



## CASE STUDY - SYNTECH BIOFUEL TRIAL

### Background

KKB's net zero pathway commits us to find ways of reducing the carbon footprint of our bulk earthworks activities.

The introduction of electrified and hybrid plant over the last few years have generated some reductions. However, with the likelihood that hydrogen-powered models of the heavy plant we use for earthworks at least 2-3 years away, we need to look at some short-medium term solutions such as the use of biofuels for use at the Lower Thames Crossing.

We decided to partner with Syntech, a company which, like us, is located adjacent to the LTC's site. They have developed an Advanced Smart Biofuel (ASB) which meets the BSEN 14214

standard but crucially is manufactured solely from waste vegetable oils generated here in the UK making it a much more sustainable alternative to most HVOs which are transported sometimes thousands of miles from source.

### The Trial

We approached Syntech offering to trial its ASB for the first time on heavy machinery which would enable us to test the fuels performance in site conditions and discover the practicalities and any issues with using it.

We selected a local earthworks project at the London Gateway Port in Corringham, Essex which involved the bulk excavation, transport, placement, and compaction of 700,000 cubic metres of surcharge sand.

### SYNTECH ASB KEY FACTS

- Meets BSEN 14214 Standard
- 100% fossil fuel-free
- Manufactured from waste vegetable oil
- 93% reduction in CO2 emissions
- 100% sourced from UK







With several identical 30-tonne articulated dump trucks (ADTs) in use on the site we selected one model to use only the ASB for a month. This was to work as per plan amongst the sister ADTs for true, and consistent data collecting.

Syntech transported a 4000 litre container of ASB, fitted with fuel pump and meter, to site in early March 2025 - a month before commencement of the trial so we could understand and trust its shelf life.

Fatty Acid Methyl Ester (FAME) fuel is susceptible to bacterial growth, especially when exposed sunlight/heat then colder temperatures.

The trial Volvo A30G ADT machine was fitted with new OEM filters (Water Separator/High Pressure) and exclusively used the biofuel during the 4-week trial period.

## The Results

The results, which were unveiled at KKB's Sustainability and Social Governance Open Day in July surpassed expectations.

In terms of fuel consumption the trial backed-up Syntech's claim that ASB is a 1-to-1, drop-in replacement for standard diesel. Data from our plant's telematics confirmed that over the course of the trial the ADT's average ASB consumption was 17.5 litres/hour, consistent with its own historical data trend and almost identical to the diesel-powered models on site.

Although we expected some issues with the premature clogging of the fuel filters (as ASB's increased lubricity can clear historic soot and carbon from the fuel system) the filters didn't need to be changed throughout the trial.

It was planned/expected on changeover of the fuels for us to experience filter clogging from residual contamination alone, but this was not even the case.

The ASB is a drop-in fuel so there was no need to flush the tank prior, it was simply run down to empty then filled with ASB. No nuisance error codes or breakdowns were experienced and the operator reported no noticeable drop in the ADT's power during normal operation.

We downloaded ECM data and experienced no premature DPF soot/ash loading of concern which was promising.

The trial machine consumed 3500 litres of ASB throughout the trial reducing carbon emissions by nearly 8 tonnes.



## ASB POLLUTANT EMISSIONS

CO<sub>2</sub>e: ~94% lower\* (0.1675 vs ~2.68?kg/L)

PM: ~38% lower\*

CO: ~34% lower\*

PAHs: ~60-90% reduction\*

SO<sub>2</sub>: Negligible

NO<sub>x</sub>: Managed/neutralised after treatment

\*(compared to diesel)





KKB's willingness to test our ASB in genuine site conditions reflects the kind of forward-thinking collaboration that's urgently needed across UK infrastructure. From the outset, they were thorough, transparent, and pragmatic - right down to the month-long pre-trial storage test. To see Syntech ASB perform at a 1:1 diesel replacement rate, without any compromise on uptime or operator experience, confirms what we've long known: UK-sourced, waste-derived fuels can absolutely hold their own against imported alternatives.

We believe the trial is a turning point that confirms the carbon savings are real, the operational proof is there, and the momentum is building. We're excited to continue this partnership with the upcoming KKB hybrid and dozer trials, and proud to support projects like Lower Thames Crossing with homegrown innovation that can deliver impact today - not three years from now.

**Mike O'lone, Director of Environment & Sustainability, Syntech Biofuel**



We were genuinely taken-aback by how well the ASB performed. We anticipated some issues, specifically with premature Fuel and DPF filter clogging, a reduction in engine power and fuel consumption but the trial ADT functioned comparably with the other machines on site that were powered by conventional diesel. We are continuing trials to further understand the biofuel on other plant but I can see no reason why Syntech's ASB cannot be used as a drop-in replacement for fossil fuels to decarbonise earthworks and other disciplines requiring heavy plant on major civil engineering projects such as the LTC.

**Andy Care, Plant Workshop Manager, KKB Group**

