floor into one of 25 different tunnels on the lower floor. Here the materials

are compacted, bailed and readied for shipment to companies that re-use the recycled objects.

The RSC plant was originally part of another building that was transformed into a recycling plant. To form the entrance holes to the lower levels for collection of the recycled materials, workers cut directly through the existing concrete slab, including the rebar used for structural strengthening. Because heavy equipment was operating on the upper level, RSC needed to keep those floors stable and strong.

The design of the lower level prevented the support of the upper floor with posts or steel beams spaced around the lower floor, because the loaders had to be driven into the tunnels to collect and compact the materials deposited in each tunnel. To resolve this problem, RSC decided to put fiber-reinforced polymer (FRP) around the entrance holes to solidify the openings in the concrete slabs located in the first-floor corridor and in the ceilings of the lower-level tunnels, where baskets that temporarily store the recyclable materials are kept.



IN THE SPOTLIGHT

**MAPEI's FRP system**

The elements of MAPEI's structural strengthening system for concrete and masonry structures are available in several geometries. *MapeWrap* uni-directional, bi-directional and quadri-directional fabrics easily adapt to the shape of the structural member targeted for strengthening. *Carboplate* carbon fiber plates or laminates are pre-impregnated in epoxy resin, which makes them an excellent choice for reinforcement of load-bearing elements in buildings that have been restructured for architectural reasons or change of use. *Maperod*™ carbon fiber bars are also pre-impregnated with epoxy resin and are used for structural strengthening of damaged concrete and masonry elements.

In addition to the advantages of being lightweight, having a relatively thin profile and high tensile strength, and being corrosion-resistant, MAPEI's FRP structural composites are suitable for applications where the aesthetics of the original structure need to be preserved or when strengthening with traditional techniques cannot be effectively employed.

For details on MAPEI's individual FRP products, visit [www.mapei.com](http://www.mapei.com).



SA Construction, of Sainte-Catherine, Quebec, was selected to perform the first phase of the structural strengthening. They completed work on six of the 12-foot (3,66 m) high, 20-foot (6,10 m) wide, 100-foot (30,5 m) long tunnels, using *Carboplate*™ **E 170** in the 2" and 4" (5 and 10 cm) widths, *MapeWrap*™ **11** and *MapeWrap Primer* **1** from MAPEI's line of FRP Composite Systems. In addition to using *Carboplate E 170* to solidify the 150-mm-thick (5.9") structural slab, *Mapefer*™ **1K** was used to protect the edges of the frame.

There were also pits in the walls of the tunnels, which had been caused by contact with the loaders. SA Construction repaired these areas using MAPEI concrete restoration products. The crew used *Planitop*® **23** for vertical repairs of the severely deteriorated corners. *Planibond*® **CR 50** epoxy was used to inject cracks in





the wall, and **Planigrout® 712** was used to make formwork repairs in the concrete. **Planitop X** sculptable concrete repair mortar was also used for vertical repairs on the walls.

The work was done from midnight to 7 a.m. on Friday and Saturday nights over three consecutive weekends, so that work at the recycling plant was not interrupted. SA Construction's work was very successful, and the company has now bid on the second phase of the project, which will continue the tunnel repairs this next year.

## TECHNICAL DATA

**Rebuts Solides Canadiens**, Montreal, Quebec (Canada)

**Designers:** Cannon Design and Seeton Shinkewski Design Group

**Period of Construction:** 2012

**Where MAPEI Products Were Used:** MAPEI's FRP system was used to structurally strengthen openings in the main-level floor of the recycling plant. The company's Concrete Restoration Systems products, including repair mortars and

concrete grouts, were used to repair floors, walls and ceilings of the lower-level storage and compacting tunnels.

**Client:** Rebuts Solides Canadiens (Group Tiru)

**Project Manager:** Denis Gregoire

**Concrete Restoration Contractor:**

SA Construction of Sainte-Catherine, QC

**MAPEI Distributor:** Polytech MP

**MAPEI Coordinator:** Michel Lafortune

### MAPEI PRODUCTS

**Structural strengthening of floor/ceiling:** *Carboplate E 170, MapeWrap 11, MapeWrap Primer 1*

**Concrete repairs and restoration:** *Mapefer 1K, Planitop X, Planitop 23, Planigrout 712, Mapecure™ SRA, Planibond CR 50*