

IBA PROCESSING FACILITY External Slab

Ilkestone, Derbyshire, United Kingdom

Johnson Aggregates operate a number of recycling and processing facilities in the Midlands. This project involved producing a Synthetic Macro Fibre solution for a heavy duty external pavement specified to cope with heavy mobile plant operations, HGV Traffic and exposure to highly acidic incinerator bottom ash (IBA).



Project owner
Johnson Aggregates

Product
DURUS S400
Fibrin XT

Function
DURUS S400 to replace steel mesh to eliminate corrosion risk and associated shortened service life.
Fibrin XT to increase concrete durability, reduce plastic shrinkage cracking and enhance frost protection.

Volume
2000m³ C40/50 Concrete
8000kg DURUS S400
1820kg Fibrin XT

Challenge

The original concrete specification included 2 layers of A393 Mesh proposed by the Project Consulting Engineer. ADFIL were approached by a National Readymix Supplier to propose a Synthetic Macro Fibre alternative due to major concerns about spalling caused by steel corrosion. Incinerator bottom ash is highly acidic and prolonged exposure to contaminated rainwater run off would inevitably lead to a vastly reduced service life. The nature of the facility also includes high volumes of loaded HGV Traffic and heavy mobile plant used to transfer and stockpile the incinerator bottom ash before it is processed.

Solution

- After consultation with the Client and Project Structural Engineer, ADFIL were provided with the design criteria and loading information to enable a Professionally Indemnified solution to be provided by one of their Consulting Engineers.
- ADFIL liaised with the Client, Project Engineer and Readymix Supplier to ensure the proposed Macro Fibre solution was accepted and fit for purpose. The Project Engineer was keen to use the DURUS S400 alternative due to the risk of steel corrosion and resulting loss of serviceability.
- Support was given to the Readymix Supplier and Site Contractor to ensure a high quality end product.



With the **DURUS S400** Synthetic Macro Fibre reinforcement already contained in the concrete when it is delivered to site, large areas can be poured which greatly reduces construction. Saw cut contraction joints can then be cut 1/3 of slab depth, within 24hrs of placement and finishing.

Benefits of the solution

- Replacing the conventional steel mesh reinforcement with DURUS S400 Synthetic Macro Fibre has resulted in reduced construction time and easier installation along with a significant cost saving compared to the original specification.
- Any risk of reduced service life due to the corrosion of conventional steel mesh reinforcement in this aggressive environment has been removed.
- The significant Health & Safety hazards associated with steel mesh fixing have been eliminated from the construction process.
- The Synthetic Macro Fibre reinforcement is distributed evenly throughout 100% of the volume of the concrete, so it can not be placed incorrectly and jeopardise structural performance.



The combination of DURUS S400 macro synthetic fibre and Fibrin XT micro synthetic fibres resulted in a very hard wearing concrete slab, to accommodate the extreme conditions attributed to the mobile plant operations required to handle the highly abrasive IBA.

Result

- The capacity of the pavement to cope with sustained HGV traffic, heavy plant operations and the aggressive conditions has been maintained both through structural performance and in terms of enhanced impact & abrasion properties and frost resistance.
- Service life has been maintained by eliminating the risk of spalling resulting from steel corrosion.
- Installation was completed inline with the construction schedule, even with delays caused by inclement weather.
- The use of DURUS S400 Synthetic Macro Fibre has resulted in an approximate saving of embedded CO₂ of 56% when compared to conventional steel mesh reinforcement construction methods.

Products used: DURUS S400 & Fibrin XT



DURUS S400 Macro Synthetic Fibre
 Replaces conventional steel fabric mesh reinforcement in ground bearing concrete pavement applications.



Fibrin XT Synthetic Micro Fibre
 Enhances impact and abrasion resistance, reduces plastic shrinkage cracking and also provides frost resistance.