

Milan (Italy)

Giorgio Gaber Theatre

GRAND REOPENING 22 YEARS AFTER ITS CLOSURE. MAPEI'S CONTRIBUTION TO THE RESTORATION WORKS IN THE INTERIORS AND EXTERIORS



Inaugurated in 1796 and originally named Teatro Della Cannobiana, the building hosting this theatre was designed by Giuseppe Piermarini in 1776. The original structure (with four rows of boxes, a gallery and two upper circles) was later modified following restoration work in 1893 and 1932, and especially after the fire that partially destroyed the theatre in 1938. When it was rebuilt by the architects Cassi and Ramelli following the fire, the boxes were eliminated.

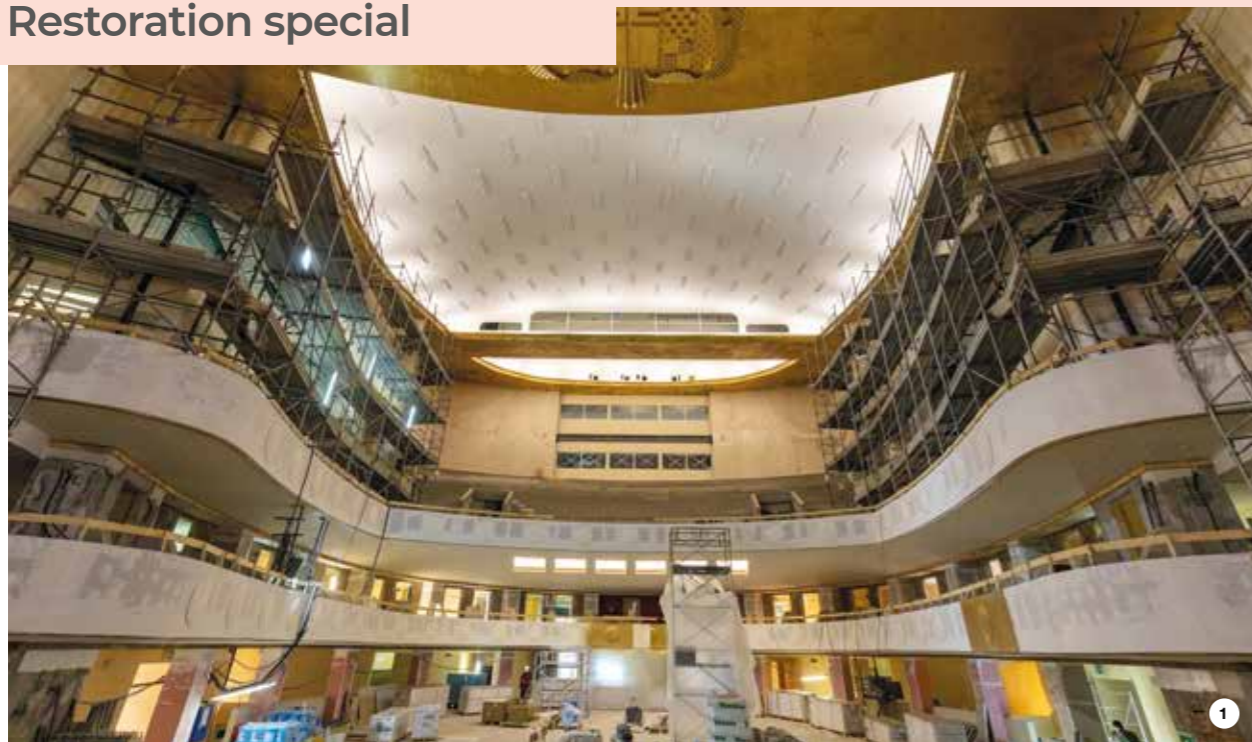
The theatre, which is now called the Teatro Lirico Giorgio Gaber, reopened its doors to the public last December after being closed for 22 years. Following the rebuilding work to bring the theatre back to its previous condition after the bombardments in 1943, apart from the second overhanging central gallery, the current theatre is much the same as it was back in 1940.

Renovation of the interior and exterior

The conservative restoration project, funded entirely by Milan City Council, included renovation work on both the interior and exterior of the structure. Inside the building, theatregoers can now find new gilding on the large, shell-shaped vaulted ceilings and other decorative features, herring-bone oak parquet flooring in the stalls, and red, black and white marble in the foyer. The walls are covered with pink granite and marmorino plaster while the ceilings are adorned with decorative features in gypsum which were recently restored.

Outside the theatre, works included restoring and reintegrating the render in the same colour as the original. This included the application of both mineral-based coatings on the neoclassic façade in front of Via Larga and coloured paste plasters on the remaining prospects. Restoration also involved a thorough cleaning and the water repellent treatment of the parts in pink granite and ornamental stone. The conservative restoration works also included the large porch, the fly tower and the dressing rooms/service unit and rehearsals rooms.

The biggest chunk of work, however, is hidden from view from visitors and included structural strengthening work on several sections of the building, the removal of asbestos, anti-seismic upgrading of the structure and an upgrade of the services equipment and acoustics.



1. The interior of the theatre during the restoration. The gold leafing on the vaulted ceiling was also restored.
2. A view of the layers of paint that were found on the golden finish of the vaults.
3. The walls in all the corridors, stair wells and stalls were finished off with SILEXCOLOR MARMORINO.
4. Before applying the render and skim coat, the masonry was consolidated by applying a coat of PRIMER 3296.

Working together with the local Heritage Authority, designers and contractors

As Technical Sponsor from the start of the project in 2016, Mapei participated in the conservative restoration work and in the upgrading of the structure by supplying products and providing on-site support. The solutions supplied for the project were defined after carrying out in-depth chemical and physical analyses, testing and sampling procedures approved by Milan City Council and the designers. The analyses were all carried out in the Mapei Research and Development laboratories and accurately pinpointed the root cause of the problems that caused deterioration phenomena, the composition of the mortars and finishes originally used, or different restoration works carried out previously that had overlapped one another. In the case of the conch vaulted ceiling, for example, the analysis carried out proved to be indispensable in showing the Works Director that, underneath a good five layers of white paint, there was a finish similar to gold leaf. This meant that the original décor could be conserved and today may be viewed in

its entirety. Testing and sampling were carried out on each and every system and technology employed to verify what had been proposed and to receive the approval of the Works Director from Milan City Council and all the designers involved.

Numerous Mapei products and systems were used in the various stages of the work, such as:

- CONSOLIDANTE ETS WR was used to consolidate the surface of weak, crumbling substrates, the ideal product for the conservative restoration and consolidation of porous stone, brick, terracotta and renders. Beside consolidating substrates, it also has high water repellent properties, which make it ideal on surfaces that might come in contact with rainwater. PRIMER 3296 was also used on most masonry substrates before applying renders and skim coats. This is an acrylic polymer-based water dispersion primer, with high penetration characteristics, even on surfaces with low porosity.
- SILANCOLOR CLEANER PLUS mould- and algae resistant solution was used to provide a hygienising

treatment for the damaged render on the brick, stone and tuff masonry.

- To strengthen the extrados of the floor slabs with steel joists, the connection of the joists to the walls was improved by anchoring the ends in the walls around the floors with MAPEFIX VE SF and applying a coat of EPORIP resin and PRIMER 3296 along each steel joist.
- An FRP strengthening system was proposed to strengthen the reinforced concrete beams. After protecting the reinforcing rods with MAPEFER 1K and integrating their surface with PLANITOP SMOOTH & REPAIR R, the concrete beams were strengthened by applying a coat of MAPEWRAP PRIMER 1 on the surface of the intrados of the beams followed by a layer of MAPEWRAP 11. The next step was to apply CARBOPLATE plates on the intrados of the beams. To increase the shear strength of the beams, and at the same time minimise the potential “debonding” effect in the longitudinal carbon-fibre strengthening, MAPEWRAP C UNI-AX unidirectional, high-strength carbon fibre fabric was applied around the supports.
- The extrados of the masonry vaulted ceilings was strengthened by applying MAPE-ANTIQUE STRUTTURALE NHL natural hydraulic lime- and Eco-Pozzolan-based mortar, which is physically and mechanically compatible with the substrates, and MAPEGRID G 220 glass fibre mesh along the extrados of the areas to be strengthened.
- Restoration of damaged and deteriorated render was carried out by firstly applying MAPEWALL INTONACO BASE natural hydraulic lime-based base render. Then, after skimming the surfaces with PLANITOP 510 fine-graded, lime-cement based skimming compound, the surfaces were painted with SILEXCOLOR BASE COAT and SILEXCOLOR PAINT in the colour shade chosen by the Works Direction.
- Restoration of damaged and deteriorated render was

carried out by applying MAPE-ANTIQUE INTONACO NHL cement-free, natural hydraulic lime-based breathable base render. MAPE-ANTIQUE FC CIVILE salt-resistant, fine-grained lime and Eco-Pozzolan based transparent skim mortar was then used to skim the surface, followed by SILEXCOLOR BASE COAT and SILEXCOLOR PAINT to paint the surfaces in the colour shade chosen by the Works Direction.

- The concrete was repaired using various products: MAPEGROUT 430 thixotropic mortar; MAPEGROUT HI-FLOW mortar and MAPEGROUT T40 thixotropic mortar, all mixed with MAPECURE SRA.
- The joints in the new marble floors in the corridors and foyer were grouted with ULTRACOLOR PLUS grout chosen in different shades in order to match the colour of the existing joints.
- The integration and restoration of the finishes on the steps of the staircases was carried out by applying ULTRATOP LOFT SYSTEM: firstly, the substrate was mechanically prepared, with the consequent removal of the dust, and primed with PRIMER SN, which was fully blinded, while still fresh, with QUARTZ 0.5 quartz sand. After the hardening of the primer and the elimination of the excess quartz, ULTRATOP LOFT W, one-component, fine-textured cementitious paste, was applied with a flat metal trowel, to create (up to 2 mm thick) decorative floor and wall coatings with a trowelled or mottled finish. After its hardening, the surface was sanded and dust was removed before applying PRIMER LT, one-component, acrylic adhesion promoter, diluted with water at a ratio of 1:1 by weight. After the complete hardening of PRIMER LT, the second coat of ULTRATOP LOFT W was applied with a flat metal trowel. The surfaces were then sanded and vacuumed before applying ULTRATOP BASE COAT, one-component acrylic formulation in water dispersion. The final finish was created by applying a coat



5. PLANITOP 510 fine-textured, lime-cement skimming mortar was applied on the external surfaces before painting them. When the render was made of lime, the product chosen was MAPE-ANTIQUÉ NHL ECO RASANTE CIVILE fine-grained, breathable, smoothing and levelling mortar.

of transparent MAPEFLOOR FINISH 58 W, two-component, aliphatic, matt polyurethane finish in water dispersion with a mohair type roller.

- The external render was restored by applying MAPE-ANTIQUÉ STRUTTURALE NHL natural hydraulic lime-based mortar with high ductility and MAPEGRID G 220 glass fibre structural mesh around the extrados of the span of the vault requiring strengthening. The render was then finished off by applying two coats of MAPE-ANTIQUÉ FC GROSSO cement-free, large-grained, lime-based skimming mortar, followed by a coat of SILEXCOLOR BASE COAT and then two applications of SILEXCOLOR TONACHINO textured silicate coating paste with high breathability, for internal and external surfaces, in the same colour as the original.
- Conservative restoration of the neoclassic façade in Via Larga was carried out by removing the deteriorated render, reintegrating it with MAPE-ANTIQUÉ

INTONACO NHL, applying a coat of SILEXCOLOR BASE COAT to even out the substrate and then applying SILEXCOLOR PAINT silicate-based paint in the same colour as the original.

- Conservative restoration of the finishes in the main vault and in the foyer by applying MALECH base coat and COLORITE PERFORMANCE protective acrylic paint, with high resistance to UV rays, in the same colour as the original finishes.
- The conservative restoration of the finishes on the walls in the corridors, in the stair wells and the auditorium with a "plaster-effect" finish included the removal of the plastic coating, the application of PRIMER 3296 to even out the absorption of the substrate, PLANITOP 560 lime-cement mortar to smooth over the surfaces, SILEXCOLOR PRIMER to even out the substrate, and SILEXCOLOR MARMORINO silicate-based plaster in the same colour as the original.

TECHNICAL DATA

Giorgio Gaber Theatre, Milan (Italy)
Original design: Giuseppe Piermarini
Period of construction: 1776-1796
Period of the restoration intervention: 2015-2021
Intervention by Mapei: supplying technical support on site and products for structural strengthening, restoring and rebuilding renders, restoring existing coatings and applying new coatings
Owner: Milan City Council, Councilor for Public Works and House – Technical Area for Culture

Project manager: Massimiliano Papetti, Milan City Council
Executive design and works direction: Pasquale Francesco Mariani Orlandi, Milan City Council
Superintendency of Archeology, Fine Arts and Environment: Antonella Ranaldi, Paolo Savio
Main contractor: Impresa Garibaldi - Fragasso
"Cantiere evento" coordinator: Francesco Maggiore, Fondazione Dioguardi
Mapei coordinator: Davide Bandera, Alberto Arosio, Mapei SpA (Italy)

MAPEI PRODUCTS

Consolidating substrates: Consolidante ETS WR, Eporip, Primer 3296
Grouting joints in marble floors: Ultracolor Plus
Applying cementitious coatings on steps: Primer SN, Primer LT, Quartz 0.5, Ultratop Loft W, Ultratop Loft F, Ultratop Base Coat, Mapefloor Finish 58W, Primer SN
Structural strengthening: Planitop HPC Floor, Mapefix VE SF, Mapefer 1K, Planitop Smooth & Repair R, MapeWrap Primer 1, MapeWrap 11, Carboplate, MapeWrap C UNI-AX System, MapeGrid G 220,
 Mape-Antique Strutturale NHL, Mape-Antique FC Grosso
Wall coatings: Silexcolor Base Coat, Silexcolor Paint, Malech, Colorite Performance, Planitop 560, Silexcolor Primer, Silexcolor Marmorino
Refurbishing renders: MapeWall Intonaco Base, Planitop 510, Mape-Antique FC Civile, Silancolor Cleaner Plus
Concrete repair: Mapegrout 430, Mapecure SRA, Mapegrout Hi-Flow, Mapegrout T40

For further info on products visit mapei.com



Three-dimensional models to rebuild the past

WE SPOKE WITH THE ARCHITECT PASQUALE FRANCESCO MARIANI ORLANDI, HEAD OF MILAN CITY COUNCIL DESIGN UNIT

What project guidelines were the drivers behind this conservative restoration project?

In-depth research carried out by the local Heritage Authority confirmed a rather complex background to the stratigraphic layout of the theatre, starting from February 1776 with the fire in the Regio Ducale Theatre and the urgency to build two new theatres in Milan: the La Scala and the Cannobiana, both designed by architect Giuseppe Piermarini. Time and the economic and political crisis the country was experiencing transformed the theatre into a cinema and assembly hall, but it was the fire in 1938, and the successive rebuild, that most radically transformed the appearance of the theatre. Research into its stratigraphic layout confirmed the historic and architectonic significance of the structure and the need to carry out conservative restoration work, but above all that it should return to its original use as a theatre.

The project identified four types of activity: entertaining, commercial, polyfunctional and other kind of activities

In which of these cases was it decided to go back to its original forms and structural features?

It was decided to restore the interior to its original architectonic form with three groups of stalls, an orchestra pit and a fly tower which had been modified over the years by adding raised areas, partitions, balconies and galleries. It was also decided to restore the external facades.

What were the most significant new features of this intervention?

From an interior aesthetic and architectonic point of view, the new features included the restoration of the imitation gold leafing, the vaulted ceilings in the gallery and the cornices running along the sides covered with five layers of paint, the gypsum sculptures in the foyer on the first floor, the "ears" on the vaulted ceiling of the stalls and gallery and the restoration of the original colours. Conservative restoration work was also carried out on the render and on the stone surfaces of the historic façade. "Milan yellow", the historic colour used to identify the most important buildings in Milan, was re-proposed.

The structure was quite badly deteriorated. What steps had to be taken before proceeding with the actual work on site?

A detailed survey on most of the architectonic and construction features was initiated to determine the chem-

ical and physical composition of samples taken from them and to draft a complete report on the nature of the materials originally used, in order to decide on the most suitable products and methods to restore the substrates.

What are the biggest problems you came across?

The presence of asbestos was, without a doubt, the problem that slowed down work and it cost a lot in terms of time and money for its removal and disposal just as the site was getting under way. A survey needs to be carried out on complex, historic buildings undergoing restoration to understand their real current state: this theatre had more than 13,000 m² of decorative stucco reliefs. Laser-scanning technology was used to measure their sizes and profiles accurately and to make three-dimensional models. This enabled us to provide proposals for the internal finishes and to create a databank of the history of the materials.

In restoration work, safeguarding the past and innovative techniques can guarantee interesting results. How important were the new materials?

New materials and work techniques contribute to maintaining the structural and aesthetic integrity of historic monuments. Strengthening structures by adopting non-invasive consolidation methods was, without a doubt, the most important result, which was achieved by using carbon fibre composites on the reinforced concrete trusses of the fly tower and for the internal masonry of the historic façades of the porch in Via Larga. Materials with fire-resistance properties were also used so that the existing historic features remained unaltered.

You have been quoted as saying that the theatre "Wasn't created to be used just during a show, but also before a show, at any time". Is the new panoramic restaurant a way of opening it even more?

The introduction of commercial activities was one of the objectives of the project, but there have always been kiosks in theatres: theatre mask sellers, wine bars and cake stalls. In this specific case, we managed to recover a space on the second floor and turn it into a restaurant. The spaces in the theatre are also polyfunctional: the stalls on the ground floor can be turned into an events hall, while the open spaces around the dressing rooms can be used as rehearsal areas for singers and musicians.