





SAN DIEGO AIRPORT

Mapei R&D Department reformulated Mapecem Premix and Granirapid: the two resulting custom-made products brought new strength to the busy airport concourses.



*Photo 1.
The installation has already been completed successfully on the lower level of San Diego Airport.*

*Photo 2.
The new porcelain tile from Ceramiche Caesar closely matches the existing limestone on the walls.*

*Photo 3.
Damage to the original limestone on the floor necessitated the renovation.*

Golden limestone interspersed with granite tiles was installed on the walls and floors of the San Diego Airport concourses in San Diego, California (USA). Then, passengers began to move across the floors with their luggage. And that's when the problems began. "Unfortunately, the limestone did not wear well or clean well, and it began to crack," says Bob Bolton of the San Diego Airport Authority. "After nine months of testing different solutions to correct the problem, we reached the conclusion that we could not save the limestone on the floors."

Mapei Meets Requirements with Flexible Formulations

Further investigation showed that the mortar bed beneath the limestone also had problems. The welded wire placed in the middle of the mortar bed for added strength had sunk to the bottom, neutralizing its intended support. At this point, Bob contacted his outside consultant, Jim Acri of Acri Stone & Tile Consulting in Aurora,

The MAPECEM PREMIX "S" * special formulation for the American market was so successful that it was recently specified for the New York City School System.



2

3

Colorado. Understanding the challenges of replacing entire floor systems in operating facilities, Jim recommended that the airport work with Mapei for the best possible solution.

Bob Bolton had certain constraints under which the work could be done. The airport concourses could not be closed for the installation, and dust and debris had to be kept to a minimum. Bolton also knew that it would be difficult, if not impossible, to set new welded wire in the mortar bed because of the limited access and work area that would be available each day, as well as certain security issues. In addition, the work time was limited to 11 p.m. - 5:30 a.m. in order to reduce

any effects on travelers passing through the airport.

With these issues in mind, Bolton knew that he would have to use bag-mix mortar rather than ready-mix concrete. He also wanted the bag-mix because of its reliable consistency and compressive strength, not to mention its to the work area. Plus, he needed a rapid-setting installation mortar to fit into the limited working time available each night. Because welded wire support could not be used, Bolton pushed for fiber-reinforced mortar. He requested through Jim Aciri that Mapei make a custom mix for this project.

Mapei's R&D Department started by reformulating MAPECEM PREMIX for the mortar bed. The scientists added fibers to the mix, then tested the results in the laboratory and at the installation site to make certain that it would meet the airport authority's requirements and be workable for the installers. The special formulation passed with flying colors.

The next job researchers tackled was to adjust the characteristics of Mapei's GRANIRAPID – a rapid-setting, yet flexible, latex mortar system – to meet Bolton's stringent requirements for bond strength and compressive strength. Because Mapei makes its own polymers, it has the ability to adapt proven products to meet the needs of specific projects, as the scientists demonstrated with GRANIRAPID.

Mapei's Technical Services team went to the site numerous times to ensure that the newly formulated products gave a proper installation. Mapei's distributor, Daltile, ensured that products were shipped regularly and on time as needed for the installation. Bolton said, "The supply line of materials to our job has been uninterrupted, and all quality-assurance field testing on the products went even better than expected!"



Stages 1 & 2



Stage 3



Stage 4



Stage 5

Matching the Tiles

The Airport Authority decided to replace only the floor tiles, but they wanted the new, more durable tiles to match the existing limestone on the walls. Looking for good quality, good color and pattern consistency, and a reputable company, they turned to Ceramiche Caesar S.p.A. of Spezzano, Modena (Italy). Marco Ferrari, the company's National Sales Manager, said, "It was a big job to make 105,000 square feet of porcelain tile match exactly during production, but we accomplished the task thanks to good teamwork."

Ferrari continued, "Before starting the installation, all lots of our tile were manufactured and approved for specific areas. We produced an 18" x 18" rectified monocottura tile that is three times stronger than marble and even stronger than granite. Each single tile is different, so we matched lots for placement in adjacent areas. For a special fit in some areas of the airport, we did water-jet cutting of the tiles at our plant to pre-cut 18 different shaped field tiles save the installers time at the site." Ceramiche Caesar shipped the tiles in two batches via cargo ship from Livorno (Italy) to Long Beach (California, USA). The tiles were then stored in Anaheim (California, USA), ready for the installers to requisition as needed.

Working with the Best Team

As Cleveland Marble, under the direction of Project Manager Elias N. Ghattas, Foreman Bryan King and his crew began the installation with Mapei's specially formulated products, things started to look good. Ghattas set up the project in five stages:

Stage 1 – Wet-Saw Cutting

The first group of workers used wet saws to cut the limestone from the floor in 2' x 2' square blocks. The wastewater from the cutting was vacuumed up and discarded of in an environmentally safe manner.

Stage 2 – Removal of Old Materials

A second group of workers lifted out the tile and the mortar bed. After removing the old materials, the workers used thick support boards and plywood to keep the floor level for passengers who used the concourses during the day.



Photo 4. San Diego Airport after the project's completion.

Stage 3 – Mortar Bed Placement

The third work group slid a slip-sheet into place and floated the mortar bed. Bob Bolton reported that on a typical night, the group placed 457 square feet of the special MAPECEM PREMIX "S", mixing 181 bags. Ghattas set up five mixing locations around the airport to meet the challenges of working with the cement and sand where aircraft engines were running. An extended forklift was used to raise wheelbarrows of mortar to the second floor of the airport facility. The mortar beds set up so well, workers were able to lay plywood over it to level the walking area.

Stage 4 – Tile Setting

The fourth group consisted of the tile installers, who set the porcelain tile with the customized GRANIRAPID System. Ghattas arranged for the GRANIRAPID "S" to be mixed inside the terminal. His people used a spare utility room whenever possible, or else set up a plastic shed to contain the dust from the mixing operation. In this stage, approximately 500 square feet of tile were set every night. The GRANIRAPID "S" adhesive cured so quickly, Bob Bolton was able to open the area to traffic even before the space had been grouted.

Stage 5 – Grouting and Sealing

The last group of workers filled the 1/8-inch grout joints with a customized formulation of Mapei's ULTRACOLOR* premium grout to provide a rapid cure and prevent efflorescence.

Partnering for Success

Bob Bolton reported that the San Diego Airport Authority was extremely pleased with the work of all the "partners" involved – Mapei Corporation, Cleveland Marble, Ceramiche Caesar and consultant Jim Acri. "This has been a 15-18 month project," Bolton said, "and Cleveland Marble has been really great with regards to safety, security and cleanliness on the project." He added, "Everyone involved had to be very flexible, especially over the holidays when increased passenger traffic caused delays and adjustments. Jim Acri met with Mapei R&D to fine-tune the products, and Mapei delivered everything on time through their distributor, DalTile. Followup and support from the local Mapei representatives have been fantastic. Caesar, of course, provided exactly what we wanted with the por-

celain tile, which matches the limestone on the wall so closely, it's hard to tell them apart!" The environmental practices used to minimize the works' impact on local ecology also resulted into a great success. The city of San Diego was so impressed with the Airport Authority's efforts that they awarded the airport their highest environmental recycling award for the second year in a row. DM

TECHNICAL DATA

San Diego Airport, San Diego, California (USA)

Work: replacement of floor tiles

Customer: San Diego Airport Authority

Project Managers: Bob Bolton of San Diego Airport Authority and Jim Acri of Acri Stone & Tile Consulting

Contractor: Cleveland Granite and Marble, Orange, California (USA)

Installation Manager: Elias N. Ghattas

Materials: tiles by Ceramiche Caesar

Mapei Distributor: Dal-Tile

Mapei Co-ordinator: Mike Granatowski, Mapei Corp.

***Mapei Products:** Mapecem Premix "S", Granirapid "S", Ultracolor. The products referred to in this article are manufactured and distributed in America by Mapei Corp. (USA) and Mapei Inc. (CDN). For further information see the web site www.mapei.com.

