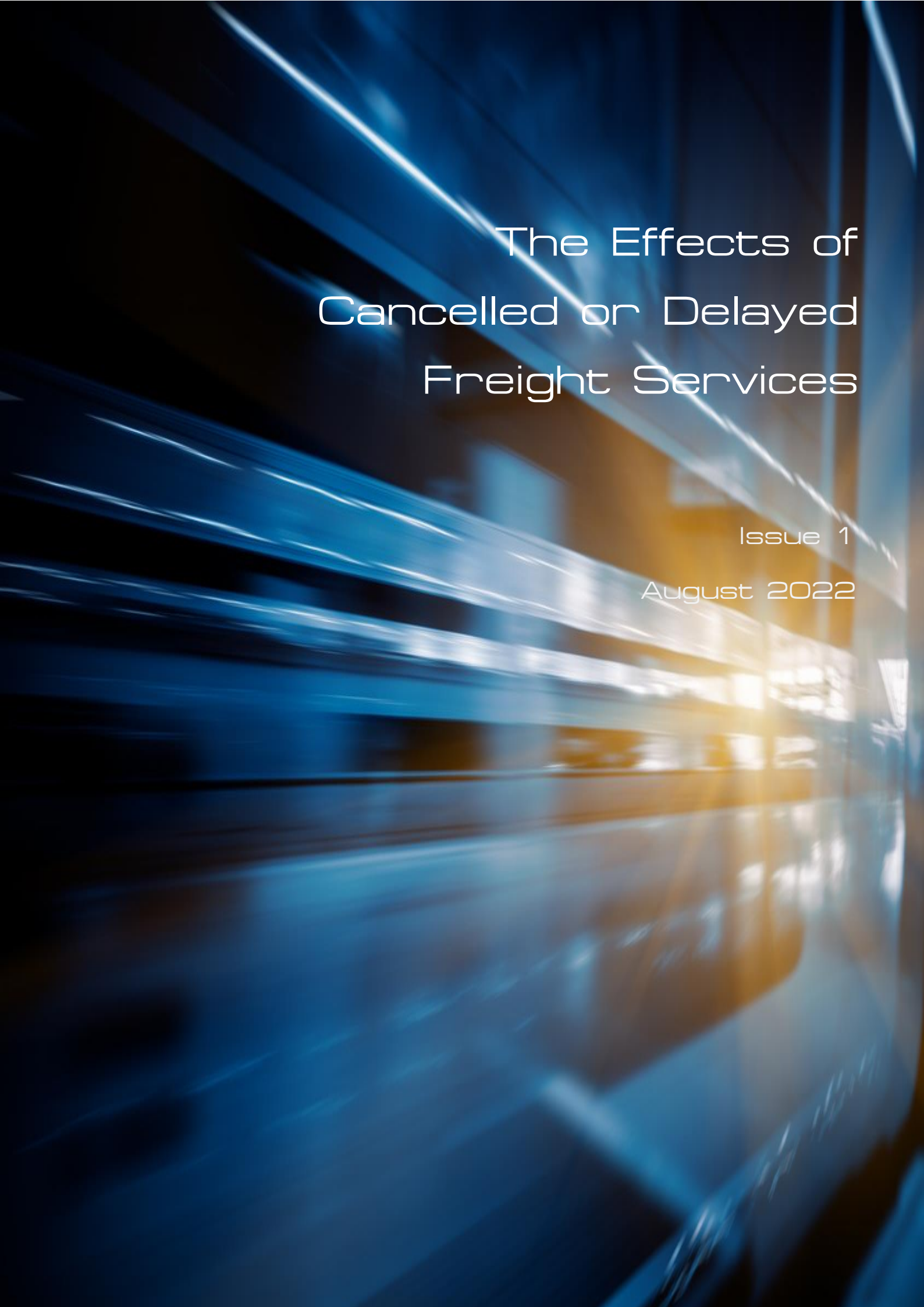

The Effects of Cancelled or Delayed Freight Services

Issue 1

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1. Precis

The Williams-Shapps Plan For Rail acknowledged that rail freight is likely to take a bigger share of traffic and revenues in the future. Rail freight has transformed from primarily conveying steel and coal to containers, food supplies and construction materials. Rail freight features in the 30-year rail plan and there is much to be done to expand the type and quantity of goods moved by rail and, with the ever increasing need to decarbonise logistics, more companies are looking to rail freight to achieve this. Moving goods by rail, whether it is parcels, aggregates, slabs, furniture, electronics, and clothes, etc, has a range of both environmental and economic benefits, which will be discussed in Section 2 of this narrative.

At present, freight trains are regularly treated as a low priority on the rail network and this manifests itself in unproductive pathing, unrealistic Sectional Running Times (SRTs) and poor real-time train regulation, primarily due to a lack of understanding of freight train behaviour (braking and acceleration). In times of disruption, this situation worsens resulting in services which are either heavily delayed or cancelled altogether and service recovery dealt with as and when there is capacity on the network. Whilst passenger services are mostly back to Working Time Table (WTT) within a day, the impact on freight and lost capacity can run on for weeks.

During disruptive events, there has been little understanding shown or action taken by the rail community as to what this means to the freight community. When a passenger service is cancelled, there are subsequent timetabled services which passengers can use. A freight service during disruption is invariably cancelled or heavily delayed and what this means to the rail freight user is discussed in Section 2. Overall, this will lead to losses in production, delays to their customer's projects, empty shelves, delayed presents, missed shipments and potential contract losses. All of these have a ripple effect on the economy be it local, national, or global.

However, it is not just the customers that suffer. Freight traincrews are often left to fend for themselves, stranded in remote goods loops for what could be hours at a time with no access to facilities. ROG have been victim to this with one of the worst examples for the company being 5Q58 Oxley to Old Dalby, where the train was stood at Small Heath for two hours on the 20th of December 2021 due to a Class 350 EMU failing in Walsall. It could have been re-routed just before reaching the failed unit, but this was not done, while other services were.

The weather and related temperatures can have an effect on traincrew fatigue, leading to potential safety issues. There are also the following extra costs of cancelling or heavily delaying a freight service which a Schedule 4 payment may not necessarily cover. These include:

- Taxi from train to a hotel or station
- Hotel costs for traincrew
- Rest Day Working for another driver and or shunter to convey the service to its destination

- Lost revenue due to having to cancel the next working
- Locomotive may have to stop for fuel on its next working
- Disruption to the fleet plan for locomotives
- The wagon set may be out of position for their next working
- Liquidated damages from the customer for missed delivery.

There also needs to be a fundamental change in mindset of isolating the transportation of goods into road, rail, barge etc and to look at it holistically as logistics, the movements of goods and people.

This narrative has been written based on first-hand experience working within the freight sector of the railway and the resulting observations, research by Fishbone Solutions and Rail freight customer's experience.

2. The Economic and Environmental Importance of Rail Freight

The economic and environmental benefits of rail freight are immense. As an example, for HS2, more than one million tonnes of construction material has been delivered by rail. This is the equivalent of 100,096 HGV journeys for just 583 trains, a ratio of 171:1.

2.1. Economic Benefits

The economic benefits are numerous. Rail works out to be more cost effective overall due to the sheer amount that can be conveyed by one rail freight service compared to the number of Heavy Goods Vehicles required to convey the same quantity of goods. With fuel prices increasing, the introduction of Ultra Low Emission Zones (ULEZ) and vehicle excise duty. Placed against a backdrop of tri-mode and bi-mode freight locomotives entering service in the 2020s and this further strengthens the case for rail freight.

Express logistics delivering to city centres is certainly a step forward with being an economic and environmentally friendly means for delivery especially with the ULEZ charges and other challenges hitting many road logistics operators.

Intermodal trains convey 25% of all containers that come into the UK from Felixstowe, Tilbury, London Gateway, Immingham, Teesport and Liverpool, to a name a few. Felixstowe is the busiest in terms of intermodal trains and a third of containers are moved by rail at this location. These contain furniture, electronics, tiles, clothes conveyed to a wide range of retailers throughout the UK.

2.2. Environmental Perspective

Below is a quick recap of the environmental benefits of conveying goods by rail vice road:

- Rail freight reduces Co2 emissions by up to 76% compared to road
- Rail produces up to 10 times less small particulate matter than road and as much as 15 times less nitrogen oxide for the equivalent mass hauled
- Each freight train removes up to 76 articulated lorries from the roads, resulting in 1.66 billion fewer kilometres per annum
- Nationally, 31% of rail freight is for the construction industry, with 25% for the intermodal market.

Although emissions from the rail freight sector itself are low (the total emissions from all of rail represent only 2% of surface transport emissions), there is potential for rail freight to contribute, and play an important role in, helping the UK to reduce emissions in the freight sector as a whole. In particular, transporting more freight by rail rather than road could help reduce emissions in the Heavy Goods Vehicle (HGV) sector, which itself contributes 22% to total surface transport emissions despite representing only 5% of road vehicles.

FOCs have also been investigating new fuels for their locomotive fleets such as Hydrogenated Vegetable Oil (HVO) as well as ordering new locomotives with multiple power sources. However, it is not just emissions but also noise that has an impact on the environment of those around the railway. Battery technology will also provide a potential solution to this and can be utilised in areas where noise is a concern.

3. The Effects on a Customer due to the Cancellation or Delay of a Freight Service.

3.1. Aggregates

A train transporting raw material for an aggregate company is seen as a long distance, heavyweight conveyor belt and part of a process to produce value added material, such as concrete and asphalt. Tarmac has a few Ready-mix Concrete (RMX) plants round London in Park Royal, Battersea, St Pancras, Hayes, and Paddington and work on a 'Just In Time' (JIT) basis.

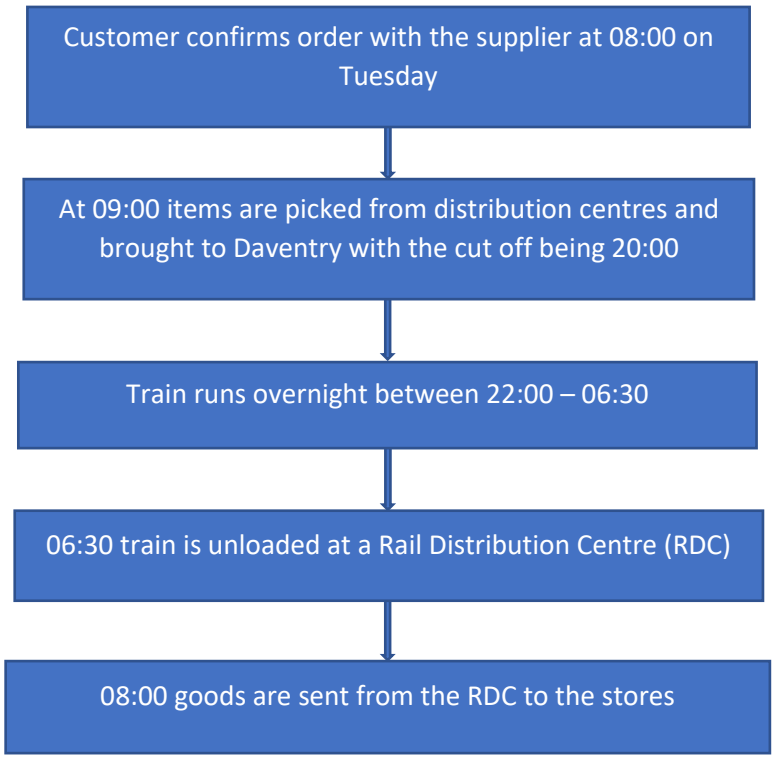
The RMX site at St Pancras, at present, takes 2,200 tonnes of sand per day for 6 days per week which is 13,200 tonnes per week. Should there be a cancelled or delayed service, then this will result in the need to scramble 73 trucks to convey the material to the site. With road costs being double that of rail, it adds significant cost to a production run.

Not only has profit been lost but also revenue. It has either led to a loss of a sale or, worse still, liquidated damages which can reach seven figures depending on the project/customer. This leaves the supplier with the predicament over who to prioritise for what has been produced.

Furthermore, their customer may have had a time sensitive delivery of a specialist mix that cannot be delivered.

3.2. Logistics – Domestic Intermodal Services (DIS)

The majority of stores in the UK, now work on a Just In Time (JIT) basis and as such rely on timely deliveries. An example flow of a typical intermodal domestic service, is demonstrated in the adjacent model.



There are many wide-reaching effects of cancelling a DIS, the bottom line being that shelves become empty, supply shortages the world over and making life challenging as it is without deliveries. There are also other considerations such as terminal workforce. This is dictated by the activities on site. So, should a train arrive late, then extra staff are required at short notice. There will also be a need to open the terminal for longer in order to offload the train, another cost that needs to be covered.

If a DIS is cancelled, it creates a back log as the next service will have to convey the consignment the cancelled service was due to convey, disrupting the JIT process. The service will only resume when the deliveries have come back in cycle.

Other factors affecting a DIS is not necessarily disruptive but a lack of understanding of their importance. These services are regularly held for empty coaching stock (ECS) moves, which although important for maintenance, do not have the time critical factor the DIS has to reach the Rail Distribution Centre. These services also lose kinetic energy by being regulated for these,

which negates some of the environmental aspect of using rail logistics, where more energy is required to recover the speed of the service.

3.3. Test and Delivery of New Trains and Removal of Older Stock

The FOCs are involved in the delivery and testing of new trains as well as hauling life expired and off lease vehicles away from the TOCs depot. A cancelled delivery results in a non-delivery to the TOCs depot, which will push back any testing, such as Platform Interface Testing (PTI) and Fault Free Running (FFR).

Delays in service introduction testing and cancelled or curtailed FFR results in extra cost to the train manufacturer as they will need to pay for extra shifts for a driver to carry out FFR, this delays the sale of the unit to the new operator and can also hold up the production line of the new vehicles. It can also delay having the old units removed from the TOCs depot as the cycle of old to new units has been disrupted leading to congestion. The delay in sale also affects the train operator's income and therefore has an impact on its workforce.

4. What Can the Industry Do To Improve?

4.1. Current Situation

In 1960, train classification (head codes) were introduced to UK rail network. This was at a time when freight trains were usually unbraked or partially braked and steam locomotives still hauled express passenger services. These head codes prioritise services by speed and therefore drive regulation policy. Over time, freight trains have become fitted with brakes throughout resulting in better stopping power. Passenger trains have become faster, be they units or loco hauled stock. So, although train technology has improved, the means of managing the traffic has not. With the emergence of high-speed logistics, more locomotives and freight vehicles coming onto the network and the need to decarbonise logistics by moving more goods by rail, there comes a need to modernise the way traffic on the network is managed.

There are two primary means of achieving this with the use of two complimentary systems, e.g., dynamic head codes in conjunction with Connected Driver Advisory System (C-DAS). This will flight trains in order of economic and or time sensitivity as opposed to whether it is a Class 1, 2 etc. and will allow a delayed freight service a better chance of arriving closer to its booked arrival time during or after a disruptive event. Below is an overview of both systems. There also needs to be a revision of current management protocols as at present they rarely benefit freight.

4.2. Dynamic headcode evaluation

In 2021 Deloitte estimated that rail freight was responsible for £800 million in social benefits each year, as well as removing 7 million lorry journeys from road networks. It outlined relief of congestions, reduced carbon, improved safety, reduced noise pollution, better air quality, decreased infrastructure wear and tear, and societal economic benefits (through agglomeration)

as the main social benefits. Much of the methodology used to calculate these social benefits are derived from the DFT's mode shift benefit report, produced in 2009. The mode shift benefit values were developed as part of the government's mode shift revenue support scheme as supportive evidence for grants, but the techniques used to estimate the social benefits within this document could be applied to headcode evaluation.

As a concept, Headcode Evaluation is the idea of re-evaluating the way we tackle freight and passenger service prioritisation. Each service travelling through the network is allocated a dynamically changing headcode that signallers will be able to use when prioritising service routing. Alongside Rail Operations Group who developed the concept, Fishbone Solutions is developing a software solution that will allow us to calculate this in real time using information on the vehicle type, planned route, and details of the loading (passenger or freight). This value is calculated using the following factors:

Environmental	Social	Economic
Carbon emission valuation	Noise	Payload Value
Well-to-tank emissions	Climate Change Impact	Derived value of passenger arriving at the destination on time
Cost to start/stop a given vehicle	Air Pollution Reduction	Derived value of payload arriving at the destination on time
Power efficiencies	Taxation	Ticket value
	Accident Cost	
	Congestion	

4.3. Connected Driver Advisory System.

This advises drivers of issues on the network ahead of them. They cannot be aware of, for example, a failed train or an infrastructure failure 20 miles away, C-DAS can then advise the driver to ease off on the power and a secondary message can then advise the driver of what the issue is. They can then be proactive and call ahead to the signaller to take a diversionary route, if necessary, keeping the network flowing and services arriving closer to their arrival time. The long-term aspiration is to develop an auto re-routing system to reduce driver workload. If there is a tracked consignment, then contact will not be lost as the route of the train will be re-forecast allowing a continuation in consignment tracking. It is a more resilient system than most as it does not rely on one data source, thereby maintaining system integrity.

There is also the opportunity to utilise apps by other developers to work in combination with C-DAS to give real time warnings of potential issues such as sagging OLE or land that is on the verge

of sliding and also feed these back to Regional Operating Centres (ROCs). This provides a proactive means of running the network and not just reactive and allow for a faster response time to rectify the issue at hand.

4.4. Other Management Protocols

While the dynamic head code system and C-DAS are being developed and utilised on the network, then current traffic management processes are in need of a review. The Management of Freight Services During Disruption (MFSDD) is an example of this procedure. There is no consistency in its current deployment and compounded with a lack of understanding of the effects of managing a disrupted freight service, it is not as effective as it should be. This is not an insurmountable issue and can be rectified with a change in strategic thinking and briefings to staff involved with network operations on how freight services behave, such as accelerating and braking and how tractive effort plays a part in these. This can also be in built into the new Great British Railways to raise awareness of how freight is managed, its importance and developments in network management to allow better regulation.

5. Summary

As demonstrated earlier in Section 1, trains run on a headcode system that is 62 years old, technology has moved on and there is now a need to manage these differently. There is the means to do so with C-DAS and Dynamic Headcodes, it just needs some courage from the industry to make the change, the first step in any challenge or change is daunting but will get easier for everyone thereafter. A longer-term remedy will be the flighting of services based on performance SRTs, as previously highlighted, the current traction based SRTs do not work and resolving this issue will release capacity as well as improving the way the network is managed. The current system is harming the growth of rail freight by just assuming it affects the end user, which it does, but we are all in effect the end user, as chances are the new sofa you ordered is on the train behind you.

6. Further Reading

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Rail Freight Growth Target – Call for Evidence

https://gbrtt.co.uk/wp-content/uploads/2022/07/rail-freight-growth-target-call-for-evidence-v6.0.pdf

Future of Freight Paper

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1085917/future-of-freight-pl

EKFB Aggregates Delivery to HS2 Railhead

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