



London Bridge Best Practice



Case Study Title: Eco Operator Training Course

Month/Year: August 2016

Key Benefits

- ✓ **32.5% increase in fuel efficiency** for all M O'Brien Hitachi excavators on site
- ✓ Predicted **saving of 71 tCO2e** for the remainder of the project
- ✓ Predicted **cost savings of £10,000** for the remainder of the project (2 years)
- ✓ Environmental awareness and behavioural change amongst machine operators

Objectives and Targets

- ✓ CEEQUAL – Energy & Carbon Performance – Energy consumption consideration by contractor
- ✓ Sustainability Delivery Statement – To minimize the levels of carbon generated over the whole life of Thames Link Project
- ✓ Project target to reduce the amount of scope 1 & 2 emissions by 5% year on year against the 2013/14 baseline

Overview

The London Bridge Station Redevelopment Scheme is committed to reducing our carbon footprint and reducing particulate and NOx emissions from our construction machinery. The latest version of the London Atmospheric Emissions Inventory estimates that in 2010 the NRMM used on construction sites was responsible for 12% of NOx emissions and 15% of PM10 emissions in Greater London. As a project, since 2015, working with our supply chain, our construction machinery either has Stage IIIB engines or are retrofitted with an approved diesel particulate filter (DPF), in order to comply with London's 'Low Emission Zone' for non-road mobile machinery and to minimise the negative impact on air quality from diesel emissions.

As an industry however, we have been focussing on improving the efficiency of our construction machinery, yet the operator of this machinery is the largest influence on fuel consumption.

The training

On the 22nd of December 2015, seven plant operators from M O'Brien's and Keltbray attended a half day driver 'eco-operator' course carried out by CITB on the project. The objective of the training was to help develop more knowledgeable, efficient and environmentally conscious operators.

The training was given by two ex-machine operators, where half of the training time was spent in the classroom and the other half was out on site learning how to operate the machines more efficiently.

The training involved focussing on:

- **Machine operation** – Eliminating bad habits and making better use of the machines functions such as eco mode
- **Site planning** – Using the correct plant and size
- **Maintenance** – Ensuring the machine is checked and maintained regularly and drivers undertake checks daily

The machine operators were also given information on why it is important to become more efficient.



Use of telematics

Since September 2015, with M O'Brien's, we have been analysing telematics information from their Hitachi excavators. Telematics provide us the ability to monitor machine use and operational data remotely. The information provided allows us to see how the machine is operated and details information such as fuel efficiency, carbon production and use of functions by the operator such as 'eco mode'.

Data was collected in two phases to enable a comparison to be drawn.



London Bridge Best Practice



Results of training

Increase in use of 'eco-mode'

Since the training in December, there has been a remarkable increase in the use of driver 'eco-mode'. Eco-mode is a function within Hitachi machines which decreases the engine speed to reduce fuel consumption while increasing the hydraulic pump flow rate to compensate for operating speed.

Before the eco-operator training was run, the average monthly use of eco-mode was just 4%. The telematics data from January-May 2016 shows an average eco-mode use of 33%, with some machines showing as high as 90%. This is an average increase of **29%**.

According to the manufacturer's specification data sheets for the machines under analysis, using eco-mode can reduce fuel consumption by between 20-25% based on the machines we currently have.

If this assumption is to be taken, this would account for a fuel reduction of **469 litres** from Jan-May 2016.

Driver eco awareness & behavioural change

In addition to the increase use of 'eco-mode', the telematics data has shown even greater increases in fuel efficiency. Before the training, the average monthly fuel efficiency across the machines was 8.50 litres/hour. After the training, this had reduced to just **5.74 litres/hour**. This equates to a saving of 2.76 litres/hour.

	Before	After	Change
Eco-mode Use (%)	4	33	+ 29%
Fuel efficiency (litre/hour)	8.50	5.74	- 32.5%

Between January and May 2016 the M O'Brien Hitachi machines worked 1189 hours and so a saving of 3283 litres of diesel was achieved.

	Fuel Savings (litres):	Carbon Savings (kgCO ₂ e):	Cost Savings (£0.42/litre)
Total:	3283	9735.6	£1378.86
<i>Of which attributed to eco-mode:</i>	<i>469</i>	<i>8345.3</i>	<i>£196.98</i>
<i>Of which behavioural change:</i>	<i>2814</i>	<i>1390.3</i>	<i>£1181.88</i>

*Carbon conversion factor of 2.9657kg/l CO₂e for fuel oil used and taken from UK Government GHG Conversion Factors for Company Reporting

Therefore, the data shows that the majority of savings can be attributed to driver behavioural change, and not only use of eco-mode of machinery.

Using this data, it is predicted that for the remainder of the project, for our M'O'Brien and Keltbray machines, the project will save **23,800 litres** of diesel, with a carbon saving of **71 tonnes** of CO₂e and a project saving of **£10,000**. The saving is 10 times the price of the training.

Driver Feedback

Feedback from the drivers was all very positive, stating the information given was helpful and informative.

"Great course, I found it very helpful and informative, learnt things I never knew before and both trainers were very helpful and easy to understand"

John McGee, M'O'Brien Machine Operator

Conclusion

The training was a great success, leading to significant reductions in fuel efficiency and the use of the eco-mode feature. This has resulted in reduced carbon emissions associated with lower fuel usage, a reduction in fuel costs, an increase in the life of the machine and a reduced impact on air quality.