

## Technology - Roman bridges



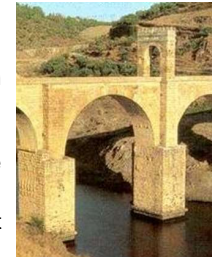
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## Technology - Roman bridges

The Romans built long **durable** bridges (many still stand today) and made important discoveries in **structural design**. They used main elements:

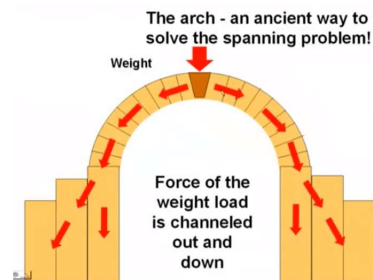
- **Stone** - main material
- **Concrete** - the first civilisation to make bridges from concrete - pozzolana.
- **Arch** - the shape of the arch allowed the bricks to be inserted at a curved angle until they joined at the peak of the arch with a **trapezoid keystone**.
- **Cofferdams (keson)** - a temporary structure that allowed the construction of a pier
- **Piers** - legs of the bridge



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## Technology - Roman arch

- used the **tensile strength** of the stones themselves
- shape allowed the bricks to be inserted at a **curved angle** joined at the peak of the arch with a **keystone**
- trapezoid keystone used the weight of the stone and concrete in the bridge to compress the tapered stones together.
- pressure formed a structure in the arch that required a tremendous amount of force to rupture
- **the arch was the strongest in the centre**



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## Technology - Roman concrete

- unique **material they chose to build with**
- **natural cement called pozzolana**
- used as mortar for the **piers (the legs)**
- cement **grew stronger over time**
- pozzolana is still used in some countries. It's made by combining **two parts pozzolana (which is a type of slag that forms naturally from volcanic rock) with one part powdered lime**
- in the 3rd century B.C the Romans used pozzolana instead of sand in concrete in their construction
- **This gave their structures supreme strength and stability**



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## Cangas de Onís



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## Location

- Cangas de Onís is in **Asturias, northwest of Spain.**
- Here **used to be a Roman bridge** there that was used in the Roman road that connected the Roman towns of Lucus Asturum (near Oviedo) and Portus Victoriae (Santander).
- It has five arches, three of them pointed, and from the center hangs a reproduction of the Victoria Cross.



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## Location II

- The Roman bridge of Cangas de Onís - also known as "Puente Vieyu" or "Puentón" - is one of the most famous symbols of Asturias



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## Style

- touristic centre point of town of Cangas de Onís.
- originally built in Roman style
- undergone modifications in almost every century since its construction
- you can see the different pieces of stonework the comprise the whole
- a wooden replica of the Victory Cross hangs from the central arch.



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## Interesting details

- had great **strategic** and **commercial** value for the town Cangas de Onís
- **the only stone bridge** over the mighty Sella until the 19th century,
- **important** for transport, communication and for trade between Asturias and Cantabria
- together with the river Sella is the famous **touristic attraction**



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## Under the bridge

The Sella River probably leads to the establishment of Cangas de Onís as the first capital of the Kingdom of Asturias.



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## Origin

The current "Roman Bridge" dates back to the Middle Ages, probably from the late 13th century.



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## Appearance

Its stylized and graceful shapes and arch design resemble the Romanesque style of the Gothic transition.

It has three slightly pointed arcs; By far the largest is the central archway under which the river flows. Both side arches have different sizes.

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## Appearance II



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## Victory Cross

From the central arch hang reproductions of the famous Victory Cross; It is a piece of precious metal from the beginning of the 10th century, the original of which is preserved in the Cathedral of Oviedo.



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THANK YOU FOR YOUR ATTENTION

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## RESOURCES

[http://www.spainisculture.com/en/monumentos/asturias/puente\\_sobre\\_el\\_rio\\_sella.html](http://www.spainisculture.com/en/monumentos/asturias/puente_sobre_el_rio_sella.html)  
[https://en.wikipedia.org/wiki/Cangas\\_de\\_On%C3%ADs](https://en.wikipedia.org/wiki/Cangas_de_On%C3%ADs)  
<https://cz.depositphotos.com/125104844/stock-photo-red-bench-and-secondly-the.html>  
<https://www.google.com/maps/>  
<https://www.flickr.com/photos/menezo/2449663463>  
[https://en.wikipedia.org/wiki/Asturian\\_language#/media/File:Map\\_Iberian\\_Peninsula\\_910-es.svg](https://en.wikipedia.org/wiki/Asturian_language#/media/File:Map_Iberian_Peninsula_910-es.svg)

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