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RAIL FREIGHT

RAIL REFORM AND WHY NOW IS THE TIME FOR A FREIGHT REVOLUTION

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Executive Summary:

In this paper we have set out our joint vision for a possible future of the UK railway. It is our strong belief that a revolution, not evolution, is required to meet the challenges set by competing transportation modes. Autonomous, multi-purpose, environmentally efficient and cost-effective transportation and logistics will replace the traditional applications.

The current pace of change within the UK rail industry is too slow and unsustainable. Much of this is driven by a misconception that change is too complex and expensive. This is simply wrong. Significant improvements to rail operations can be made now and many are inexpensive and achievable.

"Private investors, willing to support innovative businesses, can often only do so with firm commitments from public bodies to pursue change. Railway Industry Association (RIA) members, who have so many novel technologies and services that could make a real difference to everyone who uses, builds, operates, and maintains the railway, have no route to make those differences real. We need a new approach." (Page 4, A Railway Innovation Strategy 2022, Railway Innovation Association).

We have attempted to forecast the possible shape of the industry today, in 5 years and in 30 years. All of our suggestions are formed around the following principles:

1. **Sustainability for all –** Environmental, sustainable, social responsibility built into business as usual

2. **Multi-mode access –** Allow the rail infrastructure to be utilised as a dual-function dynamic system, with the ability to be used by both rail and road vehicles, to complement rather than compete

3. **Carbon Negative –** Become the only true Carbon Negative transportation mode

4. **Dimensional –** Develop the railway as part of a total transport solution where road, rail, air and maritime are seamlessly integrated for the customer

5. **Adaptive Railway –** Change the railway systems and processes to become as easy to use as road, air and maritime

6. **Collective Industry Leadership –** Plan and lead. Through the use of more collaborative industry forums to create a 30-year industry owned and led strategic plan.

The industry needs to empower itself with longer term visions, strategies, funded plans and investments to change the industry structure permanently allowing a more flexible and future proof railway to be developed that works seamlessly for our customers.

If rail is to continue to play a serious part in supporting the UK economy and drive down UK transport carbon emissions, the entire rail operating platform needs radical change.

Full collaboration is key; removal of counterproductive and expensive processes, forums and regulatory bodies is required. This change needs to happen now.

Despite the well-proven benefits of continuous improvement, a supply chain keen to build an even better railway can find itself stifled, frustrated, and often prevented from innovating. We have already started our journey and are leading on three concepts that are designed to provide benefits in all five of the industry priorities: decarbonisation, digital transformation, levelling up, cost avoidance and programme execution.

Part 1:
Rail Reform and why now is the time for a Freight Revolution

The purpose of this paper is to stimulate dynamic and creative thinking, develop a series of collaborative initiatives for innovation and investment and solve the longer-term challenges facing our rail industry customers and stakeholders.

Rail Operations UK (parent company of Orion High Speed Logistics and Rail Operations Group) and Fishbone, as industry stakeholders, have first-hand experience of these challenges and a track record in innovating to resolve them. However, we need the industry to empower itself with longer term visions, strategies, funded plans and investments to change the industry structure permanently allowing a more flexible and future proof railway to be developed.

Therefore, in this paper we have structured our thinking around these industry challenges by understanding the industry today, in 5 years and in 30 years. As independent Small and Medium Enterprises we believe in this revolution so strongly we are investing our own business capital to develop our propositions and change the nature of our service offerings to create a revolutionised rail freight sector that can deliver increased levels of economic, environmental and social benefit for our customers.

This paper focuses entirely on enabling and improving railway operations, from our perspective of enabling the provision of a high value freight and logistics service for our customers. To date we have identified over 50 industry challenges, which is certainly not an exhaustive list, out of which we have highlighted the most significant to our initiative.

Today's Freight Challenges:

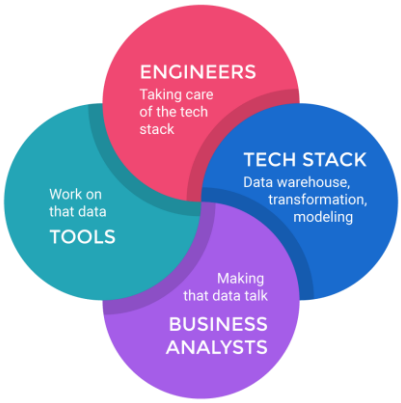
- **High cost and low value –** The railway is very expensive and offers poor value to customers, both passenger and freight. In fact, there aren't even any industry metrics for customer value. Operators are unable to influence many aspects of the cost structure in a competitive manner and therefore have limited ability to improve the value proposition to our customers.

- **Poor customer value propositions –** The customer is not at the heart of the process and cannot access the value that SMEs like Fishbone and Rail Operations UK could provide, mainly due to inflexible procurement and Tier 1 contracting policies. We transact like a 20th Century business and need to advance by developing initiatives, such as, easy and interactive customer portals. Delivery is king and should be the sole focus of the railway system.

- **Capability versus capacity –** The traditional railway methodologies for measuring capacity and performance are preventing real utilisation. The motorways are far busier because of the

capability and flexibility offered by this transport mode. A capability analysis of the railways would require the 'whole system' to be understood and thereby enable it to be optimised for the benefit of all stakeholders. We should be asking "what is the capability of our system to deliver the demand", not "what is my capacity and performance".

- **Data utilisation –** Data inherently has no value and should be freely shared. This simple approach would develop a **data-driven** industry. Data is more about process than technology and should be the backbone of the rail system. Analysis of data is where the true value lies. We need to let any organisation, regardless of background, play with data, freely and openly in order to innovate and create.



- **Conflicting incentivisations –** The industry must agree priorities for investment and incentivisation. If we are going to be the 'cleanest transportation option' incentives must be deployed to allow this transition.

- **Quality focus to reduce risks –** Quality delivers. Competing industries are governed, managed and led through quality management. It is incomprehensible that the infrastructure operator has no quality function as a common language and skill set with which to improve its service. Risks are a positive part of a well-managed system and the start of the creative cycle within a quality environment.

- **Railway processes and governance –** Regulation and governance that provides no benefit to the operation of the railway should be removed. Perceived control through regulations and governance stifles creativity and innovation.

- **Unambitious strategies –** Fear of change, lack of agreed common strategies, traditional thinking and protectionism provides an environment where good initiatives are dumbed down to the point of being meaningless or ineffective. As an industry we should be striving for Carbon Negative, the only one that can achieve this status and we should recognise that de-carbonising is a great start, but not the end goal.

"Space X did not ask permission to change the way payloads are delivered to orbit, they challenged every part of the operation, innovated and collaborated with a common purpose" - NASA

Tomorrows Challenges:

- **Sustainability –** The RSSB sustainability principles need to become the core values of the railway industry (and indeed will be when the Sustainable Rail Strategy is published this spring). Specific, meaningful and widely communicated KPI's need to be developed where all stakeholders understand the part they play. Rather than measuring traditional railway performance, we should be establishing the five capital values – Manufactured, Financial, Social, Human and Natural as a method of engaging our customers.

- **Digitised knowledge base –** Cloud based, interactive and predictive digitised products are here now and in 5 years will probably be the cornerstone of transport system design, operation and management. The lack of coordinated strategies is preventing changes needed to increase customer value in rail.

- Road logisticians have next generation information compared to rail, air traffic controllers have vast amounts of real-time and predictive information available to make critical decisions. Railway planners and signallers do not, and will not have next generation information, unless a coherent and funded plan is developed.

- **Full adoption of CSM-RA and simplification of standards –** The industry needs to change the perception that the railway industry is complex and risky with respect to new, novel or innovative changes. A quick conversation with an insurance broker is enough to understand how risky the industry is perceived. CSM-RA has a worldwide recognition and should be the foundation for a simplification and rationalisation of our railway system.

- **Autonomous transportation –** Automation of transportation systems, a reality in maritime, aerospace and automotive, but not rail, is going to continue developing and will provide higher value, more flexible and more energy efficient solution. Developing a strategy to integrate rail in autonomous transportation will be a key driver of future value and customer benefits. The railway should pioneer the use of automation and robotics to optimise logistics and increase value and vastly improve safety.

"My definition of innovation is providing value for my customers"
Mary Barra – CEO General Motors

The benefits for all industry stakeholders by collaboratively addressing these challenges and others not listed, are vast but also essential. We believe that without change the threat from other transportation modes will supersede any railway initiatives due to the pace of this change.

Customers are very demanding, they require flexibility, reliability, value and prioritisation as a minimum but are increasingly looking for partners to deliver their individual visions, our feeling is the industry is not matching the pace of customer change.

That being said, the industry is working very hard to change. Many current initiatives are exciting and will provide industry and customer benefits, these must be encouraged, supported and most importantly delivered. However, if they are not part of a wider strategy and vision they will not benefit stakeholders and customers and will not change the industry future.

Some of these initiatives can and should be delivered today:

1. Incentivisation to improve the operational performance of freight services
2. Improving utilisation of our rail network
3. Driving traction decarbonisation
4. Supporting modal shift and the growth of UK rail freight.

This paper contains a suite of opportunities by which the above can be achieved and how a revolution could be developed, agreed and delivered. The list represents initial thinking from both companies. They are not developed to completion. Indeed, as stated above, they represent an opportunity for further dynamic and creative thinking which will, in turn, drive further research, modelling and development of the ideas. Where we have included immediate actions and next steps, they represent the collective actions under development by Rail Operations UK and Fishbone collaboratively.

Our Freight Revolution:

We believe a rolling 30-year plan for the industry should be agreed with all stakeholders on an annual basis, that is structured to provide direction and enable entrepreneurial innovation, not regulate and control.

We have developed a vision and, after considering all of the publicised information and providing expert evidence, are aligned to improving value for our customers. However, many actions are needed **now**, to stop the gap between rail and other transport systems widening and to remove costs from the industry. Our plan below therefore details actions we believe are needed now, in the next 24 months and 5 years.

Freight Revolution Visions:

1. **Sustainability for all –** Building on the RSSB sustainable development principles, a vision where all stakeholders work against a common plan to provide the most comprehensive and effective sustainable system. Initiatives in this area are not only centred around environmental sustainability but also in driving value improvements in line with passenger network demands

Rail is among the most energy efficient modes of transport for freight and passengers - while the rail sector carries 8% of the world's passengers and 7% of global freight transport, it represents only 2% of total transport energy demand.

2. **Multi-Mode Access –** Initiatives in this area are focussed upon having a railway that is capable of operating as a dual-function dynamic system, with the ability to be used by both rail and road vehicles. Ultimately, we are trying to achieve a seamless transition between rail and road for freight logistics companies, using autonomous vehicles

3. **Carbon Negative –** Setting up the rail industry to be carbon negative, as a staged plan to be delivered within 30 years. The reason for this is to meet and eventually exceed the requirements of the Paris Climate Agreement and COP 26. Examples of initiatives include the creation of a renewable co-operative energy grid and the promotion of shifting to electric rail vehicles

4. **Dimensional –** Having a railway that is able to use 3 core modes of transportation to move goods around the country. These are surface travel, using the current overground rail network, underground travel and air travel. The objective here is to think creatively on how best to use UK infrastructure and the latest innovations in travel and construction to offer a quick, efficient and safe service to all rail users

5. **Adaptive Railway –** Aiming to cultivate a rail industry that is capable of reacting quickly to customer needs and requirements. Overall goals in this area include achieving same-day

response times for Rail Logistics requests, automated network prioritisation, setting route growth targets by the route's capacity and allowing new train design to lead to more flexible usage of the existing UK rail network infrastructure

6. **Collective Industry Leadership –** Through the usage of more collaborative industry forums, we are aiming to create a 30-year industry owned and led strategic plan, which will utilise some of the above vision statements and roadmaps to achieve these. The aim is to promote wider collective thinking to tackle the industry's most prevalent issues through SME engagement, innovation sharing and data accessibility.

Part 2:
Immediate Reform and Innovation Opportunities:

1. **Train Planning (Adaptive Railway)**

The whole timetable planning process needs to be simplified. It also needs to be more dynamic and responsive to the needs of operators, especially those who have short notice or very short-term needs, e.g. freight and logistics.

Road transport logistics companies are able to respond to customers' needs within 24 hours. If rail is to compete with road and fulfil the Governments' desire to drive large scale modal shift, then rail must be able to respond within the same timeframes.

There should be a complete re-cast of the national timetable. Elimination of clockface departures will increase timetable flexibility and improve network capacity. Given that the railway is fundamental in the growth of the UK economy, priority should now be given to maximising infrastructure utilisation (similar to the aviation industry), not necessarily being constrained to ensuring that all passenger trains work to a uniformed timetable.

Research should be undertaken to examine the potential for 'flighting' of trains, as per the Channel Tunnel, to maximise utilisation by taking advantage of the differing levels of train/traction unit performance. This uses a principle based on consecutive hourly 'windows' within which, at the start of the hour, the fastest trains are pathed first followed by the second fastest trains and so on. This principle repeats every hour. On some routes, consideration must be given as to whether freight paths are placed in the WTT before all other services.

A key part of challenging the existing processes is understanding the capability of the system. Capability assessment is the backbone of any assurance process, benchmarking, analysis and measurements of the system to define whether a change will work and what needs to be true to make the change.

Our capability model was developed through collaboration with the Network Rail West Coast South Route and identified the following benefits:

- The system, in this case the WCS route, can be defined, the inputs and outputs measured and control strategies developed
- Relationships and logic linking (how the different elements interact and affect each other) can be understood
- The individual elements of the system can be measured and hotspots identified on other areas within the system (e.g. what is the impact on maintenance if I change the demand?)
- The capability can be designed around the desired outcomes (e.g. what is my capability of developing higher performance, improving safety, improving response times, etc.?)

- Opportunities for collaboration are identified through understanding the interactions and relationships within the system
- Develops a common understanding for every person within the system and the part they play in delivering the desired outcomes
- Variables within the system can be understood and measured
- Constraints within the system can be understood and challenged
- The system can be simulated mathematically and represented visually.

Immediate Actions:

- Develop baseline capability model for Rail Operations UK customer flow
- A simplified more responsive timetable planning process
- Re-cast of the national timetable including elimination of clock face departures
- A system of train 'flighting' to be adopted on major arterial routes
- Industry Response Time Equivalence Metrics (Air, Road, Rail and Maritime) to understand performance and constraints
- Modal shift incentivisation to increase rate of transfer to rail
- Infrastructure utilisation metric for every km of rail to understand capability
- Develop rail path utilisation metric
- Develop new dynamic freight management system.

Next Steps:

- Complete dynamic headcode transponder system
- Implement 7-day timetable
- Build a layered capability model to include:
    - Theoretical maximum capacity model
    - Baseline and predictive demand forecasting
    - Baseline performance model
    - Baseline maintenance forecasting
    - Baseline operational forecasting
    - Baseline major works impact
    - Baseline service level agreement contracting.

2. Sectional Running Times (Adaptive Railway)

The industry has far too many Sectional Running Times (SRTs). Historically, specific SRTs were created for each traction type … of which there are many. Furthermore, for locomotives, multiple SRTs are created for the same traction type to reflect the vast range of trailing weights. The result is hundreds of specific SRTs, many of which are in urgent need of review.

The hundreds of traction specific SRTs could be replaced with a much simpler suite of generic 'performance' based SRTs. These would be SRTs created around a specific level of performance any train would have to deliver in order to meet the demands of that particular SRT.

Performance based SRTs would be built around the requirement for any train to accelerate from a start at one location to passing the next location in a given time period, passing one location to reaching the next in a given time period, etc. exactly the same as it is now. The difference being that new SRTs would not be traction specific, they would be based on the necessity of which train was to run in that path, to be able to fulfil those specific SRTs.

A part of the planning process, specifically in terms of maximising asset utilisation, would be to embed the WTT with performance based SRTs. Over a particular portion of railway, within a given time 'window', as many performance-based paths would be embedded in the timetable, with the highest performing paths going in first followed by the next highest performing and so on … **'flighting'**.

Immediate Actions:

- Elimination of traction specific SRTs, replaced by performance based SRTs
- Embedding the WTT with paths derived from performance based SRTs
- Develop data strategy to derive live SRT performance from rolling stock
- Develop capability simulations based on real performance SRT's to understand constraints and model changes
- Automate the real performance SRTs within the Infrastructure utilisation metric for every km of rail to understand capability and opportunity to increase utilisation
- Junction margins and traversal times need a complete review.

Next Steps:

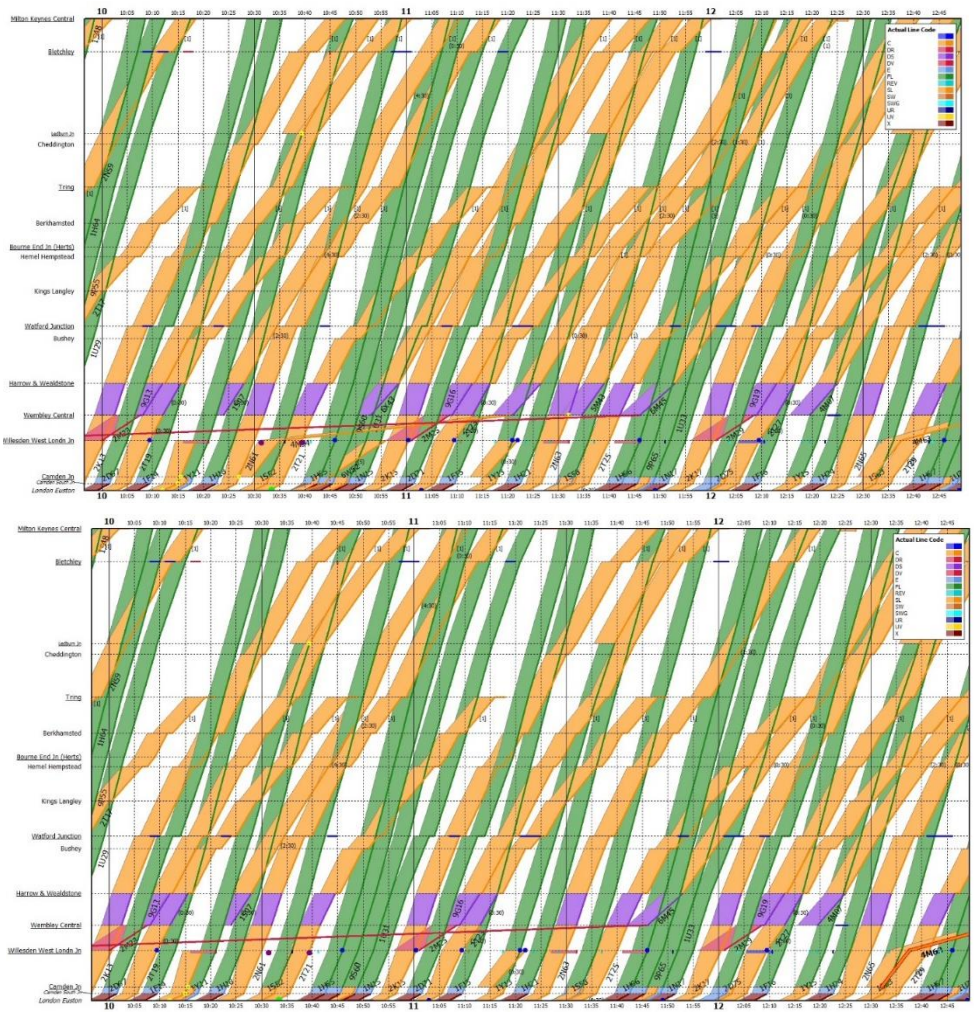
- Industry wide Assurance and Readiness Governance
- GBR Modal Shift Delivery Group
- Collaborative Industry Shaping Sessions.

3. Timetable and Train Path 'Ownership' (Adaptive Railway)

It is widely recognised that certain parts of the UK rail network have reached capacity, meaning there are no more paths available for any more trains. Two examples of this are the Castlefield Corridor, between Manchester Piccadilly and Deansgate, and the West Coast Main Line (WCML), between Euston and Milton Keynes.

Standing on Manchester Oxford Road station, it's very clear that it's an extremely busy stretch of line with passenger services, along with the occasional freight service, 'nose to tail' in both directions. However, standing on Milton Keynes station, one does not get the same feeling of absolute congestion. There are often considerable gaps between trains, gaps which suggest that there is capacity for additional trains. And there is!

The reason for this inconsistency between the two locations is that there is a difference between 'planned' services and 'actual' services. Planned services are services which are embedded in the national timetable. A graphical representation of this is seen on what's called train planning 'grids' … see graphic below. The upper graph represents the planned services whilst the lower graph represents the actual. There is more 'white space' on the actual graph.



Actual services are those trains which actually operate on the day.

With the Castlefield Corridor, nearly all trains embedded in the timetable are passenger services. Passenger services always run, with occasional exception.

However, with the WCML, many of the services embedded in the timetable are freight services and a significant amount of these do not run. This is because they are 'Y', strategic or contingency paths. In other words, they are there 'just in case'. But whilst it benefits the freight operators to have 'just in case' paths embedded in the timetable, 'just in case' they need to run a freight service at short notice, it prevents others who have a desire to operate a more permanent service, from doing so. This is a key inhibitor to modal shift and often prevents the opportunity to run additional freight services.

Currently, each TOC / FOC have 'ownership' of their own train service paths. Given the limited capacity on some parts of the network, there is an ever-increasing desire for operators, especially freight operators, to acquire as many paths as possible. Many of these paths are speculative, e.g. the operator doesn't always have a train to run in the path but the paths are still embedded in the timetable.

With each freight operator, of which there are currently seven, all having their own freight paths embedded in the national timetable, many of which are not used, this falsely utilises all network capacity along particular sections of a route. Whilst a mechanism exists within the Network Code (part J) for non-utilised paths to be surrendered, the process is cumbersome, complicated and seen by some as high risk in that the path may be lost altogether, e.g. for new passenger operations.

To ensure long-distance, end-to-end paths are embedded in the WTT, a new, collaborative national train planning unit would be formed, with one key output being the identification of as many long distance, performance-based paths as possible between major freight terminals and logistics hubs.

Immediate Actions:

- GBR must assume control of the national timetable (NTT), including WCML. GBR will ensure that, apart from WTT paths being embedded in the NTT, national/common user strategic paths are also embedded in the WTT.
- All non-utilised 'Y', strategic or contingency paths should be 'handed back' to the GBR NTT. These are then added to the national strategic path pool. However, these must be protected as freight only paths. These can be utilised by whichever freight operator requires them … to run a 'real' service … and, where necessary, modified accordingly. Mechanisms must be created to ensure such paths are protected for freight.

There will be four types of train paths in the GBR NTT:

1. TOC owned … for programmed daily services
2. FOC owned … for programmed daily services
3. Strategic (GBR owned) … common user paths for those who require to operate a new service
4. Specialist (GBR owned) … for operations such as infrastructure testing, monitoring and maintenance.

Strategic paths should be performance based and should be split into, say, 6 or 7 categories. Each of these categories will have defined, performance based SRTs based on maximum speed, rate of acceleration, capability to achieve and maintain maximum line/train speed, braking capability and train length (to determine junction traversal times). A particular level of traction performance must be defined to fulfil the SRT requirements of that particular path.

Performance based SRTs will have numerous advantages including:

- the elimination of the comprehensive and outdated suite of traction based SRTs
- the ability to use train 'flighting' as a part of maximising network utilisation (as per the Chanel Tunnel)
- it will incentivise operators to improve the performance of their services, e.g. the better performing train they operate, the better the path.

Under these arrangements, operators can bid for a strategic path, but they must be able to fulfil the performance criteria with the train they are bidding. The better a trains' performance, the better the path the operator is able to fulfil and therefore acquire. Where more than one bidder is able to demonstrate the required level of train performance, paths will be awarded to the highest bidder.

Freight paths could be identified to reflect significant performance differential between electrically hauled and diesel hauled freight services.

Next Steps:

- Predictive Timetable Planning
- System Capability Analysis
- National Sustainability Targets
- New Freight Management System.

4. Train Classification (Adaptive Railway)

The current 4-digit train classification coding arrangements (also known as 'the headcode' or 'train reporting number') was introduced in 1960. This was a time when many trains were still steam hauled and many freight trains still operated without the continuous automatic brake system. Main line trains operated at various speeds between 25 and 90mph. The 4-digit headcode is made up of:

- Digit 1 … numeric (0-9) denoting the 'class' or classification of the train
- Digit 2 … alpha (A-Z) denoting destination or other significant characteristic
- Digit 3-4 … numeric (0-99) denoting a unique 'reference' number.

Whilst there have been minor adjustments to the classification of certain trains over the years, the principle 0-9 classification has remained largely unchanged in over 60 years. In principle, class 1 (express passenger train) has the highest priority, class 2 (ordinary passenger train) has the next level of priority. This priority 'ranking' continues through to class 9 and, the lowest ranking, class 0 (light locomotive).

The problem with the existing arrangements is that classes 1 and 2 are higher priority than classes 3 to 0. In other words, all passenger trains have a higher priority than all other trains. Unfortunately, this does not take account of the trains' average speed, neither does it take account of the economic, environmental or social value of the train. In many cases, the average speed of an express freight train, especially 75mph intermodal services, are higher than that of passenger trains, in particular, stopping passenger services.

The table below highlights an example of this. This gives an example of three trains operating over the 'UP Slow' line between Tring and Harrow & Wealdstone on the West Coast Main Line. The 12.27 service from Tring to Euston stops at all stations. Although the train has a potential operating speed of 110mph, the stopping nature of the schedule reduces the average speed of the service to just 42mph. In contrast, the two intermodal services highlighted have an average speed of 55 and 66mph respectively.

	2T26 1227 Tring - London Euston	**4L99 0952 Lawley Street - Felixstowe North F.L.T.**	**4O49 0931 Basford Hall - Southampton M.C.T.**
Tring	0 m	0 m	0 m
Harrow	20.25 m	20.25 m	20.25 m
Mins	29	22	18.5
Avg speed	**42 mph**	**55 mph**	**66 mph**

Over this portion of the route, the freight trains are faster. In this context, they should be a higher priority. But they're not. They run as a class 4 service in contrast to the higher priority, albeit slower, class 2 passenger service.

In order to reflect average operating speed, the first digit of the 4-digit train classification code should be completely restructured to reflect potential average speeds. The current average speed of a freight train is extremely low but this reflects the often poor paths they have to operate in, e.g. significant time spent in goods loops. Potential average speed would therefore need to be determined taking into consideration running time only. An example of a revised train classification code could be as follows:

Class	Description (example)
1	Passenger, parcels or ECS train with an average speed in excess of 100mph
2	Passenger, parcels or ECS train with an average speed in excess of 75mph
3	Freight train with an average speed in excess of 65mph
4	Passenger, parcels or ECS train with an average speed in excess of 60 mph
5	Freight train with an average speed in excess of 50mph
6	Passenger, parcels or ECS train with an average speed in excess of 40 mph
7	Freight train with an average speed in excess of 40mph
8	Slow freight or engineering train
9	Exceptional service, e.g. test train
0	Light locomotive

Furthermore, train priority should not be determined by average speed alone. Trains vary in terms of their value to the economy, the environment and also their social value. As an example of this:

- a slow, all-stops passenger train loaded with commuters heading to work in the morning could be thought of as having more economic value than a 75mph freight train returning empty to the loading terminal. Consideration would also need to be given to the trains' next service which could be of lessor or greater value
- an intermodal freight train conveying £20m of newly imported, time-sensitive goods, could be thought of as having more economic value than a lightly loaded rural passenger service conveying a handful of low-revenue generating passengers

- a freight train conveying the equivalent load as a large number of lorries, could be thought of as having a higher environmental value than a multi-engine, high carbon emitting, diesel passenger train conveying a low number of passengers.

Along with the trains' average speed, this 'value-based' approach should also be considered in determining a trains' priority, both for train planning purposes and real-time regulation. The second digit in the trains' 4-digit train classification code could be used for this purpose.

Currently, this digit (an alpha character) typically represents the trains' destination or, in some cases, other significant information about the train. But this is historic, derived from the times when all trains used to display the 4-digit train classification code on the front of the train as an indication to signallers as to what the train was and where it was going.

Modern train description signalling technology has essentially made this obsolete now. The A-Z character could therefore be used to indicate the economic, environmental and social value of the train. In this case, the character could represent the following:

Alpha	Description (example)	Example
A	of significant economic, environmental and social value	12-car, electric passenger service conveying large volumes of business and leisure travellers
B	of significant economic and environmental value	12-car, electric passenger service conveying large volumes of business travellers, and electric hauled, high value freight service
C	of significant economic and social value	12-car, diesel passenger service conveying large volumes of business and leisure travellers
D	of significant environmental and social value	12-car, electric passenger service conveying large volumes of leisure travellers
E	of reasonable economic, environmental and social value	8-car, electric passenger service conveying medium volumes of business and leisure travellers
G	of reasonable economic and environmental value	8-car, electric passenger service conveying medium volumes of business travellers, and electric hauled, medium value freight service
H	of reasonable economic and social value	8-car, diesel passenger service conveying medium volumes of business and leisure travellers
I	of reasonable environmental and social value	8-car, electric passenger service conveying medium volumes of leisure travellers
J	of low economic, environmental and social value	2-4-car, electric passenger service conveying low volumes of business and leisure travellers
K	of low economic and environmental value	2-4-car, electric passenger service conveying low volumes of business travellers, and

Alpha	Description (example)	Example
		diesel hauled, low value freight service, e.g. empty
L	of low economic and social value	2-4-car, diesel passenger service conveying low volumes of business and leisure travellers
M	of low environmental and social value	2-4-car, electric passenger service conveying low volumes of leisure travellers
N-Z	Other trains with little or no economic, environmental and social value	Engineering services, works trains, light locomotives, etc.

Note: there could be numerous permutations of the above. Factoring in both a revised train classification number and a second digit, value based alpha character, a 4-digit train classification code could look something like this:

Train classification code	Meaning
1A26	1 = average speed above 90mph A = of significant economic, environmental and social value 26 = unique reference number
1D38	1 = average speed above 90mph D = of significant environmental and social value 38 = unique reference number
2A02	2 = average speed above 75mph A = of significant economic, environmental and social value 02 = unique reference number
2G60	2 = average speed above 75mph G = of reasonable economic and environmental value 60 = unique reference number
3B12	3 = average speed above 75mph B = of significant economic and environmental value 12 = unique reference number
4E76	3 = average speed above 60mph E = of reasonable economic, environmental and social value 76 = unique reference number
4A51	4 = average speed above 45mph A = of significant economic, environmental and social value 51 = unique reference number
4B27	4 = average speed above 45mph B = of significant economic and environmental value 27 = unique reference number
5L27	5 = average speed above 30mph L = of low economic and social value 27 = unique reference number
5S08	5 = average speed above 30mph S = of no economic, environmental and social value 08 = unique reference number
6N11	6 = average speed above 40mph N = of little or no economic, environmental and social value 08 = unique reference number

The principle of this revised train classification is that the first two digits determine train prioritisation as opposed to the current principle of just the first digit.

Again, mechanisms need to be introduced which afford levels of protection, both in terms of protecting freight paths and also protecting services in which any associated investment was made to raise the trains' priority, e.g. new traction.

Deloitte undertook an analysis on behalf of RDG to understand the value of rail freight. Their findings were documented in the following report:

https://www.raildeliverygroup.com/media-centre-docman/12807-2021-04-role-and-value-of-rail-freight/file.html

Train classification … so what needs to change?

- The existing arrangements which determine a train's priority during the train planning process and real-time train regulation process needs to change. This is because the existing arrangements do not take into consideration:
    - the train's average speed over a particular section of route
    - the value that the train delivers to the economy
    - the environmental impact through carbon and particulate emissions
    - the social value of the train
- It is suggested that the existing 4-digit train reporting number is kept but that the first two digits are aligned a different function to what they have currently. The first digit (1-9) should be realigned to reflect the train's average speed. The second digit (A-Z) should be realigned to reflect the train's economic, environmental and social value.

Immediate Actions:

- Dynamic Headcode where the classification changes with priority of train and the relative location
- HQMI to signaller and control
- Intelligent transponder strategy
- Headcode Evaluation System.

Next Steps:

- Dynamic Headcode Evaluation System
- Dynamic Railway Transponders.

5. Supporting Freight Growth (Sustainability for All)

The formation of a GBR 'modal shift delivery group' needs to be considered. To incentivise the use of electric traction, the 40% renewable energy tax as part of the EC4T tariff, needs to be either abolished or some form of rebate mechanism established. Furthermore, consideration needs to be given to a potential reduction in track access charges for electric traction, e.g. the locomotive only.

As well as national targets for rail freight growth, there needs to be Regional/Route growth targets which would be determined by route capacity availability (freight corridors).

Immediate Actions:

- Review incentivisation mechanisms and implement positive and simplified system.

Next Steps:

- Freight Facilities Grant system
- EC4T and E-Fuels subsidy development.

6. Seven-Day a Week Timetable (Adaptive Railway)

An increasing demand from transport logistics is driving the need for a seven-day-week railway. This requires infrastructure engineering to be applied across the week, as per the Continent, and Engineering planning to be nationally focussed to ensure continuity of long-distance services.

Immediate Actions:

- Develop Concept
- Consult.

7. Modal Shift Revenue Support (Sustainability for All)

MSRS needs to be expanded to include all types of freight operations and all types of freight commodities. MSRS in its current form is also over complicated and based on road benefit cost ratios which could be simplified. MSRS should also include all forms of transport modes that switch to rail, including air. Maybe also expand the heading title to 'Modal Shift Revenue Support'.

The current formula the DfT uses to assess the environmental value of modal shift via its assumptions on road congestion need to be realistic or geared in such a way that they promote modal shift to rail. The fact that on a 600-mile round trip from the West Midlands to Mossend, almost 500 miles of the journey was considered to have no environmental value attached! This is beyond belief despite using the M42, M6, M8 and M74. Finally, the scheme needs to be proactive as opposed to reactive to allow rail operators the opportunity to include MSRS in their cost modelling.

Immediate Actions:

- Review scheme with stakeholders.

8. Freight Facilities Grant (Sustainability for All)

The re-introduction of the freight facilities grant in England/Wales (still exists in Scotland) would be welcome and would help with the capital costs of terminal developments. Likewise, funding rounds to support innovative investment in green and progressive ideas and tech to support the future of freight, is a must, especially if we're going to steer the industry into the future.

Immediate Actions:

- Review scheme with stakeholders.

9. Capital Support Scheme (Sustainability for All)

In addition to the revenue support scheme, MSRS, consideration should be given to a capital support scheme to help initiate new rail freight traffics. The principle should be that the support is a one-off boost that will help the contracting parties overcome the initial plug-in costs of new road to rail traffics.

It should only be awarded to genuine 'new to rail' traffics – not more of the same utilising

existing terminals. It should reward brand new developments where there are significant carbon savings and where the investment results in a long term (min 3-5 years) rail traffic commitment.

The capital support could match fund the combined investment made by the contracting parties. Examples could include – installation of new rail sidings, new loading ramps, roll cages, platforms etc. The capital support should be repayable if the parties don't deliver the carbon saving volumes anticipated in the contract.

Immediate Actions:

- Review scheme with stakeholders.

10. Rail Connected Developments (Multi-Mode Access)

Whilst there is significant focus on the provision of additional freight capacity on the main line infrastructure, freight growth also requires increased terminal capacity. This includes the enhancement of existing facilities as well as the development of new facilities.

The existing Freight Facilities Grant (FFG) scheme supports this by offsetting the capital costs of providing rail freight handling facilities. It can also be used to help companies reinvest in existing rail freight facilities.

However, the calculation formulas and values must be reviewed in order to take into consideration the changing economic and environmental landscapes. Furthermore, the existing arrangements are retrospective and provide little opportunity to include financial support in the modal shift business planning process. Being able to include FFG in modal shift business planning would significantly improve freight growth.

The circa £20m price tag per new rail connection is growth inhibiting. Given the installation of new point work and fairly insignificant changes to the signalling system, this price tag is ludicrously high and unjustified.

Immediate Actions:

- Develop Concept
- Consult for 3rd party investments.

11. Asset Data Baseline and 3D Modelling (Three-Dimensional Interconnectivity)

Having been involved in many Network Rail and High Speed 2 programmes it is incomprehensible that with modern technology a complete and interactive 3D model of the UK infrastructure is not available and indeed updated every time a train operates. Many safety related incidents are caused through manual planning processes reliant on old and out of date information.

The UK road network has such a system. Google map the UK system regularly as a private business and allow free access to the analysis. The simple addition to each train of a high-definition CCTV recording device, in turn connected to a central data and analysis system could map every part of the UK system weeks.

The financial benefit to the industry would be immediate, reduction in quality and safety issues, improvement in planning processes and outcomes, involvement of 3rd party analytics to improve performance and identify critical issues and finally allowing the understanding of the 'system' to release additional capability.

Immediate Actions:

- Develop Concept
- Consult for 3rd party investments.

Next Steps:

- Identify private funding options
- Develop business case for Road / Rail logistics at Network Rail stations
- Complete predictive demand forecasting
- EV Superhighway technologies.

12. Quality Focus, Automation and Process Simplification (Adaptive Railway)

The railway is generally managed through manual processes and regulations develop either for privatisation or as a reaction to incident. These processes give the appearance of control to the regulators, infrastructure owners and funders but, in reality, make every step in the journey onerous, expensive and inefficient.

Private business is built on quality, quality management and quality processes and yet quality is absent in the regulatory processes of the railway industry and within the structure of the infrastructure operator.

We can learn a lot from looking at other industries quality successes, for example, automotive manufacturing consistency, aerospace repeatability, astronautics value improvement and marine efficiency of operations all achieved through consistent application of quality management.

Immediate Actions:

- Quality review of Safe Track Worker Programme for freight operations
- Quality review of Network Rail governance and processes for freight operations
- Automation, analytics and application development for quality improvements.

13. Response Time Equivalence for Transport Models (24-Hour Target) (Adaptive Railway)

As part of our need to focus on customer demands it would make sense as an industry to measure the important aspects of the railway performance as a comparator to other transportation modes. This should be industry metric, recognised by our customers and fully auditable.

The metric would demonstrate to customers the railways' ability to react to their demands as we move towards a 7-day, 24/7 railway operation of the future.

Immediate Actions:

- Baseline Rail Operations Group response performance
- Develop response time metric
- Hot spot analysis
- Challenge findings with stakeholders.

14. Infrastructure Utilisation Metric for the Whole Network (Adaptive Railway)

Infrastructure utilisation remains a dark art with differing bodies claiming, usually to protect a commercial position, utilisation of the network is poor. A simple measure shared across all stakeholders would identify the true utilisation of infrastructure. This measure could form the baseline for improvements, investments and to improve performance and utilisation across under used parts of the network.

Immediate Actions:

- Baseline Rail Operations Group response performance
- Develop infrastructure utilisation metric
- Hot spot analysis
- Challenge findings with stakeholders.

15. Risk Based Asset Management (Adaptive Railway)

In the 21st century we must move away from prescriptive and manual based repeatable maintenance and release the potential of the vast data systems embedded into modern fixed and mobile assets. A risk-based maintenance system should include train and track information and analysis working together to provide a system with the highest possible capability.

An effective risk-based management system includes a common industry wide enterprise asset management and resource system that properly catalogues asset attribute data, a functional hierarchy, criticality analysis, risk and failure analysis, control plans, reliability analysis and continuous improvement. People would not fly if aircraft were maintained like trains.

Immediate Actions:

- Implement Fishbone OTMR data analytics on Rail Operations Group fleets
- Implement Fishbone Operations Led Engineering on Rail Operations Group fleets
- Implement Risk based maintenance improvements
- Complete Euston Exemplar programme.

Next Steps:

- Develop intelligent freight fleet.

16. Modal Shift Delivery Group (Collective Industry Leadership)

If GBR is serious about item 7 above (Modal Shift Revenue Support (Sustainability for All) then the leadership should form a review group to drive home initiatives.

Immediate Actions:

- Implement Modal Shift Delivery Group.

17. Small and Medium Enterprise Forum (Collective Industry Leadership)

The relative importance of small businesses is increasing with these businesses making up 16.3million; 60% of total private sector jobs, compared to large organisations, which identify as having over 250 employees. SME's make up 99.9% of all businesses in the UK, 96% of which are micro-businesses, employing no more than 10 people, leaving just 0.1% for large organisations. From this, it is clear to see that small businesses are of significant importance for the future of the UK and its economy.

SMEs are critical to the transformation of the railway for at least three reasons:

- Being innovative. SMEs bring innovation into the economy. Innovation sits at the heart of an SME and is often the only product
- Adapting to change. SMEs can be much more adaptable and responsive to change than larger and more complex Tier One companies. SMEs should lead change programmes
- SMEs are excellent at partnering with any customer, supplier or co collaborator, it is in their best interest. SMEs should not be an afterthought that is difficult to contract with and which relies on pass downs from larger companies.

Immediate Actions:

- Implement Derby SME Innovation forum
- Challenge GBR to truly engage with SME's as equals during procurement, major programmes and development.

18. Industry Emission Metric (Collective Industry Leadership)

The global population is becoming more focussed on emissions, de-carbonisation, sustainability and the environment and yet no common measures, with understood metrics, algorithms and analytics are available. The language and visualisation of carbon must be quickly developed to enable the railway to 'talk' to customers in a meaningful way.

Immediate Actions:

- Baseline Rail Operations Group response performance
- Develop infrastructure utilisation metric
- Hot spot analysis
- Challenge findings with stakeholders.

19. Multi-Mode Stations (Adaptive Railway)

Railway stations generally have a unique position within any town or city with the central locations. This advantage should be utilised to develop a strategy where passengers, logistics and freight can be managed. The environmental benefits of rail are known, yet the ability of customer to access products and services to maximise this benefit is almost zero.

Euston Station, the West Coast South Route and Rail Operations Group have shown what is possible with high-speed logistics, the launch of the Orion fleet has been an unparalleled success and is the blueprint for multi-mode operations. With the correct business cases, operational plans and private investments the railway could stimulate an entirely new market opportunity where a viable commercial option for transportation removes vehicles from the road network because it is a better value service to the customer.

Immediate Actions:

- Develop business case for multi-mode operations
- Develop operational model with stakeholders
- Invite private investment
- Consult plans with Great British Railways.

These 20 points reflect only a small proportion of the improvements that we wish to see delivered. We openly share them and welcome discussion, sharing and engagement on any part of this paper.

We will collectively update the paper with more ideas, innovations and most importantly deliveries for our customers.

Thank you for taking the time to read our views.

Rail Operations UK

Rail Operations UK was founded in 2013 and is the parent company of Rail Operations Group, Traxion and Orion High Speed Logistics.

Rail Operations Group set the pace in providing professional rail services to the Train Operating Company and Engineering community for the rail haulage, testing, disposal and commissioning of rolling stock.

Traxion is a specialist rolling stock management company committed to delivering the best rolling stock storage, maintenance and end of life services to the UK rail industry through specifically designed and customised solutions.

Orion High Speed Logistics is a premium on-demand delivery service, set to transform UK logistics with next generation high-speed logistics trains for optimised end-to-end delivery.

Fishbone

Fishbone was founded in 2012 and is an independently owned transportation solutions provider. Led by innovation and new possibilities in data technology, Fishbone serve the wider transport sector with a suite of tailored engineering services, products and consultancy solutions. Fishbone use their experience and independent thinking to turn complex challenges into data-driven, cost-effective solutions.

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