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ASCE HONOR FOR THE TCZEW BRIDGE IN POLAND

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This note presents the background for the introduction of the quoted bridge, as the International Civil Engineering Landmark, on the list of the ASCE History and Heritage Program. The history and the key structural features of that bridge have been briefly discussed. The opinion has been expressed that this long-span lattice-tube girder bridge could be regarded, really, as an ingenious child of the famous tubular Britannia Bridge in England. The observation of a matching, open-minded and global historic landmark policy of the ASCE has been positively underlined.

1. INTRODUCTION

The American Society of Civil Engineers, upon a corresponding decision of May 14, 2004, has approved the motion of the Tczew County and the Gdansk University of Technology in Poland, to honor the historic bridge over the Vistula-river in Tczew – **Old Wisla Bridge at Tczew** – by the status of the *International Historic Civil Engineering Landmark*, in line with the regulations of the relevant *History and Heritage Program*.

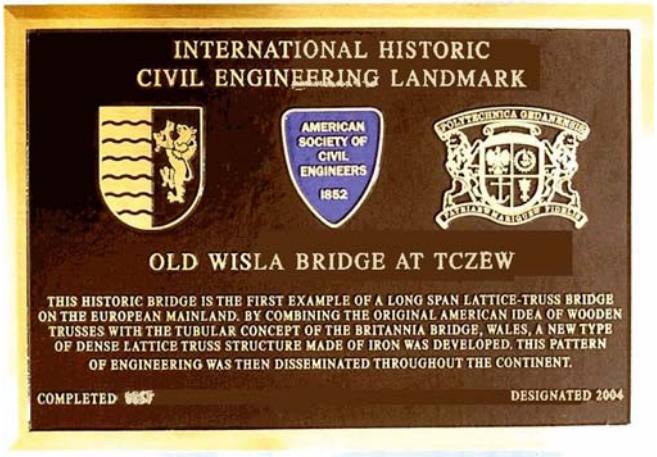

Fig. 1. ASCE plaque honoring the historic Tczew bridge

On September 24, 2004, in the presence of the Polish state and local government representatives, as well as – of the Gdansk University of Technology and the American Embassy in Warsaw, Poland, the proper bridge plaque (Fig. 1) has been unveiled.

With the reference to those occurences, in this note a brief background of that fact has been described and the bridge itself characterized.

2. BACKGROUND

The group of the Tczew bridges (the historic rail-road, and presently – barely road bridge: *1857; railway bridge: *1891; and the highway bridge in the nearby Knybawa: *1941) has today not only a pretty large practical significance but is, at the same time, very substantial as far as the development of large bridges, made of iron and steel, is concerned.

Therefore, at the Gdansk University of Technology in Gdansk, located very close to the mentioned city of Tczew, the investigation of all those bridges is considered to be an important element in the education process of future bridge engineers. A major recognition of the historic heritage of „Tczew" became very actual.

In such situation, it was natural that the Faculty of Civil Engineering at the Gdansk University of Technology initiated special teaching and research on the history and heritage in civil engineering. In particular, on that topic special international seminars and conferences were carried out – in 1993, 1995, 1997, and 1999. Hereby, the first permanent bridge in Tczew, that historic structure of 1857, became a special subject of the latter conference.

The performed research, conducted together with the Univesity of Kaiserslautern in Germany, resulted in the conclusion on the leading character of that type of bridge construction on the European mainland – which deserves international recognition. There originated an initiative of the bridge owner – the Tczew County, and of the Gdansk University of Technology, to properly honor that bridge; it has been addressed to the internationally most important *History and Heritage Program* which is being observed by the ASCE *Committee on History and Heritage: CHHCE* since the sixties of last century (Prasuhn 1999a).

Maybe, it is worthwhile to quote some of the objects already similarly honored by the ASCE (Prasuhn 1999b); the *Panama Canal* (*1914) – designated in 1984, and the *Eiffel Tower* (*1889) – designated in 1986, can be expressive evidences of the high rank of that action . Among the bridges, the three first honored were the following:

Iron Bridge (*1779) – Coalbrookdale, England; first object at all honored in 1979.

Forth Railway Bridge (*1890) – Queensferry, Scotland, honored in 1985.

Quebec Bridge (*1917) – Quebec, Canada, honored in 1987.

3. THE BRIDGE

The issue of the oldest Tczew bridge, being now the most recent ASCE laureate, was raised in the past quite often. The relative most recent studies can be quoted, as follows: (Ramm 1999), (Groh 1999), (TUG 1999), (Cywinski 1999), (Cywinski 2000), (Ramm 2001), (Ramm 2003a), (Ramm 2003b), (Affelt(2003), and (Cywinski 2005).

On the basis of all that research, the subject bridge can be characterized in the following manner. After the first railroad was opened in 1825 (England: Stockton-Darlington), a dynamic development of the rail network took place in all Europe. The first German railroad connected the cities of Nürnberg and Fürth (1835), whereas in Prussia – those of Berlin and Potsdam (1838). On Polish soil, at that time under alien rule, the construction of railroads originated in 1845 – as a part of the Warsaw-Vienna route.

Thus, it was also natural that the Prussian government decided to connect Berlin and Königsberg (presently: Kaliningrad, Russia). On that route, called the *Prussian Eastern Railway*, the rivers Wisla and Nogat were the largest natural barriers. The design and construction of the relevant bridges was in charge of *Carl Lentze*, a high-ranking ministerial officer for construction issues in Prussia. All necessary computation was made by the Swiss engineer *Rudolf Eduard Schinz*, former student of the industry school in Zurich – later the ETH Zurich (*1854) – and graduate of a similar school in Paris, the predecessor of the famous Ēcole des Ponts et Chaussées.

Carl Lentze made two trips to England (1844 and 1849), in order to study the outstanding examples of large span bridge constructions – the suspension bridges of *Thomas Telford* (Menai: *1826, l=176 m; Conway: 1826, l=98 m), and the tubular girder Britannia Bridge of ***Robert Stephenson*** **(***1850, l=72+142+142+72 m). The latter bridge, together with the American *Town*-system of bridge constructions, became the model for the historic bridges in Tczew (Wisla) and Malbork (Nogat); here only the first one is considered.

The idea of the Tczew bridge was the lattice-tube girder system of the superstructure. It resulted in a significant decrease of the dead load and wind effect, keeping the required stiffness intact. The bridge consisted out of three two-span continuous girders, each span of ca. 130 m (l=3x2x130 m). It became an inspiration for many later bridge structures in all Europe.

Originally, the subject Tczew bridge was a rail and road bridge. A substantial increase of the rail traffic, as far its intensity and load are concerned, caused that in 1891 a separate, parallelly located railway bridge was opened, leaving the former for the service of road traffic only. In 1912 both bridges had to be alongated by some 250 m because the Wisla-river bed had to be broadened.

Those matters – the second bridge and the elongation of both bridges – are outside the scope of this note. Fig. 2 shows the present-day preserved part of that bridge. Its daring shape addresses suggestively, still today, both the bridge specialists and laymen.

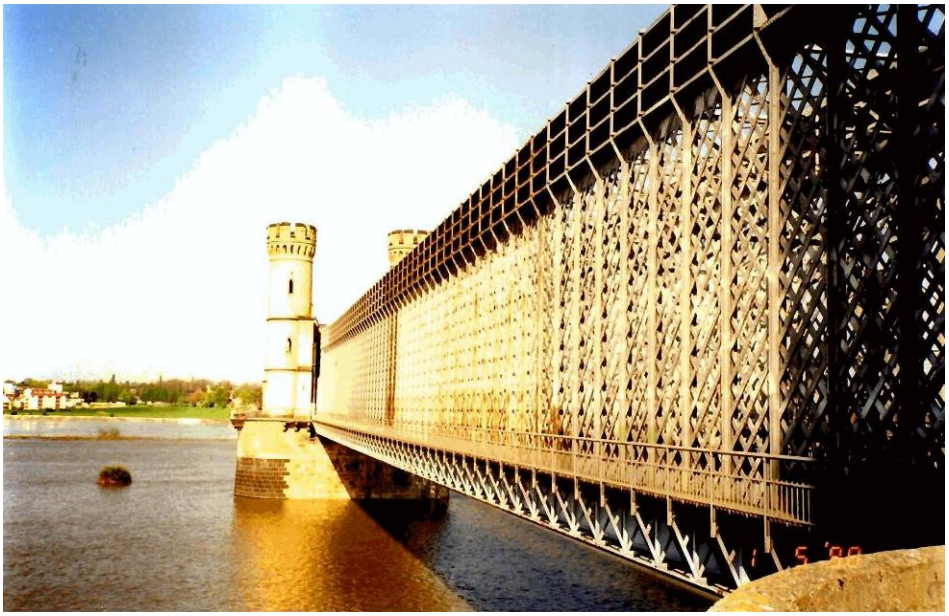

Fig. 2. Present impresion of bridge

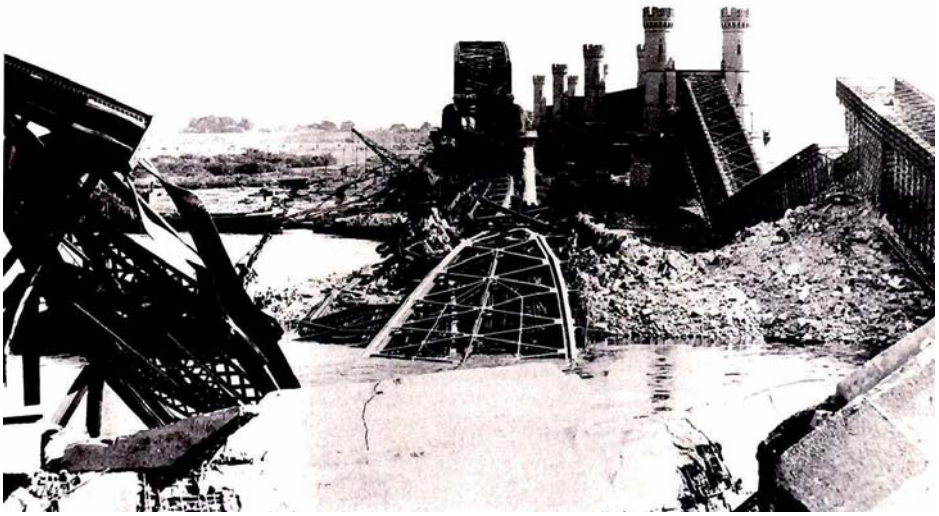

Fig. 3. War damages of bridges in 1938

Germany's attack on Poland in 1939 caused that in the first hours of W.W. II both bridges on the Wisla-river in Tczew have been partly destroyed by

the Polish army (Fig. 3). Later, they have been provisionally repaired by the Germans but in 1945 they suffered another destruction – this time by hands of the retreating German army. After Poland's come back, both bridges were successively rebuilt – however using casual superstructures, just available.

Fig. 4. Contemporary brid's eye view of bridges

The present bird's eye view of both the bridges is given in Fig. 4; it shows visibly the preserved part of the historic bridge with the pairs of towers on the piers. Fig. 5 presents a relevant side view of that bridge; behind it the present railway truss bridge is visible. The „philosophical" sense of that bridge results from Fig. 6. It exhibits the interior of the lattice-tube bridge superstructure of today – originated in 1857.

4. FINAL REMARKS

In this note the genesis and some circumstances have been shortly discussed that originated the recommendation of the **Old Wisla Bridge at Tczew** for its designation by the ASCE as the *International Historic Civil Engineering Landmark*. Author is convinced that such action was fully justified and the American Society of Civil Engineers took the right decision. Thus, the ASCE deserves a suitable acknowledgement of the world of civil engineers.

Fig. 5. Side view of bridges

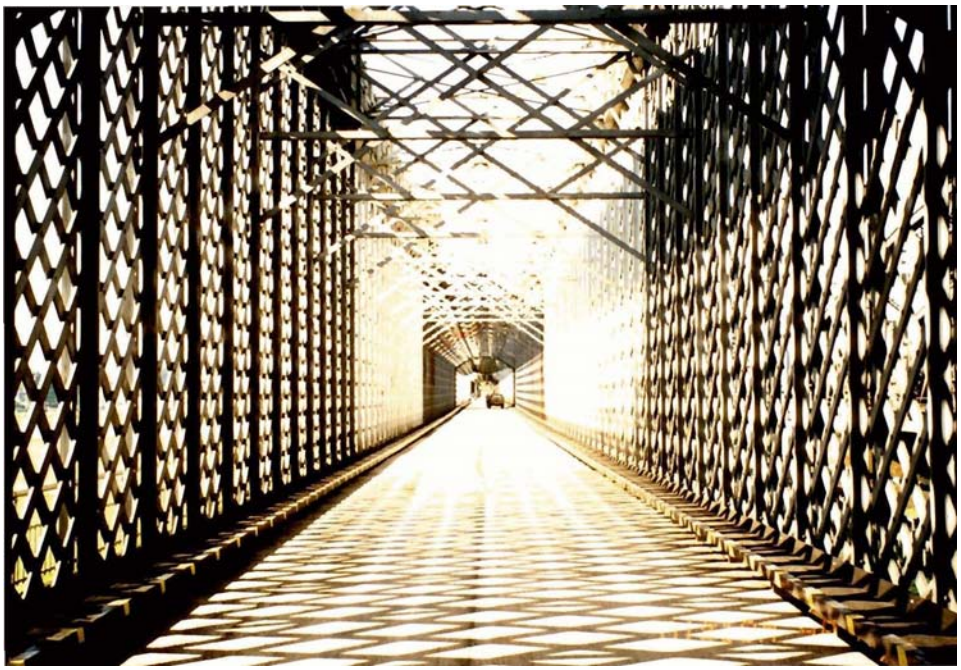

Fig. 6. Bridge interior „philosophy”

This action has also another meaning. It seems to be an appropriate occasion to make that world adequately sensitive. Today, the problems of civil engineering history and heritage are deeply connected with those of sustainability. Within the feedback relation, they exert a considerable impact on the development of the society (Cywinski 2001), (Cywinski 2004).

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