



## Cosenza (Italy)

# SAN FRANCESCO DI PAOLA BRIDGE

FROM CONCRETE ADMIXTURES TO COATINGS FOR THIS STRUCTURE DESIGNED BY SANTIAGO CALATRAVA, A NEW LANDMARK FOR THE CALABRIA REGION

Hailed as the tallest cable-stayed bridge in Europe, 26<sup>th</sup> January 2018 marked the inauguration this new bridge in Cosenza (southern Italy) designed by the architect and engineer Santiago Calatrava, originally from Valencia (Spain) and now a naturalized Swiss citizen. The bridge was named after San Francesco di Paola, patron saint of the Calabria Region, and it is one of the most important infrastructures constructed in southern Italy in recent years. It connects two parts of the city which, until then, had always been separated

by the River Crati. Santiago Calatrava came up with a cable-stayed bridge supported by a single, 104-m tall inclined pillar weighing 800 tonnes, which reaches up to the highest point of the bridge. The materials used were those typically favoured by the Valencian architect-engineer for his designs: steel, concrete and natural stone. The bridge deck, which is made entirely from steel, is 140 m long and 24 m wide and is open to both vehicles and pedestrians. The feature which characterises this structure,

however, and is visible from various parts of the city, is the single, inclined pillar bearing the weight of all the steel cables and the bridge deck. Calatrava's design for this element has a box-like, almost square section with rounded corners, with the top part of the pillar slightly inclined towards the inside of the bridge. A solution which emphasises the direction in which the cables are pulling, a design choice which is intended to highlight the bond between the structure and the city and direct your gaze towards the city of Cosenza

itself.

The form of the bridge is similar to that of a giant harp, a symbol of harmony, and is a trusted design the Valencian architect-engineer has already successfully used in Seville (Spain) in 1992 and in California in 2004.

### Admixtures from a great family

Like a harp that plays the sweet notes of technology and innovation: to construct this bridge, the best solutions offered by Mapei took the field, including super-plasticising

admixtures and special mortars to anchor steelwork, skim surfaces and finish off the load-bearing structures.

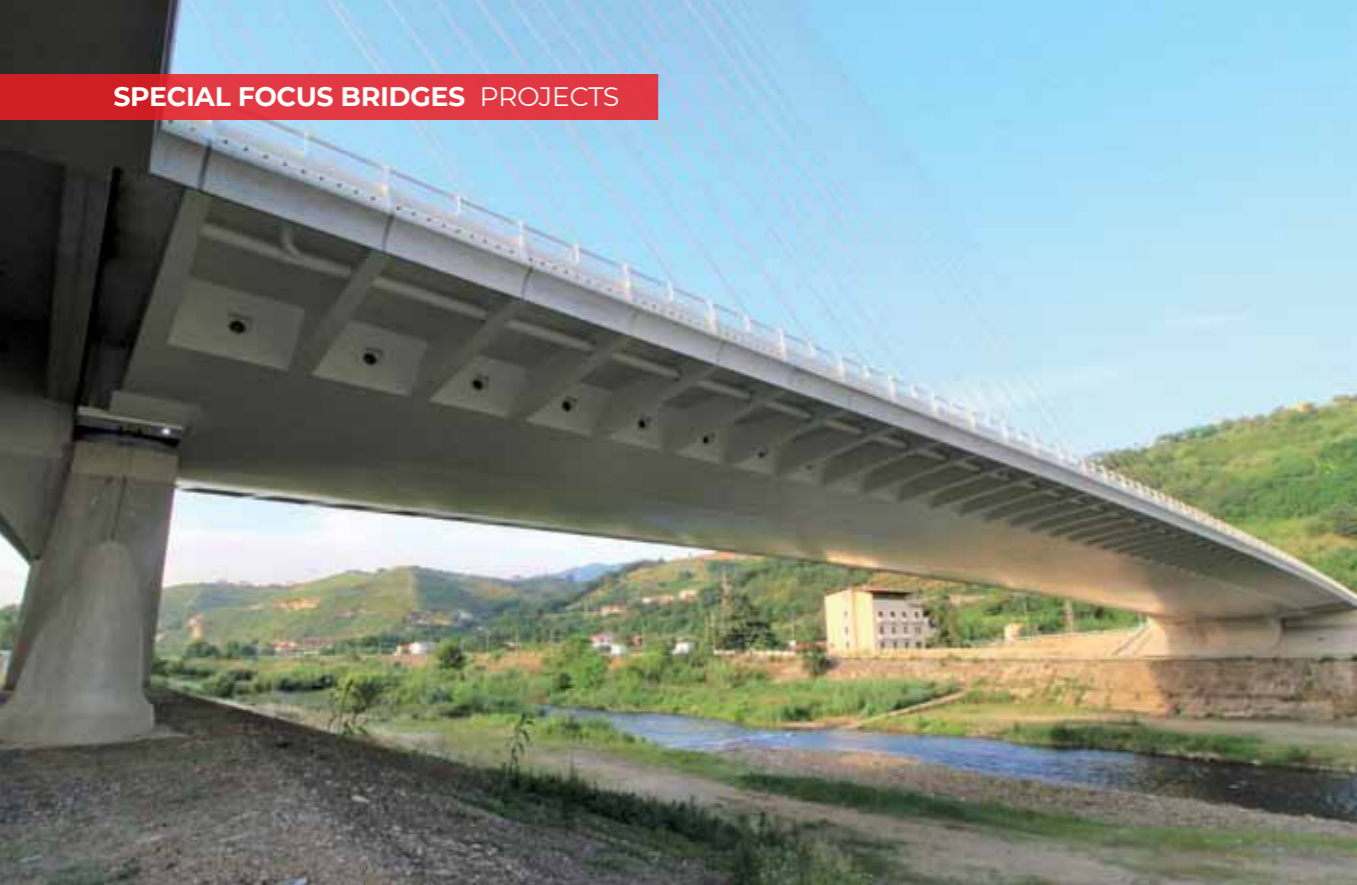
The main contractor for the bridge was Cimolai SpA, and right from the start Mapei played an important part in the mix design of the concrete used to construct the two abutments, the main pillar and all the ancillary work for these parts of the bridge. Going more into detail, DYNAMON SX 42, which is part of the DYNAMON family of admixtures, was used extensively. This product is a formaldehyde-free, super-plasticising solution of acrylic polymers which is highly effective in dispersing cement granules, and also contains secondary components which considerably improve the cohesion and pumpability of concrete.

MAPEFILL high-flow, non-shrink cementitious grout was used later on during construction of the bridge to anchor the uprights for the protection barriers in place.

Once the enormous ashlar caisson for the bridge had been built, a series of tests were carried out on site to find the most suitable system to protect the concrete. Tried and test-

### Problems and solutions

This big project required the use of high performance admixtures for concrete, able to ensure the durability of the structure. This is the reason why DYNAMON SX 42 was used extensively. This is a formaldehyde-free, super-plasticising solution of acrylic polymers which is highly effective in dispersing cement granules, and also contains secondary components which considerably improve the cohesion and pumpability of concrete.



ed systems proposed by Mapei were also chosen in this case, and work continued by applying MAPEFER two-component, anti-corrosion cementitious mortar to protect the steel reinforcement.

Small areas of the bridge were reintegrated with MAPEGROUT LM 2K two-component, thixotropic, fibre-reinforced, cementitious mortar or else with MAPEGROUT T40, medium strength, shrinkage-compensated, fibre-reinforced, thixotropic mortar. EPORIP was also used for monolithic construction joints between fresh and hardened concrete.

The next stage of the work was to skim over all the substrates with light grey PLANITOP 100 fast-setting, fine mortar.

The surfaces were then painted with QUARZOLITE BASE COAT coloured

acrylic undercoat and adhesion promoter, which has good defect-covering properties and is suitable for use on both internal and external surfaces.

The last step was to finish off the surfaces with ELASTOCOLOR PAINT, a special protective and crack-bridging elastomeric paint with long-lasting elasticity and good resistance to chemical agents and ageing.

So, thanks also to Mapei, a new city has been born, a city whose history is symbolised by the old town centre dominated by the Federiciano Castle, and a future shaped by a modern and majestic feat of engineering, as well as by the River Crati, which will soon become navigable, and by new residential buildings and the redevelopment of an area which was once full of slum housing.

The superplasticizing admixture DYNAMON SX 42 was used to prepare the concrete mix. The surfaces were then finished with ELASTOCOLOR PAINT.

#### DYNAMON SX 42

Liquid superplasticizing admixture for ready-mix concrete.

FIND OUT MORE



#### TECHNICAL DATA

**San Francesco di Paola bridge**, Cosenza (Italy)

**Year of construction:** 2018

**Period of the Mapei**

**intervention:** 2013-2018

**Client:** Cosenza City Council

**Intervention by Mapei:** supplying admixtures for

the concrete mix, products for anchoring, building mortars and coatings

**Design:** Santiago Calatrava

**Main contractor:** Cimolai

SpA

**Subcontractor:** Calabro Inerti

**Works direction:** Vito Alvino

#### Mapei coordination:

Mirco Malvasi, Achille Carcagnì and Daniele D'Ippolito, Mapei SpA (Italy), and Gn Rappresentanze.

#### MAPEI PRODUCTS

Admixtures for concrete: Dynamon SX 42

Building products: Mapefill, Mapefer, Mapegrout T40, Mapegrout LM 2K, Mapefer, Eporip, Planitop 100  
Coatings: Quarzolite Base Coat, Elastocolor Paint

For further information on products visit [mapei.com](http://mapei.com)



STOP CORROSION OF STEEL IN CONCRETE STRUCTURES

**Mapeshield®**



Mapei has developed a range of specific products for galvanic cathodic protection and prevention: **Mapeshield I**, **Mapeshield E 25** and **Mapeshield S**, the perfect allies against corrosion of steel reinforcement in concrete structures, increase durability and guarantee the nominal design life of structures.

EVERYTHING'S OK WITH MAPEI

