



CASE STUDY

Earthworks on the Norwich Bypass: Northern Distributor Road (NDR)

Overview

Starting in June 2017 the Norwich Bypass is one of the UK's largest road infrastructure projects. Officially known as the Northern Distributor Road (NDR), its construction was managed by primary contractor Balfour Beatty, with Flannery Plant Hire chosen as the main earthworks contractor.

The Project

The Norwich Northern Distributor Road, is a 12.4 mi (20.0 km) dual-carriageway linking the A47 to the south east of the city to the north west of the city. The road is designated the A1270, and will open in the Spring of 2018, when it will be named the Broadland Northway.

Innovations

Flannery Plant Hire has invested heavily in Caterpillar equipment for this project with a particular focus on connected machinery and CAT Production Management. The other major focus for this project was a fleet CAT 730C Ejector articulated dump trucks.

- **CAT Production Management**, is a payload weighing system that improves fleet productivity and reduces operating costs. It uses external lights and digital display to signal the loader that the proper load has been reached. This maximises machine efficiency by ensuring precise and consistent loading of machines.
- **CAT 730C Ejector**, this machine can eject and spread material while moving, reducing additional spreading and dozing equipment. "On-the-go" ejecting results in faster

cycle times and reduced power train loads. The ejector body offers clean load ejection and the capability to work in areas with restricted overhead clearance and soft underfoot conditions.

- **CAT VisionLink**, ensures that machine usage and performance data can be made accessible to customers. This means that they can monitor and reduce idle time and fuel burn and improve utilisation by knowing if, when, where and how every asset is being used.



Case Study

Operations Manager, Niall Hester, explains how this project represents the first time the business has been able to use advanced Caterpillar Production Measurement (CPM) data to support the management of a major project.

Niall: "We have been working with Balfour Beatty on numerous projects over the years, but the significance of the Norwich Bypass is the collaborative approach we have taken with sharing data and information. As part of the planning process we were able to show the team how we could provide data on payload, fuel burn and overall performance of each core machine on site, all using the Caterpillar VisionLink system.



When we were awarded the project we went out and purchased a vast range of new Caterpillar machines, ranging from five to fifty-tonne excavators and the latest ADTs. This included the Cat 730C Ejector Truck, which is fitted with the Cat Production Management System (CPM).

In practical terms, the purchase of the ejector with CPM was firstly all about productivity and safety, as ejector trucks do not have to stop and lift the skip to tip material. By ejecting on the move, these trucks can not only spread material and reduce dozer usage, they can also eject on slopes or uneven ground.

So when it comes to productivity they are much more efficient, especially when you are able to see the payload on the machine from the in-cab monitor. This means you can also ensure the truck is not under or overloaded, optimising fuel burn per tonne on each cycle.



It is this kind of information that is very useful for Balfour Beatty, as they can ensure the best possible carbon footprint for the site. Equally, they can see the impact of fleet matching with highly productive excavators, in this case the Cat 336F Hybrid Excavator, which also has CPM.

No matter where the units are working on the new 20.1km dual carriageway, which runs from Attlebridge

to Postwick, data can be sent and received in real-time. For our team onsite this data is sent via VisionLink into the Caterpillar online portal. This means that our managers and the Balfour Beatty team can login from any connected location. By being able to measure and calculate data, including the tonnes per load, tonnes per cycle, distance travelled per day, and how many litres of fuel a machine burns per hour, each day we can have a clear picture of where we are in the programme.

This has allowed us to better manage the project as we know, through GPS, where the machines have been working and the amount of earth that has been moved. In addition, as we can see idle time against work time, we can change the fleet mix to potentially add an additional ADT to the cycle of longer tip runs, which can optimise the performance of the excavator.

This data is not only useful for the management of the site, it also supports our operators, as we share information with them and jointly look at ways to improve performance. For example, because the in-cab monitor on the Cat 730C ejector unit displays payload weight and status, and external lights automatically signal the excavator operator when target payload is achieved, our operator teams all benefit from a safer working environment."

Aside from the investment in product Flannery have also focused on recruitment of local operators, fitters and important members of the supply chain. As Niall explains, “The location of this project has meant that we need a really strong focus on finding a strong pool of local operators to support the project and working with a local supply chain to offer the best value solution for the client. As with previous projects we will look to continue our working relationships with these operators and businesses going forwards, the pipeline for work in the East of England looks strong and this is a great opportunity for us to build a network here.”

Flannery have also been involved in a number of community engagement projects as part of the projects commitment to the Considerate Construction initiative. This has included work to a local Scout Group who needed a new car park and spending time in local schools, talking about careers in construction and the importance of safety around machinery and construction sites in general.



Conclusion

By combining CPM with additional data relating to the health of machines, all of which comes through VisionLink, we have a much better visibility of potential issues that will reduce uptime. For instance, if an air filter was blocked, we receive notifications via VisionLink and are able to get a Finning fitter straight on to site, before it creates a major issue. This proactive approach has helped us reduce downtime significantly, especially as we are able to schedule servicing for preventative maintenance issues when the machines have finished operating.

Each day we are learning more about the performance of equipment and this information is being shared with Balfour Beatty, so we can all see the benefits of technology driven project management. Feedback from operators using the ejector truck, especially beneath overhead cables has been hugely positive and everyone onsite is able to identify the safety improvements it offers.

From a performance perspective we have also witnessed a dramatic increase in cycle times, not to mention the reduction in the use of more-expensive-to-run dozers. So even at this early stage, we already know we'll be looking to invest in more connected Caterpillar machines and ejector trucks in the future.

Scan this QR code from your smartphone for a quick link to the **Background Video**.

