



Engineering Innovations

Asset and Technology Solutions

Balfour Beatty

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Innovative engineering and logistics solutions

Balfour Beatty’s Asset and Technology Solutions business develop innovative engineering and logistics solutions that underpin the delivery of major building and infrastructure projects across the UK.

Our team of experts solve challenges and improve project delivery. Working with clients, preconstruction and delivery teams, we understand project challenges and constraints before developing new solutions, or improving those that exist already, in order to reduce costs, increase productivity and remove, reduce or control safety risks.

In this document, we’ve set out some examples of the challenges that we have provided better, safer and more efficient solutions for.

Introduction



Transporting personnel and materials in and out of tunnels safely

Major Projects

Hinkley Point C

Challenge

To safely transport personnel and materials in and out of confined spaces or tunnels without reversing.

Solution

We created a DV60 swivel chair allowing the driver to always face the direction of travel. Using a DV60 base unit, we modified the slew ring to fit a subframe and designed a personnel carrier and a flatbed module to carry people and materials. We also installed a camera system to aid the driver and detect when people are near the wagon to reduce the risk of collision.

Benefits

The bi-directional wagons improve safety by eliminating the need to reverse, and also increases productivity by allowing a variety of items to be carried all at once.



Installing 200km of 400kV cable underneath London

Power, Transmission and Distribution, (National Grid)

London Power Tunnels

Challenge

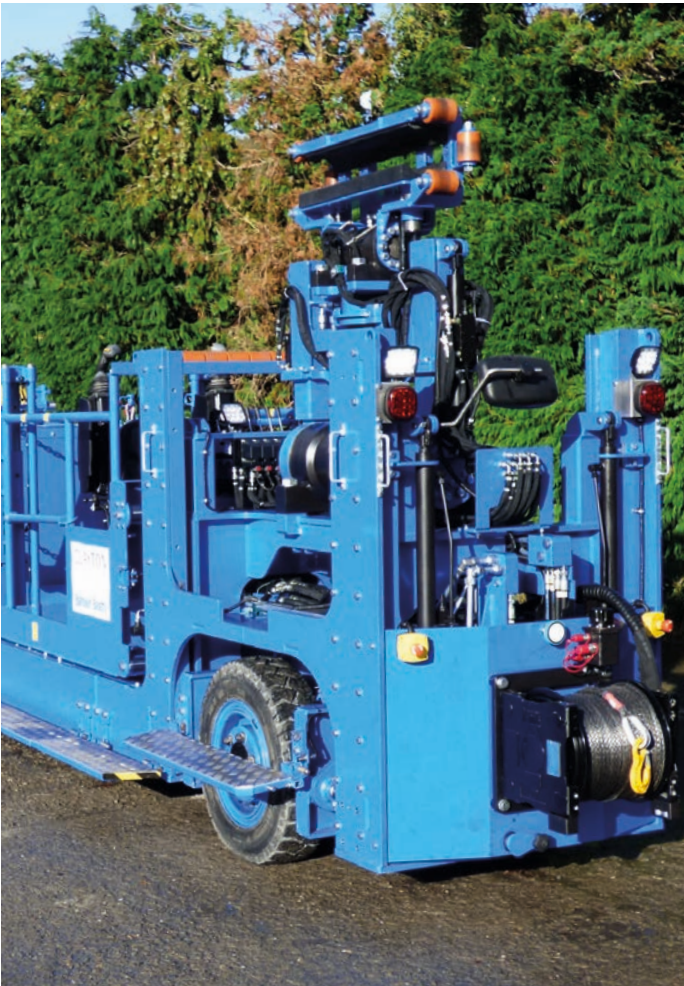
To install 200km of 400kV cable within 32km of tunnel beneath London.

Solution

We used a mechanised and automated method of installing cable.

Benefits

Our solution reduced the requirement for labour intensive and manual methods of installing cable through mechanisation and automation. Productivity was improved through efficient and logical machine sequencing and cable installation. This process introduced consistency, accuracy and repeatability – all contributing to a safe and quality-controlled installation.



Lifting 140 cable drums

Power, Transmission and Distribution, (National Grid)

London Power Tunnels and Hinkley Point C

Challenge

To lift, manoeuvre and place 140 cable drums within an allocated compound.

Solution

We used a remote controlled, four-legged mobile gantry crane with the capacity to lift and manoeuvre 55-tonne cable drums.

Benefits

This solution reduced the requirement for mobile crane hire, thus lowering costs.
Laden and empty cable drums can be offloaded from a trailer without the requirement for a mobile crane that is expensive and requires pre-planning with additional operators and slingers on site.



Having this flexible solution available on a permanent basis means cable drums can be moved around the compound as and when required.

Installing 320kV DC cable in the Eurotunnel

Rail & Utilities

ElecLink

Challenge

To install 100km of 320kV DC cable within the confines of the Eurotunnel, within a restrictive time window, on a live railway.

Solution

We used a mechanised and automated method of building and installing cable – deploying a cable handling system and hauling units.

Benefits

This solution helped reduce the need for labour intensive and manual methods of installing cable.
The efficient and logical machine sequencing and cable installation also improved productivity.
Consistency, accuracy and repeatability were also increased, this contributed to a safe and quality controlled installation.



Installing a 50km-long monorail system in the Eurotunnel

Rail & Utilities

ElecLink

Challenge

To install a 50km-long monorail system safely, quickly and efficiently on the wall of the Eurotunnel.

Solution

We used 12 monorail works wagons – each equipped with two handlers for lifting the monorails into position. This allowed us to work alongside 12 drill wagons comprising of three drill rigs, each with four drills for installing the monorail bracketry.

Benefits

The combination of both the drill wagons and monorail wagons permitted a significant quantity of steel brackets and monorails to be installed at a high production rate, whilst eliminating hand arm vibration and manual handling.



Completing a central joint on 100km of 320kV DC cable

Rail & Utilities

ElecLink

Challenge

To complete a central joint on 100km of 320kV DC cable in the Eurotunnel.

Solution

We used a comprehensive tracked solution which incorporated two jointing modules with specialist clean rooms and two cable handling modules for jointing HV cables in the centre of the tunnel.

Benefits

The clean rooms have air handling units and condensers which clear the room of contaminants and maintain the optimal conditions for jointing the cables. The platform can support jointing activities for up to 50 hours, with four 100 kilovolt-ampere generators and on-board welfare facilities.



Creating a vacuum litter machine for the M25

National Highways
Connect Plus

M25

Challenge

To find a safe and efficient method of collecting litter on the M25.

Solution

We created a vehicle mounted vacuum litter machine with a 5m³ waste collection unit.

Benefits

The vacuum litter machine improves efficiency as it reduces time spent clearing litter compared to traditional methods with a litter picking stick. It also creates a safer working environment by limiting time that workers are exposed to high volumes of traffic.



Safely accessing overhead gantries on motorways

National Highways

Motorway gantry maintenance

Challenge

To find safe access to maintain and service the overhead gantry on the motorway.

Solution

We created a modified truck with an incorporated scissor lift platform and crane system to aid with lifting.

Benefits

This created an efficient method of enabling access to overhead gantries, ensuring all workers are safe whilst working at height.



Creating a powered spacer trolley for safer works

Power, Transmission and Distribution

Overhead cabling projects

Challenge

To provide an upgraded trolley that uses the latest reliable drive and power system technologies, gives greater use between charging for increased productivity and to prevent runaways on steep inclines with new safety innovations.

Solution

We produced a new environmentally friendly 24V powered spacer trolley with 4 braked motors that traverse along the conductors at controlled speeds of up to 6kph.

Benefits

The powered spacer trolley reduces the risk of injury through muscle fatigue and finger trapping by enabling the operator to keep their hands away from the conductor. It also reduces the risk of a runaway with braked motors.

A new version of the spacer trolley has been created using a 24V DC motor for greater torque and power.



Installing HV cable as it is dispensed from cable drums

Power, Transmission and Distribution

Hinkley Point C and Viking Link underground cabling projects

Challenge

To assist the installation of HV cable as it is dispensed from cable drums of varying size and inclination.

Solution

We utilised a cable dispensing ramp with a box roller outlet for guiding the cable as it is dispensed from the cable drum and is pulled into the underground ducting.

Benefits

The cable is supported and protected from damage, and operators can maintain safe distance as the high loadings from pulling the cable are absorbed by the ramp.



Preventing trespassers on tower cranes

UK Construction Services

Lewisham Gateway Phase 2

Challenge

To find a cost effective and simple solution for preventing trespassers from gaining access and climbing tower cranes.

Solution

We created a six-metre high, lockable security enclosure made from specialist mesh panels.

Benefits

The lockable security enclosure enhanced design to improve safety measures, whilst simplifying systems for easier installation.



Transporting a 50-tonne cable drum

Power, Transmission and Distribution, (National Grid)

Hinkley Point C, 400kV AC cabling scheme

Challenge

To safely transport and dispense a 50-tonne cable drum via a public highway and a haul road.

Solution

We transported the cable drum using a 150-tonne heavy duty DAF tractor and an 80-tonne Goldhofer Vessel Bed trailer with an integrated motorised cable drum dispenser. The solution permitted the cable drums to be moved on the public highway and then dispensed at the desired cable pulling location.

Benefits

Balfour Beatty now has the capacity to move large cable drums without employing external hauliers. This reduces cost and provides programme security, as we do not have to rely on an external haulier's availability.



The solution can also remove the requirement for craneage, as the trailer has the range and capacity to self-load the cable drums.

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