

HIDAG - BRIDGES IN SLOVENIA

- HISTORIC BRIDGES in SLOVENIA
- What can we learn from them?
- Author: GORAZD HUMAR, M.Sc.C.E.

SLOVENIJA

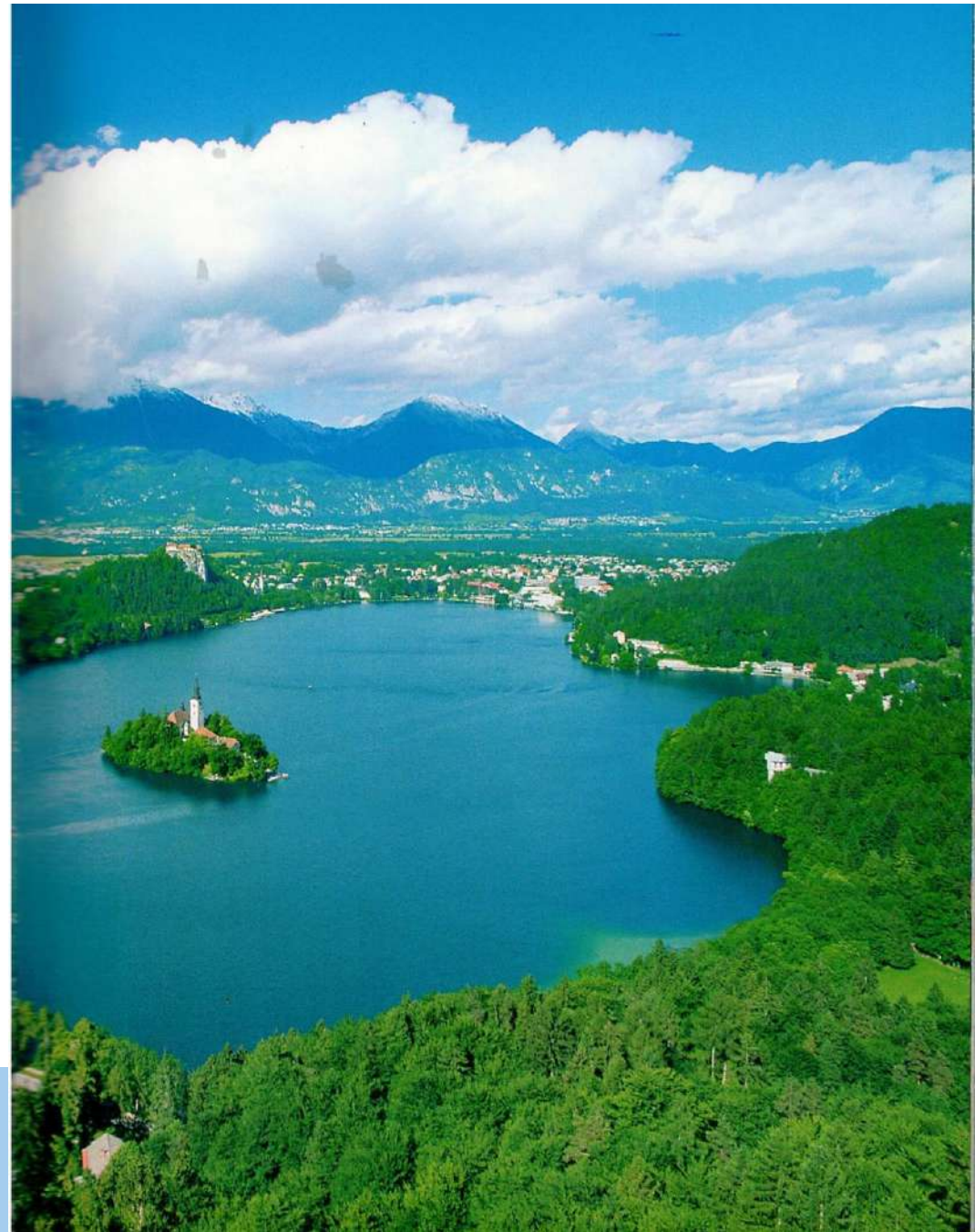


- Presentation of Slovenia:
- Surface: 20.256 km²
- Inhabitants 2,04 million
- 60% of the surface is wood
- 4.000 underground caves
- Hungary is our neighbour country, off. language
- 42 km of sea shore

BLED lake



BLED lake



PIRAN –Adriatic sea



CAVES – Križna jama



POSTOJNA CAVE - the largest



LJUBLJANA – the capital



SOČA river



LIPICA horses – from 1580



Štefanka - the oldest existing bridge, 1380



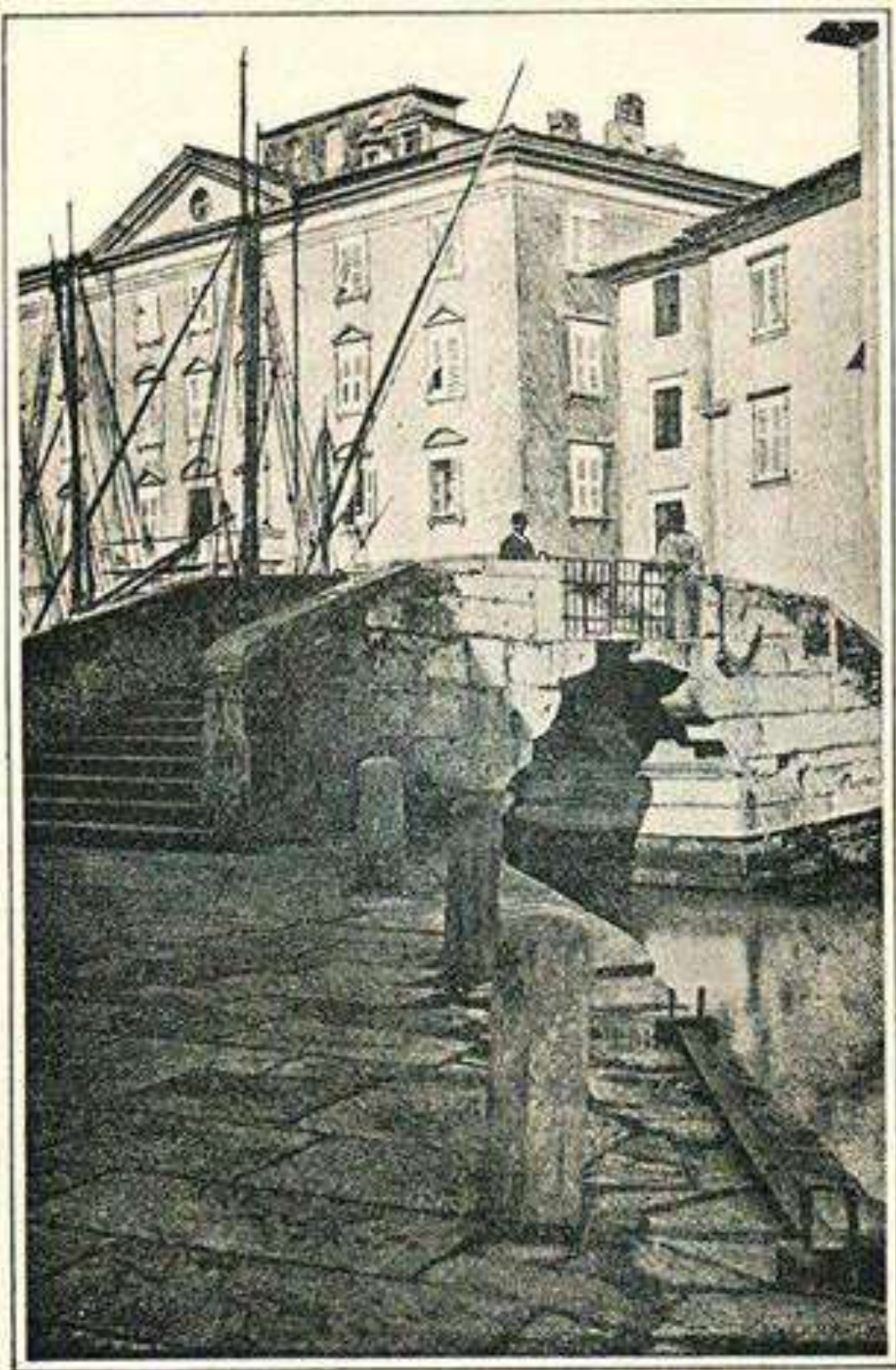


Škofja loka, 1380

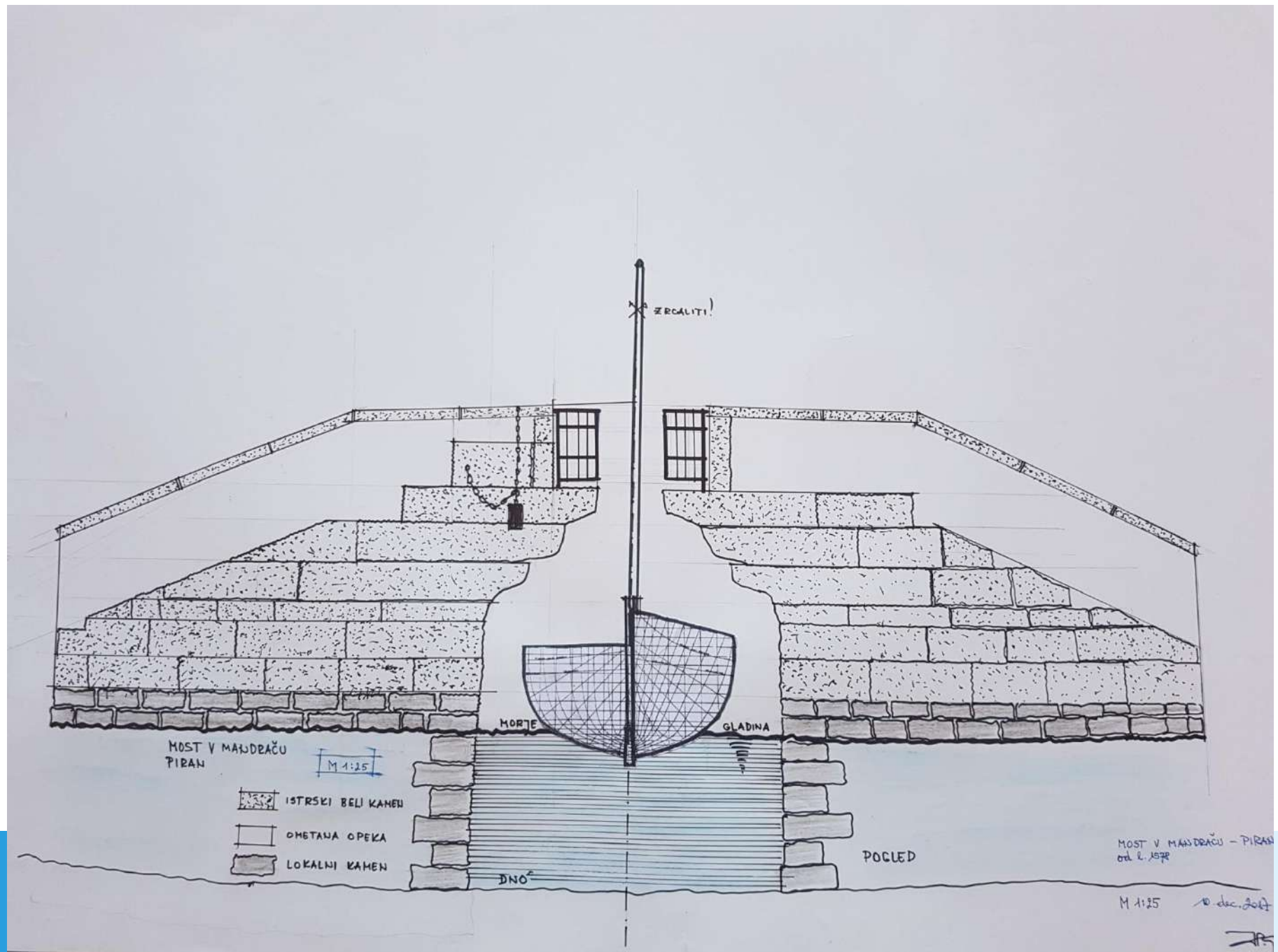


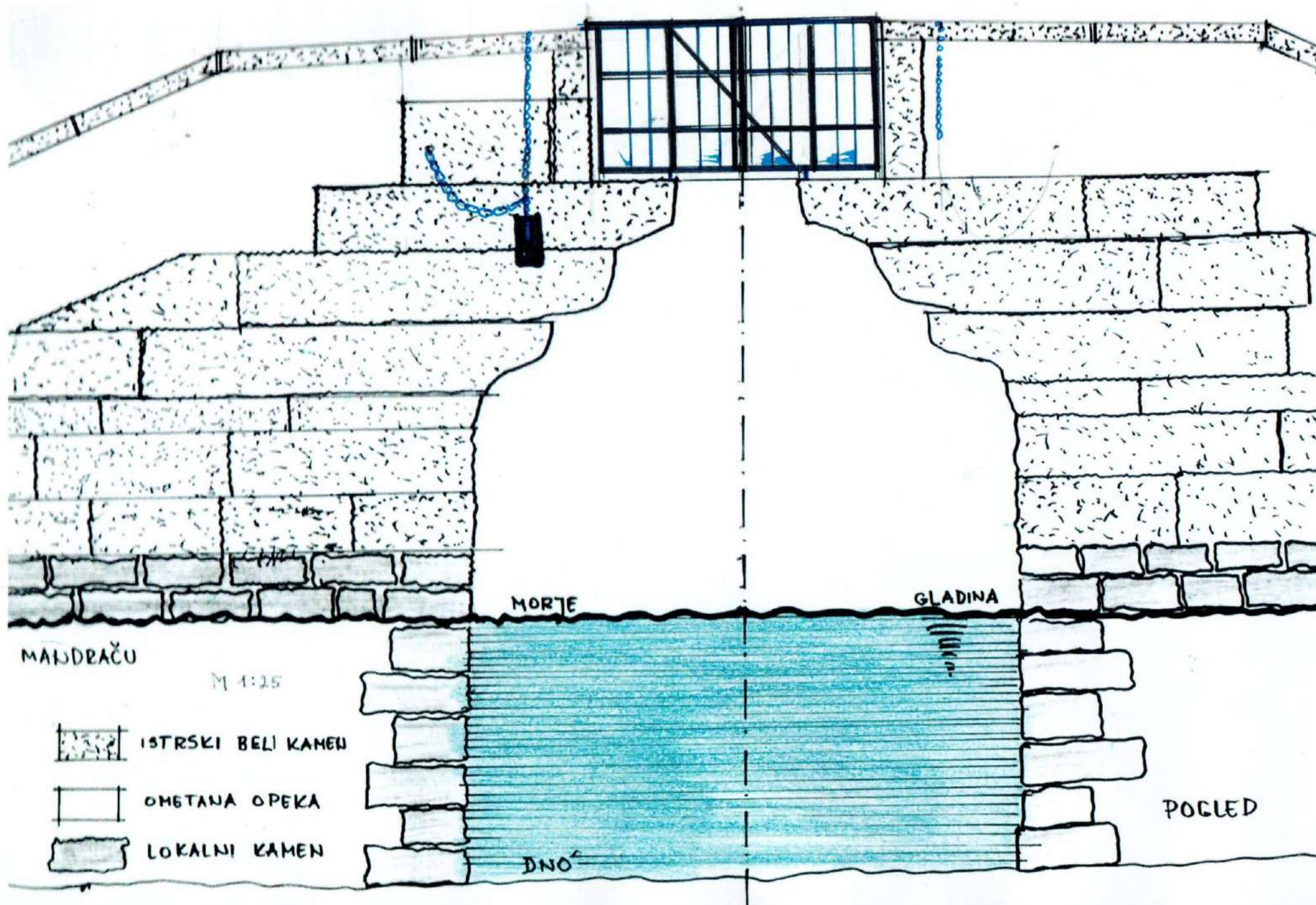
Piran – stone draw bridge from 1578



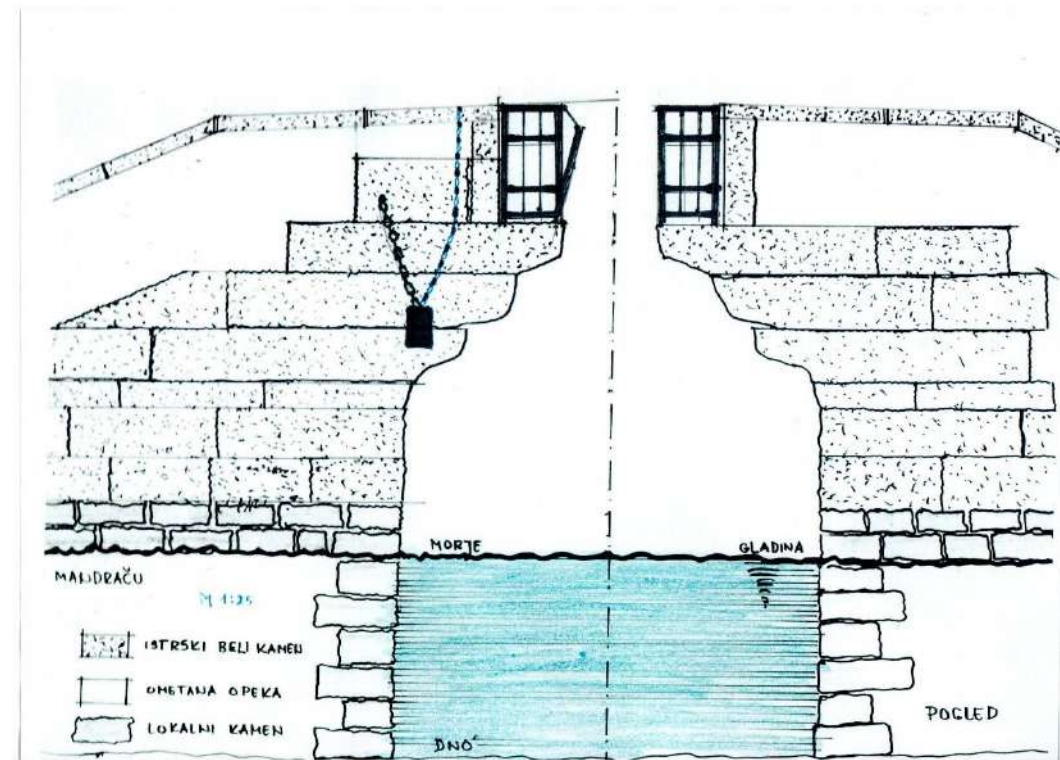
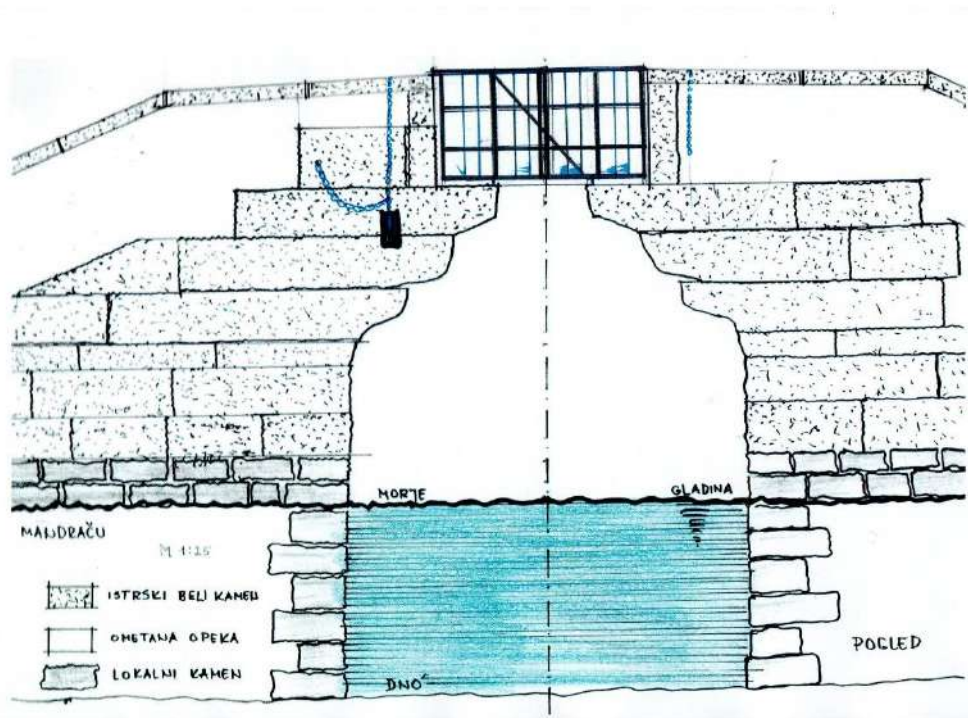


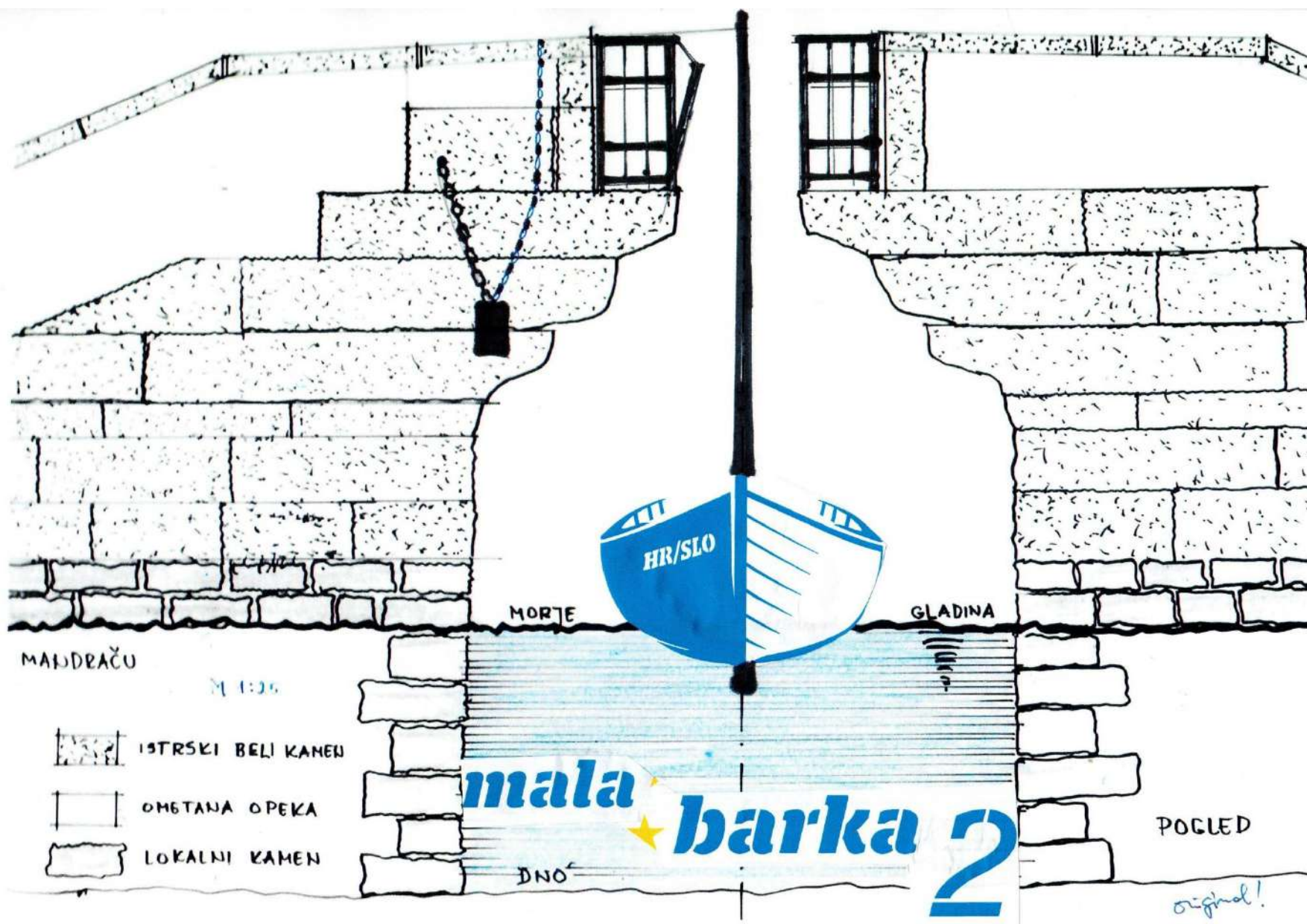
Footbridge with a draw mechanism



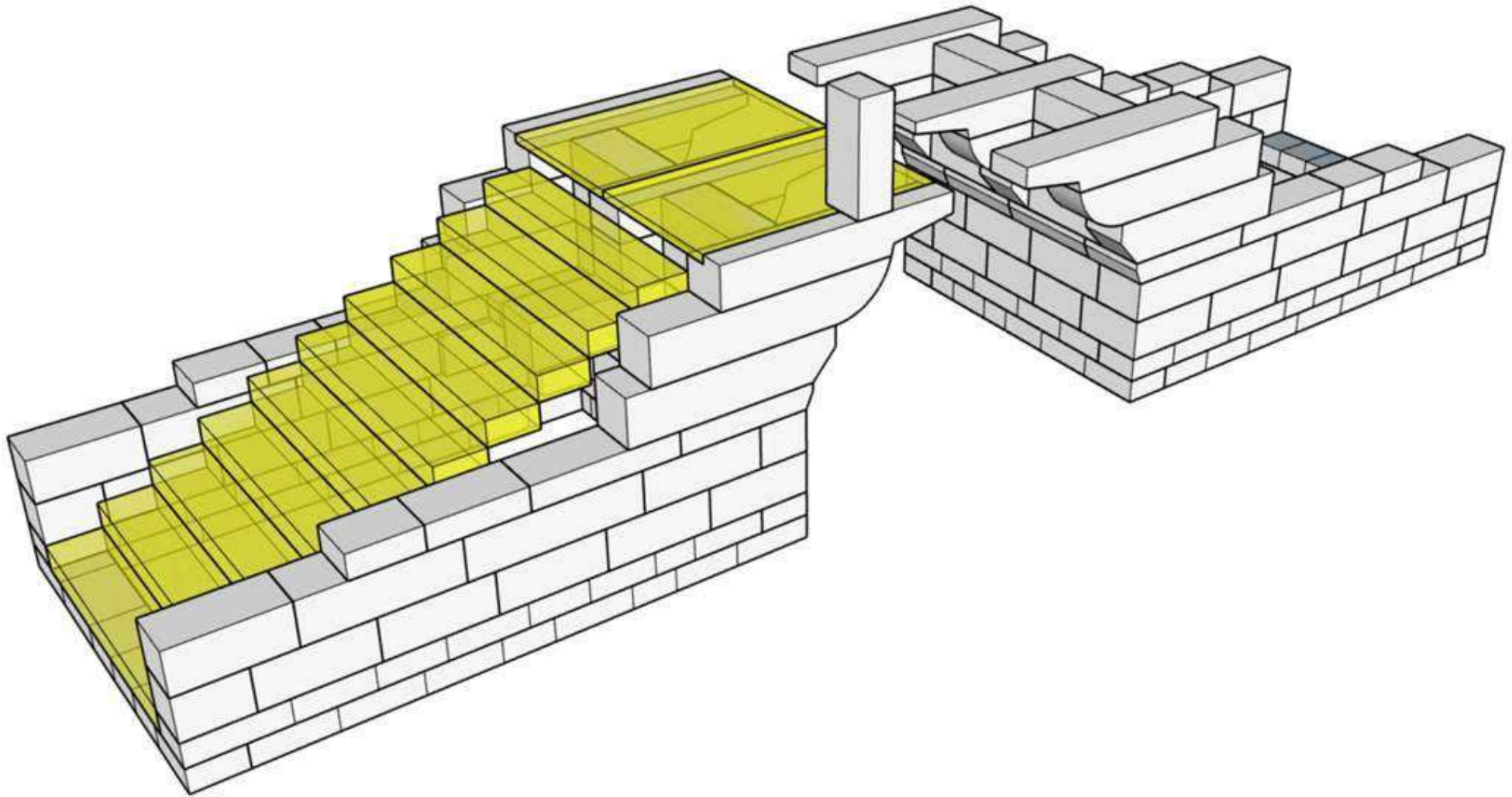


Counterweight for easier operation





Structure simulation stone cantilever girders



Vipava – bridge from 1560-80 enlarged by Napoleonic troupes in 1810





Count LANTIERI Bridge in Vipava, 1659



Stone bridge, monolithic piers
monolithic slabs $l = 2,60$ m, $h = 13$ cm









NAPOLEON BRIDGE, 1810







Monument to Rostas Pal



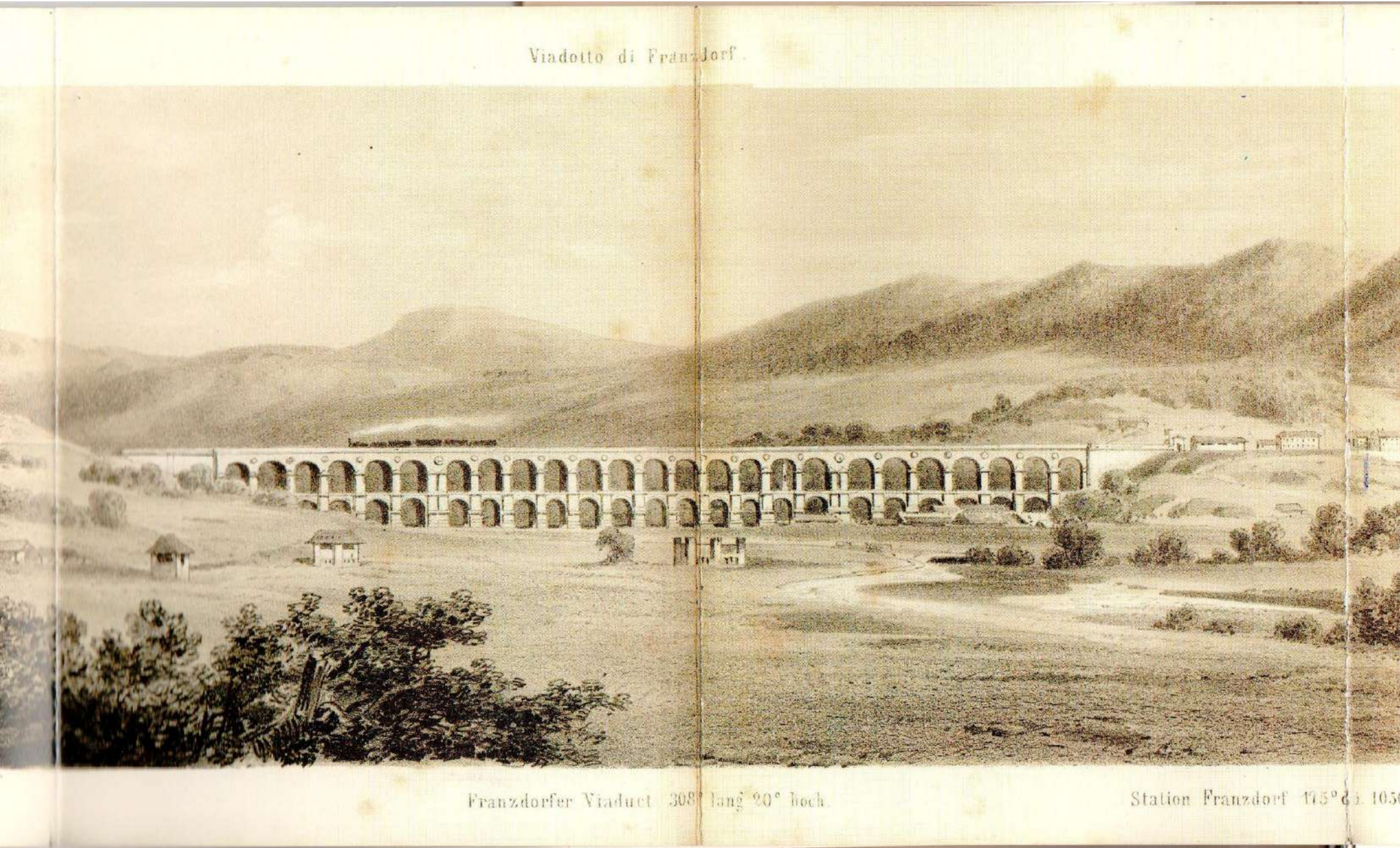
- Hungarian huzar
- Battle with French army
- 3.10.1813

Railway Vienna – Trieste, 1857



The BOROVNICA viaduct

2nd largest in Europe in 1857



Length = 568 m, h= 38 m

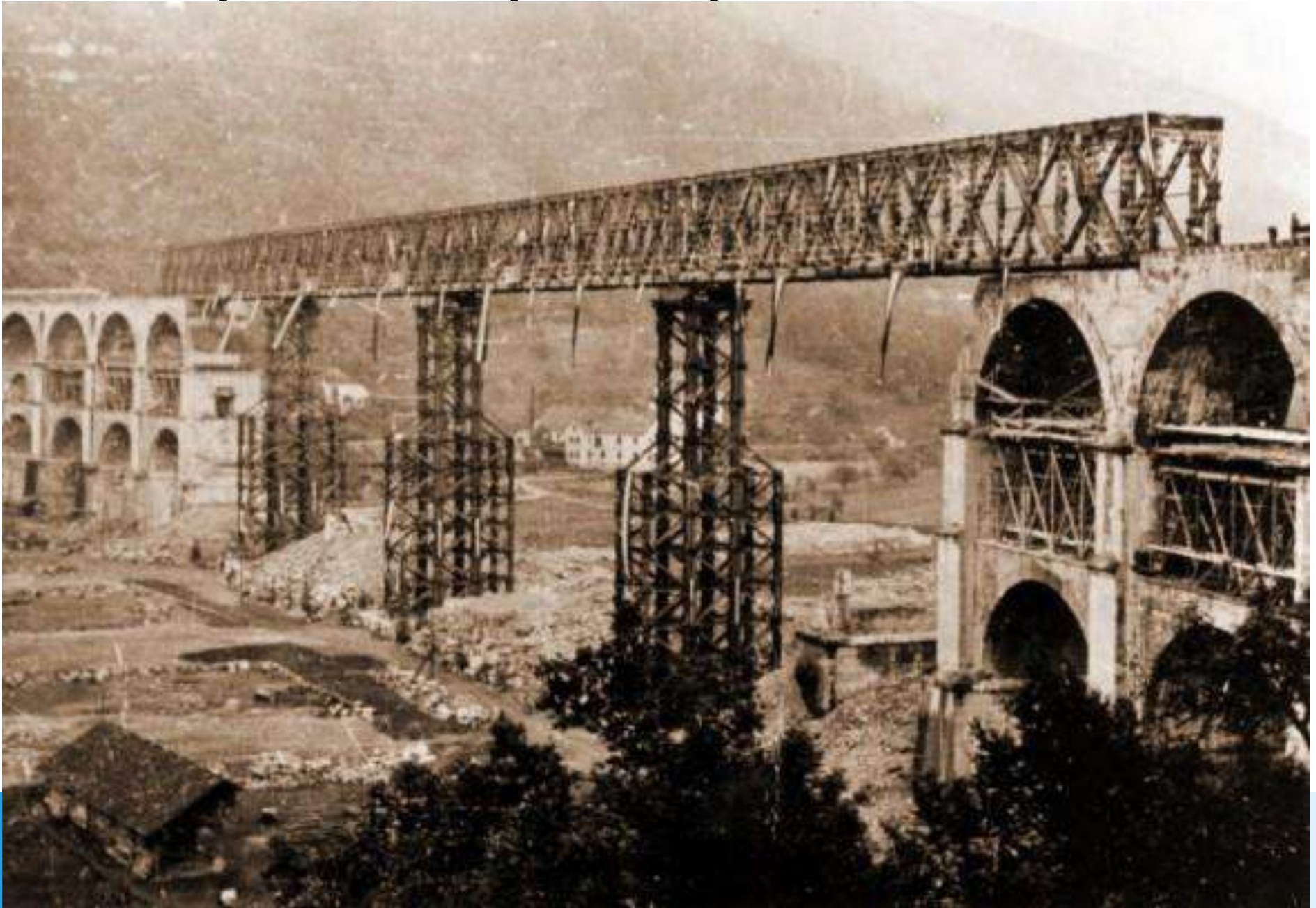


Destroyed in april 1941 by Yougoslav
royal army



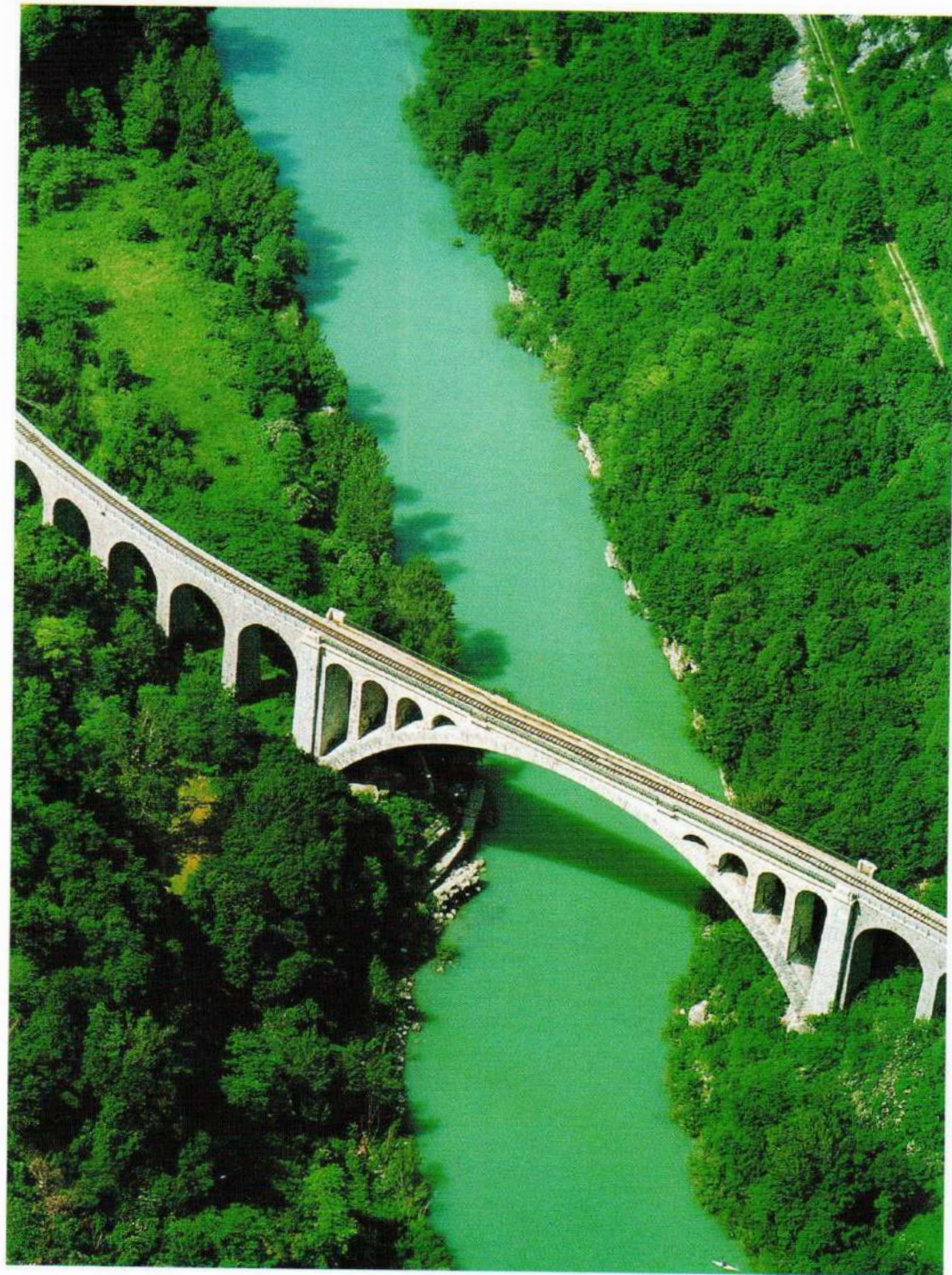


Repaired by Italian army,
finally destroyed by British in 1944



The SOLKAN railway bridge

- The Solkan Bridge over the Soča river
- Largest stone arch in the world
- Span 85 m



The stone arch bridge at Solkan in Slovenia, built in 1906

Photo: Bogdan Kladnik

The II. Railway Vienna – Trieste, 1906



The Solkan Bridge over the Soča river



The greatest stone arch in the world

span: $l = 85$ m

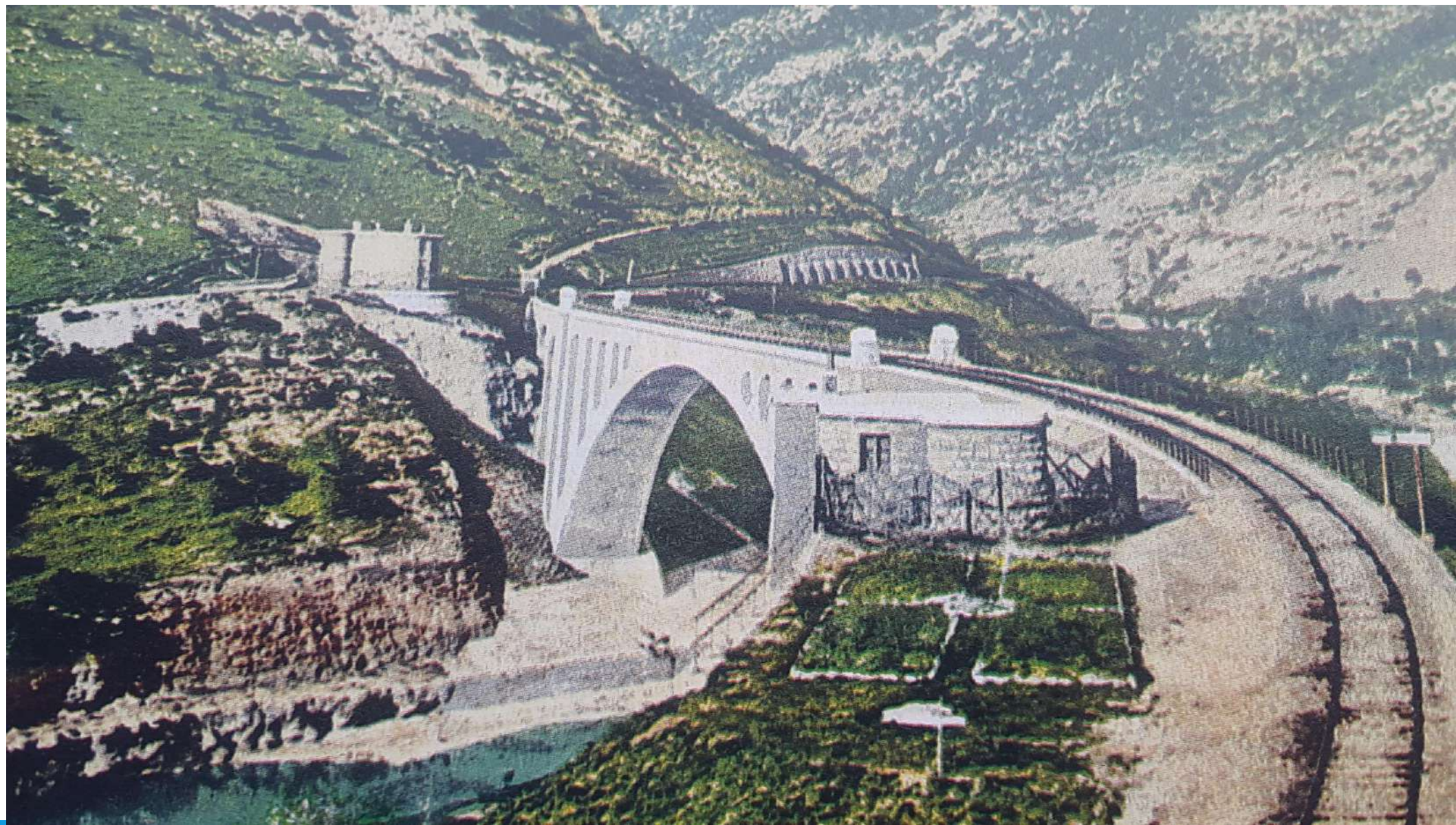
Gorica-Solkan
Gorizia
Görz-Salcano

Največji kameniti most na svetu (obok 85 m)
Il nuovo ponte sull' Isonzo (l'arco 85 m)
Die größte Steinbrücke der Welt (der Bogen 85 m)



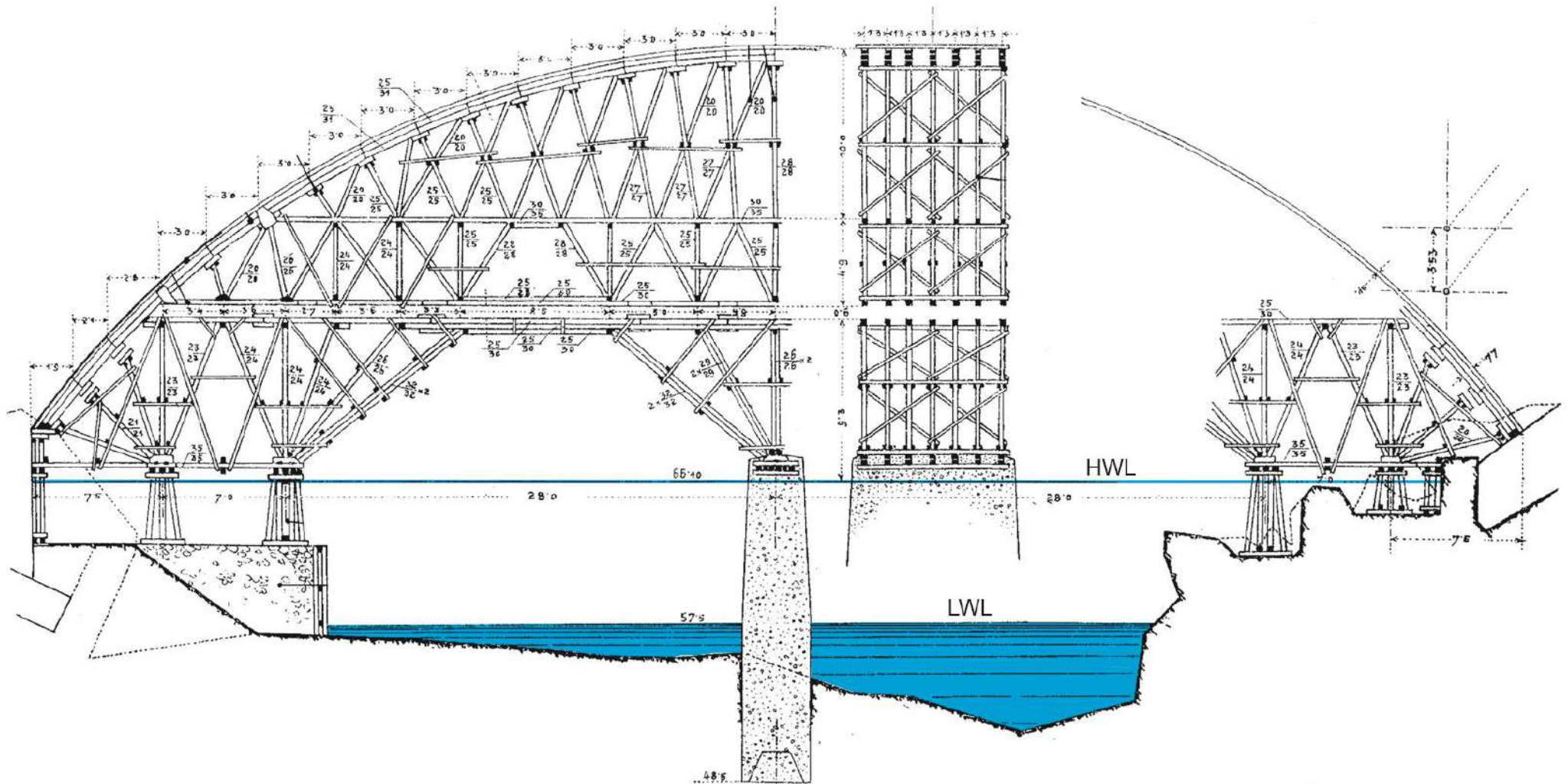


GORIZIA, Ponte ferroviario Salcano
GORZ, Salcanobrücke

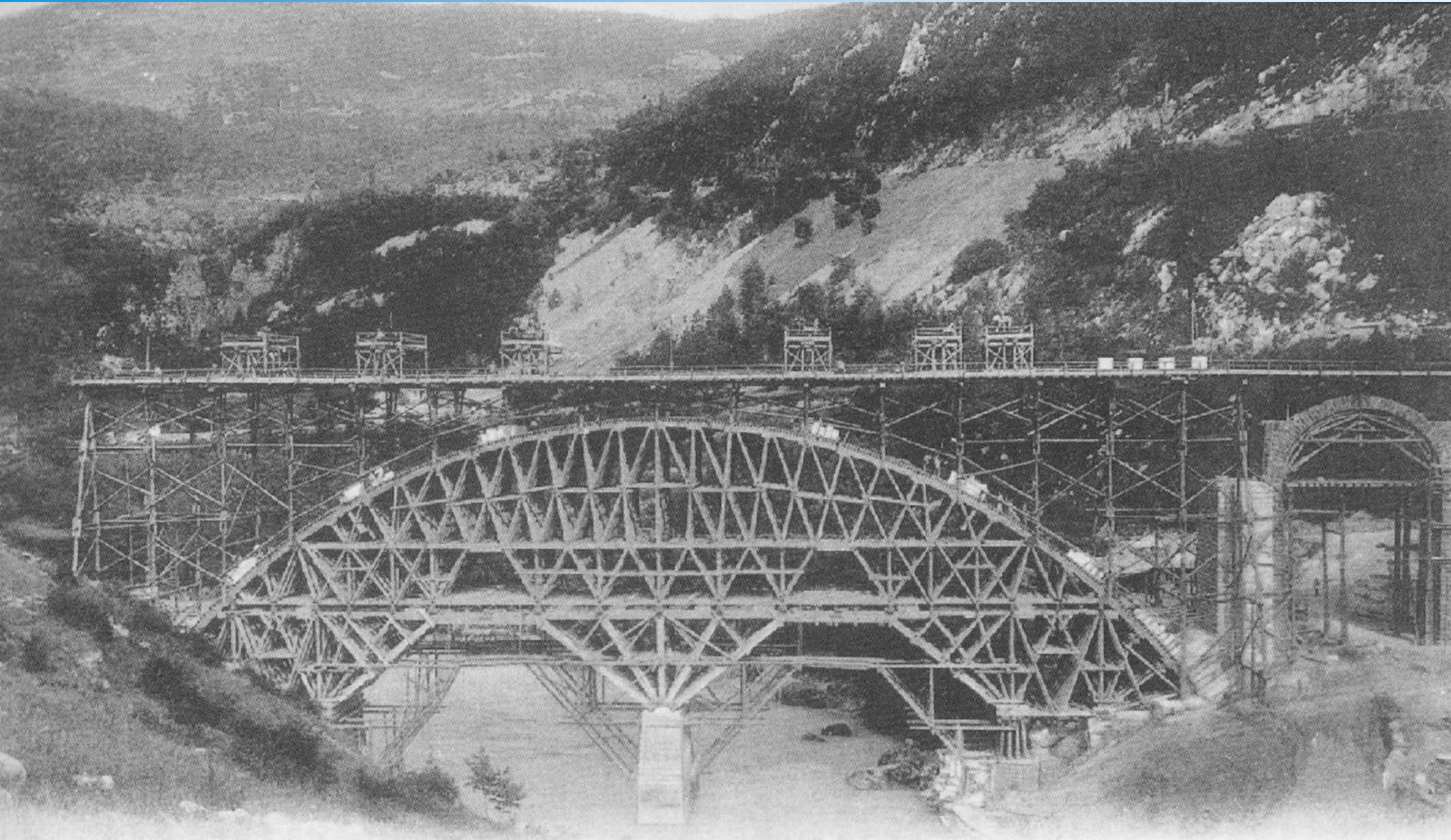


Vzdolžni prerez mostu čez Sočo pri Solkanu

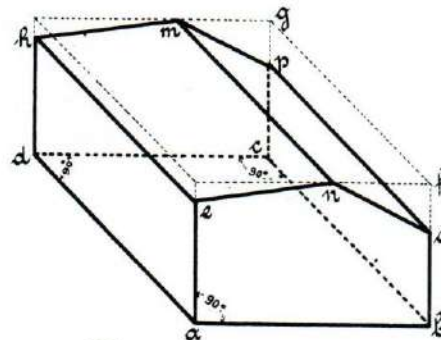
Wooden scaffolding, 1905



1st day: laying of stones in 7 segments



Bestellung N^o 4.



a, b, c, d unteres Lager.

e, n, m, h oberes Lager f. d. Fundament.

n, q, p, m " " Pfeiler.

Fundamentquader der Schichte III.

Bestell-Liste N ^o 4.								Cubatur für die Verrechnung.					
Zeichen des Quaders	Stückzahl	Längen der Kanten in millimeter						Anmerkung	des umschriebenen kleinsten Parallelepipedo				
		ab= cd.	ad= bc.	ae= dh.	cg= bf.	gm= fn.	cp= bq.		Länge ab	Breite ad	Höhe bf	Cubus einzeln	Cubus zusammen
72	2	794	1094	554	567	337	336		0.794	1.094	0.567	0.4925	0.985
73	2	794	1038	554	567	337	336		"	1.038	"	0.4673	0.935
74	4	794	788	554	567	337	336		"	0.788	"	0.3548	1.419
75	1	794	1188	554	567	337	336		"	1.188	"	0.5348	0.535
	9 Stück								Zusammen	m ³		3.874	

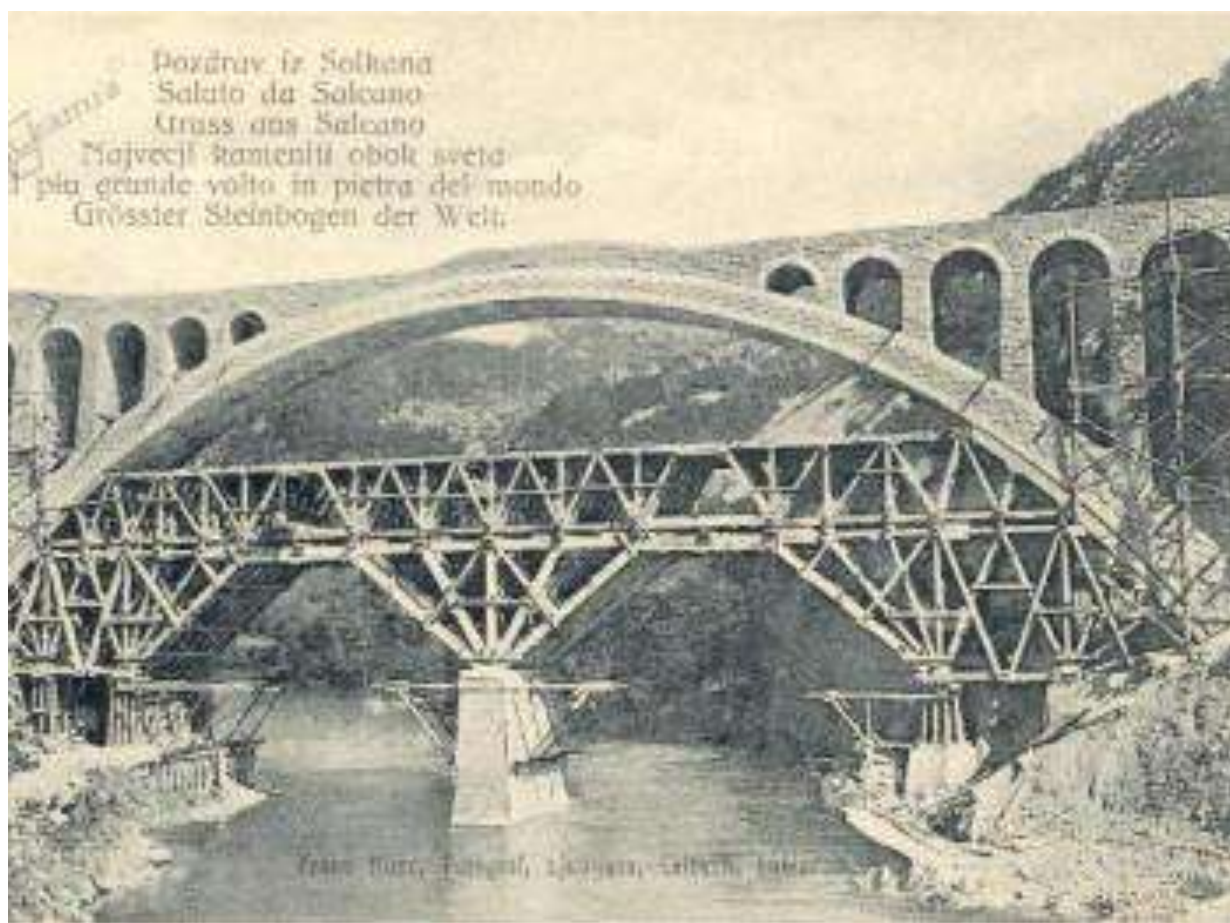
Anmerkung: Alle Quader sind vollkantig und genau nach den Dimensionen der Bestellung ohne jeden Abzug für die Fugen u. dgl. zu liefern. Die sämtlichen Flächen der Quader sind laut Fläche 5 des Mustersteines fein zu spitzen.

Alle Lagerflächen müssen auf einer glatten Ebene satt aufliegen und dürfen mit keinem Punkte darauf reiten.

Die Qualität des Steinmaterials muß jener des Mustersteines entsprechen.

Die Quader sind stets auf einem der oberen Lager mit dem vorgeschriebenen Zeichen in haltbarer roter Farbe zu versehen.

Wien, am 13. September 1904.

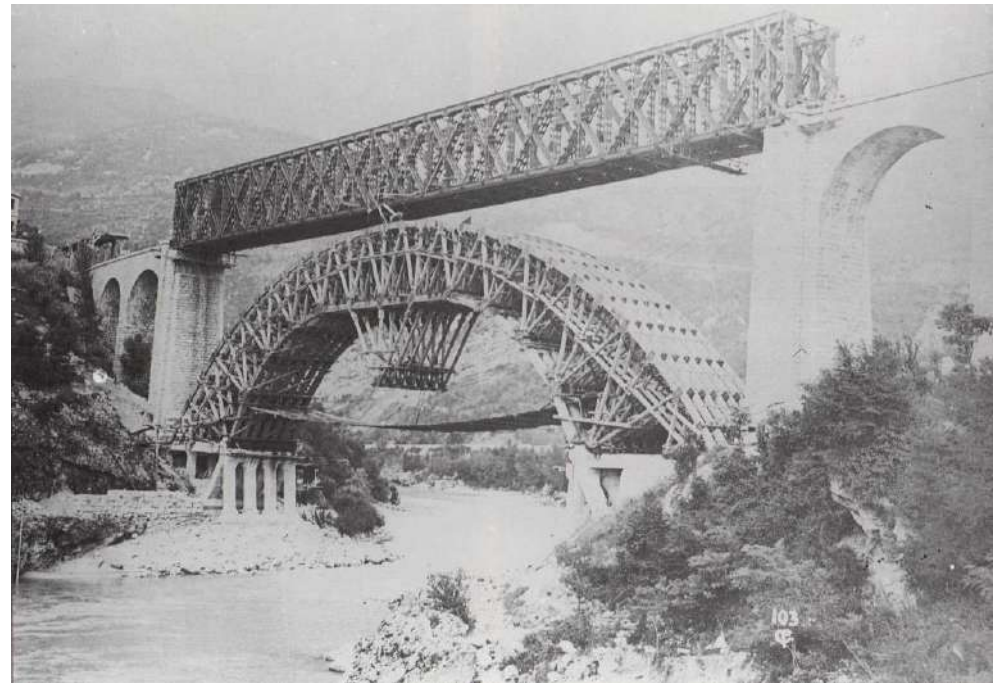


- The arch was built in:
- 18 working days !!!
- 1.960 m³ of stone

Blasted on 9. August 1916



Roth Waagner steel bridge, 1918 span 93 m, made in 3 months



Hit by an airborne attack in March 1945



Road bridge, RC arch 102 m, 1985



Military cemetery Solkan, 1915-1916, Isonzo front



N. 488
Inf.
Krupa Andreas
I.R. 77

N. 489
Inf.
Novotny Joseph
I.R. 21

Krupa András
1917

Novotny József
1917

Monument to soldiers 1915 -1916



Hradeckega Bridge in Ljubljana, 1867



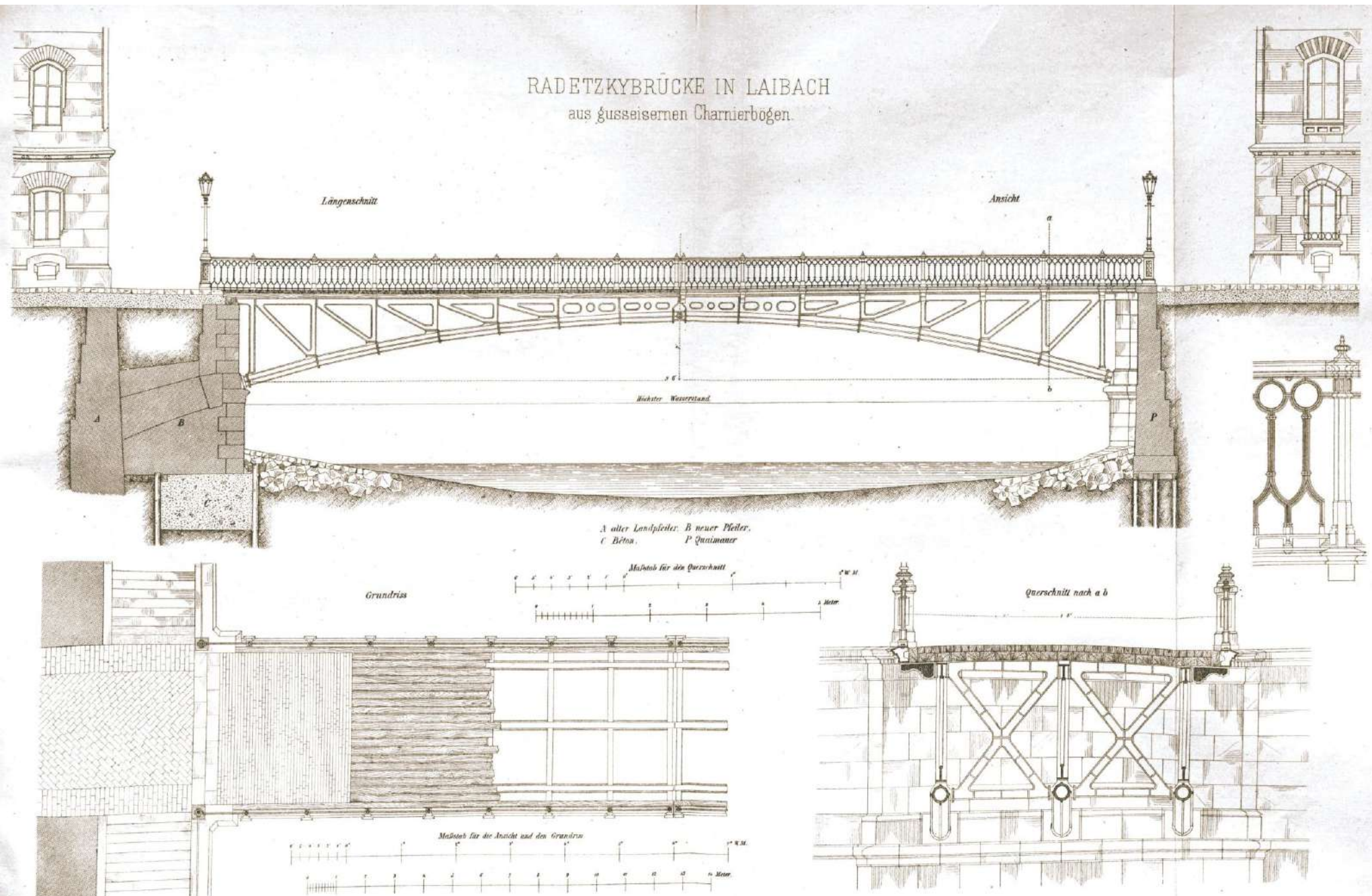
This is a footbridge



Design from 1867

N° 6.

RADETZKYBRÜCKE IN LAIBACH aus gusseisernen Charnierbögen.



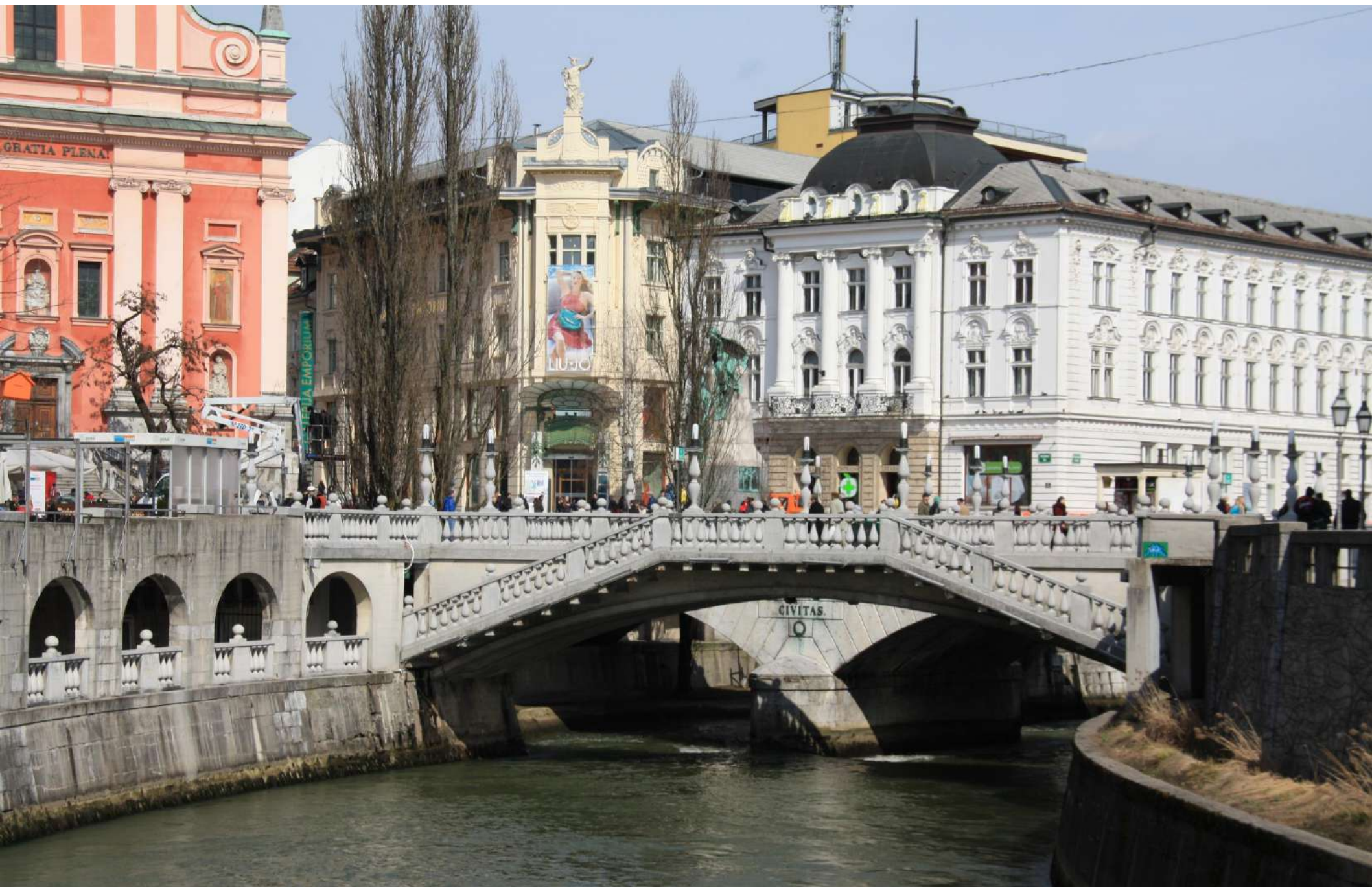




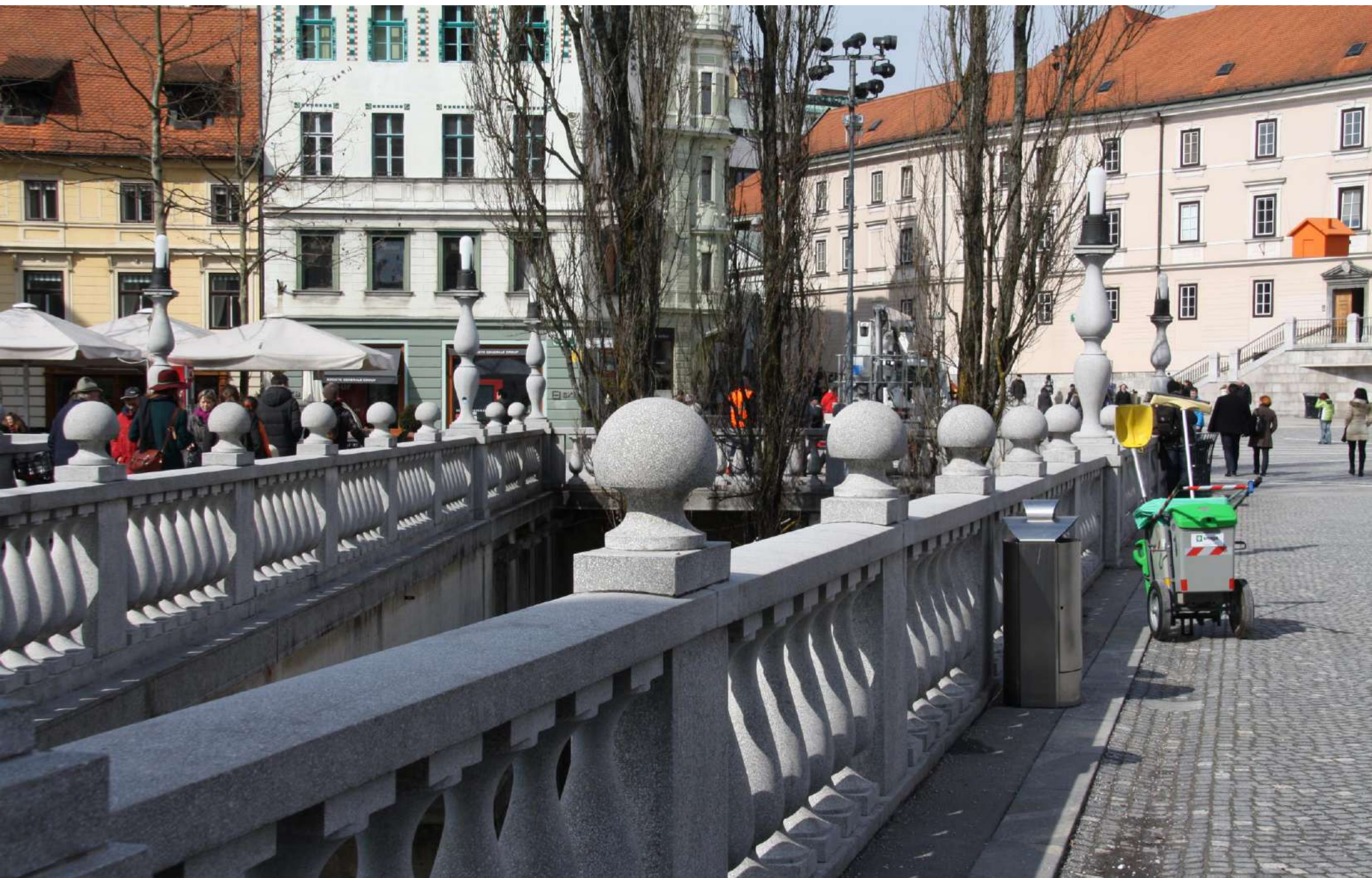
The hinge from 1867



The Triple Bridge – 3 bridges, 1934



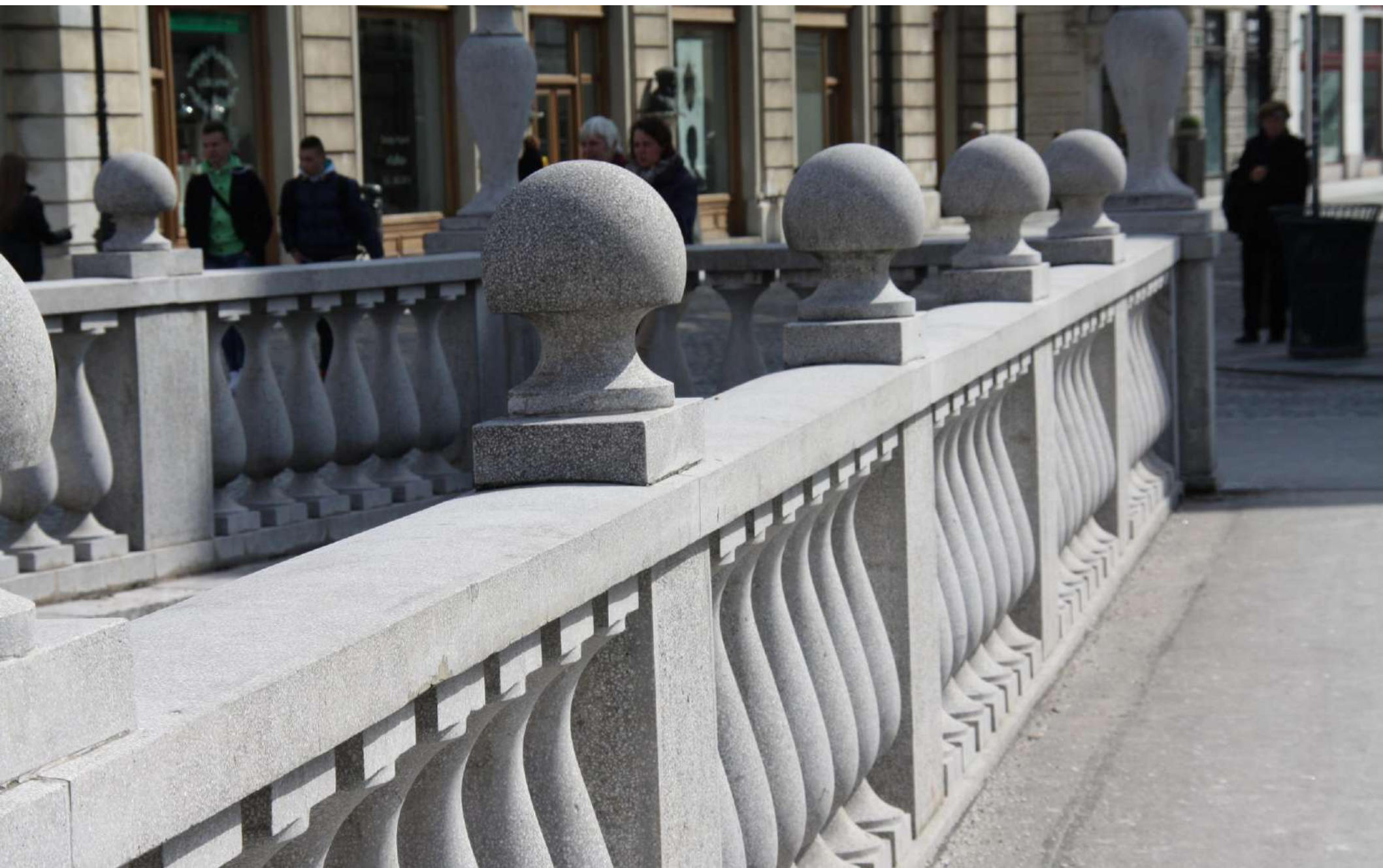
The Triple Bridge in Ljubljana





ARCHIDVCI. FRANCISCO. CAROLO.
MDCCCLII.
CIVITAS.





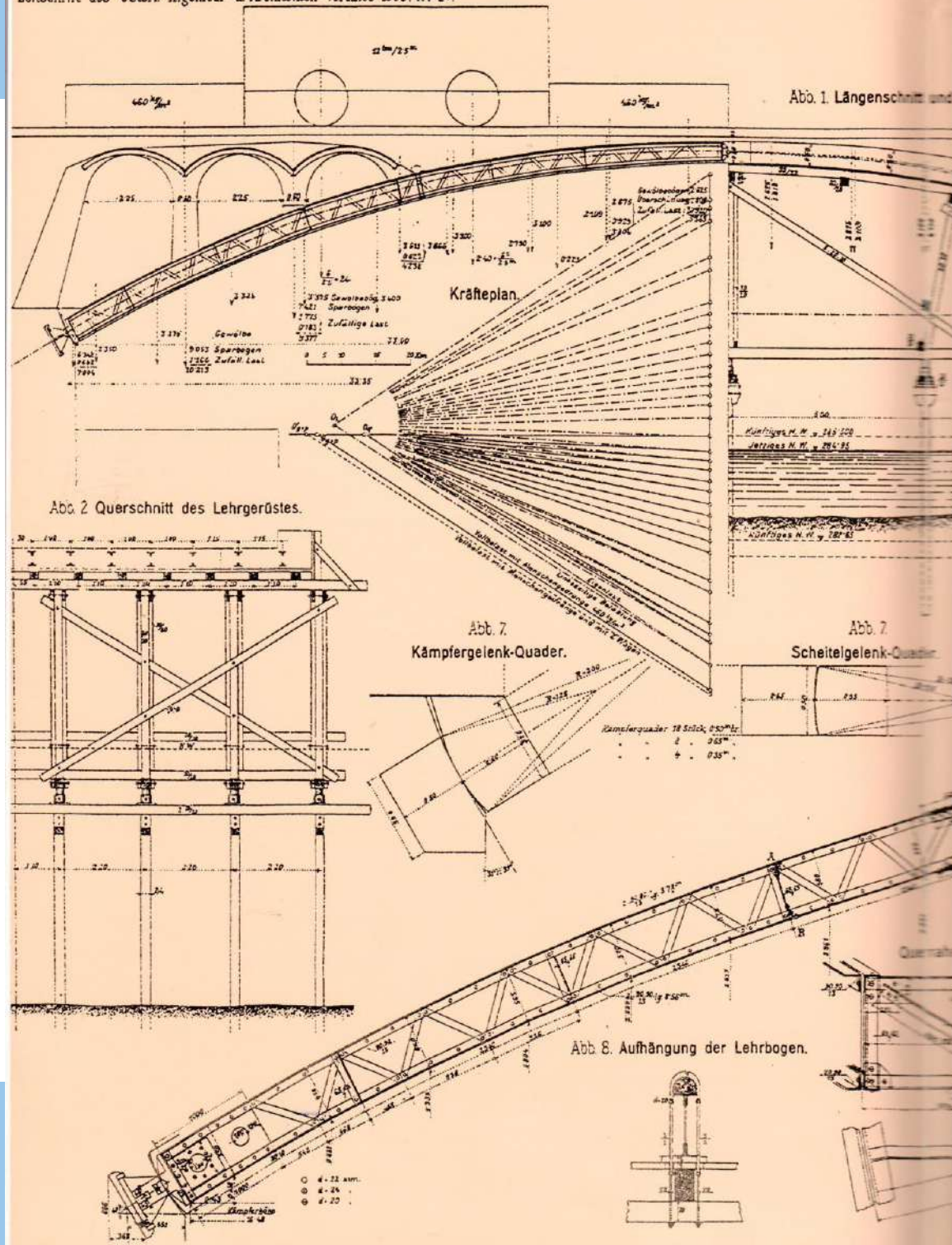
The Dragon Bridge from 1901, Ljubljana



3rd largest RC arch in Europe in 1901

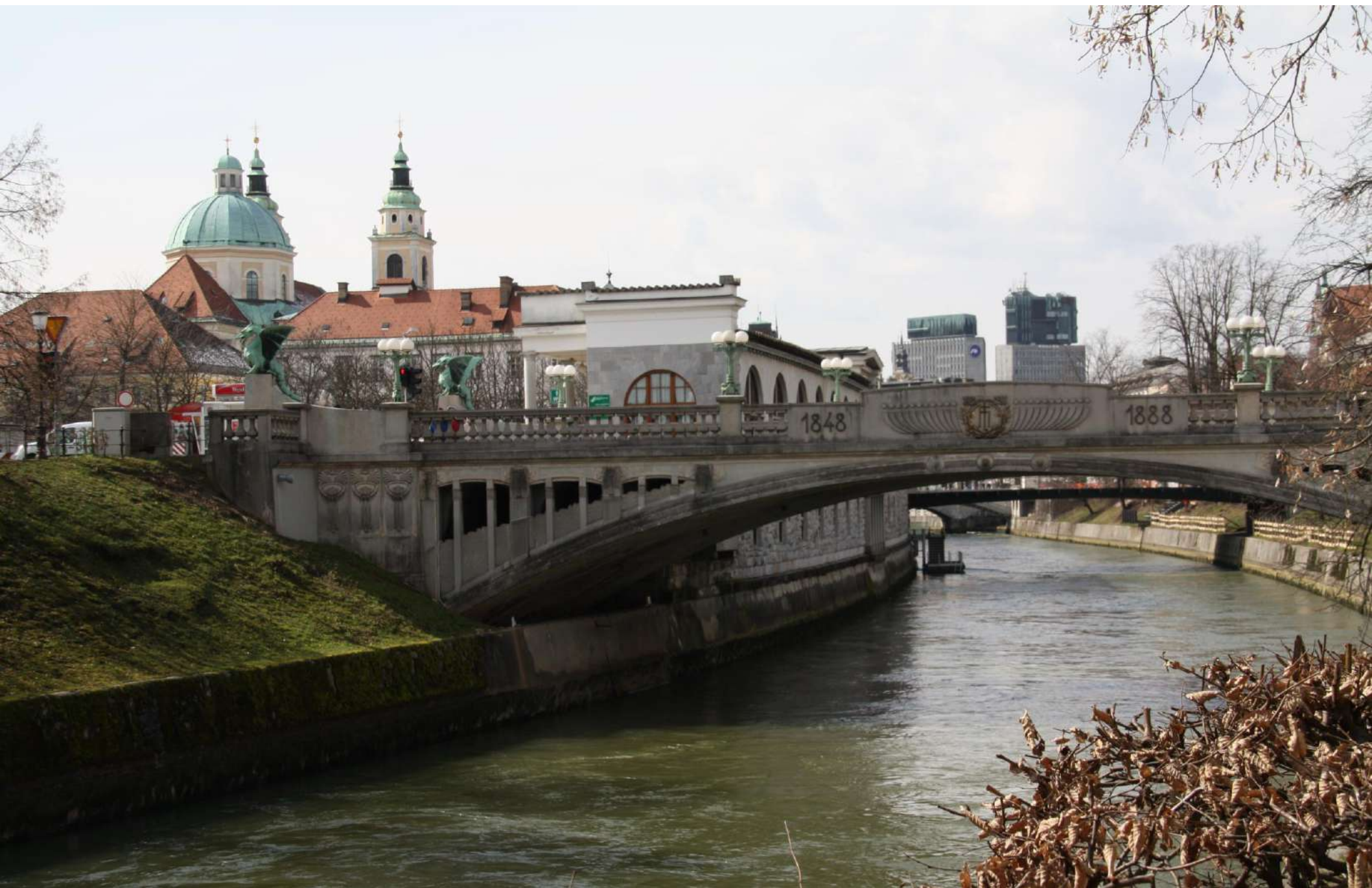


- Melan type of RC
- Span 33 m
- First asphalt in Slovenia
- First RC bridge in Slovenia
- 3 hinges



The DRAGON symbol of the Ljubljana city





The Cobler Bridge, 1935 designed by arch. Jože Plečnik



1st Cobler Bridge 1867





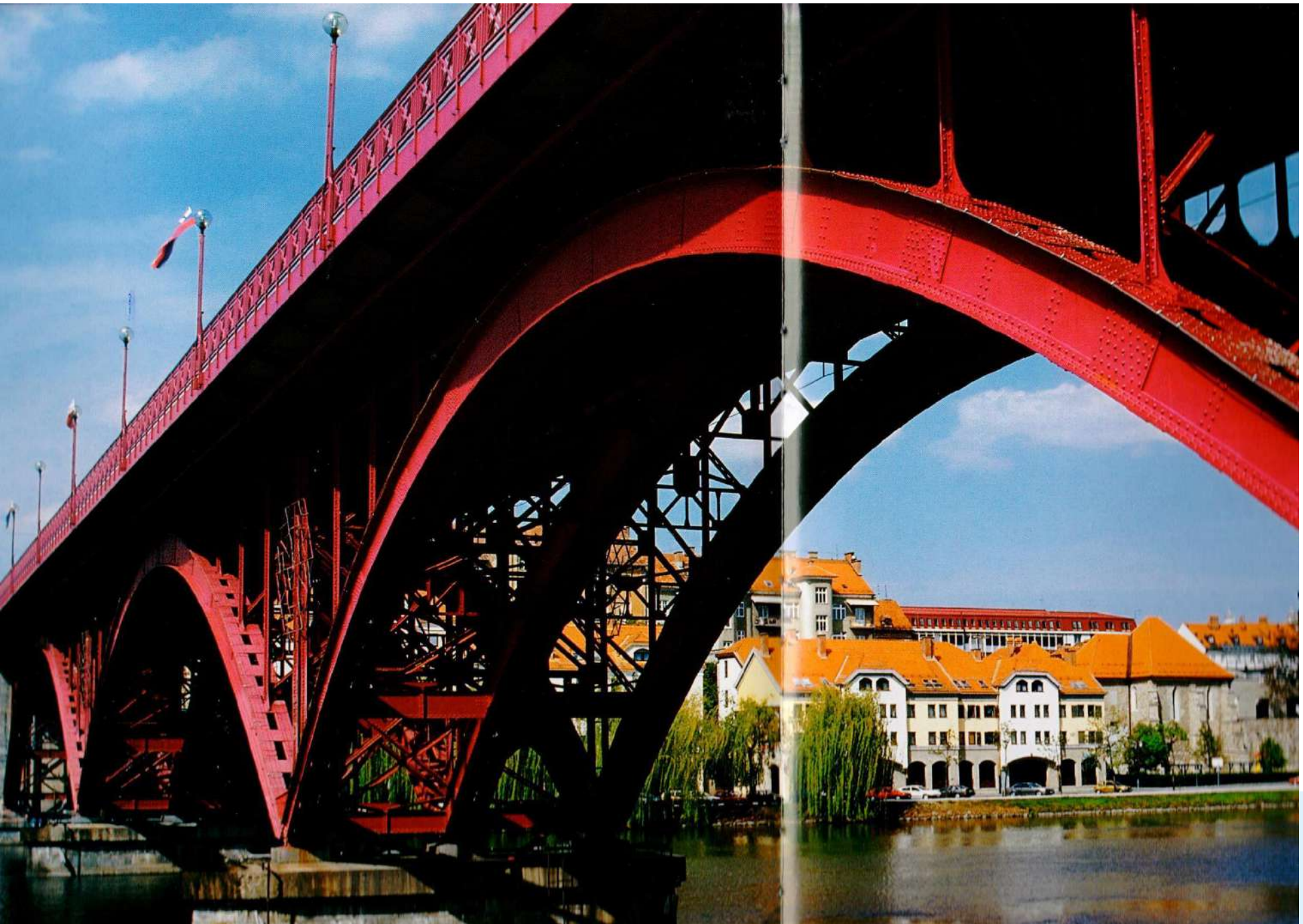




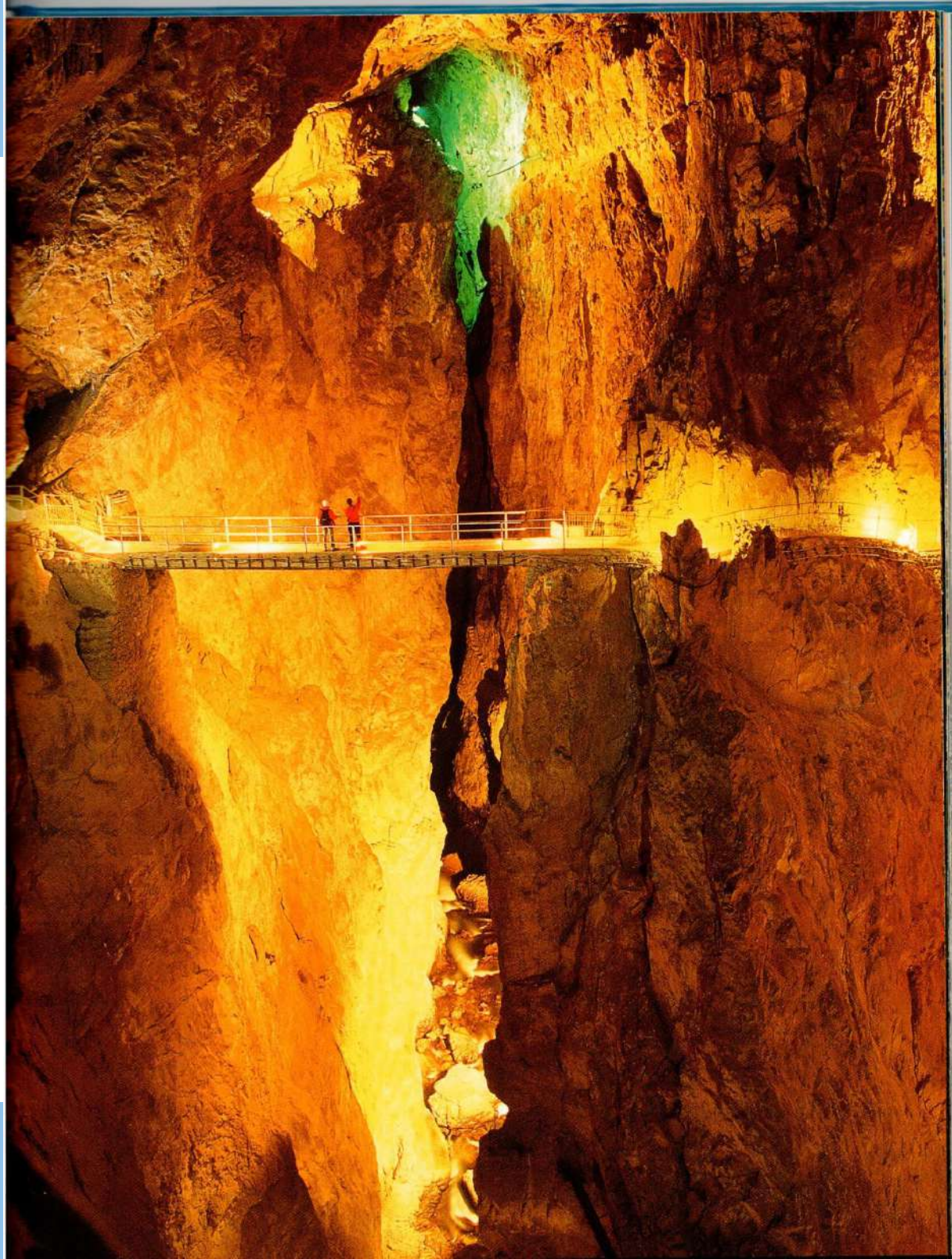
The BOHINJ Lake Bridge, 1914



The Old Bridge in Maribor, 1913



- Škocjan cave
- Bridge from 1932
- 40 m above the
- river
- Reconstructed
- in 2008



Walt Disney' s BERUNA Bridge over Soča



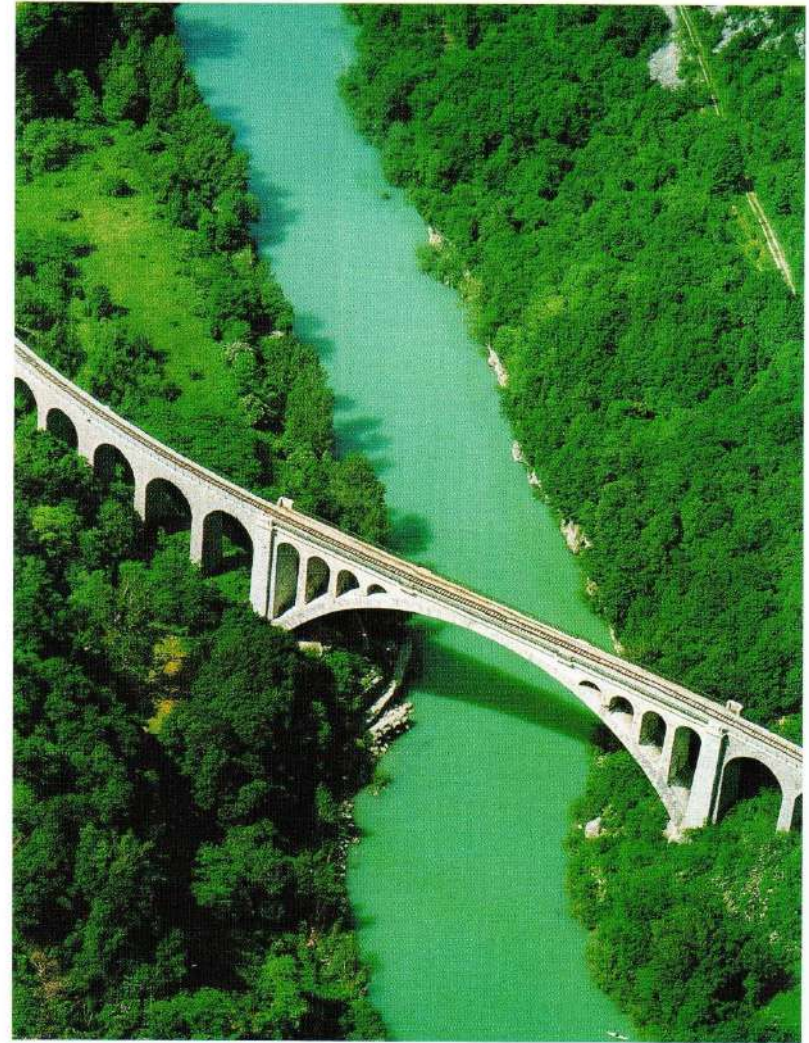
The "Beruna Bridge" over the Soča near Bovec

Štanjel –the smallest bridge, 1935





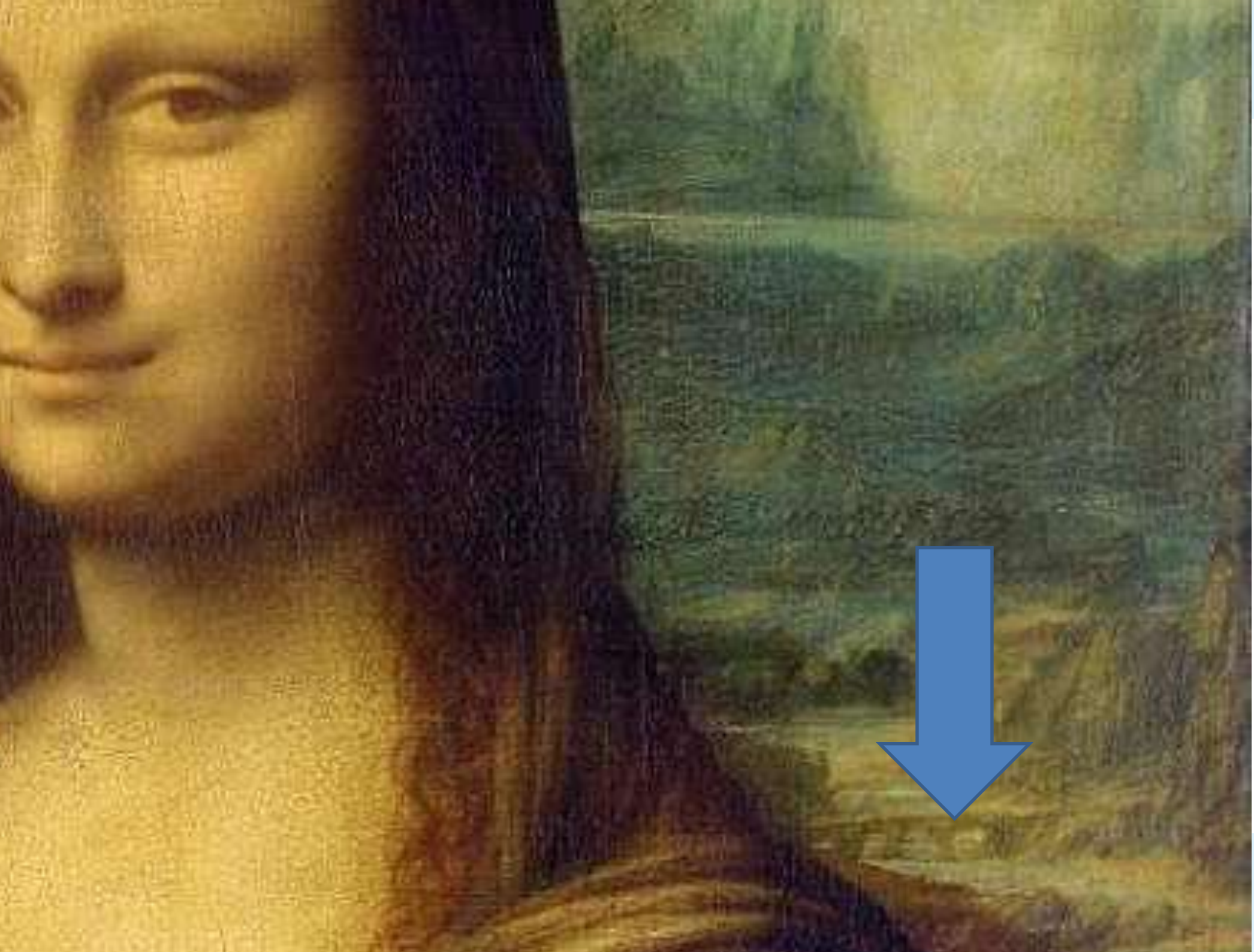
The size of the bridge doesn't matter!



The stone arch bridge at Solkan in Slovenia, built in 1906

Photo: Bogdan Kladnik





A bridge is not only an engineering structure – **it is much more!**

At the first stage it belongs to the designer

When built it belongs to everybody

And this fact requires the designers responsibility!

Gothic chapelle in Vendôme, France



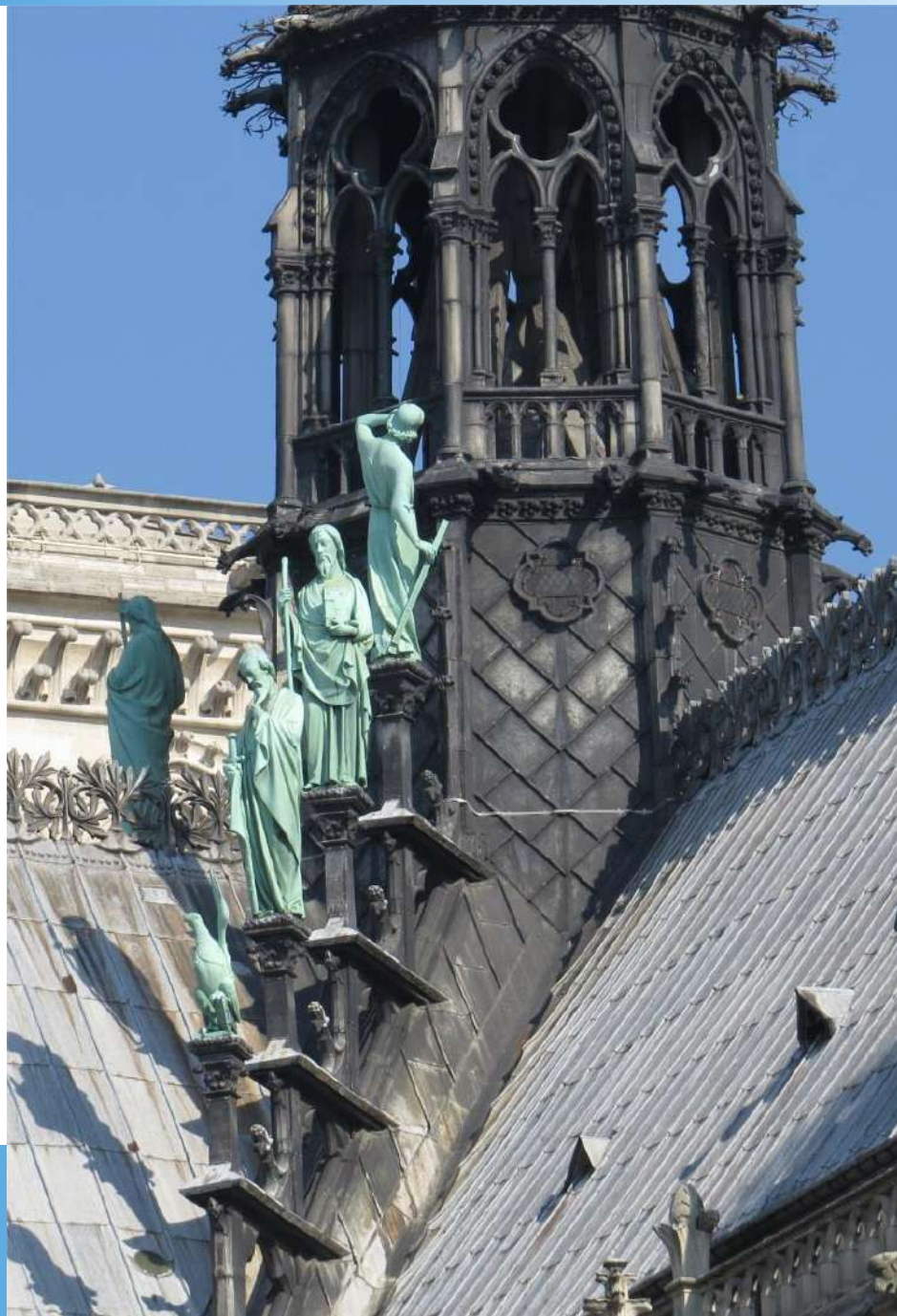
Notre – Dame on 15.April 2019



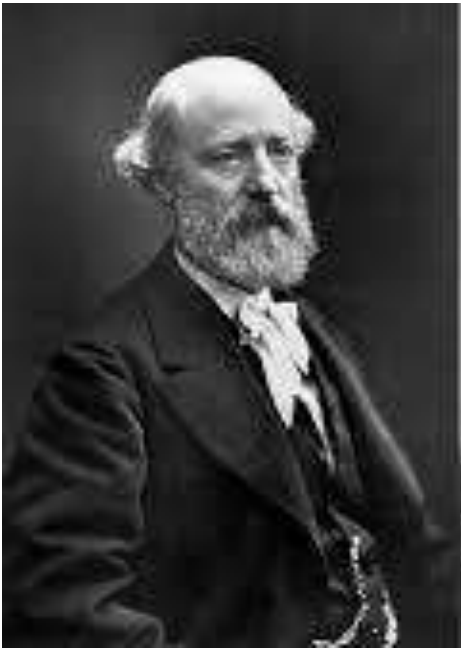


Apóstolo Tomáš podoben Václavskému

Violet – le – Duc, 1858



E. Violet – le Duc





Paul SÉJOURNÉ, 1851 - 1939

RESPECT AUX VIEUX PONTS!

Respect to old bridges!

PRAETERITI FIDES, SPES FUTURI

Latin proverb

Respect the past, believe in the future

RESPECT the PAST...



... AND THINK ABOUT THE FUTURE



Köszönöm szépen

VÉGE

Gorazd HUMAR