



UNITED KINGDOM  
QUALITY ASH  
ASSOCIATION

# CASE STUDY

## PFA for the A45 Packington Flyover

### Introduction

At Packington, on the A45 from Birmingham to Coventry, an accident black spot was removed by replacing the existing junction with a new flyover. This work required raising the ground level, which was the same as the main road level, sufficiently to accommodate a new flyover and the road construction. The consulting engineers for the contract were WS Atkins and the Highways Agency, with Wrekin Construction being the main contractors.

Pulverised Fuel Ash (PFA), also known as fly ash in many countries, was chosen as the fill material because of its economy, the ease of obtaining the large quantities required and the low density and consistency of PFA. The placing of the fill material started in February 2002 and within a period of only 6 weeks some 100,000 tonnes of PFA was supplied, completing the job by Easter. The PFA was supplied from Ironbridge power station using both stockpile and conditioned material.



### Construction

The design of the embankments required a 600mm separation layer, followed by MOT type 1 material to act as a drainage layer and then the PFA. This was placed in ~200mm layers and compacted using a CAT D6M with a following vibrating roller to 150mm thickness, see Technical Datasheet 2.0. The compaction was supplemented with a Dynapac CA302 vibrating roller. Finally, a 200mm soil covering was provided to permit vegetation growth and act as a protective layer.

### Compliance with Highways Agency Specification

The PFA was required to comply with the Highways Agency specification for General Fill (2E and 1C). This requires a minimum compaction of 95% of oven dry maximum density at the optimum moisture content. Some problems were found in determining the optimum moisture content, due to the shape of the density versus moisture content relationship with this source of PFA. However, in practice no problems with compliance<sup>1</sup> were found during the contract period.

<sup>1</sup> The requirements for General Fill to the Highways Agency Specification for Highway Works have caused compliance problems on some occasions. Refer to TRL report TRL519 of December 2001 for further information and recommendations on an alternative approach.



### Environmental Considerations

In the initial phases of the contract the Environment Agency expressed environmental concerns about the use of PFA, due to the close proximity of fields and a stream. A full environmental assessment showed, as with all PFA from coal fired power stations, no problems. In fact, there is minimal leachable material in PFA (<2% is water-soluble). PFA has a naturally low permeability ( $\sim 10^{-7} \text{m/s}$ ) making it difficult for water to penetrate and the recommendations for designing such embankments effectively isolate them from the surrounding environment. For further details see Technical Datasheet 8.0.



### Conclusions

The use of PFA as a fill material at Packington has proven to be successful, taking minimal contract time and providing the required change in levels with ease.

In general usage the term 'fly ash' is used for pulverized coal ash but it can also cover ash from burning other materials. Such 'fly ash' may have significantly differing properties and may not offer the same advantages as ash from burning pulverized coal. UKQAA datasheets only refer to PFA / fly ash produced from the burning of coal in power stations.