

Minimum Documentation Fiche

composed by national/regional working party of SECTION BASILICATA-PUGLIA



01. Picture of building

Depicted item: Carpineto viaduct
source: ph. Pierangelo Laterza
date: 2019

1. Identity of building

1.1 current name of building

Carpineto viaduct

1.2 variant or former name

Carpineto bridge

1.3 number & name of street

SS407 Basentana

1.4 town

Vietri di Potenza

1.5 province/state

Potenza/Basilicata

1.6 zip code

85058

1.7 country

Italy

1.8 national grid reference

40°36'51.8 N 15°28'35.6 E

1.9 classification/typology

Infrastructural work/bridge

1.10 protection status & date

-

2. History of building

2.1 original brief/purpose

Infrastructural work/bridge

2.2 dates: commission/completion

1971/1978

2.3 architectural and other designers

Riccardo Morandi

2.4 others associated with building

-

2.5 significant alterations with dates

-

2.6 current use

Infrastructural work/bridge

2.7 current condition

Medium

3. Description

3.1 General description

The "Carpineto viaduct" is a cable-stayed highway bridge. It was built along the "Sicignano-Potenza" highway in southern Italy. The project is by Eng. Riccardo Morandi.

Morandi, a famous Italian engineer, consolidated his knowledge of reinforced concrete through the design of important buildings in "Calabria", due to the damage caused by the 1908 earthquake. When he returned to Rome, Morandi began to obtain a license for an original Italian system for the prestressing of concrete. In 1948, in fact, he obtained the first license on the prestressing system called "Morandi M5". With this certification, Morandi designed many infrastructures: bridges, thermal and thermoelectric power plants, factories, etc.

The "Carpineto Viaduct", in fact, is the result of a long knowledge and application of prestressed reinforced concrete in bridges and buildings. Morandi, in fact, was an important researcher of reinforced concrete. In his various inventions and in his works, he was able to concretize the relationship between form and function, obtaining the best from this material. He invented numerous technical solutions but also shapes and spatial structures.

Particularly interesting is the construction history of this bridge, which represented the social and historical conditions of the period in which it was built. In fact, the construction of the bridge was entrusted by the "Cassa del Mezzogiorno" to engineer Morandi (with contract to the company "IOCRI"), when, in those years, there were a series of strikes and workers' revolts (12 only in 1975, one of which lasted 20 days). These conditions made it even more difficult, from some points of view, to carry out the work itself.

3.2 Construction

The cable stayed, counterbalanced caisson structure of the bridge was built due to the fact that the ground was prone to landslides. The structure was built in about 4 years and has a length of 181 meters. The bridge is composed of two roadways that, in fact, need to be strictly adhered to the ground to allow an optimal angle of view (considering the slope of the two points of support). In fact, Morandi designed the viaduct using the same static scheme for the "viaduct over the Tevere" at the "Magliana" in Rome (a work he had designed a few years earlier). Unlike this, however, the structure of the "Carpineto bridge" has a construction peculiarity: each direction of travel, in fact, has its own structure due to the unfavourable ground conditions. In order to solve this condition, Morandi designs the stranded elements that are tilted, doubling the support on both sides. As described in the "monograph of execution" drawn up during the design phase, the construction of the bridge led to a series of unexpected events. In fact, during the operations of "tensioning" of the stays, 4 diagonally-placed ashlar broke and then 4 heads were damaged due to bad anchoring. For these problems, Morandi had to make structural changes to the project to save the structure (which was in danger of collapsing).

3.3 Context

The structure was built along the "SS407 Basentana". This freeway starts from the motorway junction of "Sicignano degli Alburni" and joins "Metaponto" with the "SS Jonica". This work, as well as the "Carpineto viaduct", was financed with the funds of the "Cassa del Mezzogiorno", starting from about 1960. In fact, these infrastructural works (freeways, bridges, aqueducts, railways, etc.) had to represent the premise for an industrial development of the reclaimed areas.

4. Evaluation

4.1 Technical

This work represents a remarkable application of construction engineering. Morandi's signature, in fact, represents a work of extraordinary technical and structural value, with the application of the first prestressed reinforced concrete systems, especially in a southern area that is not very industrialised.

4.2 Social

High value.

4.3 Cultural & aesthetic

This work represents Morandi's ability to provide a solution to every construction requirement. The "Carpineto bridge" represents, in fact, a work with an aesthetic value compared to the modern architectural trends of the 20th century. It is extraordinary, in fact, Morandi's ability to manage reinforced concrete, succeeding in creating works of remarkable functional and structural quality. "Form" and "function" represent the concept that describes this high engineering project.

4.4 Historical

The bridge represents the genius and engineering skills of 20th century Italy. This work, in fact, represents the image of an Italy that, after the Second World War, exploited all its resources to build important infrastructures at the service of the community.

4.5 General assessment

The work represents the synthesis of Riccardo Morandi's structural language, which is expressed in his technical, structural, technological and innovative capacity in the use of reinforced concrete.

5. Documentation

5.1 Principal references

BOAGA, Giorgio, Riccardo Morandi, De Luca, Roma, 1974.

MORANDI, Riccardo, Il viadotto Carpineto I per la strada di grande comunicazione Basentana, in "L'industria Italiana del cemento", n.10, 1977.

MORANDI, Riccardo, Strutture strallate in cemento armato, in "L'industria Italiana del cemento", n.12, 1980.

IMBESI, Giuseppe, MORANDI, Maurizio, MOSCHINI, Francesco, Riccardo Morandi: innovazione tecnologia progetto, Gangemi, Roma, 1991.

SAGGIO, Antonio, Riccardo Morandi. Cemento d'autore, in "Costruire", n.102, Novembre 1991.

5.2 visual material attached

Fig.01 – Design section and perspective (Riccardo Morandi, 1977)

Fig.02 – Historical photo of the construction site ("Cassa del Mezzogiorno" archive, 1980)

Fig.03 – Historical photo of the bridge support point ("Cassa del Mezzogiorno" archive, 1980)

Fig.04 – Photo of the bridge along the road

5.3 rapporteur/date

Antonello Pagliuca, April 2020

Giuseppe D'Angiulli, April 2020

Donato Gallo, April 2020

Pier Pasquale Trausi, April 2020

6. Fiche report examination by ISC/R

name of examining ISC member: date of examination:

approval:

working party/ref. n°: NAI ref. n°:

comments:

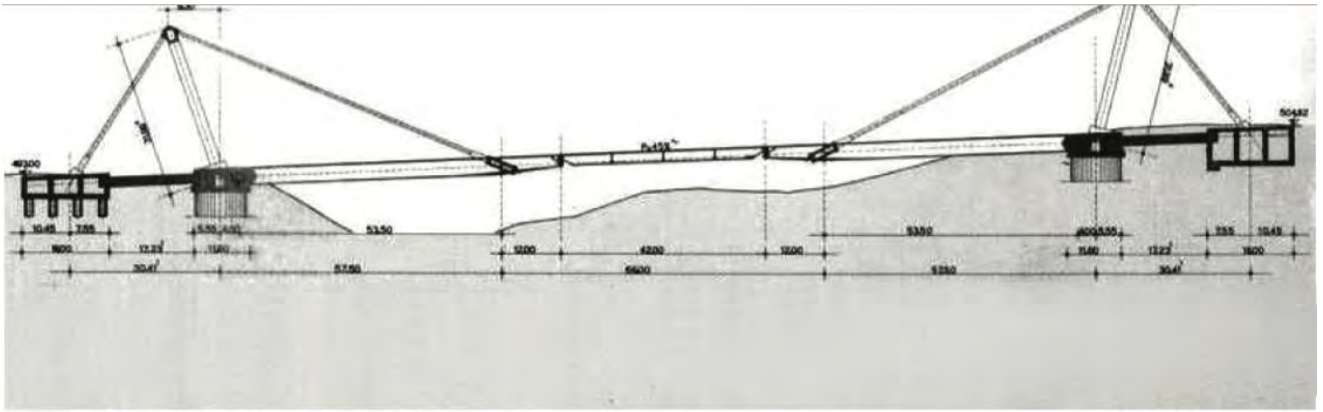


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