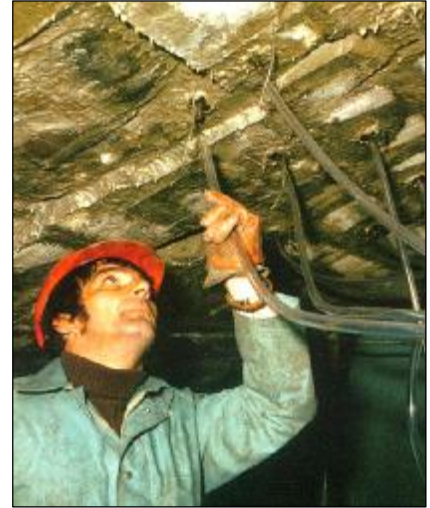


## Restoration of Causey Arch, Durham



The Grade 1 Listed Structure spans 31 metres and when constructed it was the largest single span bridge in England

Vacuum injection of resin into 18<sup>th</sup> century masonry arch bridge saves ancient monument for posterity.

Client	Durham County Council
Principal Contractor	Balvac
Value	£162,000
Programme	15 Weeks

Causey Arch, a Scheduled Ancient Monument and Grade 1 Listed Structure was constructed in 1727 to provide a link for coal transportation between Tanfield and the River Tyne. Spanning 31 metres it crosses the deep ravine of Causey Burn and when constructed was the largest single span bridge in England.

However, the arch lay derelict and unused for virtually 200 years. During that time the arch soffit suffered severe deterioration and spalling due to constant wetting, drying and frost action. Mortar in the joints had also been worn away by both water ingress and plant growth and the rock face supporting the eastern abutment had been severely weathered.

Many techniques were considered to stabilise the inner of the three rings of stone in the soffit. Following a site trial the process finally chosen to restore the stonework integrity was the Balvac Vacuum Injection System. The first stage of the procedure was to re-point the joints on the underside and edges of the arch

using cementitious mortar. Each stone showing signs of cracking and delamination was then core drilled and injected with resin.

Working in sections up the sides, to the top of the arch, a vacuum could be established. As the air and water were drawn out epoxy resin was introduced under low pressure. This process was carried out on over 1200 stones, test-coring confirming its effectiveness.

On the spandrell walls and abutments all vegetation was cleared out of the mortar joints which were then filled to a depth of 40 mm from the surface by pressure pointing. The front of the joint was then hand pointed.

Finally the bridge was waterproofed and parapet railing was installed. The eroded cliff face carrying the south abutment of the arch was rock-bolted and grouted to stabilise the large irregular sandstone blocks

Causey Arch is now restored as near as possible to its original state and is one of the main attractions in the Beamish Country Park.

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