

Cold shoulder to the hard shoulder

Use
hard shoulder
for M6 (N)
only

Congestion is a serious problem on many road networks around the world and its extent and severity are expected to increase significantly unless effective measures are introduced to mitigate this, as **John Conquest** reports

As the environmental impact and financial constraints make conventional widening and the construction of new roads much less appropriate. Interventions are therefore required that help to manage movement in an economic and sustainable way. The managed motorway concept can deliver similar benefits to conventional widening and can be delivered at a reduced cost and in a more sustainable way.

However, even at around 40 per cent cheaper than widening, managed motorways still require significant levels of funding which are not easy to secure in these times of austerity. Is there scope to move the managed motorway concept on further, in a way that delivers similar benefits, but with a reduced price tag and without significantly reducing safety and operational performance?

Since the introduction of motorways in the UK in the 1960s the design has not significantly altered and a hard shoulder has always been seen as an essential

safety component. However, the development of vehicle technology and improvements in reliability means there are now much fewer breakdowns - less than a third as many light vehicles and a 20th as many LGVs break down now as they did in the 1970s. In fact, comfort breaks are estimated to account for 60 per cent of all stops on the hard shoulder. This raises the question – does the road user now need a continuous refuge?

The introduction of part-time hard shoulder running on the M42 ATM Pilot Scheme was originally considered to be a bold step, and still is by some. However, road user surveys have confirmed that the majority of drivers are confident using the hard shoulder as a running lane and are generally supportive of rolling out this type of operation to ease congestion. This Pilot scheme has now been operating since September 2006 and is seen as a clear success. This was further endorsed by the announcement of the UK's Secretary of State for Transport in January 2009 which identified the roll out of managed

motorway type interventions at congestion hot spots across the English motorway network. The dynamic use of the hard shoulder is now in operation on the M6 J4 to J5 (Birmingham Box Phase 1) and is due to go live on the M6 J8 to 10A in Spring 2011 (Birmingham Box Phase 2).

THE GREAT LEAP FORWARD

So, what could be the next big step for managed motorways? This thought piece outlines the concept of removing the hard shoulder and replacing it with a permanent running lane. In simple terms, the road layout could be similar to the M42 ATM pilot scheme but the road marking between lane 1 (previously a hard shoulder) and lane 2 could be changed from a solid line to a dashed line.

If the hard shoulder is permanently removed it opens the potential to undertake a complete review of the technology/supporting infrastructure and operational staff needed to operate a managed motorway.

STAFFING ISSUES

For example: the need for a hard shoulder monitoring system and associated staff would no longer be necessary; or the need for the Traffic Officer Service to do a debris check prior to a hard shoulder link being opened would also be unnecessary.

But would the introduction of this concept introduce the need for additional technology/infrastructure/operational staff? Would there be a net loss or a net gain in capex/opex to meet the safety and operational requirements agreed for a particular scheme?

How a managed motorway would look in terms of technology/infrastructure provision and what the 'operational wrap' would be would need to be developed from an evidenced-based perspective. This is only a concept and clearly significant work would be required to

- Establish the importance of road user compliance and what types of enforcement may be required to achieve acceptable levels of compliance

- Develop appropriate operational procedures

- Evaluate the consistency requirements with other similar interventions to avoid road user confusion

- Establish the procedural assessment work required to deliver such a scheme.

However, if the above stacks up, the potential advantages of this evolution of the managed motorways concept could include:

- An opportunity to reduce the amount of technology equipment/infrastructure needed to support the operation of the scheme. This may

operating speed is deemed necessary to operate a motorway without a hard shoulder). A combination of lane closures could also facilitate maintenance operations and the road space used more flexibly.

- Road users could use Emergency Refuge Areas (ERAs) for emergency stops (when it is within their control). This would provide a safer environment than the hard shoulder for them, other road users and recovery organisations. It may be feasible, given appropriate technology and processes that facilitate speed control along with rapid detection and response, to remove the need for ERAs.

- Should a breakdown occur in lane 1 it would be treated exactly the same as a breakdown/incident in any other live lane and signals and signs could be utilised to protect the vehicle/occupants.

- Consideration could be given to operating the road with differential speed limits to support the operating regimes.

A truly dynamic road space may not have a designated hard shoulder but a fully adaptable space where all running lanes are managed to best achieve the operational outcomes

determine the feasibility, safety and operational effectiveness of such an intervention. Detailed assessment would be needed to:

- Determine the safety implications and estimate the potential safety performance

- Establish road user and wider stakeholder acceptance to such an intervention

- Establish the maximum safe operating speed and assess the associated Benefit Cost Ratio of operating within those safety constraints

- Assess the implications on maintenance operations and road workers

- Assess the implications on the Emergency Services and Recovery Industry

- Assess the implications on the road haulage industry

- Determine the technology and infrastructure provision that would be required to meet the safety and operational requirements

in turn reduce the capex, opex and carbon footprint.

- An opportunity to reduce the time demands on operational staff

- A transfer in risk from the operator to the road user when compared to the dynamic use of the hard shoulder. As the motorway would operate with 4 lanes, with the ability to close 1 or more lanes when not required, the need to "open" the hard shoulder with all associated checks and operator intervention is removed.

- Even when closed, lane 1 would be classified as a lane and not a hard shoulder and is therefore far less likely to be used for breakdowns or comfort stops. Thus the lane would be free from obstruction when required for traffic and also for use by the emergency services. The time required to open a running lane would be significantly less than for opening the hard shoulder.

- Lane 1 could be closed in low flow conditions that could introduce a higher operating speed (if a lower

EVOLUTIONARY THINKING

The Highways Agency's Managed Motorway programme has demonstrated that a lot can be achieved by thinking outside of the box and putting the rulebook to one side. To date, the industry has worked together to develop new tools and processes to make the most of the existing road space.

Now the Managed Motorways concept of providing adaptive road capacity could evolve further. So, a truly dynamic road space may not have a designated hard shoulder but could have fully adaptable space where all running lanes are managed to best achieve the operational outcomes. However, the chains of convention may need to be broken to foster and develop new thinking.

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[Reference: 7th ITS Europe Congress, Geneva: 'Highways Technology – Providing Management and Capacity', 2008 Pengelly, I., Patey, I., 2008 Conquest, J.]