

maeg

- BRIDGES AND VIADUCTS

Arch bridges

Specialist in the **design,** **manufacturing** and **installation** of steel structures

About Maeg

Maeg is an international player in the construction sector. With more than 40 years of experience, Maeg's expertise can adapt to each project characteristics to devise tailor-made and innovative engineering solutions, concretely transforming design into substance.



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SHINDAGHA BRIDGE

Location	Dubai, United Arab Emirates (UAE)
Client	Road & Transport Authority (RTA)
Contractor	Belhasa Six Construct LLC
Scope of work	Design, fabrication and installation of steel structures
Period of execution	2019-2021
Weight	2.500 tons
Length	135 meters

The 12-lane deck of the Shindagha Bridge is made of concrete while the iconic arch, also referred to “infinity arch” for its architectural shape similar to the mathematical symbol for infinity, is entirely made of steel. The project is part of the Shindagha Corridor, a 13 kilometres extension to improve the traffic flow in on of the most ancient neighbourhoods of the city, also welcoming the maritime traffic at the entrance of the Dubai Creek.

The steel arch is made of 46 segments reaching a height of 67 meters and span length of 135 meters and, in its final geometry, it had only 20mm of tolerance from the theoretical development. Its installation was split in two phases: in the first phase, 10 arch ribs have been installed by 600ton crawler crane and were partially embedded in the

concrete piers to allow then the completion of the concrete deck, starting then the second phase with the erection of macro segments of around 100 tons and 41 meters length by using a 600ton crawler crane standing on a barge. Arch segments were placed on 35 meters tall temporary towers, four of which placed inside the water, four above the pier

protection system composed by piles and five above the deck. The final surface layer of the painting treatment of the arch is quite particular and gives a silver metallic aspect to the structure.





MOARAVA BRIDGE

Location

Olomouc, Czech Republic

Client

Contractor

SILNICE GROUP a.s.

Scope of work

Design, fabrication and installation of steel structures

Period of execution

2020-2021

Weight

480 tons

Length

55 meters

The Morava River basin is usually affected by copious floods. Since the most destructive one in 1997, the Olomouc districts started to implement flood protection measures: due to the necessary widening of the riverbed, there was the need to replace the existing bridge located in Masarykova Street.

The Bridge over the Morava River is both a road and rail bridge. It represents the penultimate phase in the construction of this stage of flood protection. The structure has been designed by the renowned architect Antonín Novák to resemble the shape of a floating fish, which is recalled by the sinuosity of the double arches placed on the internal side of each of the two carriageways and connected to the deck with metal bars with a diameter of 60mm. The overall structure has a width of 26 meters and a length of 55 meters. Its installation took place in

in two different moments to avoid the interruption of the traffic, one carriageway per time: firstly one way of the existing bridge has been demolished, then the new structures assembled on the ground and lastly launched in its final position with the aid of a launching nose.





FOOTBRIDGE

02

Location	Dubai, United Arab Emirates
Client	Joint Venture Road & Transport Authority (RTA), Meydan and Meraas
Contractor	Belhasa Six Construct LLC
Scope of work	Design, fabrication and installation of steel structures
Period of execution	2016
Weight	2.300 tons
Length	205 meters

Second footbridge crossing the Dubai Water Canal, it has a 205 meters long white arch that reaches 50 meters of height. His Highness Sheikh Mohammed Bin Rashid Al Maktoum, Vice-President and Prime Minister of the United Arab Emirates and Governor of Dubai has renamed the project “Bridge of Tolerance” symbolizing the connection between the 200 cultures and nationalities present in the city.

This footbridge is characterized by a rhomboidal section arch with a largeness of 205 meters and a height of 50 meters, which has a cross-section of about 6 meters at the base that tapers up to 2.1 meters in the key section, giving a sense of lightness and simplicity. The arch was preassembled and welded on the ground in seven macro-segments

lifted then on the top of temporary towers, reaching at their tallest point 53 meters of height, by means of two 600-tons crawler cranes. The weight of the arch alone is 1.700 tons and, through 20 steel cables (for a total length of 858 meters), supports the S-shaped deck, 6.7 meters wide,

curling in two concrete ramps wrapped around the bases of the arch. The width of the free span, evoking a sense of absence of gravity as if the footbridge floated gently above the water, gives to the footbridge an impressive visual impact.





RIVA TRIGOSO BRIDGE

Location

Sestri Levante, Italy

Client

Municipality of Sestri Levante

Contractor

Joint Venture Grandi Opere Italiane Srl - Maeg Costruzioni S.p.A.

Scope of work

General Contractor

Period of execution

2016

Weight

250 tons

Length

55 meters

Following the disposal of industrial shipyards in the area, the Sestri Levante waterfront had the necessity to redesign and renovate the urban and aesthetic logics of the seaside destination to facilitate the flow of vehicles, pedestrians and cyclists.

The Riva Trigoso Bridge, crossing the Petronio River, consists of a mixed single span 54 meters long and 9.5 meters wide, made of steel and concrete. It is supported by a steel arch, inclined of 75 degrees from the vertical axis with a height of 8.5 meters, and by a series of I-section horizontal elements placed at a pace of 3.6 meters from one another. On the sea side there is a 3 meters wide cycle-pedestrian path with, from the planimetric point of view, a curvilinear shape moving close to the road bridge at the midpoint and progressively distancing towards

the ends. The structure was preassembled on the side and placed in position with one lifting.





KOMO BRIDGE

Location	Kango, Gabon
Client	Ministero T.P. Gabon
Contractor	Groupement Santullo-Sericom S.A.
Scope of work	Design, fabrication and installation of steel structures
Period of execution	2013-2014
Weight	500 tons
Length	80 meters

The Komo Bridge is built along the main commercial route leading to the capital of the country, Libreville, where half of Gabon's population is concentrated. The structure crosses the Komo river and replaces a previous viaduct that has become impracticable. Through the modernization of the road network, the Republic of Gabon wants to promote the diversification of the economy of the country and to develop tourism and agriculture.

This arch bridge renews a bridge over the Komo River, the main way to transport local goods. The bridge was originally built between 1973 and 1975 with an overall length of 378 meters (25+41*8*+25); in February 2012 a pillar of the bridge has been damaged due to an

accidental collision with a barge, also affecting the position of the deck and causing serious problems to traffic and to the commercial network. The project aimed to both increase the width and the height from the water surface to ease the transit of boats, therefore the damaged pile and the two adjacent spans in prestressed concrete have been

demolished and replaced with a 80 meters long single-span arch bridge, with a reticular truss at variable heights. The structure has total weight of 507 tons and rests on two new piles, each one consisting of four poles connected to each other with steel beams of 2 meters height.





SANT'ANDREA ROUNDAABOUT

Location

Gorizia, Italy

Client

Commissario Delegato per l'Emergenza della Mobilità Riguardante la A4 ed il Raccordo Villesse

Contractor

FVG Cinque Scarl

Scope of work

Design, fabrication and installation of steel structures

Period of execution

2010-2012

Weight

790 tons

Length

65+50 meters

The project is part of the project to transform the Villesse-Gorizia junction into a highway and completes the Sant'Andrea roundabout in the city of Gorizia, before the Italian border with Slovenia. Given the symbolic position, the colours of the bridges recall the Italian flag: red arches, supported by white cables and beams, surrounded by the green of the landscape.

The project consists of two arch bridges placed one in front of the other, the first with 40 meters long and 84 tons heavy arch, while the second, slightly smaller, has 34 meters long and 64 tons heavy arch. The deck is composed of a reticular beam supported by steel cables hooked to the arch, which is inclined of 30 degrees towards the internal part of the roundabout. The installation of the arches can be divided into two

main phases: they were first raised horizontally by using a 300-tons crane and then, with a slow rotation, raised and turned. Finally, two 120-tons cranes placed on the side

accompanied the rotation of the arch to correctly position the two ends to fit perfectly into the supports until the joints were welded.





ARCO DEL BICENTENARIO BRIDGE

Location	Bogotá, Colombia
Client	Gobernación de Cundinamarca
Contractor	Consorcio Infraestructura Cundinamarca Constratista
Scope of work	Design, fabrication and installation of steel structures
Period of execution	2012
Weight	760 tons
Length	140 meters

Between 2010 and 2011 the Tequendama region has suffered frequent storms and consequent landslides, making the soil shaky and unstable. Compared to concrete, the construction of a steel structure allows to reach a greater depth of the piles - up to 30 meters - balancing the instability of the ground and absorbing vibrations.

The Arco del Bicentenario Viaduct celebrates the two hundred years of independence of the Cundimarca region (one of the 32 departments in Colombia). This viaduct consists of a deck made of S355J0W steel with a length of 140 meters and a width of 11 meters, supported by a bifurcated arch made of S355J2 steel with a total weight of 766 tons. The viaduct is supported by two pillars with depth between 25 and 30 meters and with a diameter of 1.5 meters to counterbalance the

instability of the ground and absorb vibrations. The arch was assembled on the ground with the help of temporary equipment and, once completed, positioned and supported by a system of temporary cables that, hooked to a

temporary tower placed on each end of the bridge, unloaded their weight on counterweights. After the installation of the key element, joint have been welded completing the installation.





VERSA BRIDGE

Location

Mariano del Friuli, Italy

Client

Friuli e Venezia Giulia Strade S.p.A.

Contractor

Mariano Scarl

Scope of work

Design, fabrication and installation of steel structures

Period of execution

2012

Weight

450 tons

Length

110 meters

Suspended over the Versa River in a beautiful rural area, the Versa Bridge is part of a broader development project planned for the entire area. With its 30 meters of height, the works strongly characterizes the landscape of the region having, thanks to the use of a chromatically non-invasive paint, a minimal environmental impact.

The Versa Bridge has an overall length of 110 meters and its 14.80 meters wide deck is composed of a mixed structure. From the planimetric point of view, the edges of the deck are slanting of 50 degrees. The structure is supported by two steel arches made of a circular section with two meters in diameter and cross at the center line, forming the shape of a vault.





LEONARDO BRIDGE

Location

Arezzo, Italy

Client

Province of Arezzo

Contractor

Joint Venture Impresa S.p.A. - Marcegaglia S.p.A.

Scope of work

Design, fabrication and installation of steel structures

Period of execution

2009-2010

Weight

2.580 tons

Length

475 meters (5+3*30+110+ 77+48+4*30+25)

Part of the broader renovation of the regional road N. 69, it was built to solve the traffic congestion problem afflicting the area. Legend tells that the landscape of the area is the one painted behind the Mona Lisa, therefore for this reason and for the engineering peculiarity of the structure, the bridge has been dedicated to Leonardo da Vinci.

The Leonardo Bridge is a double-arch bridge designed by the Spanish studio of architects Carlo Fernandez Casado SL. The distribution of the spans had to consider the geology of the ground, the flow of the Arno River and the need to climb over the Sun Motorway A1: for these reasons the 475 meters long structure has twelve spans with two inclined arches, in correspondence of the two main spans, joined at the

top by mean of two intermediate connections. These arches have been assembled on site by using temporary towers and are connected to a 22.6-meter-wide deck through lower connection placed every 5 meters. Overall, the steel structures weight reaches 2.584 tons. A design criterion

was the search for a solution that did not involve any visual or scenic interruption of the surrounding landscape, therefore this light structure leaves the view wide and unhindered.





MUSIC BRIDGE

Location	Rome, Italy
Client	Municipality of Rome
Contractor	"Consta" Consorzio Stabile Soc. Cons. p.a. (consorziata Mattioli S.p.A.)
Scope of work	Design, fabrication and installation of steel structures
Period of execution	2007-2008
Weight	1.320 tons
Length	190 meters

Planned since 1929, it had acquired an extremely high political and aesthetic relevance for the city: it is now the only modern steel bridge crossing the River Tiber in the historic centre of Rome. In case historical artefacts emerged during the works, site operations have been supervised by a group of archaeologists.

The Music Bridge has an overall length of 190 meters with a free span between the supports of 182 meters. The pedestrian deck, which has a variable width between 17 and 20 meters, has been installed on top of temporary towers until where shores made it possible, continuing then with a cantilever method. Using the same principle of a cable-stayed bridge, the central segments have been supported by steel cables connected to two temporary towers located on the ground, reaching

a height of 30 meters. After installation, the two diverging arches have been fixed on one side and left free to slide on bearing on the other. The peculiarity of the structure is the presence of six steel cables inside the deck supporting its weight: only when these cables were properly tensioned,

and temporary ropes loosen, the structure could support its weight changing its structural behavior into the arch type. This solution became necessary to support the weight of the considerable central span of the bridge while improving the seismic performance of the structure.





SARPI-DALMAZIA FLYOVER

Location

Padua, Italy

Client

Municipality of Padua

Contractor

ATI Consta Consorzio Stabile Soc. Cons. p.a. -
Consorzio Ciro Menotti

Scope of work

Design, fabrication and installation of steel
structures

Period of execution

2007-2008

Weight

1.700 tons

Length

102 meters

The Sarpi-Dalmazia flyover crosses the Padua's railways station and represents an important contribution to the local road network, connecting the suburban neighbourhood called Arcella to the city centre. It has been launched by using roller conveyors without interfering with the below train traffic, which has never been interrupted.

The structure is composed of two arches converging together on the North side forming, from above, an isosceles triangle. The arches have a trapezoidal section, reach 23 meters of height and are connected by reticular bracings. Steel cables support the 102 meters long and 22 meters wide deck of the bridge, which is composed of five longitudinal beams with a centre to centre distance of 4 meters, laying on horizontal

double-T elements 2 meters high. Altogether, the structure has a weight of 1.700 tons. The assembly phase took place without interfering with the below railway traffic: firstly it has been pre-assembled on the ground with the aid of

temporary towers, secondly it slid in position by means of roller conveyors until, finally, it has been hooked and secured to support pillars with steel ropes.





MARMORE BRIDGE

Location

Terni, Italy

Client

Anas S.p.A.

Contractor

Consorzio stabile Uniter

Scope of work

Design, fabrication and installation of steel structures

Period of execution

2006-2008

Weight

2.500 tons

Length

302 meters (31+173+98)

The Marmore Bridge crosses the Nera River and the state highway S.S.N. 209. It has a key role for the local road network by reducing travel time between the cities of Rieti and Terni from one hour to only fifteen minutes, avoiding a dangerous route.

The structure of this arch bridge is composed of a pair of steel pipes with a diameter of 2200mm including an internal reticular bracing system, necessary to maintain the geometry during the first assembly phases, as well as external crossbuck bracings connecting the different elements. The bridge has a total length of 302 meters with a width of 12 meters. Strain gauges have been used both during the construction and testing phases to measure possible deformations of the main structures, either due to mechanical stress in case of loads or to

thermal reasons in case of variations of the temperature. To safeguard as much as possible the environment, the bridge was built at a height of 70 meter from the ground without the aid of any temporary support structure: instead, to

ensure stability and resistance during the assembly phase, the structure has been supported by steel cables that also added an internal elastic coaction. Altogether, the weight of the steel structure amounts to 2.500 tons.





Ideas
shape
the
World

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