

Swansea Transport Link: Use of PFA's unique combination of benefits

Pulverised Fuel Ash (PFA) is a readily available, cost effective and sustainable fill material used in road construction, amongst other applications. Generation Aggregates supplied 22,000 tonnes of PFA for a new 1.4km public transport link near Swansea.



Figure 1 - Ivan Skidmore, Technical Sales and Project Engineer at Generation Aggregates and Dean Mitchell, General Foreman at Dawnus Construction oversee the use of PFA during the construction of the new highway

Introduction

In early 2012, the Welsh Government awarded a contract for the design and construction of a new 1.4km highway on a brownfield site to the east of Swansea, South Wales.

Known as Ffordd Amazon Stage 2, the project was awarded under an NEC3 Engineering and Construction Contract Option A to Dawnus Construction, a Swansea-based civil engineering and building company.

The Project

The project was intended to provide a dedicated bus route from the new Coed Darcy Urban Village to nearby Swansea and to also be an access road for new and existing businesses in the area.

Coed Darcy is a major part of the regeneration of the entire Swansea Bay area and Ffordd Amazon Stage 2 will primarily be a public transport link between the village and the A483 (Fabian Way) into Swansea City Centre.

The first stage of the scheme began in March 2012, with work undertaken to check and finalise the design.

Why PFA?

PFA was chosen for use, as it is an ideal engineering fill material, with Generation Aggregates supplying the project by road from RWE npower's Aberthaw Power Station, near Barry.

The use of PFA helped to bolster the environmental credentials of the scheme, by avoiding the need to utilise primary raw materials. Other properties of PFA that make it ideal for use as engineering fill include its lower density when compared to soils (1.5Mg/m³ against around 2Mg/m³) and its lightweight nature, which leads to savings in materials and haulage costs. Typically, the use of PFA results in a 25% reduction in lorry movements.



Figure 2 - PFA being loaded at Aberthaw Power Station: Over 700 loads of PFA from Aberthaw were used in the construction of the new highway



Figure 3 - Aerial view of the Ffordd Amazon Stage 2 site and PFA being used

PFA also provides immediate and increasing strength, with field tests on existing embankments demonstrating the positive strength gain and long-term stability of PFA. In addition, PFA does not suffer from internal settlement and will absorb water, so is not easily saturated, allowing construction work to continue in bad weather conditions.

For this project, other materials were considered and the original design was for the embankment to be wholly constructed with 1A Granular Fill. However, because PFA was readily-available as a more cost effective lightweight secondary aggregate material, a total of 42,500 tonnes was used with 1A material only utilised up to the 1,000 year flood level +0.5m.

Deliveries of PFA for the project from Aberthaw Power Station took place over a three and a half week period, with Generation Aggregates supplying a total of 22,000 tonnes of conditioned PFA for the scheme. An average of 1,500 tonnes was delivered per day, reaching almost 2,000 tonnes daily on some occasions. In total, over 700 loads of Aberthaw PFA were delivered.

Speaking of Generation Aggregates' involvement, John Evans, Project Manager at Dawnus Construction said, "The use of PFA has helped to ensure a first class job and I would like to add a personal note of thanks to Generation Aggregates for the excellent service provided."

Acknowledgements

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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.

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