

## CASE STUDY

### BRIDGE INFILL WITH PFA AT KIRKSTALL, LEEDS

This bulletin describes the use of PFA in the filling of a redundant bridge span for British Rail at Kirkstall, Leeds in West Yorkshire.

#### The scheme

Bridge No.24 is a three span bridge crossing the River Aire, the Leeds-Skipton line, with the third span no longer required after the removal of a redundant line. The scheme involved the construction of reinforced concrete walls at either side of the bridge with the void being filled totally with PFA.

#### Filling procedure

A reinforced concrete retaining wall was constructed at one side of the bridge to completely fill the aperture. At the other side, the reinforced concrete was only constructed to half its total height to provide access.

The PFA was used to fill the void until headroom was lost. PFA was laid in layers not exceeding 200mm, when compacted, and actually compacted with six to eight passes of a Bamford Twin-drum vibrating roller. Upon loss of headroom, British Rail suggested to the contractor that the PFA should be further laterally compacted into the remaining void as they retreated out of the tunnel.

#### Grouting procedure

Sacrificial grout pipes were installed horizontally below the bridge decking to allow the further use of a PFA/Cement grout to fill the remaining void. To ensure complete void filling to the underside, further grout injection through the bridge decking was carried out. At this stage, the reinforced concrete wall was completed and the grouting operation commenced.

The PFA for the grout was supplied in 'conditioned' form and mixed with the cement in a 10:1 PFA/Cement ratio by weight, with sufficient water added to slurry the mix and achieve adequate travel.



## Why PFA?

The choice of PFA for void filling was made on the basis of a light-weight, inert fill material, which would impose little lateral loading on the abutment and retaining walls. The PFA had an average compacted density of 1.3/1.4 tonnes per cubic metre. Some 1400 tonnes of PFA were supplied for the fill and 240 tonnes of conditioned PFA for the grouting.

## Acknowledgments

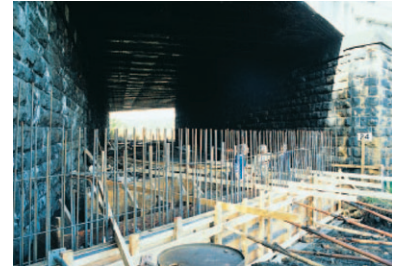
The works were designed and supervised by British Rail (Divisional Civil Engineer, Mr G.C. Holmes), Leeds

## Contractor:

Rodil Developments Group Ltd, Leeds

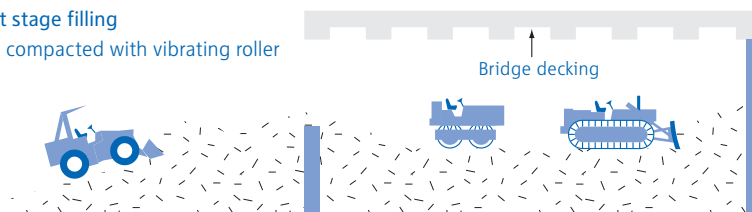
## Grouting Sub-contractor:

Tremdrill Ltd, Wolsingham, Co. Durham



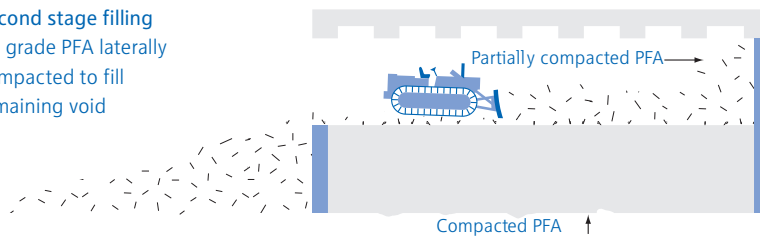
### First stage filling

PFA compacted with vibrating roller



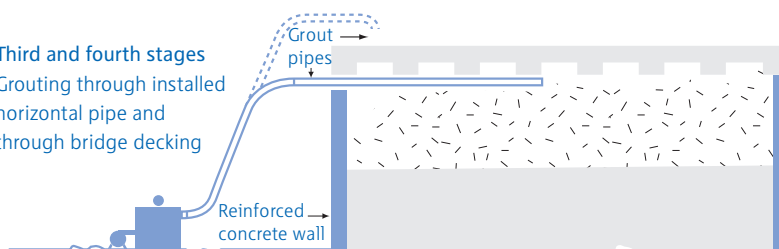
### Second stage filling

Fill grade PFA laterally compacted to fill remaining void



### Third and fourth stages

Grouting through installed horizontal pipe and through bridge decking



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