

Health and Safety toolkit 329

Zero carriageway crossings

Introduction

The Health and Safety toolkit is intended to be a means of identifying the many good practices, innovations and ideas which contribute positively to health and safety. This includes all ideas already being put into practice on the Highways Agency network, as well as those which could potentially be transferred/implemented.

Should you wish to put forward an idea for potential inclusion in the toolkit, please complete this proforma and forward to the project email address:

HealthandSafetyToolkit@highways.gsi.gov.uk

Introduction

This document contains a selection of delivery partner approaches and ideas for eliminating carriageway crossings.

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Brief description of idea

To eliminate the need for traffic management personnel having to cross a live carriageway on foot to install and maintain temporary signs the following 'five point plan' was developed and is being successfully implemented

- 1. Mobile lane closures for deployment of remote controlled signs** – the use of Type 12C mobile closures for the initial placement of all central reserve signage. This eliminates the need for carriageway crossings to erect and dismantle temporary traffic signs in the central reserve at the start and completion of each programme phase.
- 2. Remote controlled signs for lane closures** – the use of Morelock prismatic lane closure and narrow lane advance signs which are solar powered and can be operated remotely. These signs eliminate the need for road workers to adjust narrow lane signage when installing off peak lane closure modifications. In addition, the M62 team is trialing illuminating these remote controlled signs using solar technologies.
- 3. Fixings to manage reactive crossings during high winds** – a new Britpave product has been adapted by Morelock Signs to fix signage in the central reservation which will save reactive carriageway crossings by road workers during inclement weather. It is the first time this product has been used in a traffic management scheme.
- 4. Permanent sign poles deployed in the central reservation** – the M62 smart motorway currently has all repeater signs on poles within the soft verge central reservation. This innovative strategy is saving reactive road crossings during inclement weather as there are no sign frames or sandbags.
- 5. Straight lane one and two lane closures** – the installation and removal of tapers has always been a hazardous operation. Using only direct one and two lane closure reduces these risks significantly. In addition to a 60 minute increase in the productive working window per shift, this approach delivers a corresponding decrease in the exposure time of operatives to live traffic and a significant reduction in the manual handling of equipment.

To what activities can this idea be applied in practice?	Traffic management and road worker safety.
What are the benefits of this idea?	Safety of road user and traffic management personnel greatly improved by having zero road crossing significantly reduces the exposure of traffic management operatives to the live traffic. Journey reliability will benefit from quicker installation of traffic management schemes.
Are there any cost implications of implementing the idea? If yes, please quantify.	No.
How would you describe this idea? (eg innovation, good practice, new idea etc)	New idea of good practice.
Is this idea currently being used in practice? If yes, where?	Yes on the M62 junction 25 to 30 smart motorway scheme.
Are there any conflicts to potential implementation of which you are aware? (eg Highways Agency standards/specifications, chapter 8, CDM regulations etc)	No known risks or departures required all approved methods.
Further information.	Email: HealthandSafetyToolkit@highways.gsi.gov.uk

Additional information

Please provide any additional information which would support this idea – eg photographs, diagrams, sketches etc.



M4M5 Smart motorways – the scheme

To eliminate the need for traffic management personnel having to cross a live carriageway on foot to install and maintain temporary signs the following ‘five point plan’ was developed and is being successfully implemented











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M4M5 Smart motorways – the scheme

- 33 new gantries.
- Six refurbished gantries.
- Nine existing gantries to demolish.
- Dynamic hard shoulder running and Controlled Motorway sections.
- Seven emergency refuge areas (100m Lay-bys).
- Pegwell brake footbridge demolition and replacement.
- New communications ductwork infrastructure ~ 30km trench.
- Surfacing – re-profiling & surface course replacement.
- Six replacement MS3's.
- 34 Ms4's, HADECS & CCTV.



M4M5 Smart motorways – the scheme

	2011	2012	2013
Detailed design phase	Summer 2011 		
DP Integration/review and target cost	Oct 2011 		
Mobilisation works	Winter 2011 		
Main works construction phase - M4 (narrow lanes) and then hard shoulder only closures		Jan - Nov 2012  	Feb 2013
Main work construction phase - M5 (narrow lanes) and then hard shoulder only closures		April 2012  	Feb - April 2013
Testing and commissioning (6 months)			April - October 
Construction complete			March/April 2013 
Commissioning complete			October 2013 

SR10 Scheme

Total Scheme Budget £88.6m

Brief description of idea

As part of the continued work being carried out by the Highways Agency, road worker safety forum. The M4 M5 project team made the following commitment:

To install, maintain and remove all aspects of Temporary Traffic Management (TTM) required for the M4 M5 Project without the need for road workers to cross any live carriageways. This commitment will be fulfilled by using a number of accepted temporary traffic management methodologies and techniques such as:

- 12C Mobile Lane Closures
- Use of pre-placed Remote Controlled Smart Signs and blinds
- Utilisation of overnight road closures for switches

Brief description of idea

By removing carriageway crossings, an activity that scored a risk rating of 25 was totally eliminated.

Other activities also had their risk ratings significantly reduced.

Likelihood		Likely (8)	Probable (6)	Possible (3)	Remote (2)	Unlikely (1)
Fatal	(4)	24	18	12	6	3
Major Injury/Permanent Disability	(4)	24	18	12	6	3
Minor Injury	(2)	12	6	3	2	1
No Injury	(1)	6	3	2	1	0.5

**H. W. MARTIN
(TRAFFIC MANAGEMENT) LIMITED**

RISK ASSESSMENT

Description of Task / Work Activity	Carrying equipment across the live carriageway	Assessment Number :	HWM/TM/04
Assessed by:	T Mouldsdale Safety Manager	Reviewed and agreed By:	Graham Beswick Director Responsible for Safety Date : 03.01.12
Persons Exposed to Risk	Staff, Employees, Members of Public		

Hazard	Risk	Initial Assessment			Control measures to reduce Risk	Responsibility for implementing and monitoring Controls	Risk after Controls
		S	L	R			
Crossing the live carriageway	Hit by moving traffic Fatality Serious injury	5	5	25	<p>Refer to HSE guidance CIS no 53</p> <p>Personnel trained & competent NHSS 11A/B, D High vis. jackets/trousers worn to BS 471 Personnel to avoid running when crossing the carriageway. Request use of VMS/Matrix signs to support traffic management operations Extra care required in adverse weather conditions when visibility is reduced</p>	<p>Training Manager Operatives</p> <p>TSCO Foreman Operatives</p>	5x1=5

Assessment Legend : S : Severity of Injury L : Likelihood of Occurrence R : Risk Rating Risk Rating = Severity of Injury multiplied by Likelihood of Occurrence
Acceptable Risk < 5

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Brief description of idea

- Case presented on the basis of traffic flow assessment on diversion routes and agreements reached with LA's (BCC and SGCC). Close liaison with Area 2 EMAC for roadspace.
- Comprehensive risk assessment undertaken to assess risk reduction to workforce versus risk to travelling public.
- Agreement reached with SW ROB that can be undertaken as a trial.
- Report compiled on trial.

Resolution of workforce issues



Percieved pre-start workforce issues

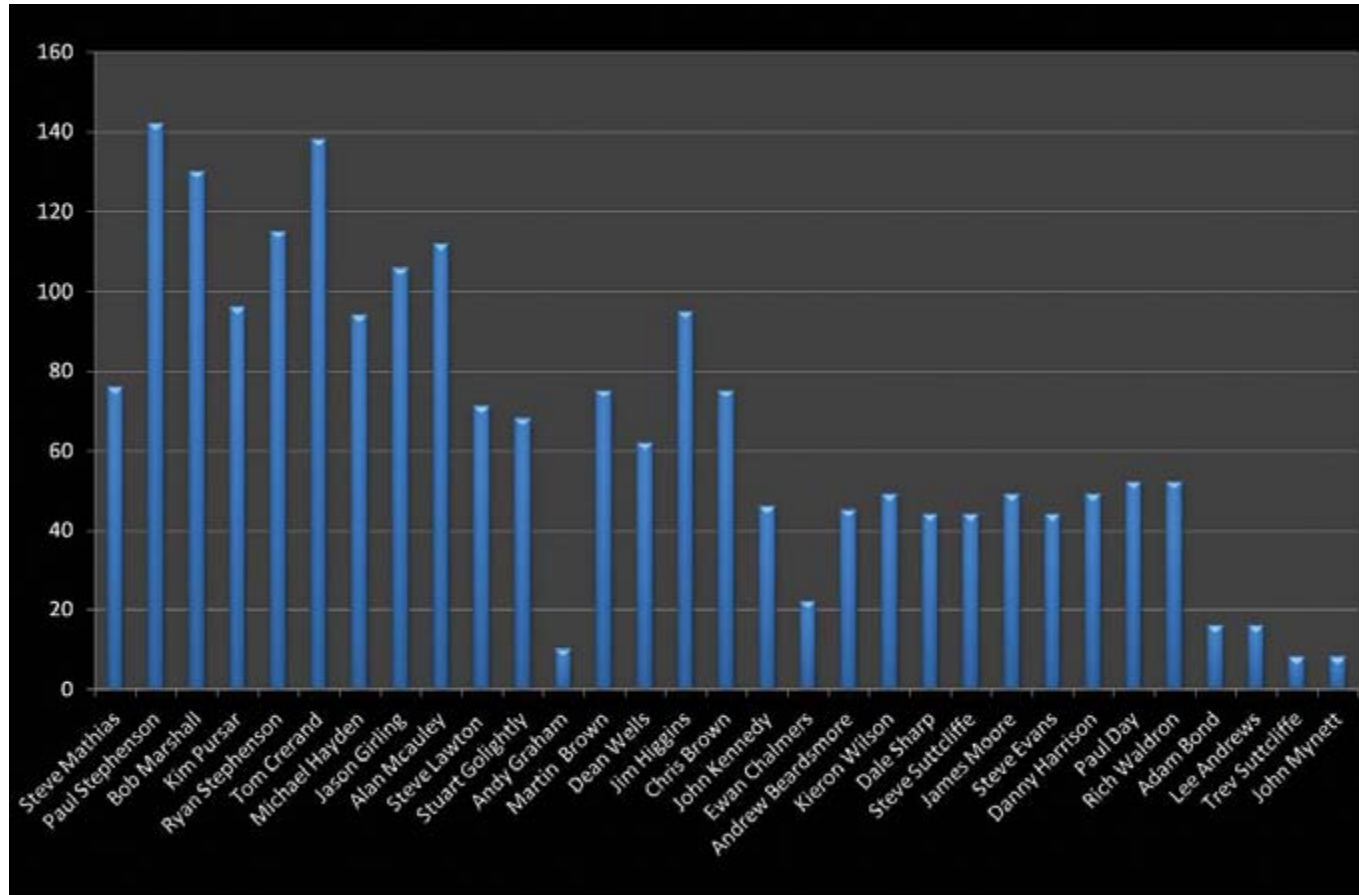


Resolution of workforce issues

Key factors to success

1. Daily briefings to site staff reinforcing the no carriageway crossing policy.
2. Totally committed management team with a 'can do' attitude.
3. Only operatives with a positive attitude inducted for the scheme.
4. Carefully selected operatives for the site maintenance team.
5. Comprehensive descriptive method statements.
6. Listening to the workforce's concerns and issues and dealing with any suggestions in a proactive manner.
7. No fuss ethos regarding the no carriageway crossing policy.

Resolution of workforce issues



Remote controlled signage

Remote controlled temporary blind signs

These type of signs are used to control the 'zone of influence' on the M4 Eastbound, the M48 Eastbound, the M5 Southbound and the M4 through the works.

Remote controlled prism signs

These type of signs are used to control entry into the narrow lanes, including nearside lane closures, on the M4 Eastbound, the M4 Westbound and the M5 Northbound.

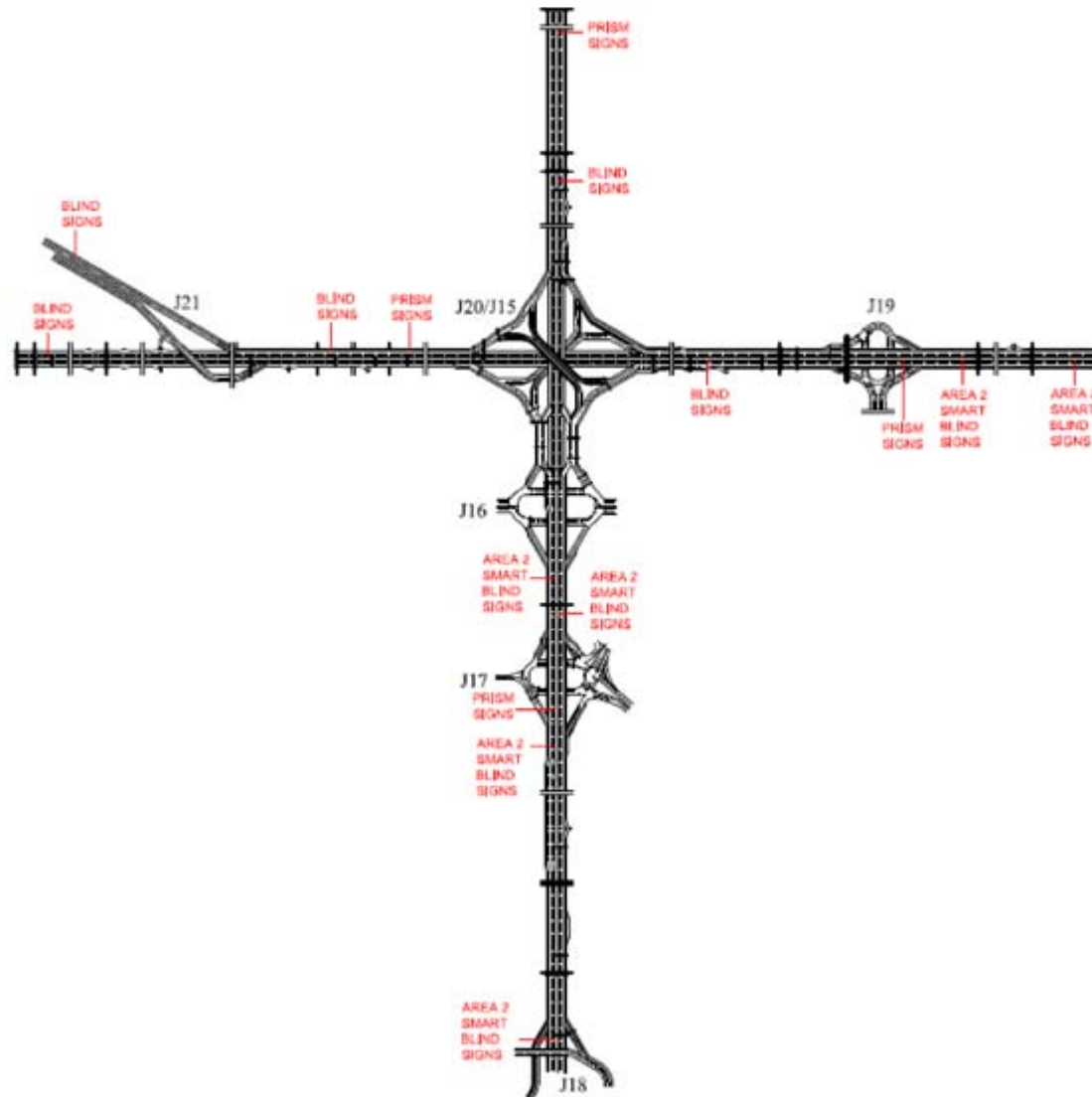
A further set is used to control the lane closures on the M5 Southbound.

Remote controlled area 2 smart blind signs

These type of signs are used to control the zone of influence on the M5 Southbound and the M5 Northbound and Southbound through the works.



Positioning of remote controlled signage



Overcoming remote signage issues

A comprehensive incident management plan was formulated with multi-agency liaison and support to enable a procedure to be implemented whereby with the cooperation and assistance of the Highways Agency traffic officer service rolling blocks are provided to facilitate the replacement / temporary fix of any central reservation remote signage that fails to operate in the expected manner therefore enabling planned works to proceed.

The support provided by the Highways Agency traffic officer service is invaluable in helping the project to succeed with zero carriageway crossings.



12c mobile lane closures

Mobile lane closures	Mobile lane closures are planned and executed well in advance of all works requiring blind signs.
	Mobile lane closures utilised to carry out central reservation maintenance within the same shift as installing or repositioning blind signs.
	Mobile lane closures never used to install temporary traffic management lane closures.
Traffic management vehicles	Carefully planning of traffic management vehicles utilised for installing temporary traffic management i.e IPV vehicles always used for offside lane closures.

Site personnel feedback

Steve Matthias – Site Supervisor

Pros: Less manual handling. Happy workforce. Easy to adjust to new working methods.

Cons: Extra planning time consuming. Blind sign failure.

Paul Stephenson– Maintenance Foreman

Pros: Safer. Minimises risk. Less stressful.

Cons: More driving. Anxious when equipment in live lane cannot be retrieved as quickly.

Dale Sharp – Installation Foreman

Pros: Quicker, easier, safer. Easier than expected to adapt to.

Cons: Blind sign failure can cause delays.

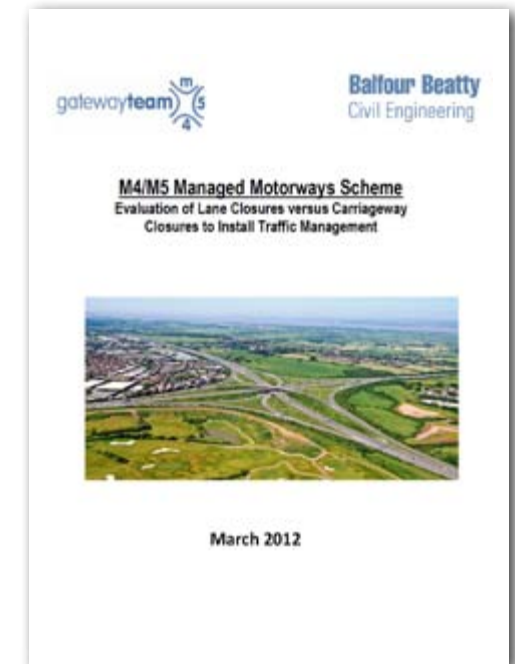
Carriageway closures – lessons learnt

There was a considerable amount of works done during each night that the carriageway was closed including work undertaken by both the M4/M5 scheme and area 2. Not have been possible under lane closures.

Benefits in increased outputs in installation of narrow lanes, lining and varioguard. A 'typical' single night of a total closure (12 January) would have required 14 separate lane closures to undertake the same amount of work.

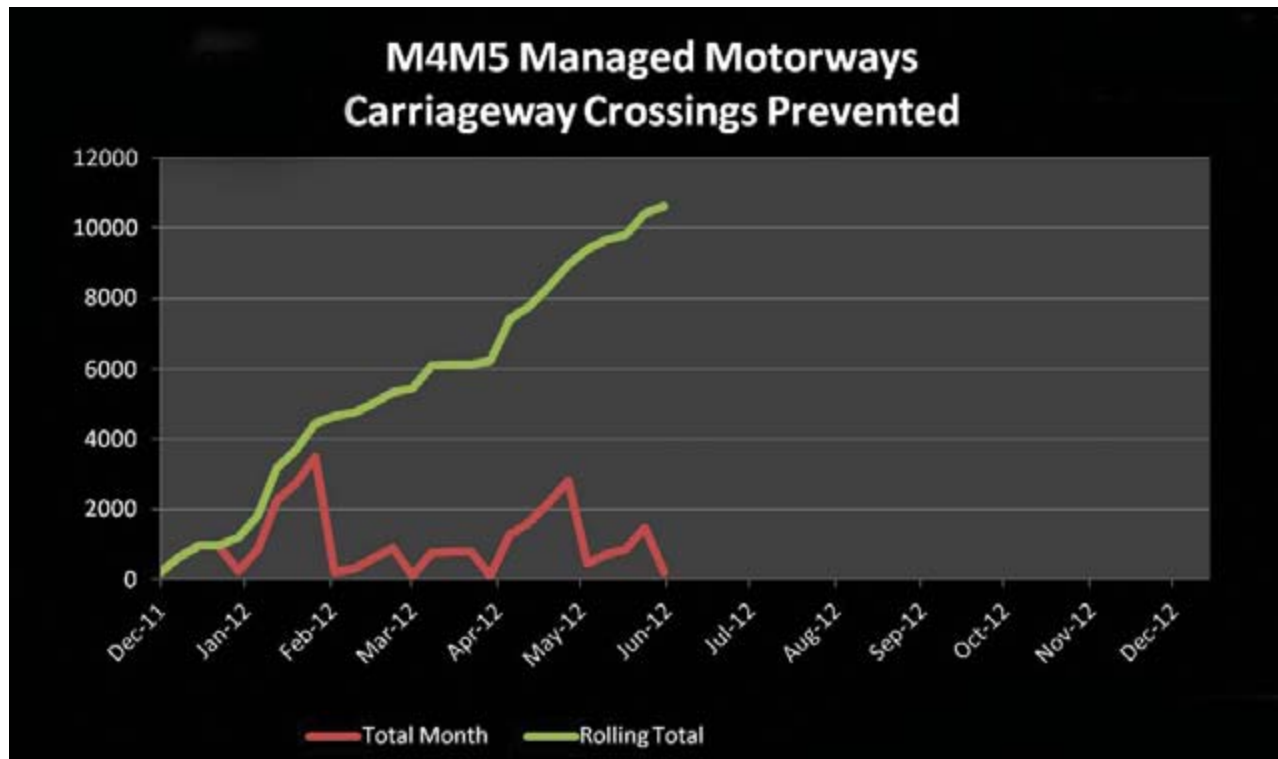
Advanced 'remote control' signing under mobile closures negated the need for any carriageway crossings. On 12 January alone, estimated that approx 840 carriageway crossings were saved equating to over four hours of roadworker exposure time.

There were no issues with safety or congestion on any of the diversion routes whilst the M4 was closed. Some valuable lessons were learnt in terms of the types of diversion signing used for the closures.



Key other lessons learnt

By June 2012 the scheme saved an estimated 10,000 carriageway crossings.



Zero carriageway crossings

Road workers are recognized in the construction industry as being at a high risk of fatal and serious injury and Britain has one of the busiest road networks in the world; and also one of the safest. One of the major hazards involved during work on the highway is the setup and removal of traffic management. In particular live carriageway crossings whereby road workers are expected to cross the live carriageway to install temporary road signs.

To install temporary smart signs in the central reserve requires 14 crossings per sign comprising 2 men to carry the frame and sign, sand bars and sand bags. On the A1(m) barrier replacement scheme, there were 18No. Smart signs positioned on the Northbound and Southbound carriageways that would require 252 live carriageway crossings to install.

By working in line with the Highways Agency's strategy for health and safety, aiming for zero, and our commitment to zero harm, connect plus is eliminating live carriageway crossings from all lifecycle and improvement schemes. This is through working with our framework contractors' in working towards the Highways Agency's vision for improving road worker safety, seeking to reduce risk exposure and to eliminate fatalities and injuries to personnel undertaking works on the Highways Agency's road network.



A1(m) barrier replacement scheme

Following an incident in 2009 the 1.4km of substandard steel restraint system was replaced by a vertical concrete barrier in keeping with the current standards. The A1(m) barrier replacement was a six week renewals scheme carried out by Volker Fitzpatrick on behalf of Connect Plus and was the first central reserve barrier replacement scheme to be carried out and funded by Connect Plus on the network as part of the DBFO contract. The scheme was located North of Hatfield tunnel between marker posts 34/9 and 36/3 running through Stanborough, Lemsford and Welwyn Garden City.



Planning

Through early Contractor Involvement (ECI) with the Traffic Safety and Control Officer (TSCO) and traffic management contractor TREK, Connect Plus planned out a safe way to deliver the scheme. Table 1 shows the number of live carriageway crossings not required due to the traffic management methods used.

This shows that over the six week delivery period, Connect Plus eliminated the need for 1154 live carriageway crossings by road workers on the A1(m) scheme showing that Connect Plus is committed to working alongside the Highways Agency strategy for zero live carriageway crossings and to Balfour Beatty's health and safety strategy, zero harm. By temporarily closing the carriageway by means of mobile closures, lane closures or total closures, this eliminated the risk involved in crossing the live carriageway when undertaking tasks such as installing temporary signs.

	April	May
Lane closure	204	188
Road closure	120	84
Mobile lane closure	558	0
No crossings not required due to mitigation measures	882	272
Table 1	1154	

Equipment and carrying out the works

The majority of live carriageway crossings are undertaken during the installation and removal Traffic Management, and through changing our approach to traffic management setup and removal, the need to cross the live carriageway was totally eliminated from this process.

A total of 508 live carriageway crossing were eliminated during setup by using mobile lane closures, this was to install 18No. Smart Signs in the central reserve that could be remotely controlled from the hard shoulder. This new technology was used thorough the scheme to initiate lane closures for the installation of varioguard / static road signs, total closures for the installation of the narrow lanes / Hatfield tunnel maintenance and to make the road user aware that narrow lanes had been implemented throughout the works.

The configuration of the signs placed in the central reserve needed to be changed as the formation of the road layout changed; therefore the ability to remotely change the configuration of the signs from the hard shoulder eliminated further carriageway crossings.



Best practice

Connect Plus holds the 30 year DBFO Contract with the Highways Agency. It is therefore in our interest to invest in measures that will ensure the safety of the road worker as we aim for zero. The introduction of Smart Signs during temporary road works has given Connect Plus and the operatives that carry out the work on site piece of mind as these signs provide a far safer working environment by not having to cross the live carriageway to replace or change the configuration of the signs.

It is likely that in the future, works / routine maintenance will be carried out in the same areas and it was decided that on the A1(m) scheme, these Smart Signs would become a permanent addition. These permanent signs have the ability to rotate through 180°. This means that when not in use, the signs can be remotely rotated through 90°, facing away from the traffic as shown in the pictures above. The ability to rotate through 180° enables works to be carried out in both the Northbound and Southbound carriageways.

This approach to temporary traffic management has the potential to eliminate the need for thousands of live carriageway crossings throughout the duration of the 30 year contract, and further savings can be made if this approach to traffic management is implemented throughout all lifecycle renewals schemes. Connect Plus currently operate 80 smart signs, smart blinds and smart frames across M25 DBFO network demonstrating commitment to the road workers that carry out work on a daily basis on our behalf.



The use of remote control solar traffic management signs

Standard approach



Standard approach



Reasons for using

The standard approach has been to use Traffic Management signage which must be removed/changed manually by a Traffic Management operative. The innovative approach is to use remote control signage which can be changed by the Traffic Management operative using a remote from up to 30m away. The signs have solar panels to create the power which enables them to be remotely operated. The justification for introducing these now is that for the next three months on site we will have the same night lane closures, where as previously the closures were changing nightly.

The signs reduce the number of road crossings, estimated to be over 80 per week, greatly reducing the risk to the traffic management operatives when placing signage.

Key details

Overview and typical applications	<p>Remote control signage for lane closures and road works have been placed along the central reserve of the motorway. The Traffic Management operative can use the remote control from the hard shoulder to change the sign. The lane closure sign pictured above allows for three lanes to be displayed as either open or closed. Ordinary signage has been placed on the hard shoulder side.</p>
Key benefits	<p>The use of remotely operated signs eliminate the need to traffic management operatives to cross the road and change the signage manually. The Traffic Management operative can park on the hard shoulder and use the remote from their vehicle. This eliminates the risk of collision with traffic and also manual handling of signage. Information on signs can be changed quickly and efficiently.</p>
Lifecycle and business cost benefits	<p>Will be on site for approximately three months. Although remote control signage is more expensive than ordinary signage the potential for future accidents to Traffic Management operatives is greatly reduced ultimately cost benefiting the business. The use of these innovative signs and a low number of accidents involving Traffic management operatives will favour the company when applying for future tenders. Signs are £1000 to buy compared to normal sign at £400. This site hired nine signs for £700 a week.</p>
Implementation / construction benefits	<p>Efficient and effective traffic management. Eliminates risk to traffic management operatives.</p>
Skills and SHE requirements	<p>Traffic Management operatives must be competent in using the remote control signage.</p>
Design, commissioning and operation	<p>Operated on site by Conemasters.</p>
Watchpoints	<p>Keeping batteries charged in remote control. Using remote control correctly eg Do not close wrong lane on the sign.</p>
Risks	<p>n/a</p>

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Please quote Highways Agency publications code **PR70/12**

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