

Balfour Beatty
Plant & Fleet Services

0845 602 7064

Your sustainable partner of choice.
Solving your problems and making it easy.



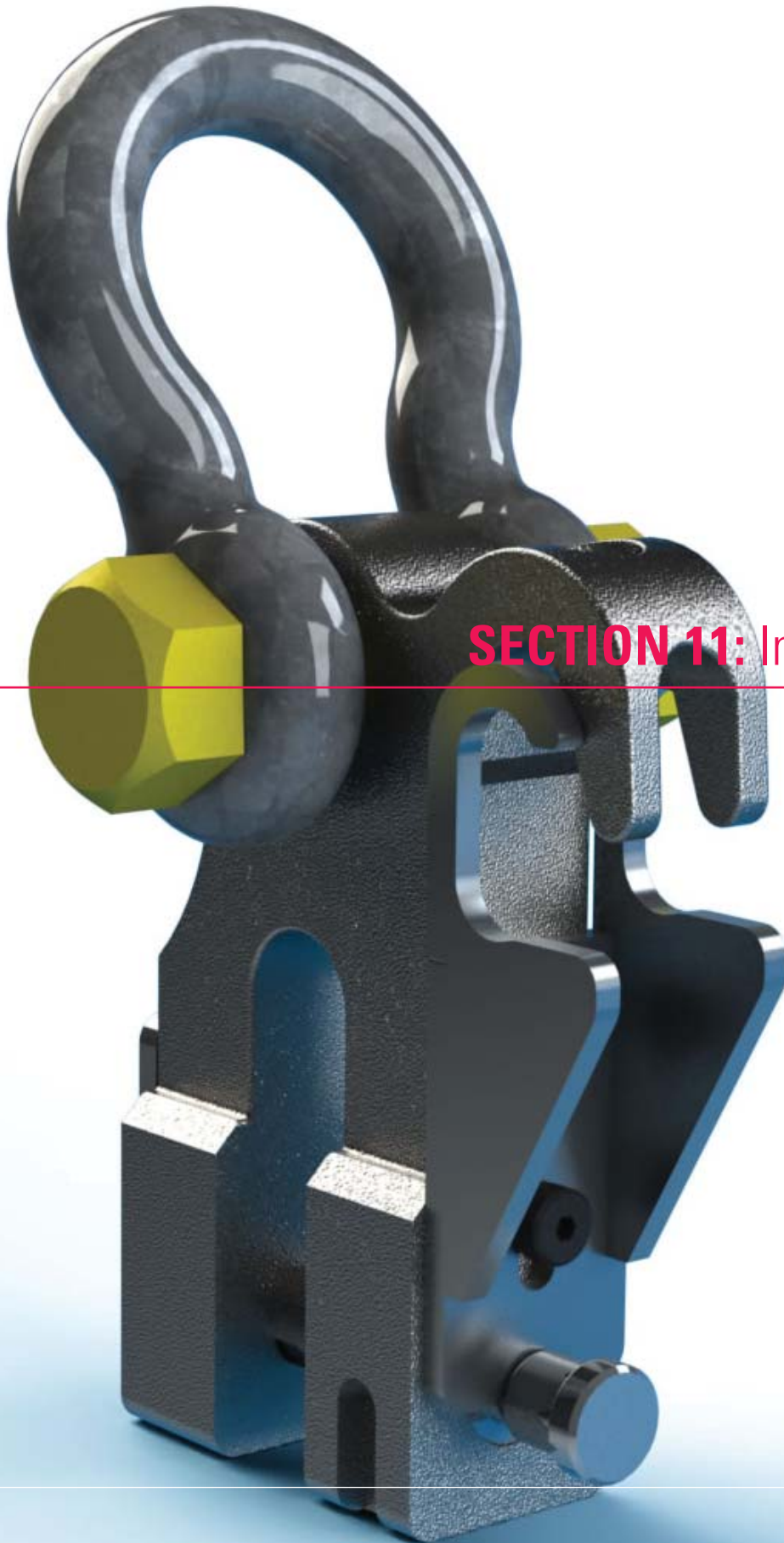
Innovation



A section from our full **Product Catalogue**

Please visit www.bbpfsc.com to view our full service offering

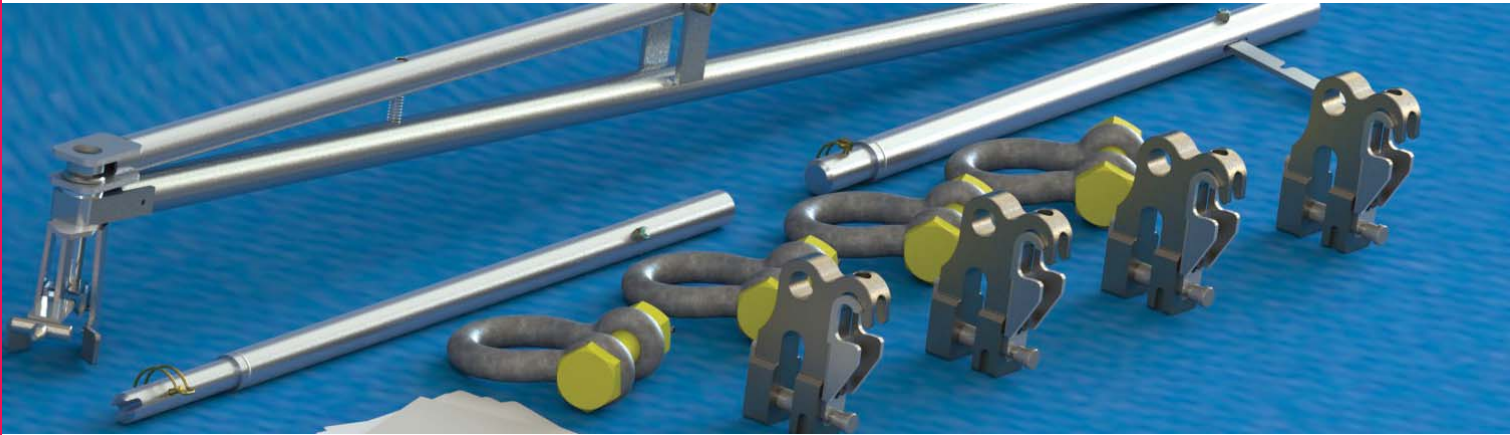




SECTION 11: Innovation



SECTION 11: Innovation



Specialist Equipment, Design, Consultancy and Innovation

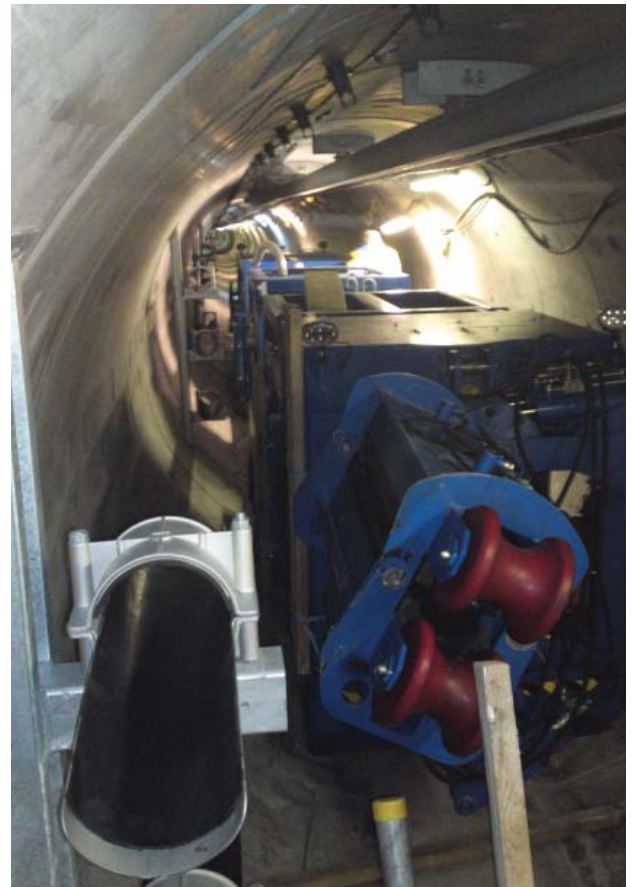
Our Innovation team has extensive experience in the provision of innovative engineering solutions to support all of our Plant and Fleets Services business activities, wider Balfour Beatty and external customers.

Our team has a proven record in design consultancy, project management and manufacture, including the identification of, innovative plant and products that assist in improving our customer's efficiency and productivity.

Working through well established systems and procedures we are able to ensure the efficient execution of all aspects of the project including engineering design, build and project management. This consultancy service offers customers innovative bespoke plant and products to meet their unique challenges.

Our first priority is to provide excellence in engineering and development through a skilled and dedicated team. We are particularly effective in the area of innovation, where our dedicated multi disciplinary consultancy team has had considerable success in developing a range of products, all of which have resulted in significant productivity improvements and cost savings for our customers.

Our design department is supported by Chartered Mechanical, Electrical Engineers and Design Draughtsman who work hand in hand with the project management team who provide full project and procurement management solutions. Each of these departments can be contracted out as a team or supplied to your project on individual secondment.



Tunnel tractor in action, designed, built and project managed by our Innovations team for installing cables underground in the London area for Balfour Beatty Utility Solutions.



Our team design with Sustainability and Zero Harm in mind, helping you to achieve your goals.

The Innovations team provide a wide range of services:

Design Services	<ul style="list-style-type: none"> • Design engineered solutions to operational problems • Mechanical and electrical design • Provision of 2D and 3D engineering drawings and models • Provide Failure Modes & Effects Analysis (FMEA) analysis and reporting prior to manufacture
Documentation Services	<ul style="list-style-type: none"> • Provide operators and servicing manuals • Inspection and test procedures
Technical Services	<ul style="list-style-type: none"> • CE Marking • Technical Construction Files
Project Management	<ul style="list-style-type: none"> • Management from initial design to manufacture and delivery
Zero Harm & Sustainability	<ul style="list-style-type: none"> • Experienced in providing solutions to specific Zero Harm and sustainability problems • Using design thinking to solve problems

Our philosophy is to work closely with our customers to ensure we fully understand their unique requirements before we start to develop an engineering Zero Harm solution either on a consultancy or sponsor basis.



SECTION 11: Innovation



Lo-Loc®

An innovative Zero Harm solution keeping Feet on the Ground.

Working at height has been identified as a major fatal risk in our business and the wider industry. The Lo-Loc® is an innovative Zero Harm and cost effective solution, keeping feet on the ground.

It provides a safe, quick and simple solution to attaching chains and slings to lifting points which cannot be reached without working at height.

Along with providing a safe solution for accommodation collection and delivery, the Lo Loc® system can be used on a variety of plant and equipment. This ranges from traditional items such as generators, lighting towers and rails tools to specialist equipment such as the tunnel tractor and wheel washes.

The Lo-Loc® is ideal for plant, equipment and cabins with a suitable lifting eye

What are the benefits?

- No working at height
- Feet on the Ground
- Remotely fitted
- Quick and Easy to use

Technical Information

- 6000kg Safe Working Load
- Robust Steel Body
- Stainless Steel Moving Parts
- Max reach 4.5m (with tool extensions)
- LOLER Certified

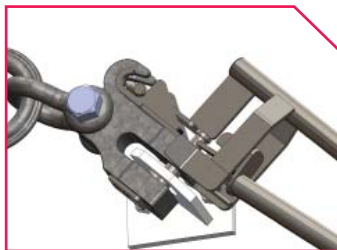




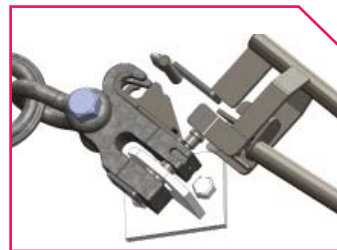
Position



Engage



Lock



Remove

The Problem

Working at height is one of the major fatal risks identified by ourselves and the wider industry. Together with the removal of ladders by August 2011 from working practices, the Innovations team was presented with a huge challenge - develop a system of lifting that allowed the operators feet to remain firmly on the ground.

Why is it an issue?

In 2008/09 in the UK there were 11,754 injuries caused by falls from height, 7,065 of the injuries required the person to be off work for three or more days, 4,654 caused major injuries and 35 were fatalities.

What did we do?

- The initial inquiry was for a feet on the ground solution to lifting cabins without retrofitting or modification to cabin units
- Focus on providing a safe and cost efficient solution
- Developed initial ideas and findings and discussed with key stakeholders
- Innovations developed Lo-Loc®; a patented solution that keeps feet on the ground

The Solution

Lo-Loc® :

- Innovative Zero Harm, cost effective solution, keeping Feet on the Ground
- Provides safe, quick and simple solution to attaching chains and slings to lifting points that cannot be reached without working at height
- Can be used with any plant, equipment and cabins with a suitable lifting eye

Rating



5



5



SECTION 11: Innovation



Volumetric Cement Mixers

A sustainable solution that minimises waste.

Volumetric concrete mixers are in essence mobile batching plant, with the vehicle carrying the individual ingredients of stone, sand, cement and water in separate hoppers. The ingredient proportions are individually controlled and are fed into a continuous mixer delivering a uniform mix to the required design.

The specific amount of required fresh concrete can be mixed onsite, to any design, without wastage providing great cost benefits. There is no hydration or segregation during transit as it is delivered fresh with improved workability. Vehicle movements are reduced, with multiple deliveries achievable from one load providing a more sustainable solution for concrete delivery.

The introduction of the volumetric cement mixer has the potential to save thousands of pounds against traditional ready mix.

The Problem	The Balfour Beatty and Mott Macdonald Joint Venture (BBMM JV) for the Highway Agency Area 4 has faced immense wastage and high costs for ready mix.
Why is it an issue?	<ul style="list-style-type: none"> • Traditional ready mix delivery needs precise volumes to be calculated in advance • Significant cost for under or over delivery and waiting time • Over ordered material simply disposed by producer with high negative impact on C^o2 production
What did we do?	<ul style="list-style-type: none"> • We undertook a full market review to understand the market size, nature of current operators and the current and future legislation of cement production • We evaluated a number of different manufacturers to understand their design philosophy and quality
The Solution	<ul style="list-style-type: none"> • The Nu-Rock NUVM 2 • Capable of producing upto 2.25 m³ cement at 3 min / m³ • 12t road chassis, body size to prevent overloading • Ideal for highways maintenance, e.g. barrier repair, sign erection • Significant reduction in C^o2 production through reduced vehicle movements and more efficient use of materials

Rating	★	5		5
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Asphalt Recycler

A cost effective solution that increase life cycles of materials.

The Asphalt Recycler will recycle 100% of asphalt planings, producing up to 5 tonne of fresh asphalt every 20-25 minutes. By completely recycling all break-out materials and bitumen based products on-site, there is a minimum requirement for vehicles and therefore minimal vehicle movements, thus ensuring minimal disturbance to local residents.

Landfill is not required because all the bituminous materials are recycled and re-used again in refurbishing the footway and pavement. The Asphalt Recycler is capable of producing a minimum of 200 tonnes of high quality bituminous material per week for either base course or wearing course.

The customer recognises this is an excellent way of reducing costs while contributing to the business's sustainability targets.

The Problem	This came from a customer at Connect Plus who are looking to recycle road planings as it is becoming increasingly expensive to send to landfill and purchase fresh virgin asphalt.
Why is it an issue?	<ul style="list-style-type: none"> • Increasing cost for landfill disposal • Pressure from government to reduce new material usage • Tightening council budget requiring 'more for less' • Non sustainable • Damaging to public perception of Balfour Beatty
What did we do?	Explored and examined a number of various asphalt recycling systems to find the right solution.
The Solution	<ul style="list-style-type: none"> • VEB Asphalt Recycler • Recycles 100% of road planning's into high quality asphalt. • Mobile or static units • Capable of producing upto 10t in 20 minutes • Meets all current environmental emission standards • Significant cost savings

Rating	●	5		5
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SECTION 11: Innovation



Road Repair Patcher

A Zero Harm and cost effective solution to repairing potholes.

The road repair patcher provides a highly effective and efficient way of repairing potholes, cracks and similar damage through the effective use of materials and low numbers of staff. Against traditional methods the road repair patcher is cost effective and can achieve less than £10 per m2 repair.

There are sustainable benefits, through waste reduction, and also Zero Harm benefits as staff are not taken off the roads.

The Problem	Potholes are a growing problem on the road network, with the UK facing more than ever before. The traditional method of patching potholes was unreliable, expensive and required staff to work on the roads.
Why is it an issue?	<ul style="list-style-type: none"> • Increasing average cost of pothole repairs under conventional methods • Tightening council budget requiring 'more for less' • Potholes occurrence are escalating year on year in England • Conventional methods are hazardous with gangs in the road • Significant productivity improvements cannot be realistically made under conventional methods
What did we do?	Explored and examined a number of various pothole repair methods to find the right solution.
The Solution	<ul style="list-style-type: none"> • A 'one man, one machine' road repair patcher, providing efficiencies while achieving Zero Harm with operator repairing from within the cab. • Produces pothole repairs for as little as £11 per pothole • Can achieve productivity of up 200 pothole repairs per day • Cost effective against the conventional methods • More sustainable through minimised waste

Rating	●	5	🌱	5
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Wheel Wash

A sustainable and economical solution to road contamination problems for quarry, waste management and construction industries.

Wheel Washers deliver high volumes of water under high pressure directly on to tyre treads and vehicle underchassis to ensure the complete removal of muck and contaminants. The high performance Wheel Wash uses 50% less energy than alternative electric and diesel-run systems.

The Wheel Wash utilises a unique inverter-driven pump systems on all wheel wash systems resulting in:

- Low Energy Requirements
- Cost Savings
- Flexibility
- Improved Reliability

These machines have been hired to both our internal customers within Balfour Beatty and to external customers including, Balfour Beatty Construction at Midhurst and McLaren Construction in Swindon. This is an ideal solution for Balfour Beatty Construction and Balfour Beatty Civil Engineering sites that need to clean road vehicles.

The Problem	A method to keep muck and contaminants off the road network by efficiently cleaning vehicles
Why is it an issue?	<ul style="list-style-type: none"> • Reactive – Road sweepers are required which is expensive and not completely effective • Some wheel wash systems have expensive operating costs and can be energy greedy • Water wastage • Not in line with our sustainability goals
What did we do?	Working with Hippowash, we have introduced a patented sustainable wheel wash system into the Balfour Beatty Group.
The Solution	<ul style="list-style-type: none"> • Proactive – Muck is cleaned off the vehicle before leaving site reducing site requirements for road sweepers and providing cost savings • Contributes to our Zero Harm goals by removing dirt and mud before it can be deposited on the road network • Recycles 99% of all water used • Cost effective against conventional wheel washes through using an inverter to reduce the unit's power requirements. This can drastically reduce the unit's operating costs

Rating		5		5
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SECTION 11: Innovation



Snow brush

Powerflex 2200T

The multi purpose grounds maintenance machine.

Powerflex is a multi-purpose grounds maintenance machine, which features interchangeable attachments that enable it to perform all manner of outdoor tasks, such as sweeping, mowing and snow clearing. This makes Powerflex versatile and suitable for a wide range of applications, including gardens, parks, churchyards and residential complexes. Maintaining outdoor areas is an all year task, the Powerflex is well suited to winter or summer work.

The Problem	Existing facilities maintenance was slow and expensive.
Why is it an issue?	<p>A number of issues with the previous methods of facilities maintenance:</p> <ul style="list-style-type: none"> • Zero Harm issues from snow and ice, manual handling and external contractors on site • Expensive to hire various items of plant or sub contract out the required work • Existing methods of facilities maintenance are labour intensive
What did we do?	Sought an inexpensive but highly capable and flexible solution for facilities maintenance.
The Solution	<ul style="list-style-type: none"> • The Powerflex 2200T, with demountable attachments for a variety of facilities maintenance tasks • Tackles the hazards presented by snow and ice, manual handling and external contractors • Operates 12 months of the year, with work ranging from road sweeping to gritting and from mowing grass to ploughing snow • Manual handling taken out of a number of tasks • Cost effective against both hiring the various plant and contracting the work to external suppliers

Rating		5		5
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The range of facilities work the Powerflex can undertake:

Winter

- Gritting roads and pathways
- Snow brushing
- Snow blowing
- Snow ploughing

Anytime

- Suction Sweeper for cleaning and maintenance
- Tipping and loading with front loader
- Load carrying
- Hedgetrimming
- Weed brushing
- Mowing, either mulch, rotary or flail



Power washer



Gritter



Flusher



Sweeper



Snow plough



SECTION 11: Innovation



Suction Excavation

An efficient and safe solution to all your excavation challenges.

Suction Excavators virtually eliminate the potential high risk of injury that is associated with mechanical methods of excavation. Suction Excavators offer an efficient key hole quick dig method that uses immense suction to remove the ground around underground utility services without the risk of damage.

Spoil is removed through a nozzle and deposited directly into a self contained area at the rear of the lorry. Spoil is tipped at your convenience into a recycling unit or a road side skips. This method has proven to be totally safe and to date has eliminated all service strikes, saving lives and millions of pounds across the UK.

The Problem	Damage to underground utilities during excavations.
Why is it an issue?	<ul style="list-style-type: none"> • Strikes to buried utilities is a major hazard to the workforce • Strikes cause significant delays to projects • Strikes result in significant costs to the business for repair and loss of service • Strikes damage the reputation of Balfour Beatty
What did we do?	Working with our supply partner we have further developed the suction excavator design to offer greater productivity and enhanced Zero Harm features.
The Solution	<ul style="list-style-type: none"> • New 32t suction excavators • Built onto heavy duty 8 x 4 chassis, able to access any site and carry a heavier payload • Hydraulic power arm, no manual handling, operator is always positioned in place of safety when working on deep excavations • Collapsible handrail around top of vehicle, full edge protection for operators during routine maintenance • Additional CCTV for the driver to cover blind spot on near side

SECTION 11: Innovation



The SAFEST suction excavator available in the UK

Rating		5		5
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Case Study - Tunnel Tractor

Balfour Beatty Utility Solutions

What was the challenge?

We were approached by Balfour Beatty Utility Solutions to develop a tunnel tractor for a project they were involved in. The requirement was for a tractor unit capable of operating in either 4 metre diameter tunnels and capable of pulling lengths of cable weighing up to 55 tonnes into the tunnel and attaching them to preinstalled wall supports. The limiting factor on the design was that the tractor had to be designed and constructed such that it could be lowered into the tunnel through an access hatch 2.5 x 1.5 meters.

What did we do?

Our design and engineering team undertook a full review of requirements and through a series of discussion documents refined a design which would fulfil the requirements. This design was taken to a UK based manufacturer and our engineering team fully project managed the manufacturing process.

What was the result?

The tractor was commissioned and put into service installing cables through the length of the tunnel with efficiency and speed.

What were the savings?

Previous methods of installation risked damage to the cable and also posed serious health and safety risks. The new tractor unit eliminated both and offered significant productivity improvements.

What did the customer say?

Excellent unit. Now the tractor has successfully completed this contract we now want you to modify the design of the unit making it compatible for the next tunnel which goes live in 2013.

Following on from the success of the tunnel tractor, we are now developing a machine to work in three meter tunnels with twin circuits.



Rating



4



5



Smart Fortwo

A revolutionary design for a city car

The New Diesel Smart Fortwo



SUSTAINABILITY
smart fortwo emissions
(CO2) range from 86 g/km
to 119 g/km
...a collective responsibility

The smart fortwo has been awarded a four star NCAP adult occupancy protection rating by the European New Car Assessment Programme out of a possible five stars. Based on this Euro NCAP rating the fortwo fares relatively well in an accident having been given a high result.

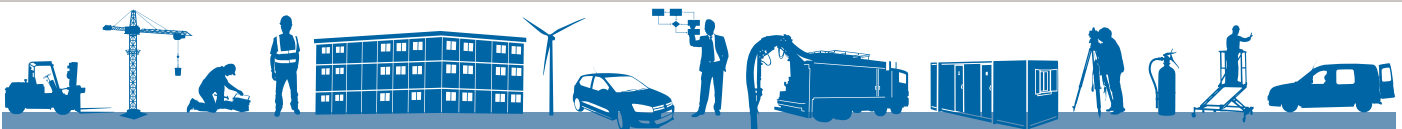
Smart fortwo insurance groups start at group two and rise to group five. Base models are (group one and two cars are the cheapest to insure) very cheap to insure, whilst the higher specification cars are fairly cheap to insure too.

The Smart Fortwo is larger than the original model is to provide larger impact-absorbing crumple zones while electronic stability control (ESP) is standard across the range. Driver and passenger airbags are standard (the passenger airbag can be deactivated if a child seat is being used), while side airbags (head and thorax) are optional.

This would make an ideal sustainable 'pool car' solution for your business.

The Smart Fortwo offers:

- World's smallest direct injection engine
- 83.1mpg
- Produces only 89g/km of CO2
- minimal noise and pollutant emissions
- ecologically-conscious life cycle
- Environmentally painted using powder-coating – using 40% less energy than conventional painting methods with zero solvent emissions
- Surplus powder paint is collected and 98% is reused
- Smarts are built from pre-assembled, synthetic modular parts. It makes the re-use of parts and elements of the car much easier as dismantling is simple



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