ICE submission to National Infrastructure Commission Freight Study call for evidence

ICE's response considers the NIC's questions in the context of the potential benefits from and challenges to the deployment of HGV 'platooning' on the UK strategic road network. It also sets out some issues for consideration.

NIC questions about freight movement

This response focuses specifically on questions 1, 4, 5 and 6.

1. What are the key constraints to the effective and efficient movement of freight in the UK and what can be done to overcome them?

Roads are the primary method of transporting freight within the UK. In 2015 just over three quarters (76%) of all goods moved were by road with the remainder by water (15%) and rail (9%).[1]

The UK strategic road network faces a range of challenges from traffic load, congestion, its relatively unplanned nature and resulting high transport emissions. Road freight is a factor in these challenges:

- In March 2016-2017 1.97bn tonnes of goods were lifted by GB registered HGVs (up 17% on the previous year). These vehicles covered 19bn Km. (up 3% on previous year)[2]
- HGVs are currently estimated to account for around 17% of UK GHG emissions from road transport and around 21% of road transport NOx emissions, while making up just 5% of vehicle miles.[3]
- The UK ranked in the top ten most congested countries in the world, the third most congested in Europe behind Russia and Turkey.[4]
- Much of the UK's domestic road freight originates in, and is destined for, the midlands and south of England, a high density area.[5]

Reducing the volume and increasing the efficiency of road freight will be essential. 'HGV platooning' has been identified as a potential part of the solution to these challenges.

[1] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/627597/domestic-road-freight-statistics-2016.pdf
[2] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/651257/road-freight-stats-april-2016-to-march-2017.pdf
[3] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/590922/freight-carbon-review-2017.pdf
[4] http://inrix.com/press-releases/scorecard-2017-uk/
[5] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/627597/domestic-road-freight-statistics-2016.pdf

4. How can freight lower its carbon and air quality impacts?

Referred to variously as 'HGV', 'truck' and 'lorry' platoons, these are convoys of up to 3 heavy goods vehicles, travelling close together, with acceleration and braking controlled by the lead vehicle and using smart technologies to mutually communicate. Three vehicle platoons are in the region of 50m long.

A range of potential benefits from HGV platooning have been suggested:

- Lower fuel consumption and consequently lower fuel cost - HGVs drive closer together at a constant speed improving aerodynamics, with less braking and accelerating.
- Potential to reduce CO2 emissions by up to 10%.
- More efficient road use, reducing congestion (thus improving air quality), and optimising delivery of goods.[6]

5. How could new technologies be utilised to increase the efficiency and productivity of UK freight?

A range of potential benefits from HGV platooning have been suggested, as identified in our response to Q4, as well as the potential for increased driver productivity and increased road safety.

However, the UK strategic road network has grown gradually and organically over time. It has not been as heavily planned as in other countries and on key stretches is heavily loaded. It is interspersed with junctions and slip-roads, often quite close together. This automatically creates challenges for HGV platoon trails, identifying how to manage other vehicles' access to the road. The perception of 50m HGV platoons as a long "road block" and the time needed to overtake (based on margin speeds) are significant issues.

This could be addressed by automated coupling/uncoupling of HGVs in the platoon to accommodate access from slip roads. Separation from other road-traffic has also been suggested, but it is as yet unclear what this might look like and what the economic implications might be. Its potential may be most fully realised in a Level 5 vehicle autonomy environment.[7]

The real-time data and computation requirements are complex. Factors such as vehicle type, weight of load, tyre type, and prevailing weather conditions all have a bearing upon the operation of the vehicles in the platoon. These will need to be factored in to the connectivity systems between vehicles in the platoon.[8] If realised, HGV platooning could enable a reduction in the potential for human error and thus increase road-safety.

Public acceptance is a challenge to the deployment of connected and autonomous vehicles as it will be for HGV platooning, partly because of how it is presented in the media. Improved public understanding and buy-in will be a factor in these technologies achieving roll-out. Government and industry will need to 'bring the public with them', gradually building trust through transparency and open debate.

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[6] http://www.acea.be/news/article/what-are-the-benefits-of-truck-platooning

[7] Level 0 meaning 'no autonomy and driver human controlled' and Level 5 meaning 'full autonomy and no driver control'.

[8] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/637361/truck-platooning-uk-feasibility-study.pdf

6. Are there good examples internationally of freight systems, policy, infrastructure or technology development and implementation that the UK can learn from to increase freight efficiency and/or reduce the carbon and congestion impacts?

A European Truck Platooning Challenge was initiated in 2016 by the Dutch Ministry of Infrastructure and the Environment, the Directorate General Rijkswaterstaat, the Netherlands Vehicle Authority (RDW) and the Conference of European Directors of Roads (CEDR).[9] In 2016, 6 platoons of connected trucks completed the first cross-border trial, travelling to Rotterdam from several locations, including Sweden. [10]

In the US, several automotive industry players have made proposals to test platooning technology on US roads.[11] Japan is also commencing testing, primarily to address an increasingly pressing driver shortage.[12]

The impacts on existing road surfaces and linear structures (bridges) from HGV platoons requires consideration, and current 'road-trains' in Australia/US may provide some useful data.

Other comments

A number of other issues will require consideration:

- How will HGV platoons impact upon a) existing infrastructure, and b) design-requirements for future infrastructure? E.g. will our assumptions about the vibration impacts on bridges, or road-surface deterioration rates, have to change?
- Will HGV platoons be consistent with efforts to reduce congestion and the load factor of the UK strategic road network? How does it fit with the wider modal-shift agenda?

About ICE

Established in 1818 and with over 92,000 members worldwide, ICE is a leading source of expertise in infrastructure and engineering policy and is widely seen as the independent voice of infrastructure. ICE provides advice to all political parties and works with industry to ensure that civil engineering and construction remain major contributors to the UK economy.

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[10] https://www.theguardian.com/technology/2016/apr/07/convoy-self-driving-trucks-completes-first-european-cross-border-trip
[11] https://uk.reuters.com/article/us-daimler-usa/daimler-to-test-truck-platooning-technology-on-u-s-roads-idUKKCN1C027D
[12] http://www.truckinginfo.com/channel/equipment/news/story/2018/01/fuso-begins-truck-platooning-tests-in-japan.aspx