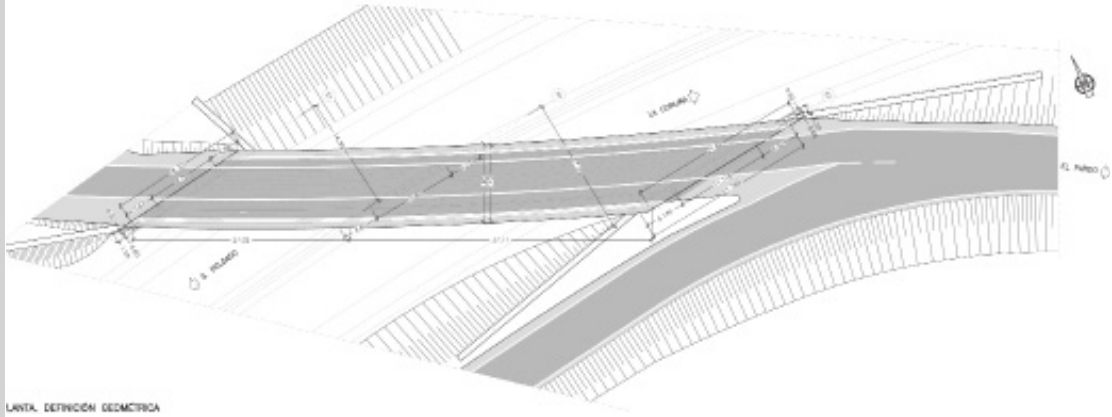
CONSTRUCTION PROJECT



# Padre Huidobro Avenue Bridge, Highway A-6

## Madrid

| | |
|---|---|
| CLIENT | **Madrid City Council** |
| PROJECT DATE | **2014** |
| LOCATION | **Madrid, Spain** |
| FIELD OF ACTION | **Construction project and Technical assistance during construction** |

### DESCRIPTION OF THE STRUCTURE

The structure is located in the district of Moncloa-Aravaca, in the city of Madrid. It is a skewed bridge with 63 m length, with two spans prestressed concrete deck supported on a central pier and in two abutments with wing-walls. The deck, with 1.60 m thick, consists of two spans of about 26 and 33 m and cylindrical hollow core with 0.80 or 1.20 m diameter. There is an expansion-joint on the paved road over each abutment.

The central pier is made of reinforced concrete with a rectangular section of 0.9 x 10.8 m and about 4.9 m height. The foundations were constructed by diaphragm walls of 80 cm wide and 20 m deep. The abutments and wing-walls consist of reinforced concrete 0.80 m thick front wall and about 5 m height over the ground level lined by brick masonry.

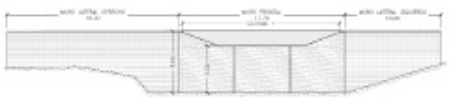
ines
ingenieros consultores

C/ Nuñez de Balboa, 120
3D, 28006 Madrid, Spain
Tel.: +34 915237633

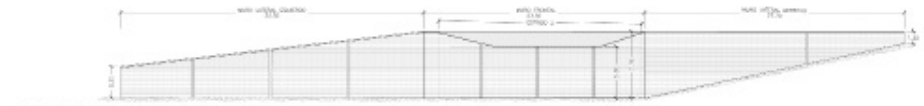
ines@inesingenieros.com
www.ines.es/en

# Padre Huidobro Avenue Bridge, Highway A-6

## Madrid



ESTRIBO 1 MUROS LATERALES. ALZADO DESARROLLADO



ESTRIBO 2 Y MUROS LATERALES. ALZADO DESARROLLADO

The main damages of the structure were the moisture, leaks and efflorescence on both spans of the slab due to an inappropriate waterproofing; patina because of the corrosion of the slab reinforcement; and cracks of medium importance. In the pier, there are cracks on the top of the shaft lining, due to an excessive pressure between elements. In the brick of the abutments and wing-walls, lining were found both cracked and loose elements due to the excessive pressure, as well as moisture and leaks because of the bad waterproofing. On the platform the pavement had general damages.

**REPAIR ACTIONS**

The upper layer of the pavement was removed, in order to place a new wearing course of hot bituminous mixture with 4 cm depth.

Firstly, the concrete walls were cleaned and sanitized waterjetting at high pressure. Then an anticarbonation treatment was spread, consisting of a special translucent satin paint, which also eliminates the concrete spots. Specific stains on masonry were cleaned by mechanical brushing and solvents application.

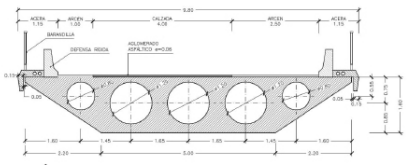
ines
ingenieros consultores

C/ Nuñez de Balboa, 120
3D, 28006 Madrid, Spain
Tel.: +34 915237633

ines@inesingenieros.com
www.ines.es/en

# Padre Huidobro Avenue Bridge, Highway A-6

**Madrid**



For the regeneration and stabilization of the brick lining the structural walls of the abutments and for the wing-walls, several actions were defined and they are following described.

In order to repair the fissures or cracks and the vertical relative movements in relation with the concrete wall, first those cracks were injected with milk at low pressure.

Moreover an upper and continuous anchorage system from the masonry to the concrete one was built, through a cap of 50 cm (over a regularization mortar) that binds them, this cap was anchored to the concrete walls with vertical anchorages of Ø16 each meter. This solution was combined with horizontal anchors with a diameter that decrease (from Ø500 to Ø200 mm) when the vertical distance from the coronation increase.

The cracks of the lower face of the slab were sealed with an epoxy material, in order to carry out its structural regeneration. The deteriorated expansion-joints were restored with new ones of the same typology, but with a Hypalon band to collect the run-off water. Also a water dip element was done placing an angular galvanized steel profile, on both sides of the deck.

Finally, the damaged sections of the handrail were repaired and repainted.

Before intervention

After intervention

ines
ingenieros consultores

C/ Nuñez de Balboa, 120
3D, 28006 Madrid, Spain
Tel.: +34 915237633

ines@inesingenieros.com
www.ines.es/en