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CASE STUDY

West Meadows Road Gulley & Sweeper Waste Recycling Facility

Derby, United Kingdom

"To Zero Landfill" has designed and commissioned a process to handle and recycle waste with high levels of deicing salts. A ground bearing reinforced concrete slab to support HGV and mobile plant operations is required. Conventional steel reinforcement would be at a high risk of corrosion.

Project owner
To Zero Landfill

Products
DURUS S400
Fibrin XT

Functions
Eliminate risk of steel reinforcement corrosion and reduce embedded carbon

Contractor
CSJ Construction

Volume
8000kg DURUS S400
1500kg Fibrin XT

Challenge

This facility handles and recycles road gulley waste and road sweepings, both of which have high concentrations of deicing salts which pose a high corrosion risk to conventional steel fabric reinforcement.
The site operator is also very keen to promote sustainability, and as such, the reduction of embedded carbon in the construction of the facility was a high priority.
There is also a high risk of damage to steel reinforcement from mobile plant operations and subsequent shortened service life.

Solution

- Replacement of the initially specified conventional steel fabric in the external slab with Adfil construction fibres

Using a mixture of Adfil DURUS S400 and Fibrin XT fibres, the risk of accelerated spalling from corrosion has been eliminated which results in a significantly extended service life of the yard. A reduction of embedded carbon of –60% has been achieved and any risk of damage to steel reinforcement has been eliminated. The right type and mixture of fibres was advised by Bonar's Adfil specialists.

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The processing operation exposes the concrete to high levels of road deicing salts that would quickly corrode any steel reinforcement

The addition of Fibrin XT gives enhanced abrasion and durability, important in this application, due to tyre scrub from turning vehicles

Benefits of the solution

- By replacing the conventional steel fabric in the original design specification, post failure serviceability has been vastly improved
- The embedded carbon has been reduced in the concrete slab contruction by around 60%
- The risk of a shortened service life of the yard due to mobile plant operation damaging exposed steel reinforcement has been eliminated

Installation benefits

There was no need for steel fabric to be fixed prior to pouring the concrete, this resulted in a significant saving in construction time, allowing the project timeline to be maintained throughout construction.
The fibres are added to the concrete by the ready mixer. No extra work to mix the fibres is needed on site.

Result

The risk of a shortened service life caused by steel fabric corrosion after repeated exposure to deicing salts has been eliminated.

Post failure serviceability has been improved due to eliminating the potential damage to exposed steel from constant mobile plant operations.

A saving of around 60% in embedded carbon has been made in the External Yard concrete, in line with the Client ethos for sustainability.

As a result of using synthetic macro fibre reinforcement in place of conventional steel fabric, the project was completed in time to satisfy Client requirements.

Products used

DURUS S400
Macro fibre made out of polypropylene.
Improves the bond with the concrete.

Fibrin XT
Micro fibre made out of polypropylene.
Reduces plastic shrinkage.

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