1. BASIC DATA

State Party: Spain
Name of property: Vizcaya Bridge
Location: Basque Country, Province of Bizkaia
Date received by the World Heritage Centre: 25 January 2005
Included in the Tentative List: 20 December 2002
International Assistance from the World Heritage Fund for preparing the nomination: No
Category of property:

In terms of the categories of cultural property set out in Article 1 of the 1972 World Heritage Convention, this is a monument.

Brief description:

The monumental lattice iron transporter Bridge which straddles the mouth of the Ibaizabal estuary west of Bilbao, was designed by the Basque architect, Alberto de Palacio. It merged 19th century iron–working traditions with the new lightweight technology of twisted steel ropes created by the Frenchman, Ferdinand Arnodin, to create the first bridge in the world to have a hanging transporter carrying people and traffic on a suspended gondola high above passing ships.

Built by private initiative between 1887 and 1893, it has operated almost continuously since it was built.

Vizcaya Bridge was used as a model for many other similar bridges in Europe, Africa and the Americas, only a few of which have survived.

2. ACTIONS

Background: This is a new nomination. Supplementary information sent by the State Party has been received on 25 November 2005.

Date of the Technical Evaluation Mission: 31 August – 3 September 2005

Dates of request for additional information and of receipt from State Party: None

Consultations: ICOMOS has consulted TICCIH.


3. THE PROPERTY

Description

Vizcaya Bridge, which was opened in 1893 was the first bridge in the world to transport passengers in a hanging transporter. The bridge spans the mouth of the River Ibaizabal and joins two towns, Getxo and Portugalete, west of Bilbao.

Only the bridge structure is nominated. This includes the land on which its two support pylons are sited, the superstructure over the river, and the surface area under its cables. The nominated area is 0.8595 ha. Two buffer zones, one or each bank of the river, encompass the neighboring urban areas. The land covered by the buffer zones is 12.36 ha.

Vizcaya bridge synthesized new technological advances in steel with engineering solutions evolved for iron railway architecture to address the problem of transporting people regularly across wide shipping lanes, in flat urban landscapes, without interrupting shipping or raising and lowering bridges. Vizcaya’s mechanised aerial ‘gondola’ suspended from the bridge’s high horizontal platform created when it was built a new method of transport.

The architect, Alberto de Palacio, conceived the project and brought it to fruition. Using exchanges of knowledge with French engineers such as Gustave Eiffel, and working with Ferdinand Arnodin, creator of twisted steel cables, which through their lightness revolutionised the design of suspension bridges, de Palacio patented the idea of a transporter bridge jointly with Arnodin.

Vizcaya Bridge is 45 metres high and has a 160 metre span.

Since it was completed, Vizcaya Bridge has operated continuously, apart from during the Spanish Civil War between 1937 and 1941. Each year it now moves 6 million passengers and functions 24 hours a day as a toll bridge.

It has been modified in part and upgraded to meet new requirements (see History below). Since 1999 the public has had full access including a walkway on the bridge deck – something envisaged in the original scheme. So far 250,000 people have taken advantage of this deck access.

The technical details of the construction are as follows:

The deck or platform which suspends the gondola is constructed of lattice, rolled and riveted iron. It is connected to two tall double-lattice lightweight pylons. The towers of similar construction and the whole structure is braced and anchored by steel cables stretching some 110 metres from the towers.

The towers are made of iron rolled at the rolling shop and hot-riveted to one another. They are double structures with the couples braced at three levels. The highest and lowest braces are elliptical arches. The central brace is the deck. Each of the couples is formed in diagonal lattice work with the lowest diagonals forming a pointed arch.

The deck is a lattice girder constructed in a similar way to the towers. The mobile gondola hangs from a ‘car’ mechanically rolling along the deck. It is suspended by a
system of crossed cables to prevent it swinging horizontally.

Unlike many transporter bridges that declined in use or were abandoned when their surrounding industries declined over the past fifty years, the Vizcaya Bridge has by contrast been restored and continues to provide a continuous and valued service between two towns that now have developed new industries, related to tourism and a new port.

Since 1996 the Vizcaya Bridge has been managed by a private company, El Tranbordador de Vizcaya S.L.

Although more than twenty transport bridges were built in Europe, Africa and the Americas, in the forty years following Vizcaya’s completion, only eight have survived. Vizcaya has taken the lead in organising an international committee for those remaining transporter bridges.

History

The Vizcaya Bridge can be seen as a culmination of iron working practices in the Basque area. The local iron seams were mined in Roman times; from 13th-16th century iron was exported to France and the Low Countries from as many as 300 Basque ironworks. And by the 18th century Basque iron was being used as agricultural implements for colonising new lands in South America. At the end of the 19th century, the ironworks were at the peak of their output with the adoption of new production methods disseminated by the industrial revolution. A dense array of iron and steel works and shipbuilding were developed around the mouth of the River Ibaizabal and Bilbao was the most important industrial, mining, commercial shipping and financial centre in Spain. Around 12 million tons of goods, mainly iron ore and iron products, were exported each year along the three miles of the River Ibaizabal to the port on the Bay of Biscay. Industry developed all along the river on its west bank towards the estuary.

Towards the end of the 19th century, as the population increased, the right bank of the estuary was colonised for housing. This brought the need for transport across the mouth of the river for people moving from where they lived to where they worked and to link the railways on both banks. This link could not interrupt the dense shipping traffic in the river.

Many solutions were considered; it was architect, Alberto de Palacio who developed the idea of a cable reinforced transporter bridge, making use of the lightweight twisted steel rope cables newly invented by Ferdinand Arnodin. This allowed a bridge to be built on flat land without the need for ramps and created a structure that did not have to be raised and lowered to allow the passage of ships.

The iconic nature of the bridge was recognised at the time. De Palacio said that it should endow the estuary with a ‘elegant and grandiose aspect’ and be proof of the ‘extraordinary wealthy Bilbao mining area’.

The bridge was opened on 16 June 1893. It has operated continuously since apart from during the Spanish Civil War.

Protection and Management

Legal protection:

The bridge is owned by the Spanish State. Property rights are exercised by the Ministry of Development who delegates this to the State Ports Authority, who in turn delegate most decisions to the Bilbao Port authority.

The bridge is a listed cultural monument approved by decree in 2003 under the Basque Cultural Heritage Act 7/90.

The Getxo buffer zone is part of a protected urban area under the Getxo Development Plan. The Portugalete buffer zone is protected under the Portugalete Town Development Plan, in which the bridge and its moorings are listed as singular elements. These plans limit the heights of existing buildings to between three and five stories and approval is needed for changes to frontages.

Management structure:

The management of the bridge of Vizcaya has since 1996 been in the hands of a private company, El Tranbordador de Vizcaya S.L. In 1995 they were given a concession by the harbour authorities to run the bridge until 2025. The company employs 30 people.

A Management Plan (in Spanish) has been drawn up by a group of stakeholders who comprise representatives of the Ministry of Culture, Basque Government, Bizkaia Provincial office, Portugalete and Getxo Town Councils, and the Vizcaya Transporter Company. The main aims of the plan are to coordinate actions of the various stakeholders, to draw up agreements with public or private institutions who can improve conservation, knowledge of the bridge, and to promote understanding of the bridge at local, regional and national level.

A Trustee Board is to be created to advise the Monument Commission on the drawing up of programmes and projects relevant to the objectives of the management plan.

An Advisory Board has already been created with representatives from government departments, NGOs, Universities and relevant individuals. One of its main functions will be to assemble adequate studies, analysis and research.

A Technical Team will be set up to implement approved plans and keep control of documentation.

Cultural tourism will be a key focus of the activities of all these groups.

Resources:

The main funds for the bridge come from the income generated by its use. Currently around half a million vehicles and 6 million passengers use the bridge each year and their dues are considered to provide adequate revenue for maintaining the bridge. Further funds for large-scale projects are provided by the company and for extraordinary needs or initiatives, subsidies can be provided by Bizkaia Provincial Council’s Department of Culture.
Justification of the Outstanding Universal Value by the State Party (summary)

Vizcaya Bridge is one of the outstanding architectural iron constructions of the European Industrial revolution, synthesizing new technological advances in iron and steel. It is also known for its aesthetic qualities.

As the first transporter bridge in the world, it represents an innovation in methods of transport and has influenced bridge construction around the world.

The bridge represents a culmination in iron working traditions in the Basque region.

4. EVALUATION

Conservation

Conservation history:
The bridge was damaged in the Spanish Civil war in 1937 when the bracing cables on the Getxo side were blown up causing the deck to fall into the estuary. Reconstruction commenced in 1939 and certain modifications were introduced. The lattice work on the deck was given a wider mesh and a deeper girder.

The energy source for the bridge has also been modified several times. The original system involving a steam boiler which lasted only twenty years and was replaced by an electric motor. This has been replaced twice and its position moved from high up in a cabin to a lower level.

The bridge was subject to a major restoration scheme between 1996 and 1999, after the present company took over the concession. Restoration has included work on all the main structures, using original materials and techniques, replacement of the gondola, installation of new lift, replacement of wear-generating elements with synthetic substitutes, and removal of ancillary structures such as restaurant and ticket office. These changes are discussed under authenticity below.

The work programme also included the development of mobile scaffolds for maintenance, the installation of security system, and the drawing up of specifications for regular maintenance such as painting, and good practice for element substitution.

Public access, envisaged at the time of construction but not implemented, was made possible as part of the programme.

In order to keep disruption of the bridge to a minimum, the work programme confined activity to three hours a day.

State of Conservation:
The state of conservation of the bridge is now very good.

Protection and Management:
The contract to run the bridge was given to the current private company on 1995. It has an obligation to run a public utility and keep the bridge functioning 24 hours a day.

The Company employs nearly 40 people, of whom a few more than 30 have a permanent status. At the technical level, the central point of the policy of the Company is technical maintenance work through regular diagnoses, using modern technologies, if necessary, and preventive measures.

The public Company has a workshop run by a team of four permanent technicians. They organize daily inspections of the superstructures, and weekly visits of the bearings support of the cables at the top of the pillars and of the cables.

All the personnel of the Company take part in annual training activities, where the values of the inheritance and its importance are pointed out and strengthened.

The five year restoration programme completed in 2000 was entirely supported by the Company at a cost of 3 million euros, paid for by the Company in bank loans and with the assistance of Basque private companies. Annual running costs are supported by subsidies from the Basque government.

It received in 2004 an important European award for its management and conservation of the bridge.

The restoration project and all other smaller projects have to have the authority of the Basque government in Bilbao who have a technical team of specialists, including a conservation architect, to advise on the bridge.

The Advisory board already set up under the Management Plan has established good working arrangement with the company.

- Buffer zones

The buffer zones are protected by virtue of the town development plans for the two banks of the river.

It remains less than clear how these development plans will protect the area from large-scale tourism projects such as one currently being considered (see below).

Risk analysis:
The nomination dossier only considers risk to the nominated area – i.e. the bridge structure. Given the protection the bridge enjoys and its current good state of conservation, those risks are minimal.

However there are risks associated with its setting – in the area designated as a buffer zone. The greatest threat is inappropriate development. Currently a very large five-storey car parking scheme, partly underground, but also involving corbelling out form the cliff at the southwestern limit of the buffer zone, (outside the directly protected area) is being considered in order to respond to anticipated increases in visitor numbers if the bridge is inscribed. The area is presently a public garden. The change of use, and the bulk and scale of this scheme, would have a considerable negative impact on the surroundings of the bridge and views from the bridge. Other considerations are the undesirability of excavating the wooden piles near the right bank pillar, as this might lead to biological deterioration of the wood.

ICOMOS considers that if the tourism potential of the bridge is to be development in a sensitive way, there will be a need to provide the necessary tourism infrastructures in away that does not impact on the setting of the bridge.
The lattice work of the iron frames on the Vizcaya Bridge starting with Thomas Telford’s Menai Straights bridge in 1826, and also to structures such as the Eiffel Tower in Paris, all reflecting the wide availability of iron manufactured by industrial processes. Such was the success of Vizcaya Bridge, that its design and technical characteristics were copied many times over the following decades. Between 1896 and 1933 the main transporter bridges built were in France (6), UK (4), USA (2), Germany (2), Tunisia (1), Holland (1), Argentina (1) and Brazil (1). Of these eight survive. Most of the French bridges were destroyed in World War II: only the one at Martrou-Rochefort remains. In the UK, one has been demolished, while in Newport the largest transporter bridge to be constructed still gives service, the Middlesbrough bridge gives limited service, and the small bridge in Warrington operates occasionally. The other remaining bridges are Osten and Rensburg, Germany, and Duluth, USA.

The transporter bridges that followed Vizcaya did not fundamentally alter the model. Vizcaya can therefore be seen as representing a new development, rather than a tentative step, to something that others perfected and the spread of metal working technology form France to Spain and then further afield.

**Outstanding universal value**

**General statement:**

Vizcaya Bridge is of outstanding universal value for a combination of the following qualities:

- Is one of the outstanding architectural iron constructions of the Industrial Revolution;
- Combines iron technology evolved for railways with the innovative technology of lightweight, twisted steel cables;
- Is the first hanging transporter bridge in the world;
- Had a marked impact on bridge construction around the world.

**Evaluation of criteria:**

Vizcaya Bridge is nominated on the basis of criteria i, ii, iii and iv:

**Criterion i:** The bridge is a dramatic and aesthetically pleasing addition to the river estuary, and an exceptional expression of technical creativity, reflecting an entirely satisfactory relationship between form and function. ICOMOS considers that the property meets this criterion.

**Criterion ii:** Vizcaya Bridge, through the development of the hanging transporter mechanism and its fusion of iron working technology with new steel cables, created a new form of construction that influenced the development of bridges around the world over the next three decades. ICOMOS considers that the property meets this criterion.

**Criterion iii:** Vizcaya Bridge cannot be said to represent a civilization or cultural tradition in its entirety; rather the bridge represents a facet of industrial engineering, for which criterion ii is appropriate. ICOMOS considers that the property does not meet this criterion.

**Criterion iv:** Vizcaya bridge represents a notable point in the development of large bridges. It is more difficult to justify that as being an important point in human history. For these reasons ICOMOS considers that the property does not meet this criterion.
5. RECOMMENDATIONS

Recommendations

Vizcaya Bridge has survived in use remarkably well and is now being managed and conserved within an appropriate framework involving representatives from relevant stakeholders and the potential to draw in experts as necessary. The one vulnerability is the setting of the bridge. Although buffer zones have been identified, it is not clear that the planning controls within these buffer zones will be tight enough to deter inappropriate development. In particular, the proposed car park development is seen as undesirable and should be re-considered.

Recommendation with respect to inscription

ICOMOS recommends that Vizcaya Bridge, Spain, be inscribed on the World Heritage List on the basis of criteria i and ii:

Criterion i: The Vizcaya Bridge is a dramatic and aesthetically pleasing addition to the river estuary and an exceptional expression of technical creativity, reflecting an entirely satisfactory relationship between form and function.

Criterion ii: Vizcaya Bridge, through the development of the hanging transporter mechanism and its fusion of iron working technology with new steel cables, created a new form of construction that influenced the development of bridges around the world over the next three decades and exported French and Spanish technologies.

ICOMOS recommends that the State Party re-consider plans for the development of a large car-park complex in the buffer zone because of the adverse impact of the scheme on the setting of the bridge in visual and physical terms.

ICOMOS, April 2006
Map showing the boundaries of the property
Bridge from the street

Suspended gondola