Report
August 2023

Benchmarking Network Rail Operations & Support Costs

Office of Rail & Road
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Client Ref:ORR/CT/22-49

AMBERSIDE A Steer Company | steer | civity Management Consultants

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Executive Summary

Overview of the study

In order to inform the Office of Rail and Road (ORR) in its determination of the efficient costs of managing and operating the rail infrastructure in Great Britain, Amberside/Steer, supported by civity Management Consultants, has conducted extensive benchmarking of Network Rail's network operations and support costs against relevant Infrastructure Managers in Europe and the UK.

Together, network operations (£717m) and support functions accounted for **£1,685 million** in 2021-22, **36% of Network Rail's total operating expenditure**.

The study invested extensive effort in seeking to obtain data from European rail Infrastructure managers (IMs) and non-rail IMs in the UK. The study is based on significant engagement with peer organisations. Participants provided their cost and organisational data for review and analysis by the study team. On the basis of that data and subsequent interview with participants, this study has benchmarked Network Rail's costs for defined, comparable sets of activities with relevant targeted peer organisations.

Those comparable areas of activity in scope for this study are:

Operations	Support
• Signalling • Train Control • Electrical Control • Station Operations • Train Planning • Mobile Operations Management	• Human Resources (HR) • Information Management (IM) *known as IT or digital services in other organisations* • Finance • Procurement • Other corporate services

The participating organisations include **National Highways** and **7 European rail Infrastructure Managers**.

Those 7 are:

- **ProRail** (Netherlands)
- **BaneNor** (Norway)
- **Infrabel** (Belgium)
- **SŽCZ** (Czech Republic)
- **SNCF Réseau** (France)
- **Trafikverket** (Sweden)
- **SBB Infra** (Switzerland)

Amberside/Steer and civity Management Consultants are grateful to Network Rail and all of the participating organisations for their active engagement in this study.

The results for participating peer organisations are anonymised to preserve their commercial confidentiality. Data have been normalised and adjusted for Purchasing Power Parity.

While the availability and granularity of data understandably varies across the peer group – in particular for support costs, where for many European Infrastructure Managers cost reporting structures mean specific function-level data is not available – it has allowed for an extensive catalogue of benchmarks to be produced.

Whereas the benchmarking of operations costs includes all 7 of the above IMs, due to the lack of function-level data on support costs for other organisations, the benchmarking of support costs includes National Highways and two of the IMs.

On the basis of this benchmarking analysis, relevant efficiency gaps between Network Rail and peers have been identified, as have potential areas for action to address these inefficiencies in both Control Period 7 (CP7) and beyond.

Key efficiency opportunities

Benchmarked NR annual cost	Function and key benchmark	Gap to peer group average	Main driver of gap to peer group average
	Network operations staff costs		Reliance on overtime and high net working hours
£360 million	combined signalling, control and electrical control staff costs per FTE	20%	
	Signalling productivity		Relatively less consolidation of network operations, enabled by digitisation and integration of technology and decision support tools, when compared with peers
£292 million	million train km per FTE	9%	
	Control productivity		
£70 million	million train km per FTE	34%	
	Electrical Control productivity		
£22 million	track km electrified per FTE	55%	
	Train Planning productivity		High staff levels required to deliver resource-intensive and complex timetabling processes
£15 million	million train km per FTE	49%	
	Mobile Operations Management staff costs		Relatively high staff costs, combined with high response demands and workload
£47 million	staff costs per million train km	25%	
	HR efficiency		Significant level and complexity of HR demands and workload
£71 million	HR FTEs per thousand employees	39%	

Key findings and areas for action: Network Rail Operations costs

Overall

- Across the majority of Network Rail's operations costs, the significant reliance on overtime and high net working hours leads to higher labour costs per FTE than peers.
- Otherwise, the analysis identifies efficiency gaps and areas to target for action, but no single clear and obvious area of fundamental inefficiency to address within CP7.
- The long-term strategic opportunity is for further consolidation of network operations enabled by digital technology, with improved and accelerated integration of traffic management and decision support tools in the meantime.

Signalling and train control

- With a large and busy network, Network Rail's signalling staff costs per million train-km are **13% lower** than the average for the peer group.
- However, Network Rail's unit labour costs per FTE for signallers are **19% higher** than the peer group average, due principally to costs associated with overtime.
- The net effect of this is that Network Rail has a **9% gap to the peer group average** for signalling productivity in terms of million train-km per FTE, and a significant gap to the best in class – the peer organisation with the most efficient level of signalling cost.
- Similarly, Network Rail's unit labour costs for train control are **materially higher** than peers, and productivity is **34% lower** than the average and well behind the best in class.

- In the short term, Network Rail should continue to focus on improvements in signaller recruitment and training to reduce its reliance on overtime.
- Network Rail could improve staff productivity by accelerating the integration of traffic management solutions and decision support tools across signalling and control, leveraging advanced software and simulation, automating routine tasks and reducing manual interventions.
- Over a longer term, subject to affordability and deliverability, there are significant cost-efficiency opportunities for Network Rail from further consolidation of the operation and control of the network, enabled by digital technology.

Electrical control

- Network Rail's unit labour costs for electrical control are the **highest of the peer group**.
- Likewise, electrical control productivity (track-km electrified / FTE) is **significantly lower** than the peer group average, and particularly low compared to the best in class.
- Part of this productivity gap can be explained by the demands of managing dual electrification systems and the relative lack of economies of scale, with less than half of its network electrified.

- There appears to be an actionable opportunity, alongside the effective implementation of a Supervisory Control and Data Acquisition (SCADA) system to simplify workloads and safely reduce the intensity of staffing requirements.
- Alongside SCADA project implementation, Network Rail should establish – and give significant effort and emphasis to – benefits realisation plans to track, capture and assure efficiency improvements. This should likewise be a focus for the delivery of further network electrification in future.

Train planning

- Despite low unit labour costs per FTE that are **40% below peers**, Network Rail's train planning staff costs per million train-km are **7% higher** than the peer group average
- Productivity, in terms of numbers of train planners compared to traffic volumes, is **49% below peer organisations**, and significantly lower than the best in class
- This is explained by relatively high staff numbers required to deliver a complicated and resource-intensive timetabling process, on a complex network, with frequent, significant change to the timetable.
- Identifying and resolving timetabling conflicts also remains a relatively manual and time-consuming process – simplification through process and technology improvements can improve the efficiency and effectiveness of train planning.
- Network Rail has committed to train planning efficiencies through the course of CP7, some of which will be enabled by improved systems and technology.

- Network Rail should explore further opportunities to review processes and reduce manual interventions. This will require increased standardisation and implementation of decision support tools, improved data systems, and collaboration with train operators.
- Network Rail should also continue to invest in improved training and professional development for train planning staff.
- This should be supported by specific, focused benchmarking to assess the quality and effectiveness of train planning.

Mobile Operations Management

- Network Rail's normalised staff costs and unit labour costs per FTE for mobile operations management are each **more than 20% higher than the peer group**.
- Productivity, in terms of m train-km / FTE, is **15% below** the peer group average, and significantly behind the best in class.
- This is partly determined by response conditions: the size, spread and accessibility of the rail network, the level of incidents to respond to, weather and topography.

- Network Rail Routes should review their response arrangements to enable a high quality, 24/7 response service through flexible, well-equipped teams in line with the best in class, as well as define standards for Mobile Operations Management team outputs

Key findings and areas for action: Network Rail Support costs

Overall

- Across support functions, Network Rail benefits from the potential for significant economies of scale, in comparison to peer organisations which are much smaller in size.
- Some ad-hoc benchmarking has previously been undertaken by Network Rail for specific support functions, including Information Management (IM), Finance and Procurement studies which have usefully been provided in support of this study.
- Network Rail has also implemented significant management headcount reductions, across support functions in particular, which should increase cost-efficiency in CP7.

- The *efficiency* benefits of these changes should be assessed with further analysis and benchmarking through CP7.
- In parallel, through CP7, a systematic approach should be taken to benchmarking the *effectiveness* and quality of delivery across Network Rail's support functions.

Human Resources (HR)

- Normalised for its *organisation* size, which in terms of employee numbers is much larger than the peer group, Network Rail's HR costs are **13% lower** than the peer group average.
- Furthermore, staff costs per full-time equivalent (FTE) HR staff member are roughly **half those of peers**, reflecting a larger and more dispersed and generalist HR function.
- However, when normalised for the size of the *network*, Network Rail HR costs appear to be **less efficient** than those of peers.
- Network Rail also requires **nearly 50% more** FTEs in HR per employee in the wider organisation.
- The complexity of HR demands and workload across Network Rail, given its in-house maintenance staff, terms and conditions and legacy systems, is likely to be a significant factor in its cost levels.

- As and when terms and conditions and/or other areas of business management are simplified, Network Rail should assure the realisation of associated HR savings.
- Network Rail should review the efficiency of its human resources services, including the potential for streamlining and reducing the duplication of its systems.

Finance

- Network Rail's Finance staff costs per £ operating costs are **30% higher** than the peer group average.
- In addition, when normalised for the size of the network, Network Rail's finance costs per network km are **38% above** the peer group average.
- With dedicated finance teams within devolved regional business units as well as a strong central finance function, Network Rail's structure is different to peers who centralise all finance activities.
- The significant size of Network Rail in comparison to the peer group organisations is likely to increase its cost-efficiency, as we would expect it to exploit economies of scale.
- This suggests a potential trade-off between pure functional efficiency and having the right resources at region/route level to support effective local decision-making.
- Given Network Rail's devolved regional business units with their own finance functions, in addition to a central function, the effectiveness and quality of finance support across Network Rail should be assessed as part of a programme of benchmarking through CP7

Information Management (IM)

- Network Rail's IM costs per organisational FTE are **85% less** than the peer group average and **significantly lower** than even the next lowest other member of the peer group.
- The provision of IT services is particularly likely to benefit from economies of scale, so this will be a key contributor to Network Rail's significantly lower IM costs per FTE.
- These results align with Network Rail's own previous IM benchmarking, which found its spend was lower than that of similarly sized peers, but also concluded that this low level of expenditure had likely affected the quality of IT services and digital transformation.
- The effectiveness and quality of IM services across Network Rail should be assessed as part of a programme of benchmarking through CP7

Procurement

- Network Rail's procurement costs in the benchmark year, normalised for the value of contracts awarded are **above the peer group average**.
- Staff costs form the majority of procurement costs, and a previous, different benchmarking study on behalf of ORR, which compared Network Rail employment costs to other sectors in the UK, concluded procurement staff pay is 'within market'.
- Furthermore, review with Network Rail indicates that procurement costs per the value of contracts awarded in an *average* year would be in line with average for peers.
- This aligns with Network Rail's 2022 benchmarking study that compared the efficiency of its procurement with that of various UK public sector bodies also subject to UK public procurement and Cabinet Office rules. This study concluded that Network Rail's procurement was in the upper quartile, in terms of efficiency, and 'outperformed' the government average.
- Network Rail should continue to benchmark the efficiency and effectiveness of its procurement, against other UK public sector bodies and other relevant peers, as part of a programme of benchmarking through CP7.

1 Introduction

Background and purpose of this study

1.1 The Office of Rail & Road (ORR) is undertaking its Periodic Review of Network Rail's outputs and access charges for Control Period 7, which will run from 1 April 2024 to 31 March 2029 (CP7). To inform its determination of the efficient costs of managing and operating the rail infrastructure in Great Britain, ORR requires a benchmarking of Network Rail's operations and support costs against appropriate peers.

1.2 ORR commissioned Amberside/Steer, supported by civity Management Consultants, to carry out this benchmarking study. ORR wishes to understand how Network Rail's operations and support costs compare with those of organisations providing infrastructure management services elsewhere in Europe and, in the case of support costs, organisations operating in other sectors with similar characteristics.

1.3 The requirements of the study specified that it must provide:

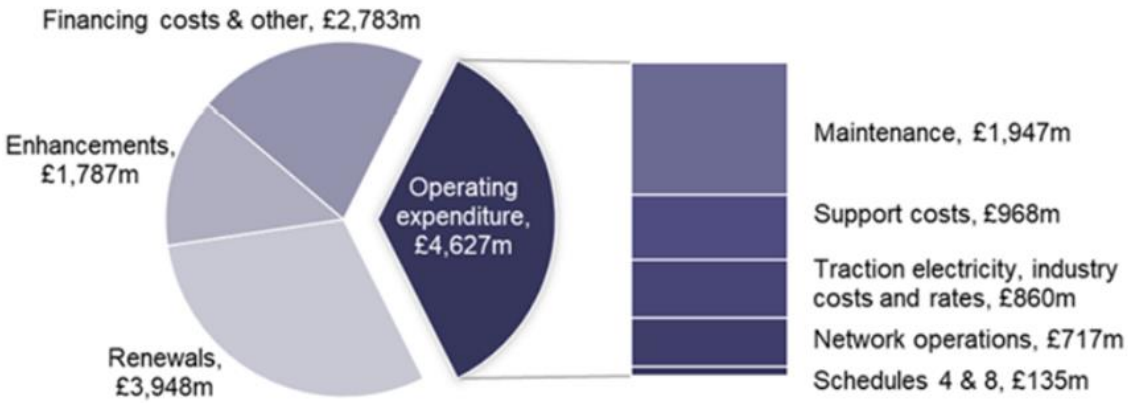
- Estimates of any efficiency gaps between Network Rail and the chosen peers, together with an explanation of the sources of those gaps
- Advice on the extent to which those gaps are actionable over different timeframes.
- Clear conclusions that can inform pragmatic decisions about the level of efficiency that Network Rail can achieve during Control Period 7 (CP7).

1.4 The results from the study will form part of the evidence base supporting ORR's determination of Network Rail's efficient costs and access charges for CP7.

Overall scope of study

1.5 This study covers two different categories of activity, namely network operations and support functions, which together account for £1,685 million in 2021-22 (36% of Network Rail's total operating expenditure (see Figure 1-1)).

Figure 1-1: Network Rail's cost structure



Source: Annual efficiency and finance assessment of Network Rail 2021-22, ORR, October 2022

1.6 Both categories encompass activities that are critical to the delivery of a safe and reliable railway. However, the scope of the benchmarking exercise for each category is different due to the nature of the activities:

- Network operations activities – those activities directly associated with the operation of trains, and stations – are largely rail-sector specific, such that the associated costs must be compared with those incurred by other rail Infrastructure Managers; while
- Support functions, predominantly associated with the running of the organisation rather than the railway, are more generic and can be compared with the costs of peers in other sectors.

1.7 Subsequent sections of this report describe the definition of the relevant cost areas for comparison, in each area, in more detail.

1.8 A similar exercise was last conducted on behalf of ORR as part of its Periodic Review 2013 process, 10 years previously. This previous exercise was conducted with different scope and functional definitions (and without differentiating/disaggregating costs by function), and as such comparisons cannot be made between studies.

Purpose and structure of this report

1.9 This report sets out in detail our methodology, analysis and findings.

- Section 2: Detailed definition of the functions and activities in scope
- Section 3: Benchmarking methodology
- Section 4: Engagement of the peer group and data collection
- Section 5: Benchmarking and analysis of Network Rail operations and support costs
- Section 6: Conclusions and recommendations

2 Detailed definition of functions and activities in scope

Overview of scope

2.1 ORR's Invitation to Tender (ITT) indicated that the scope of work should include support and operations expenditure related to specific identified functions and activities, as depicted below.

Figure 2-1: Initial scope defined in the Invitation to Tender

Network Rail's support expenditure includes:

- Human resources
- Information management
- Finance
- Procurement
- Asset management
- Other corporate services

Network Rail's operations expenditure includes:

- Train control (signallers)
- Station operations
- Electrical control (power engineers)
- Other operational staff (such as Mobile Operations Managers)
- Controllers

2.2 Amberside/Steer and civity committed to further refine and agree the relevant scope of functions and activities with ORR at project inception.

2.3 At the project inception meeting and in subsequent early engagement with ORR and Network Rail, we discussed the scope of activities to be benchmarked in detail. Following discussion, ORR agreed a number of specific changes to the scope, as described in Table 2-1.

Table 2-1: Scope considerations at project inception and agreed outcomes

Area of scope	Summary of dialogue	Agreement
Train planning	Not included in ITT, subsequently requested by ORR as it is a key function for the operation of the network	**Include in scope**
Delay attribution	Not included in ITT as it is not comparable with other Infrastructure Managers (or non-rail operations/support)	**Not in scope**
Asset management	Included in ITT, subsequently proposed for removal by ORR as it is complicated and difficult to delineate support costs from direct asset management activity and retain a useful peer	**Remove from scope**
Finance	Included in ITT, however early Network Rail engagement raised a risk of duplicating a benchmarking of Finance activities produced for Network Rail by Hackett in 2021. The report was shared with ORR by Network Rail and Amberside/Steer and civity reference the report in our analysis	**Remains in scope**
Information Management	Included in ITT, however early Network Rail engagement raised a risk of duplicating a benchmarking of IT services activities produced for Network Rail by Gartner in 2021. The report was shared with ORR by Network Rail and Amberside/Steer and civity reference the report in our analysis	**Remains in scope**

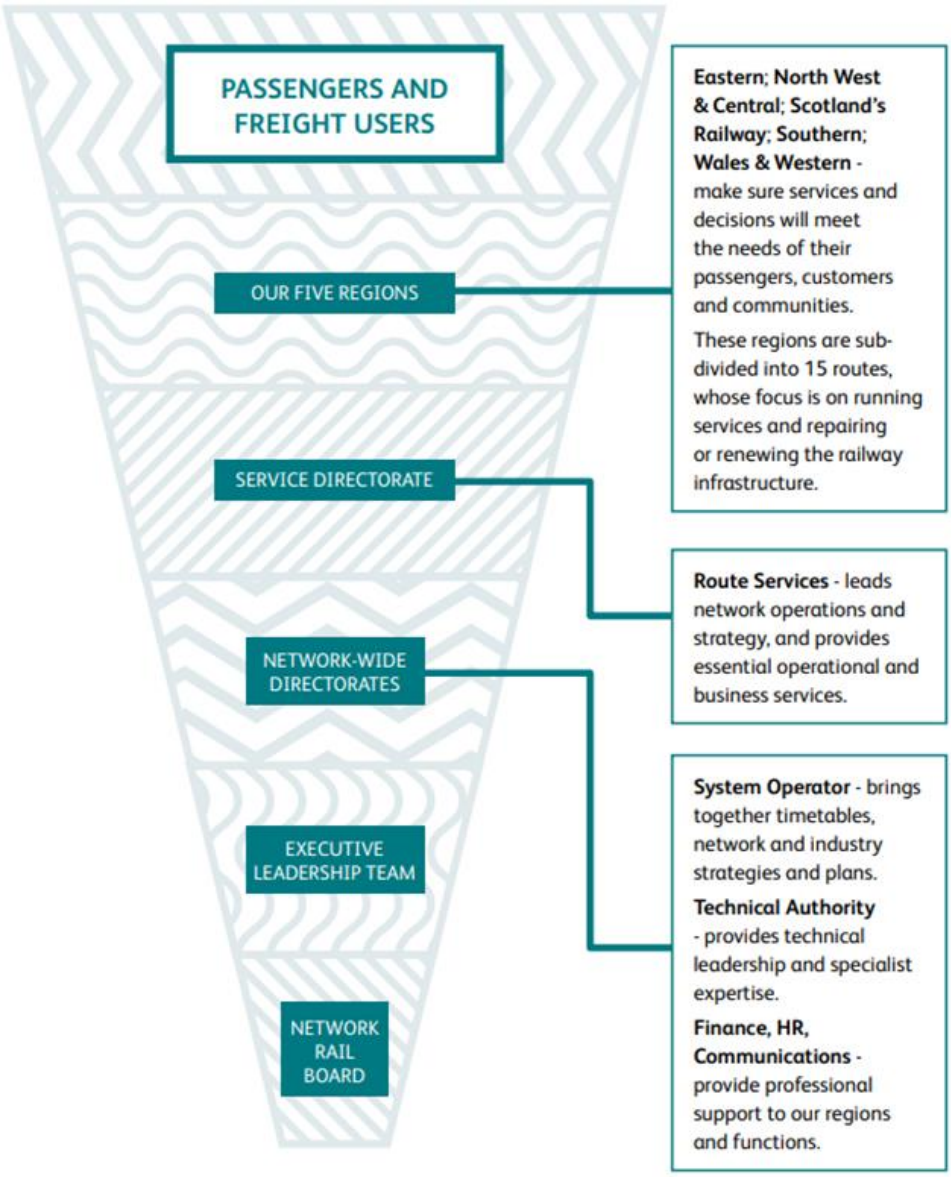
2.4 Network Rail's operations can be complex, reflecting the interaction of activities in different parts of its organisation and the impact of the relatively recent transition to a structure which devolves management functions to five regions and fifteen routes (see Figure 2-2). Hence, it was particularly important to understand the allocation of costs, frame data collection requirements and make initial comparisons in the early weeks of this study. This allowed us to define in more detail:

- The functions, activities and roles within the identified areas of scope;
- Where the functions are situated within Network Rail's organisational structure;
- The management roles and hierarchies associated with frontline operations activities; and
- The key metrics that we would expect to use to benchmark Network Rail costs in each area.

2.5 These factors are also relevant context for subsequently understanding and explaining any identified differences in costs with Network Rail's peers.

2.6 The following section describes this detailed definition of functions and activities, and benchmarking metrics, for each of Network Operations and Support.

Figure 2-2: Network Rail's devolved management structure



Source: Network Rail Limited Annual Report and Accounts, 2022

Detailed definition of Network Operations

Network operations functions and activities

2.7 Network Operations describes the set of functions directly associated with the movement of trains on the railway, and the specialist roles dedicated to delivering this activity. It is a core activity for rail Infrastructure Managers providing safe and reliable train services, and not directly comparable to other sectors. As agreed with ORR, this benchmarking study covers signalling, train control, electrical control, station operations, train planning and other operations functions including mobile operations management and incident response, operations support and rostering.

2.8 The functions and staff roles within the scope of the study, including the relevant frontline management roles defined as in scope, and their location in Network Rail's organisation, are summarised in Table 2-2 below.

Table 2-2: Network Operations functions and activities in scope

Functions	Description of staff within the function	Location of function in Network Rail's organisation
Signalling	All employees (signaller-grade staff at all levels including level crossing keepers) directly engaged in the operation of signalling equipment on the railway infrastructure. *Frontline management includes Shift Signaller managers, Local Operations Managers and Operations Managers.*	Within route operations teams (within regions), at various sizes and types of operating locations - signal boxes, Power Signal Boxes, IECCs and Control Centres across routes
Train control	Controller-grade staff directly engaged in operational route and incident control. Oversee the effective delivery and performance of the network in real-time *Frontline management includes Duty Control Managers, Route Control Managers and Current Operations Managers/Heads of Control*	Control centres and Railway Operating Centres within regions and routes; National Operating Centre based in Milton Keynes
Electrical control operations	All employees engaged in controlling electrical operations, management of power supply and isolations on the railway infrastructure *Frontline management includes duty/shift management and Electrical Control Managers*	Electrical Control Rooms, within regions and routes
Station Operation	All staff within the Infrastructure Manager's directly managed stations; includes station operations (dispatch, station control) and station management (security/facility/customer service and passenger assistance) *Frontline management includes Shift Station Managers, Station Operations Managers, Station Customer Service Managers and Station Managers*	20 stations known as 'managed stations', within regions and routes
Train Planning	All time table planners and their teams including managers directly engaged in the continuous planning of all annual timetables, conflict resolution and validation. *Frontline management includes Timetable Planning Managers*	System Operator Capacity Planning Teams, based in Milton Keynes (Regionally aligned and national/freight planning teams under operations planning managers, all in a central function)
Other operations (such as mobile operations managers)	All staff engaged in incident response, including Mobile Operations Managers. Operations support clerks carrying out dedicated administration for local operations teams, and Roster clerks carrying out rostering arrangements for signallers. *Frontline management includes Local Operations Managers and Operations Managers*	Based in route operations teams

2.9 As summarised later in this report, these definitions have been refined in the light of interviews with subject matter experts at Network Rail and project team knowledge and experience. Our interviews with Network Rail have also helped to ensure a good understanding of the staff activities, interfaces between functions and roles, delivery models and management structures across Network Rail.

Network Rail signalling staff, activities and locations

2.10 At £292 million in 2021-22, according to Network Rail's Regulatory Financial Statement, signalling grade staff, represent the single biggest area of Network Rail's operations costs. Signallers at various levels and level crossing keepers are also the biggest group of operations staff, with more than 4,800 full-time equivalent (FTE) staff in 24/7 operations. Signallers have responsibility for the movement authorisation and setting of routes within their section (as controlled by their panel or workstation).

2.11 All signalling staff work in operating locations across Network Rail's Routes (within its devolved Regional structure). There is a consistent management structure for signalling across routes, with the following hierarchy (from less to more senior): Signallers – Shift Signalling Managers – Local Operations Managers – Operations Managers – Route Operations Managers – Operations Directors.

2.12 The range of operating locations in which signallers work varies from smaller individual signal boxes, through to larger signalling centres with multiple workstations, to Network Rail's 14 largest Railway Operating Centres (ROCs). Signallers operate various technologies across these locations, ranging from token block and lever-frame signalling, through electrical control to digital signalling systems (and a corresponding range of automation in route setting).

2.13 Signalling is physically independent of the Control function in Railway Operating Centres (ROCs), which retain operational oversight and provide strategic train service management. In some cases, this is overlaid with traffic management technology that is either *connected* to the signalling system, or is not connected and is *advisory*, i.e., providing prompts and information to support the signaller in train regulation decisions.

Control staff, activities and locations

2.14 In 2021/22, Network Rail had a 475 FTE-strong control structure, with controllers in regional operations teams representing £70 million, or nearly 10% of Network Rail's operations expenditure. The control structure consists of frontline Train Running Controllers and Incident Controllers as well as, in some cases, information controllers (managing internal information and reporting but not passenger information, which is managed and provided by train operators). These staff are located in Network Rail's 14 ROCs, and one National Operating Centre (NOC). Staff in ROCs are typically co-located with train operator control staff, although the extent to which responsibilities are shared and teams combined varies by ROC.

2.15 Control staff are separate from Signalling staff, both physically and organisationally. Where they are in the same location, such as a ROC, they are typically on a different operating floor, with signallers and controllers are organised in a parallel management hierarchy that comes together at the level of Operations Director.

2.16 The Train Running Controllers, Incident Controllers and Information Controllers provide oversight and strategic train service management in communication with signalling staff, maintenance and other functions, in particular to respond to, and recover from, incidents and service delays. They are located in each of the 14 ROCs (listed in Appendix B) are supported by the following management structure (from less to more senior): Duty Control Managers – Route Control Managers – Current Operations Manager/Head of Control – Operations Director. The same structure applies across Network Rail's Regions.

2.17 The NOC provides communications, co-ordination and crisis management, including escalation of incidents requiring British Transport Police response and managing command structures put in place for significant events or incidents with implications across at least 3 routes. It is structurally and physically separate from the ROCs, located principally in Milton Keynes and

organisationally within Network Rail's System Operator function. Currently a team of 6 NOC managers oversee c.70 controllers, so it represents a relatively small part of Network Rail's controller numbers.

Electrical Control

2.18 Electrical Control Room Operators represented £22 million of Network Rail's £717 total operating expenditure in 2021/22. Almost 200 electrical controllers monitor and manage the traction power supply. Electrical Control Room Operators (ECROs) plan and carry out isolations of the power system on both a planned and emergency basis. They are managed by Electrical Control Managers (ECMs).

2.19 Network Rail has 5 electrical control rooms managing AC systems, with DC systems managed in 10 control rooms (see list in Appendix B). These are located within Routes and are managed within a separate part of the Operations Director organisation, parallel to signallers and controllers. Given the specialist nature of the role and its requirements, typically Network Rail operates on the basis of one or two ECROs on shift per electrified route section controlled – two per section for AC systems – and one ECM to around 15 ECROs.

2.20 Through CP6 and into CP7, Network Rail is transitioning to digital systems for traction power control management system, which enables real-time monitoring and control of electrical assets and the potential for more efficient operation and maintenance.

Stations

2.21 After signallers and operations management roles, managed stations were the third biggest area of Network Rail's operations expenditure in 2021/22. Network Rail directly manages only 20 of the 2,500+ stations it owns, albeit they are 20 of the biggest and most operationally significant (located in London and major towns and cities across England, Wales and Scotland - see list in Appendix B). Across these stations, nearly 1,000 FTEs carry out activities including security, passenger assistance, and customer service (which includes information provision). In one case, Birmingham New Street, Network Rail staff undertake train dispatch on platforms.

2.22 The services provided by Network Rail vary significantly across the station, depending on the size of the station and location-specific and historic factors guiding the division of responsibilities with the train operating company. Frontline station roles are supported by Shift Station Managers and Station Customer Service Managers, reporting to a Station Manager for the relevant station, within varying route and regional organisations (which can depend upon the number of managed stations per route/region).

2.23 Making comparisons even within Network Rail's managed stations portfolio, or considering this as a single group, is problematic. Network Rail itself operates a variety of delivery models and activities across stations. Managed stations can broadly be categorised in three types:

- **Type 1:** almost all functions are handled by Network Rail, namely station management, duty management, control room, security, mobility assistance, station cleaning, landlord asset management, contractor / visitor reception, lost property / left luggage and retail and commercial. The remaining tasks such as train dispatch, revenue protection, train cleaning and ticket office operation are handled by train operating companies.
  Relevant Stations:
  Euston, Glasgow Central, Liverpool Lime Street, Liverpool Street, London Bridge, Manchester Piccadilly, Paddington. Birmingham New Street fits closely but is the one station where NR manages dispatch.
- **Type 2:** almost all tasks are covered by train operating companies and only landlord asset management and retail and commercial are handled by Network Rail.

Relevant Stations:
Bristol Temple Meads, Cannon Street, Clapham Junction, Guildford, Reading

- **Type 3:** half of the functions are managed by Network Rail and half by train operating companies. Typically, Network Rail handles station management, duty management, security, station cleaning, landlord asset management, contractor / visitor reception, left luggage, and retail and commercial activity.
  Relevant Stations: *Charing Cross, Edinburgh Waverley, Kings Cross, Leeds, Victoria and Waterloo*

2.24 The overview of responsibilities for station tasks at Network Rail managed stations is below.

Figure 2-3: Overview of tasks per station at Network Rail

	Birmingham New Street	Bristol Temple Meads	Cannon Street	Charing Cross	Clapham Junction	Edinburgh Waverley	Euston	Glasgow Central	Guildford	Kings Cross	Leeds
Station management	NR only	NR only	Joint NR & TOC	NR only	Joint NR & TOC	NR only	NR only	NR only	Joint NR & TOC	NR only	NR only
Duty management	NR only	TOC only	TOC only	NR only	TOC only	NR only	NR only	NR only	TOC only	NR only	NR only
Control room (provision of train/platform info)	NR only	TOC only	TOC only	TOC only	TOC only	NR only	NR only	NR only	TOC only	NR only	NR only
Security	NR only	TOC only	TOC only	NR only	TOC only	NR only	NR only	NR only	TOC only	NR only	NR only
Mobility assistance	NR only	TOC only	TOC only	TOC only	TOC only	Joint NR & TOC	NR only	NR only	TOC only	TOC only	TOC only
Train dispatch	NR only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only
Revenue protection	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only
Station cleaning (including toilets)	NR only	NR only	TOC only	NR only	Joint NR & TOC	NR only	NR only	NR only	Joint NR & TOC	NR only	NR only
Landlord asset management	NR only	NR only	NR only	NR only	NR only	NR only	NR only	NR only	NR only	NR only	NR only
Train cleaning	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only
Contractor / visitor reception	NR only	Joint NR & TOC	TOC only	NR only	TOC only	NR only	NR only	NR only	TOC only	NR only	NR only
Information point	Joint NR & TOC	TOC only	TOC only	TOC only	TOC only	TOC only	Joint NR & TOC	Joint NR & TOC	TOC only	TOC only	TOC only
Customer service	Joint NR & TOC	TOC only	TOC only	Joint NR & TOC	TOC only	Joint NR & TOC	Joint NR & TOC	Joint NR & TOC	TOC only	Joint NR & TOC	Joint NR & TOC
Ticket office	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only
Lost property / left luggage	NR only	TOC only	TOC only	NR only	TOC only	NR only	NR only	NR only	TOC only	NR only	NR only
Retail & commercial	NR only	NR only	NR only	NR only	NR only	NR only	NR only	NR only	NR only	NR only	NR only
TOC rail services serving the station	*ATW; Crosscountry; GWR; LNER; VWC; WMR*	*GWR*	*SET*	*SET*	*SWR; Southern; Thameslink; LOROL*	*ScotRail; Caledonian Sleeper; LNER; Crosscountry; TPE*	*LNW; VWC; LOROL; Caledonian Sleeper*	*ScotRail; Caledonian Sleeper; LNER; Crosscountry; TPE; VWC*	*SWR: GWR; Southern*	*LNER; Great Northern; Hull Trains; Grand Central*	*Crosscountry; LNER; TPE; Northern*

	Liverpool Lime Street	Liverpool Street	London Bridge	Manchester Piccadilly	Paddington	Reading	St Pancras* (NB. Main station is managed by NRHS).	St Pancras low level/subsurface	Victoria	Waterloo
Station management	NR only	NR only	NR only	NR only	NR only	NR only	NRHS only	NR only	NR only	NR only
Duty management	NR only	NR only	NR only	NR only	NR only	TOC only	NRHS only	NR only	NR only	NR only
Control room (provision of train/platform info)	NR only	Joint NR & TOC	Joint NR & TOC	NR only	NR only	TOC only	Joint NRHS & TOC	Joint NR & TOC	TOC only	TOC only
Security	NR only	NR only	NR only	NR only	NR only	TOC only	NRHS only	NR only	NR only	NR only
Mobility assistance	NR only	NR only	NR only	NR only	NR only	TOC only	Joint NRHS & TOC	Joint NR & TOC?	NR only	TOC only
Train dispatch	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only
Revenue protection	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only
Station cleaning (including toilets)	NR only	NR only	NR only	NR only	NR only	NR only	NRHS only	NR only	NR only	NR only
Landlord asset management	NR only	NR only	NR only	NR only	NR only	NR only	NRHS only	NR only	NR only	NR only
Train cleaning	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only
Contractor / visitor reception	NR only	NR only	NR only	NR only	NR only	TOC only	NRHS only	NR only	NR only	NR only
Information point	Joint NR & TOC	TOC only	NR only	NR only	Joint NR & TOC	TOC only	NRHS only	NR only	Joint NR & TOC	NR only
Customer service	Joint NR & TOC	Joint NR & TOC	Joint NR & TOC	Joint NR & TOC	Joint NR & TOC	TOC only	Joint NRHS & TOC	Joint NR & TOC	Joint NR & TOC	Joint NR & TOC
Ticket office	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only	TOC only
Lost property / left luggage	NR only	NR only	TOC only	NR only	NR only	TOC only	Joint HS1 & NRHS	NR only	NR only	TOC only
Retail & commercial	NR only	NR only	NR only	NR only	NR only	NR only	Joint HS1 & NRHS	NR only	NR only	NR only
TOC rail services serving the station	*EMT; TPE; LNWR; Northern; VWC; Merseyrail*	*GA; TfL Rail; LOROL; Stansted Express*	*SET; Thameslink; Southern*	*Northern; ATW; Crosscountry; EMT; TPE; VWC*	*GWR*	*GWR; SWR*	*Eurostar; LSER; EMT;*	*Thameslink (sub-surface managed by NR, not NR(HS)).*	*Southern; SET; Gatwick Express*	*SWR*

*St Pancras Station is owned by High Speed 1 but operated by NR SE Route under contract
St Pancras Low Level is owned by Network Rail.

Key

NR only - NR solely is predominantly responsible for activity e.g. Dispatch at New Street
Joint NR & TOC - There is joint responsibility for the activity e.g. Information point at Euston (NR & 2 TOCs in the main info booth and each has separate mobile stands on concourse)
TOC only - TOCs solely are predominantly responsible for activity e.g. Ticket Office operation everywhere

2.25 Overall, the majority of staff and costs at Network Rail-managed stations are associated with security and the provision of customer assistance. Security is resourced in-house by Network Rail, with agency support contracted for significant special events. Facilities management, in contrast, is completely outsourced through managed contracts. At smaller managed stations multi-tasking is practiced (e.g. for passenger assistance and customer service).

Train planning

2.26 Train planning is organised within Network Rail's network-wide System Operator function and located in a single centre in Milton Keynes. As such, it is included with support cost expenditure in Network Rail's regulatory accounts. However, it is key to the operation of the network and therefore is benchmarked within operations functions in this study.

2.27 Train planners collate, deconflict and validate train schedules from 'bids' from train operators, for both the long-term 'base' timetable and shorter-term variations needed to accommodate each week's combination of engineering works and other events. Planners are supported by Train Planning Managers, organised as regional teams as well as a national and freight team.

Other Network Operations roles

2.28 The biggest single area of further operational activities and roles is mobile incident response, provided by Mobile Operations Managers (nearly 600 FTEs, and £48 million in 2021/22) and incident response teams. Numbers of Mobile Operations Managers and their locations and areas of coverage are determined according to local factors and no set service level (e.g., in terms of response times or areas of coverage) exists.

2.29 Further notable operations roles, based in operating locations within routes, include Roster Clerks, who typically produce and manage rosters across c.80-100 signallers, and Operations Support Clerks providing dedicated administrative support to operations teams on uniform, travel and similar issues.

Key considerations for operations cost data collection

2.30 Given the breadth and diversity of the cost areas in scope, a key practical consideration was to make data collection as easy as possible for participating Infrastructure Managers. Data provision is usually subject to internal approvals and requires input from several individuals. Hence, data was requested through a consistent excel template, across both operations and support costs, with clear definitions and completion guidance.

2.31 The key technical challenge when carrying out a benchmarking exercise is to ensure that, as far as possible, like-for-like comparisons are being made, where the respective functions include the same activities so that any conclusions from benchmarking analysis are based on a meaningful difference in cost levels.

2.32 The data requirements were shaped by Network Rail's structure and activities, which unsurprisingly differ to other Infrastructure Managers. Our detailed definition of operations functions enabled us to provide further guidance in subsequent interviews with participants, to support an accurate comparison. Where their cost structures differed, in some cases European Infrastructure Managers were only able to provide the data in a more aggregated manner and for some functions estimations of the cost assignments were made to respond to the defined activities in the scope of the benchmarking.

2.33 In the case of station operations, shaping data requirements in accordance with the structure and activities of Network Rail is a particular challenge. Its managed stations are relatively heterogeneous, with a variety of arrangements and models for the management of station operations in place, and it was not possible for Network Rail to provide costs differentiated and disaggregated by activity.

2.34 Therefore, it was decided to include for comparison Network Rail costs for Type 1 stations: those where almost all functions are undertaken by Network Rail staff. That includes station management, duty management, control room, security, mobility assistance, station cleaning, landlord asset management, contractor and visitor receptions, lost property and left luggage, and retail and commercial.

2.35 The relevant stations are:

- Birmingham New Street;
- Euston;
- Glasgow Central;
- Liverpool Lime Street;
- Liverpool Street;

- London Bridge;
- Manchester Piccadilly; and
- Paddington.

2.36 In these stations, train operating companies handle only train dispatch (with the exception of Birmingham New Street, where it is delivered by Network Rail), revenue protection, train cleaning and ticket office activities.

2.37 However, relatively few European IMs also manage stations and carry out any comparable sets of activities themselves. This was a recognised challenge for the benchmarking of Network Rail's station operations, and is discussed subsequently in our analysis, findings and recommendations.

Detailed definition of Support functions

Network Rail support functions and activities in scope

2.38 The support functions represent the business activities that are not directly related to Network Rail's role managing rail infrastructure, but they are nevertheless important in supporting this role as well as in ensuring that Network Rail meets its corporate responsibilities. The support functions we have investigated are common to most large organisations and include human resources, finance, information technology (referred to as Information Management by Network Rail), procurement and other services.

2.39 The costs of support functions consist of staff and non-staff costs, with the former accounting for the majority of total cost in the case of most functions. However, Information Management gives rise to significant non-staff costs, largely related to computer systems and software. Our analysis has therefore covered both staff and non-staff costs.

2.40 The delivery of some functions is shared between central teams and teams located in each of Network Rail's five regions, with others carried out solely by central teams. The functions within the scope of the study, staff description and the location in the organisation are shown in Table 2-3.

Table 2-3: Support functions and activities in scope

Functions	Description of activities within the function	Location in the organisation
Human Resources	Provide personnel services including management of employee benefits, recruitment, training etc.	Split between central and regional teams and based in Network Rail main/regional head offices.
Information Management	Provide information technology services within Network Rail.	Central team based in Network Rail's main head office.
Finance	All activities within NR's Finance function which carries out activities including: Transactional services, control & risk management, financial planning and analysis.	Split between central and regional teams and based in Network Rail main/regional head offices.

Functions	Description of activities within the function	Location in the organisation
Procurement	All activities within NR's procurement function which carries out the governance and administration for the procurement of goods/services.	Split between central and regional teams and based in Network Rail main/regional head offices.
Other corporate services	All other corporate support activities. Expected to include executive office and administration; legal; route services management; communications; health & safety (within Technical Authority).	Split between central and regional teams

2.41 The support costs analysed in Network Rail's Regulatory Financial Statement in 2021/22 do not exactly match these defined functions, and the costs associated with property and accommodation, utilities, telecoms, insurance and other costs not specific to functional activities represents £408 million, over 40% of Network Rail's £968 million support costs.

2.42 Of the remainder, IT and business services provided to routes (£127 million), followed by HR and Finance (£60 million each in 2021/22) are the biggest functional areas of support expenditure.

Key categories of cost

2.43 The benchmarking exercise is based on examination of total costs for each support function. However, to provide a more informative comparison, we have also investigated staff and non-staff costs separately. In addition, the breakdown of Information Management costs is different from other support functions, with significant expenditure on software and hardware, for example, so have examined non-staff costs for this function in greater depth. The categories of cost we examined for each support function are summarised in Table 2-4.

Table 2-4: Categories of support cost examined

Function	Cost categories examined					
	Total	Staff	Outsourcing	Software	Hardware	Other
Human Resources	✓	✓				✓
Information Management	✓	✓	✓	✓	✓	✓
Finance	✓	✓				✓
Procurement	✓	✓				✓
Other corporate services	✓	✓				✓

Key considerations for support cost data collection

2.44 As noted above for operations costs, it was key to ensure that, as far as possible, like-for-like comparisons are being made on the basis of comparable sets of activities. In principle, this means ensuring that:

1. For each function, the same activities are accounted for within the category of costs being compared; and
2. Appropriate scaling factors are used to produce comparable figures for organisations of different sizes.

2.45 In relation to the first point above, our initial engagement with Network Rail, industry regulators and peer organisations highlighted the following data collection considerations for support costs:

- Network Rail's organisation of activities is, unsurprisingly, not precisely replicated within other organisations. For example, Network Rail has a combined Shared Services business unit, which includes information technology, accounts payable and receivable and training costs.
- With respect to Information Management costs, there are a number of different ways to procure information technology, with each method resulting in a different split between capital and operating costs.
- Network Rail has been undertaking a management re-organisation, which means:
  - One-off costs related to the management re-organisation needed to be identified and understood; and
  - Cost data, in particular staff costs, do not reflect the changes introduced through the management re-organisation and therefore do not accurately represent the level of future costs.
- Network Rail's allocation of support costs includes support for capital investment activities. Hence, information for peer organisations that accounts for support costs incurred in relation to capital investment was also requested.

2.46 In relation to the second point above, our engagement with Network Rail, industry regulators and peer organisations has highlighted the following practical data collection considerations for support costs:

- The appropriateness of the comparison of results using a scaling factor depends upon how each organisation is structured to deliver its activities. For example, the peer organisations all contract out a more significant proportion of maintenance work than Network Rail. As a result, for the same railway/network output Network Rail would directly employ a higher number of people than peer organisations. This affects the conclusions that can be drawn from benchmarking analysis that uses the number of FTEs as a scaling factor.
- Some specific scaling factors are not used or focused on consistently by different organisations to measure/benchmark their functional costs. As an example, Network Rail's procurement department uses a measure of contracts under management rather than contracts procured to represent the activity of their procurement function, whereas other organisations focus on and hold data on the level of contracts procured.
- Some organisations were not able to provide us with values for scaling factors related to the finance function that could be used to compare with Network Rail. For example, peer organisations were unable to provide gross cashflow or numbers of P&L business units comparable to those at Network Rail.

2.47 These data collection considerations have informed our benchmarking methodology and engagement with and data collection from Network Rail and participating peer organisations, which are outlined in the following chapters.

3 Benchmarking methodology

Overview

3.1 This section describes our approach to benchmarking, as developed following the inception and set-up stage of the project and engagement with ORR and Network Rail.

3.2 ORR's requirement was for the 'quantification of any efficiency gap', to be expressed in terms of an 'actionable number'. In practice this means:

- Identifying the gap between Network Rail and the average and best among peer organisations for benchmark metrics in each functional area;
- Understanding drivers of difference, including drivers of activity levels in support functions, business strategies, operating and delivery models for Network Rail and its peers;
- Understanding the operating and strategic context for Network Rail in terms of the deliverability and desirability of change; and
- Assessing actionable change in terms of what can change and what is worth changing over the short-, medium- and long-term.

3.3 To meet the requirement for quantification of the efficiency gap we identified, and agreed with ORR, our approach to normalisation and the appropriate benchmark metrics for each of operations and support costs, as described below.

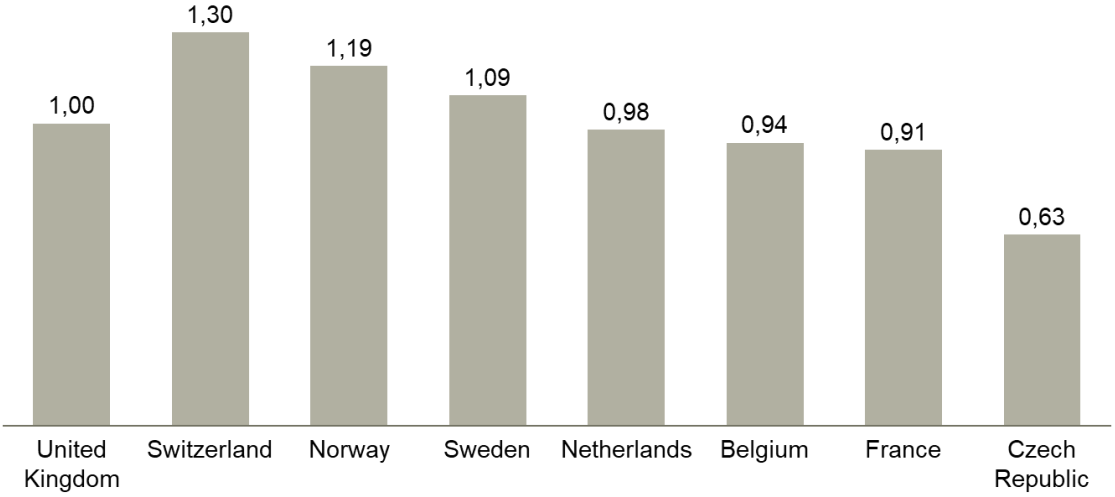
Approach to normalisation

3.4 Both network operations costs and support costs are influenced by a range of factors, some external to an infrastructure manager and some controllable, or at least manageable, by the organisation. To undertake a rigorous benchmarking exercise, enabling meaningful comparison of the costs of different organisations, we must control for external factors through a process of normalisation. At the simplest level, this will involve expressing costs in terms of a common unit of output (e.g., per train-km or per FTE) to take account of the different scale of activity across organisations, but it will also require more complex adjustments to the raw data to ensure that valid comparisons can be made.

3.5 As we are benchmarking Network Rail's costs against those of other rail Infrastructure Managers based elsewhere in Europe, a key part of the normalisation methodology is the conversion of all monetary values to a common currency (e.g., the conversion of costs expressed in Euros to costs in sterling). The conversion is based on the application of purchasing power parity exchange rates (PPPs), defined as the exchange rate required to ensure that a given unit of currency (e.g., £1) purchases an equivalent basket of goods and services in two different countries. PPPs offer a more appropriate basis for converting between currencies than market exchange rates, which can fluctuate considerably over time and distort the measurement of real resources represented by a given unit of costs.

3.6 PPPs are available from a number of published sources, including Eurostat and the IMF. We have considered the most appropriate source following the compilation of the final data set and used OECD as the basis for PPP conversion. As can be seen in the following figure, Switzerland, Norway and Sweden have higher comparative price levels than the United Kingdom, whereas the price level in the Netherlands, Belgium, France and the Czech Republic (the relevant countries for participating Infrastructure Managers) was lower.

Figure 3-1: Purchasing Power Parity per Exchange Rate



Source: Own calculation based on OECD (https://data.oecd.org/conversion/purchasing-power-parities-ppp.htm#indicator-chart), 2021

3.7 Staff costs are an important component of the overall cost base of rail and other Infrastructure Managers, and the process of normalisation will therefore also need to take account of factors influencing the cost of employing staff that can vary internationally. For example, organisations in one country may need to pay higher gross salaries than those in another to compensate for higher rates of personal taxation. Alternatively, employees in one country may be willing to accept lower levels of post-tax income than those in another because they benefit from higher levels of social provision (e.g., future pension provision and health care).

3.8 One means of addressing international differences in employment costs is to compare staff inputs directly in terms of numbers of full-time equivalents (FTEs). Such comparisons allow significant differences in the level of input required to undertake specific activities to be readily identified and can inform conclusions on relative levels of efficiency. However, care is needed in interpreting the results, since an efficient organisation in one country may have good reason to employ more staff than a peer in another. This is because the relative price of labour and capital varies significantly across countries, such that an efficient combination of resources in, say, the UK may involve a higher ratio of staff to capital equipment than in Switzerland or France. Likewise, an organisation might be incentivised to employ more staff in search of higher levels of business performance. Again, we have considered these issues further as the dataset was compiled, and as expected have made comparisons of FTEs in the case of both operations and support costs. Further, gross and net-working hours have been considered, to account for possible differences in the FTEs required per IM.

3.9 In addition to these general considerations, we have addressed issues that are specific to each of the two main categories of cost under consideration. Our approach is outlined below, having been refined following discussions with Network Rail and peer organisations.

Benchmarking network operations costs

3.10 As staff costs are the main cost component in network operations, the number of FTEs has been used as a metric for all functions within scope, enabling us to compare employment costs in relation to staff. At the same time, it is important to recognise that the availability of a FTE differs among countries, which can be accounted for by investigating the gross and net working hours per function. Gross working time is the total number of working hours, including overtime. Deducting times for bank holidays, individual holidays, sick leave and other absences (e.g., travel times and training) results in net working hours per year and per FTE. This is the relevant measure as it indicates the effective time an employee is available for work.

3.11 For signalling, electrical control and train planning, the total train kilometres, representing the movement of a train over one kilometre of track, is used to measure the number of train km controlled per FTE in these functions. Similarly, total main track kilometres, defined as the cumulative length of all tracks maintained by the infrastructure manager, excluding tracks not used for running trains, is employed to account for differences in the network and organisation size and relate these to control points to measure the degree of centralisation.

3.12 In addition:

- For signalling, we have used the number of signalling equivalent units and level crossings to account for the degree of centralisation and automation, since key differences in these factors exist between Infrastructure Managers that influence the labour intensity of these organisations.
- For electrical control, the number of track-km electrified and the number of electrical control rooms have been used as metrics to account for the level of electrification, an important driver of operations costs.

3.13 The costs of network operation are also affected by several factors that reflect the geography and configuration of the network which can only be changed over the long term. These include:

- The size of the network, measured using track-km or route-km: Typically, a network covering a large geographical area will require more signalling, electrical control and train planning resource;
- Likewise, a complex network, with a high number of signalling equivalent units and points or switches per track-km (and hence the potential for conflicting train movements), will require more controllers and signallers;
- The level of network electrification, including different energy types used for traction (e.g., the proportion of the network that is electrified using different types of electric current); and
- The intensity of use of the network, typically measured in terms of train-km per track-km, which also provides an indication of the level of resource needed to operate the network efficiently and safely: The higher the level of network utilisation, the more train planners, power engineers, train planners and signallers will be needed for operations.

3.14 Data for these metrics is generally available from published sources such as the European Commission's Rail Market Monitoring Survey, which enables comparisons on a consistent basis across the EU-27 Member States and Norway. Where necessary, we have used further information in the network statements published by all European Infrastructure Managers.

3.15 It should also be recognised that the levels of train service performance that are targeted and achieved are fundamental for rail users. Therefore, while it is not a basis for normalisation, service performance is relevant context when considering the efficiency of Network Rail's operations and support activities, and the policy choices and actions that might be taken. We have highlighted the comparative performance of participating organisations' networks in Chapter 5.

Summary of metrics used for operations benchmarking

Table 3-1: Operations costs – cost drivers and metrics

Function	Cost driver	Metrics							
		Unit labour cost	Total labour cost / m train-km	Annual gross working time [h / FTE]	Annual net working time [h / FTE]	Share of net working time	Gross working time	Net working hour cost [cost / net working	Productivity Total [m train-km / FTE]
Traffic Management: Signalling, train control & electrical control	The size and complexity of the network, the proportion of electrified sections, the number of switches and signalling units per track kilometre, and the intensity of network usage are decisive factors in determining resource requirements.	✓	✓	✓	✓	✓	✓	✓	✓
Signalling & level crossing keeping	Costs are depending on the degree of centralization and automatization of signalling and level crossing.	✓	✓	✓	✓	✓	✓	✓	✓
Train control	Cost driver for train control are primarily the size and complexity of the network	✓	✓	✓	✓	✓	✓	✓	✓
Electrical control	The cost of electrical control will depend on both the network size and the way in which it is managed	✓	✓	✓	✓	✓	✓	✓	✓
Station operation	The size of the stations and the spectrum of task determines the cost	✓		✓	✓	✓	✓	✓	
Mobile operation	The vulnerability of the network and train operations are crucial cost drivers.	✓	✓	✓	✓	✓	✓	✓	✓

Benchmarking support costs

3.16 The support costs examined as part of this study, described in detail above, relate to three different types of support activities:

- **Provision of employee-related services:** these activities are associated either with managing employees (e.g., determining frameworks for performance review and promotion) or providing services to them. The latter category includes activities related to the provision of pay/benefits (e.g., administration of contractual benefits) and to the services needed to allow staff to carry out their roles (e.g. training and IT equipment). The costs of these activities are likely to be relatively comparable to costs from non-rail infrastructure manager organisations.

- **Provision of general corporate services:** these activities arise from the need to ensure that Network Rail can fulfil its corporate obligations, for example financial reporting and meeting specific legal requirements. The associated costs are categorised under finance and other corporate services functions within Network Rail and are likely to be relatively comparable to equivalent costs for non-rail organisations, in particular those responsible for managing network infrastructure.
- **Support for Network Rail's infrastructure management activities:** these activities are carried out in direct support of Network Rail's infrastructure management function, for example procurement of rail materials for maintenance. While similar functions may exist within non-rail Infrastructure Managers, it is likely that specific activities are sufficiently different to complicate comparison.

3.17 We have benchmarked Network Rail's support costs with those of participants with similar characteristics (i.e., regulated, capital-intensive, network-based organisations). For each of the five support functions in scope, we have sought to identify the principal factors likely to drive costs and corresponding metrics to be used in the normalisation process.

3.18 For normalisation, in addition to the metrics we believe are likely to drive increased support costs we have also used total network kilometres as a benchmarking metric, to represent the overall outputs of the organisations. The output measure of total network kilometre, rather than train kilometres, enables an output-based comparison to include National Highways.

3.19 We note that there are a small number of metrics for which data was requested from Network Rail and peer organisations for which benchmarks could not be produced. This is because data was not available from or provided by a sufficient number of organisations, and/or upon review of the data and potential benchmarks we identified that meaningful benchmarks could not be produced.

3.20 The intended support costs benchmarks which could not be produced are listed below:

- Finance cost per total revenue
- Finance cost per gross cashflow
- Finance cost per business (P&L) unit

3.21 As with network operations costs, we refined this methodology following engagement with Network Rail and other organisations and as we understood more about the factors influencing the scale of each activity, not least the application of technology enabling the automation of tasks previously undertaken manually. Again therefore, benchmarking involved a mix of mechanistic adjustment to raw data and qualitative commentary on factors that cannot easily be quantified. It also involved considering the extent to which observed differences in cost between organisations are the result of management decisions or factors arising from the regulatory and fiscal environment in which the different organisations operate.

Summary of metrics used for support benchmarking

Table 3-2: Support costs – cost drivers and metrics

Function	Cost driver	Metrics						
		Network kilometre	FTEs/headcount	Total operating costs	Value of contracts awarded	Number of contracts awarded	Value of contracts managed	Function FTE
Human Resources	The size of the HR function will increase with the number of employees. There are likely to be some fixed costs arising from each contract of employment and it may therefore be appropriate to normalise on the basis of total headcount as well as the number of FTEs.	✓	✓					✓
Information Management	Information management costs will increase with the number of employees, with both equipment costs and the costs of maintaining connectivity broadly proportionate to the number of individuals linked to information networks.	✓	✓					✓
Finance	The costs of the finance function will depend on both the overall financial size of the business (in terms of costs, revenues and gross cashflow) and the way in which it is structured (with an increase in the number of business units tending to increase the level of financial oversight and support required).	✓		✓				✓
Procurement	The size of the procurement function will increase with both the number and size of the contracts procured (a minimum level of costs being incurred with each procurement and additional costs arising for larger, more complex contracts requiring a greater level of specification and evaluation).	✓			✓	✓	✓	✓
Other corporate services	These will vary with a range of factors, including number of employees and levels of cost and revenue.	✓	✓	✓				✓

4 Engagement and data collection

Peer group identification

4.1 Amberside/Steer and civity identified organisations to target for participation in the study using clear criteria designed to ensure that the final peer groups for network operations and support functions were as comparable as possible. We agreed the following criteria with ORR at the inception of the study:

- The activities of the organisations should be comparable;
- The organisations should operate within similar legal and regulatory frameworks;
- As far as possible, the peer group should include organisations based in countries that are broadly comparable in terms of their level of economic development (i.e. located in western and central Europe);
- Structural differences between the organisations and Network Rail should be readily identifiable; and
- The organisations should be accessible and sufficiently resourced to participate.

4.2 The application of these criteria required both judgement and pragmatism, informed by our previous experience of benchmarking, cost analysis and other work in which the activities or costs of the organisations have been investigated.

Prioritisation of peers

4.3 In the set-up of the project and early engagement with ORR, we established that the clear priorities for a relevant useful comparison are:

(1) Sufficient participation from European Rail Infrastructure Managers for the comparison of both operations and support costs; and

(2) Participation from regulated network owner/operator organisations in other sectors (potentially highways, energy, telecoms, water and aviation) to expand the data set for the comparison of support costs.

4.4 During project set-up, we refined the initial long list of potential organisations included in our proposal to an agreed, prioritised target list, in accordance with the criteria above. Our aim was to secure participation from at least 5 rail Infrastructure Managers with an ideal overall group of between 6 and 12 peer organisations.

4.5 Our prioritised lists of organisations to target for participation, as agreed with ORR, are shown in the tables below.

Table 4-1: Prioritised European Rail Infrastructure Managers

Country	IM name (short)	IM name (long)
Austria	ÖBB Infra	ÖBB Infra
Belgium	Infrabel	Infrabel
Denmark	BDK	Banedanmark
France	SNCF R.	SNCF Réseau
Germany	DB	DB Netz
Netherlands	ProRail	ProRail
Sweden	TRV	Trafikverket
Switzerland	SBB Infra	SBB Infra
Italy	RFI	RFI
Norway	BaneNOR	BaneNor
Poland	PKP PLK	PKP PLK
Spain	Adif	Adif
Czech Republic	SŽCZ	Správa železnic, státní organizace

Table 4-2: Prioritised Non-rail sector peers

Sector	Target organisation
Highways	National Highways
Energy	National Grid
	Electricity Distribution Network Operator(s) to be identified and engaged with support of Ofgem, e.g., UKPN
	Gas Distribution Network Operator(s) to be identified and engaged with support of Ofgem, e.g., SSE
Telecoms	BT Openreach
Water	Anglian Water*
	Severn Trent*
Aviation	NATS En Route Ltd (NERL)
	DFS

*Originally identified in proposal as Low priority

4.6 These organisations were identified as targets for participation on the basis they could be expected to meet the agreed criteria:

- ✓ Their activities are comparable, as rail Infrastructure Managers and/or organisation in regulated utilities/transport sectors with corporate support requirements;
- ✓ They operate within similar legal and regulatory frameworks;
- ✓ They are based in countries that are broadly comparable in terms of their level of economic development (i.e. they are located in the UK, western and central Europe);

- ✓ Structural differences between the organisations and Network Rail should be readily identifiable; and
- ✓ They could reasonably be expected to be accessible and sufficiently resourced.

Peer group engagement and data collection

Engagement of peer organisations

4.7 It was recognised from the outset of the study that securing peer organisations' participation and obtaining the necessary detailed data would be a challenge, and that direct engagement through identified contacts would be required. Our approach to engagement, which was agreed with ORR, required the design of template response forms to simplify data collection activity and focused discussions to clarify the activities represented by the data and help understand differences in the level and allocation of costs.

4.8 Each of the identified European Rail Infrastructure managers was approached via a joint letter signed at senior level by ORR and Network Rail. Each also received a summary briefing note addressing key questions about the project, our approach and overall data requirements.

4.9 Non-rail participants were approached through ORR and its counterpart Regulators for other sectors, and/or through existing contacts among Amberside/Steer and civity Management Consultants. Those approaches were also made using the content of the joint letter and supporting summary briefing note.

4.10 Where we could not identify contacts in potential participant organisations, and/or where we could not secure engagement through industry Regulators, we undertook a desktop assessment of published data for the relevant organisations. This approach was followed in the case of airports, air navigation companies, telecoms companies and energy utilities, all of which proved difficult to contact or were unwilling to participate. However, the publicly available data was not structured or disaggregated in a way that enabled comparison with Network Rail. For example, where information on support costs was available in the public domain (often split between staff and non-staff costs), there was no breakdown by support function and the activities included were unclear, such that the data was of limited value for a benchmarking exercise of this nature.

4.11 In the case of those organisations that were willing in principle to participate, extensive further engagement through correspondence and discussion, over and above the time allowed in the study timescales, was necessary to secure their involvement. Furthermore, despite our willingness to simplify the data request and support from the relevant regulator, many organisations that initially expressed interest (and even some who had agreed to participate) ultimately chose not to be involved.

4.12 The availability and granularity of data understandably varies across the peer group – in particular for support costs. For many European Infrastructure Managers, cost reporting structures mean specific function-level data on support costs is not available.

4.13 This means that, whereas the benchmarking of operations costs includes 7 IMs, due to the lack of function-level data on support costs being available for other organisations, the benchmarking of support costs includes National Highways and two of the IMs.

4.14 The final list of participants is presented below in Tables 4-3 and 4-4.

Table 4-3: European Rail Infrastructure Managers participating

Country	IM name	Status
Netherlands	**ProRail**	**Participated**
Norway	**BaneNor**	**Participated**
Belgium	**Infrabel**	**Participated;** support cost details unavailable
Czech Republic	**SŽCZ**	**Participated;** support costs details unavailable
France	**SNCF Réseau**	**Participated;** support costs details unavailable
Sweden	**Trafikverket**	**Participated;** support costs details unavailable
Switzerland	**SBB Infra**	**Participated;** support costs details unavailable
Austria	ÖBB Infra	Declined to participate
Denmark	Banedanmark	Declined to participate
Germany	DB Netz	Declined to participate
Italy	RFI	Declined to participate
Poland	PKP PLK	Declined to participate
Spain	Adif	Declined to participate

Table 4-4: Non-rail sector peers participating

Sector	Target organisation	Status
Highways	**National Highways**	**Participated**
Energy	National Grid	Declined to participate despite Ofgem support
	Electricity DNO(s)	Declined to participate despite Ofgem support
	Gas DNO(s)	Declined to participate despite Ofgem support
Water	Anglian Water*	Ofwat discussed but unable to facilitate participation
	Severn Trent*	Ofwat discussed but unable to facilitate participation
Aviation	NATS En Route Ltd	Declined to participate
	DFS	Declined to participate
Telecoms	BT Openreach	No available contacts or data

*Originally identified in proposal as Low priority

4.15 Of the non-rail organisations approached, despite extensive dialogue and some organisations agreeing to take part, in the end only National Highways participated. While this is disappointing overall and we would have hoped for greater non-rail participation, National Highways' engagement is very welcome and has allowed us to supplement support cost data sets and comparisons.

4.16 Potential participants who declined to participate cited the following reasons:

- Lack of benefit/value to them;
- Lack of resource availability to source and provide the required data;

- Lack of data availability in a relevant structure/at the required level of granularity; and
- Unsuitable timing given their own regulatory review and business processes.

4.17 While the study timescales allowed for up to two months' notice for potential participants, given the above constraints to data collection, some responses suggested that significantly longer notice would have been required to encourage participation and mobilise resources for what was, for them, a one-off exercise unrelated to their own ongoing business management and regulatory processes.

4.18 We have reflected this feedback from those organisations who were unwilling or unable to participate in recommendations for future benchmarking, provided separately to ORR.

4.19 Overall, we agreed with ORR that the level of participation achieved was sufficient and in line with the priorities for a representative peer group enabling comparison of both operations and support costs.

4.20 Furthermore, the extensive process of engaging with potential participants and securing the above participation and data was beneficial to the subsequent completion of the study as it allowed us to:

1. Clarify information provided in data templates;
2. Gain a clearer understanding of the activities included by each organisation in each function; and
3. Gain further understanding of the organisation and delivery of functions and activities, which helps to explain differences observed.

Peer group data collection

4.21 Amberside/Steer and civity Management Consultants are grateful for the extensive engagement from participating organisations, whose time and insight were vital to the delivery of this study.

4.22 The time made available by the following individuals, who were able to provide expert advice on the interpretation of data, was particularly helpful.

Table 4-5: Expert interviews with participating organisations

Country/sector	Organisation	Name and role of lead contact
Netherlands	ProRail	Raymond Geurts van Kessel and Joep Rooijers, Corporate Finance and Control
Norway	BaneNor	Martin Sund, Leader infrastructure performance
Belgium	Infrabel	Arno Falque, Strategy & Enterprise Steering
Czech Republic	SŽCZ	Dr. Roman Štěrba, Head of conception and strategy
France	SNCF Réseau	Dahua Chen, Chargée d'études
Sweden	Trafikverket	Jonas Noreland, Statistician
Switzerland	SBB Infra	Elmar Baumgartner (Programme Implementation Manager) and Daniel Dufner (Finance)
UK Highways	National Highways	Christopher Bell, RIS3 Efficiency Case Lead Claire Sherriff, Head of Management Accounting Gareth Kendall, Finance Business Partner

4.23 The operations cost data provided by European Infrastructure Managers has different levels of granularity. For some Infrastructure Managers, there is only partial or no differentiation between the different traffic management functions (signalling, train control and electrical control). Four of the seven peers have provided a nearly complete data set that allows detailed benchmarking. Furthermore, aggregated data classes were formed to enable further meaningful comparisons, such as signalling, controlling and electrical controlling being considered together for one group of participants.

4.24 As noted in Chapter 2, obtaining benchmarking data on comparable sets of station operations activities was a recognised challenge. Only two peer organisations were able to provide data on station operations as, in many countries, stations are fully managed by the train operating companies. Interviews with peers also highlighted that the tasks carried out at the stations, as well as the number and size of stations, cannot be adequately compared across Network Rail and its peers.

4.25 One of the Infrastructure Managers manages more than 1,000 stations of different sizes. It was not possible to determine the average size of stations, and this information was also not available for Network Rail. The tasks covered vary significantly by station, with no staff present at some due to their small size and only train operator staff responsible for ticketing present at others. Moreover, the security of stations is often outsourced by peers, while Network Rail undertakes the security function itself (with the majority of its station staff and costs associated with security and the provision of customer assistance), and its use of contractors focuses on short-term resource requirements such as major events.

4.26 While one Infrastructure Manager is responsible for more than 300 stations, comparing its performance with that of Network Rail is problematic due to the wide range of station types, operational requirements, and regional factors affecting station activity. In addition, differences in outsourcing and ownership structure distort station costs and make meaningful benchmarking difficult. This is reflected in the limited benchmarking analysis available in Chapter 5, and we make subsequent recommendations for benchmarking of station operations.

4.27 European Infrastructure managers provided less support data, reflected in fewer complete responses to the support data request despite this being sent to the same time as the

operations data request. Reporting/accounting structures meant it was not possible in some cases, and difficult/time-consuming in others, to provide the required support numbers required.

4.28 The difference in response may also indicate that European infrastructure managers give a higher priority and value to participating in the benchmarking of operations costs than business support functions, as operations represents the larger number of employees and share of costs.

4.29 Different accounting treatments and the need for further data and information to support the numbers provided in the initial data template meant that follow-up interviews were crucial. Based on our interviews with European Infrastructure managers, although the names for functions are similar, the department often carries out different activities, so our interviews and extensive dialogue also helped understand what was included in each function and ensure activities were comparable.

4.30 While a number of European Infrastructure managers who provided Operations data were not able to provide any support cost data at all, two Infrastructure managers provided the template with only a very small amount of data (i.e. one or two numbers), which was not enough for us to include in support cost benchmarking.

Network Rail engagement and data collection

4.31 Amberside/Steer and civity are similarly grateful for the opportunity for extensive engagement with Network Rail, without which the study would not have been possible. Network Rail's visible involvement and support at senior level, co-signing a joint letter to invited peers, helped to accelerate the initial response from other organisations. In addition, we are grateful for:

- Endorsement of approach and support for the study and its objectives (in addition to signing of joint letter) from Paul Marshall, Group Finance Director;
- Provision of core data required from Network Rail and extensive dialogue on Network Operations and Support cost data with Liam Rattigan, Finance Director; and
- Support in identifying and engaging with subject matter experts provided by Jonathan Hulme and Sara Darlow, Planning and Regulation.

4.32 We also undertook a number of constructive interviews with senior-level subject matter experts which informed both the detailed definition of activities and the understanding of drivers of costs and differences between organisations. We would especially like to acknowledge the contribution of the following individuals:

- Stewart Firth and Richard Horobin, Operations Strategy Directors – Route and Region operations activities, structures and cost drivers;
- Malcom Pitt, Head of Customer Experience and Accessibility – Station operations;
- Dave Robertson, Head of Station and Depot Access and Paul Ashman – Station operations;
- Tom Desmond, Director, Operations Capability – Network-wide operations roles, structures and strategy; and
- Clive Berrington, Group Commercial & Procurement Director – Procurement activities, data and measurement, including previous public sector procurement benchmarking

Benchmarking catalogue

4.33 Given the participating organisations and data available, for the purposes of this study it was possible to undertake the following benchmarking and make the valuable comparisons below.

4.34 Given the number and range of benchmarks for operations across the 7-strong peer group, with varying levels of granularity, Tables 4-6 and 4-7 below provide a summary only, and the full, detailed catalogue has been provided to ORR separately.

Table 4-6: Catalogue of available operations costs benchmarking

Catalogue of operation costs benchmarking metrics
Costs - Total operation cost / m train km
Network utilisation - Utilisation [m train-km / main track-km]
Network centralisation - Degree of centralisation I [controller FTE / manned control point] - Degree of centralisation II [main track-km / manned control point]
Network complexity - Number of switches and crossings / main track km - Number of level crossings / main track km
Labour productivity for signalling, train control, electrical control, station operation, train planning and mobile operation - Unit labour cost [staff cost / FTE] - Share of staff cost [staff cost / total operation cost] - Staff cost / m train-km - Annual gross working time [h / FTE] - Annual net working time [h / FTE] - Share of net working time - Gross working time per week - Net working hour costs [staff cost / net working hours] - Productivity (train km / FTE)

Table 4-7: Catalogue of available support costs benchmarking

Catalogue of support costs benchmarking metrics
Costs - Total costs - Staff costs - Non-staff costs - Hardware costs *(Information Management only)* - Software costs *(Information Management only)* - Outsourcing costs *(Information Management only)* - Other costs *(Information Management only)*
Organisation outputs benchmarks - Human Resources cost (staff and non-staff) / network km - Information management cost (staff and non-staff) / network km - Finance cost (staff and non-staff) / network km - Procurement cost (staff and non-staff) / network km - Other corporate services cost (staff and non-staff) / network km
FTE/headcount - Human Resources cost (staff and non-staff) / headcount - Information management cost (staff and non-staff) / FTE - Other corporate services (staff and non-staff) / FTE

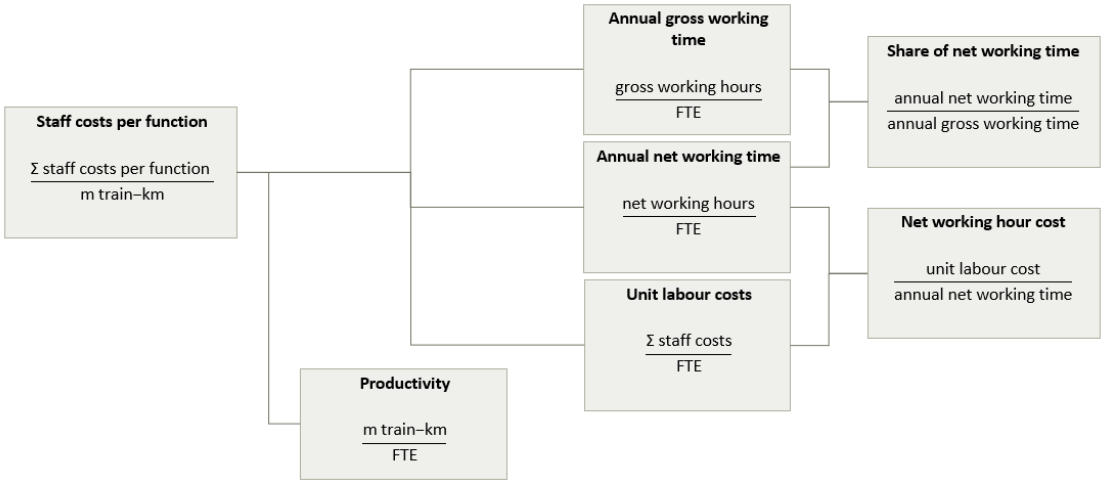
Catalogue of support costs benchmarking metrics
Total operating costs - Finance cost (staff and non-staff) / headcount - Other corporate services cost (staff and non-staff) / headcount
Contracts awarded - Procurement cost (staff and non-staff) / £ contract awarded - Procurement cost (staff and non-staff) / contract awarded
Contracts managed - Procurement cost (staff and non-staff) / £ contract managed
Function FTE - Human Resources cost (staff and non-staff) / human resources FTE - Information management cost (staff and non-staff) / Information Management FTE - Finance cost (staff and non-staff) / finance FTE - Procurement cost (staff and non-staff) / procurement FTE - Other corporate services cost (staff and non-staff) / other corporate services FTE

5 Benchmarking Network Rail Operations Costs

5.1 This section sets out the benchmarking and analysis undertaken to compare Network Rail's costs for Network Operations with other comparable organisations. It identifies the likely reasons for differences between Network Rail and these organisations and draws conclusions on which gaps and areas of difference could be actionable.

5.2 The figure below shows the benchmarking metrics for the operations functions and how they relate to each other:

Figure 5-1: Metrics analysed in operations benchmarking



Explaining the sequence of benchmarks

5.3 First, staff costs for the relevant function are analysed and related to the total traffic volume measured in million train-km per year, to provide a key measure of cost per output. Staff costs are the main driver of operations expenditure, accounting for 88.9% of Network Rail's total operations costs; ancillary and other non-staff costs account for only a minor share. Therefore, the operations benchmarking focuses on labour costs, including insurance payments, overtime and sick pay. As noted in our benchmarking methodology, labour costs are normalised for purchasing power parity.

5.4 Second, the analysis considers the fact that the availability of employees differs. Gross working hours are defined as the contracted hours per year plus overtime, whereas the net working hours are obtained by deducting bank holidays, individual holidays, sick leave and other absences such as travel times and training from the gross working hours. Thus, the net working hours represent the effective time an employee is productive. A few Infrastructure Managers were not able to provide overtime hours, and this is noted in the figures as a deviation from the definition.

5.5 The net working hours are additionally used as an input to the calculation of net working-hour costs. This value represents the average cost level per productive working hour and is obtained by dividing the unit labour costs by the number of net working hours.

5.6 Unit labour costs, in turn, are calculated by dividing the annual staff costs by the number of FTEs, expressing the average labour cost level for one FTE per year.

5.7 Productivity is mainly measured by dividing annual million train kilometres by the number of FTEs required to produce them – although, as below, there is a different productivity metric for electrical control. The number of employees is driven by the size and utilisation of the network, but also by the degree of centralisation of network control, the technology employed, and the degree of electrification.

5.8 In the case of the electrical control function, productivity is measured by dividing electrified track-km by the number if FTEs, as the amount of work is strongly driven by the size of the electrified network.

5.9 All values shown in the following section are expressed in GBP and adjusted for purchasing power parities. The data for peer organisations is anonymised using alphabetical letters, which are alternated for each benchmark, so individual organisations are not identifiable. The years shown in each figure are calendar years.

Benchmarking operations outputs

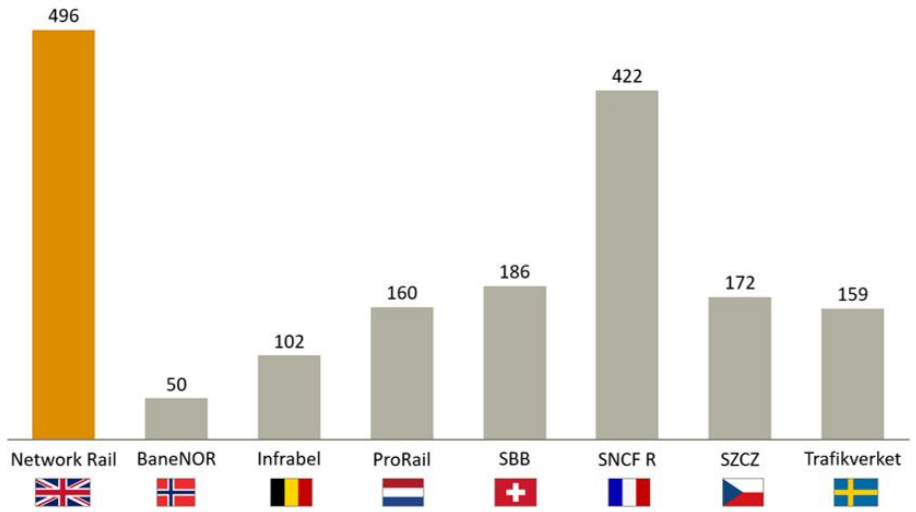
5.10 Each of the networks operated by the Infrastructure Managers participating in this study is different, varying in terms of levels of traffic, size, degree of electrification, utilisation and performance. These are all factors that can drive costs, both directly and through the strategic choices and priorities of the relevant Infrastructure Manager.

5.11 The following benchmarks for the respective networks and their outputs therefore provide context for and background to the benchmarking of operations, as we all as potential explanatory factors.

Network size

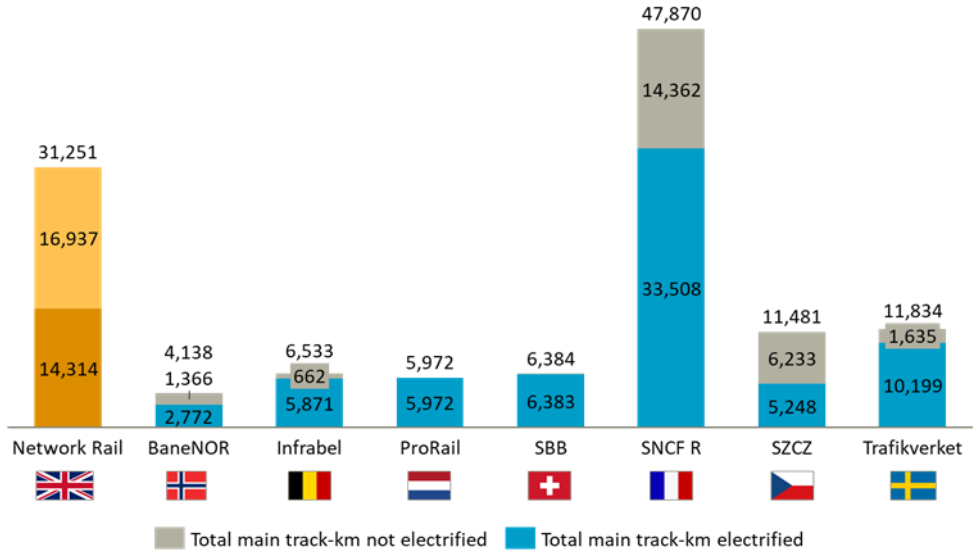
5.12 In terms of traffic volumes, as shown in figure 5-2, below, Network Rail had the highest train-km of all the participating peers in 2021, followed by SNCF Réseau. SBB, ProRail, SZCZ and Trafikverket reported similar traffic volumes. BaneNOR had the lowest traffic volume, with 50 million train kilometres in 2021.

Figure 5-2: Total m train-km 2021



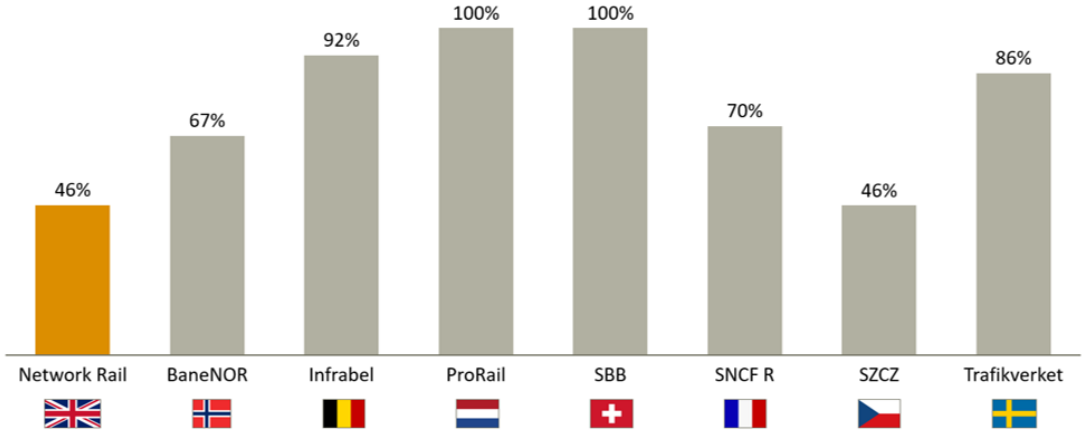
5.13 In terms of network size by track-km, in 2021 SNCF Réseau had the largest network, followed by Network Rail with 31,251 track-km. Trafikverket and SZCZ follow with both more than 11 thousand track-km.

Figure 5-3: Total main track-km 2021



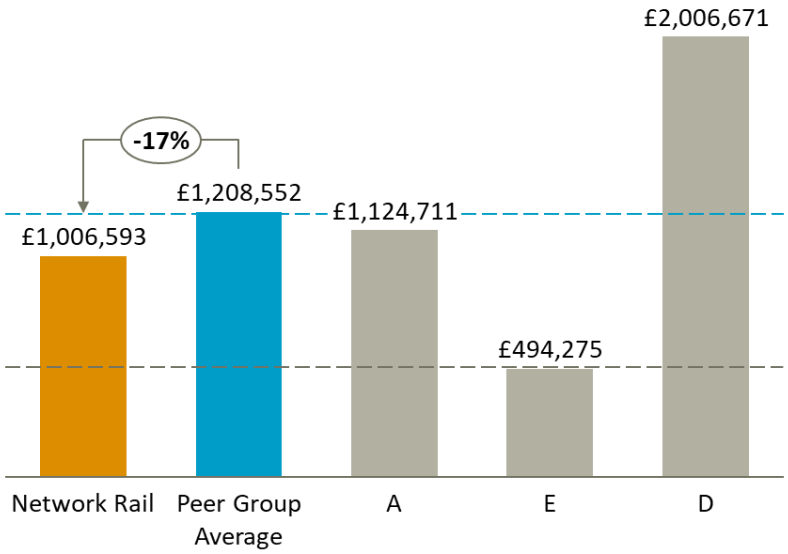
5.14 The proportion of electrified track-km varies widely across countries. Only 46% of Network Rail's and SZCZ's network was electrified in 2021, whereas ProRail and SBB have fully-electrified their network.

Figure 5-4: Electrified main track-km / total main track-km



5.15 We can also compare overall annual network operations expenditure in relation to traffic volumes across the peer group. This metric provides information on the cost efficiency of the infrastructure managers' operations. Network Rail's expenditure per train-km is second in the peer group at around £1 million, which is 17% below the group average. However, when compared to Peer E, which has reduced its operating costs through significant simplification and automation of the network, the potential for Network Rail cost savings is apparent.

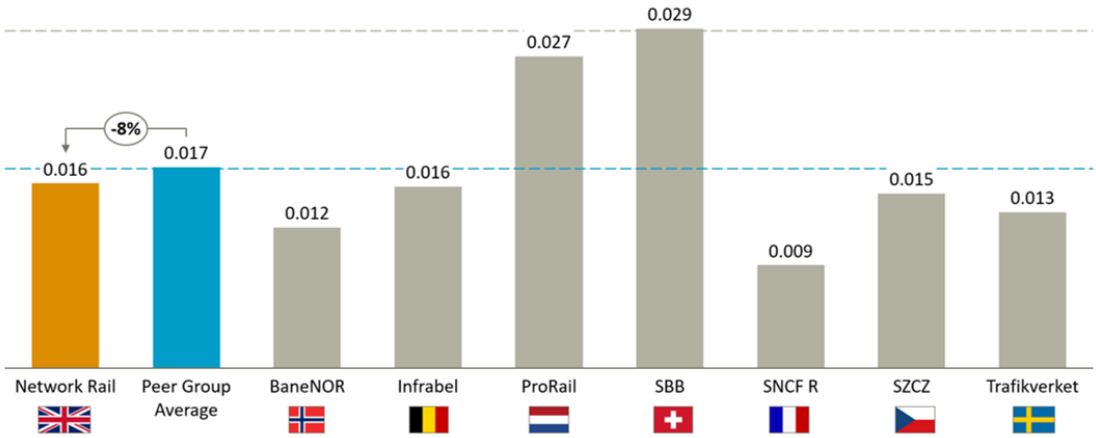
Figure 5-5: Annual network operations expenditure [total operations cost / m train-km]



Network utilisation and complexity

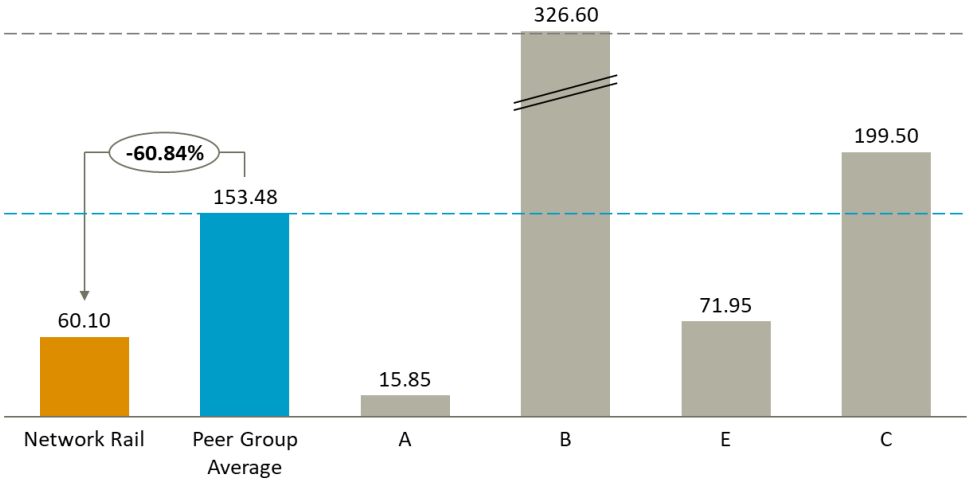
5.16 Network utilisation, measured as million train-km per main track km, is an important cost driver – the higher the train frequencies, the more operations activities are needed. Network Rail's utilisation is in line with the average for its peers. ProRail and SBB have the highest utilisation, as their networks are relatively small, but with a high traffic volume.

Figure 5-6: Network utilisation [m train-km / main track-km]



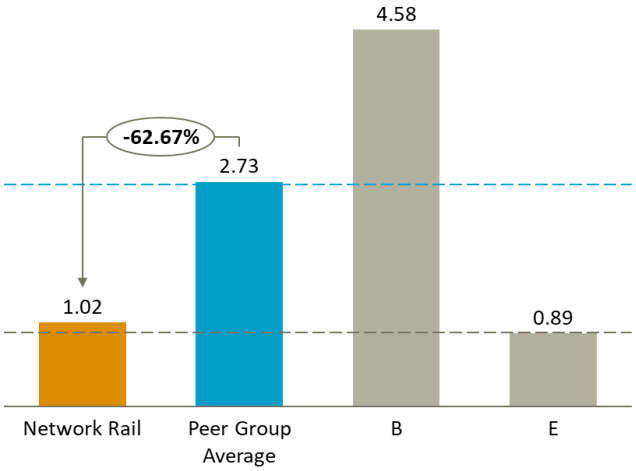
5.17 The extent to which the control of the network is consolidated or centralised is indicated by the number of train control FTE and the main track-km per manned control point. The degree of consolidation or centralisation often has a significant impact on the efficiency of operations. Network Rail's ratio of main track-km per staffed control point is significantly lower than the peer group average of 153.48 km / staffed control point. Moreover, Network Rail ranks second-lowest in the peer group with 60.1 km per staffed control point. Peers B and C have considerably reduced manned control points and switched to remote control.

Figure 5-7: Main track-km / staffed control point



5.18 The level of controller FTE in per staffed control point, also indicates that Network Rail has a substantially lower level of consolidation compared to the highest level among the peer group. Network Rail has an average staffing ratio of only 1.02 FTE / staffed control point. Peer B, on the other hand, has more than four times this staffing ratio, due to the extent it has consolidated and digitised its control centres.

Figure 5-8: Controller FTE / staffed control point



5.19 In addition to the level of consolidation or centralisation of train control, network complexity can also be a major driver of operations costs. Network complexity can be indicated by the number of railway assets per track-km.

5.20 The tables below show number of switches and crossings and the number of level crossings per main track-km. In both cases, Network Rail is well below the peer group average, at around half the level of signalling and level crossing assets per track-km.

Figure 5-9: Number of switches and crossings / main track-km

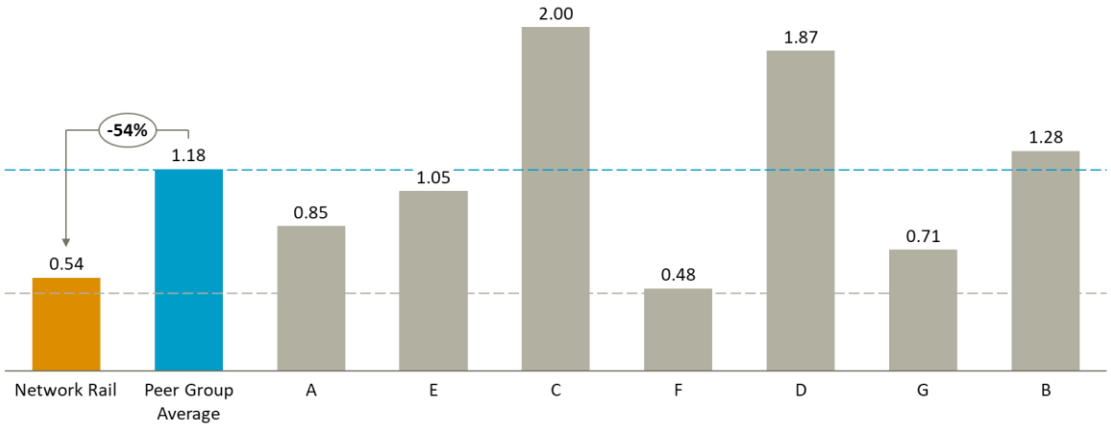
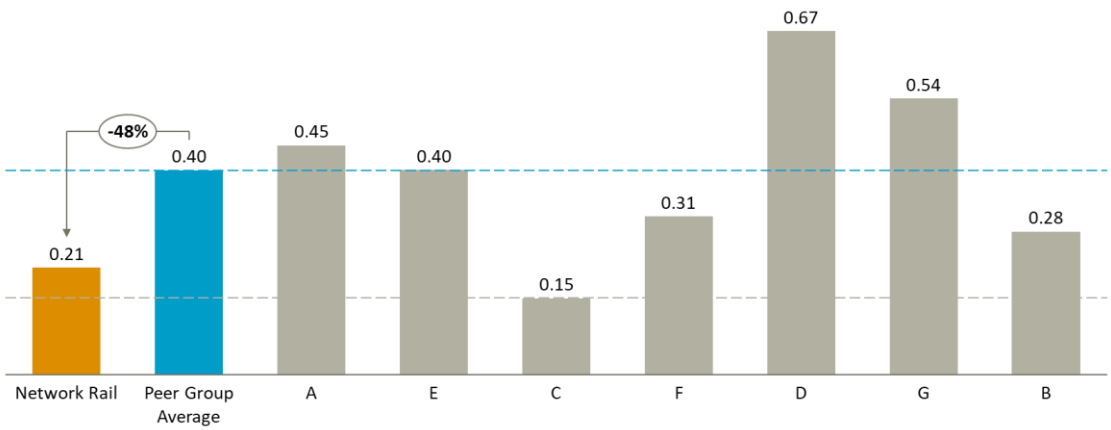


Figure 5-10: Number of level crossings / main track-km



5.21 While this highlights a relatively low level of network complexity overall, when compared to the peer group, it may also reflect a network that is spread over a larger geographic area and less concentrated on urban areas than many peers, which will bring its own challenges and drivers of cost.

5.22 It is also important to note that the nature and variety of the signalling assets and technologies operated is also a source of complexity and a driver of staff and cost levels. For historical reasons, such as differences in the technologies developed by national manufacturers as well as the investment cycles of national railways, the signalling technologies used in different countries vary widely. Currently, Network Rail operates nearly 400 signal control points, each servicing a single, typically mechanical, interlocking and therefore have a low overall span of control. Network Rail's signalling equipment ranges from legacy systems with locally operated switches, sometimes even without signals, to remote-controlled interlockings that enable the first steps towards consolidating traffic control, and modern computerised control centres that enable the highest degree of centralisation.

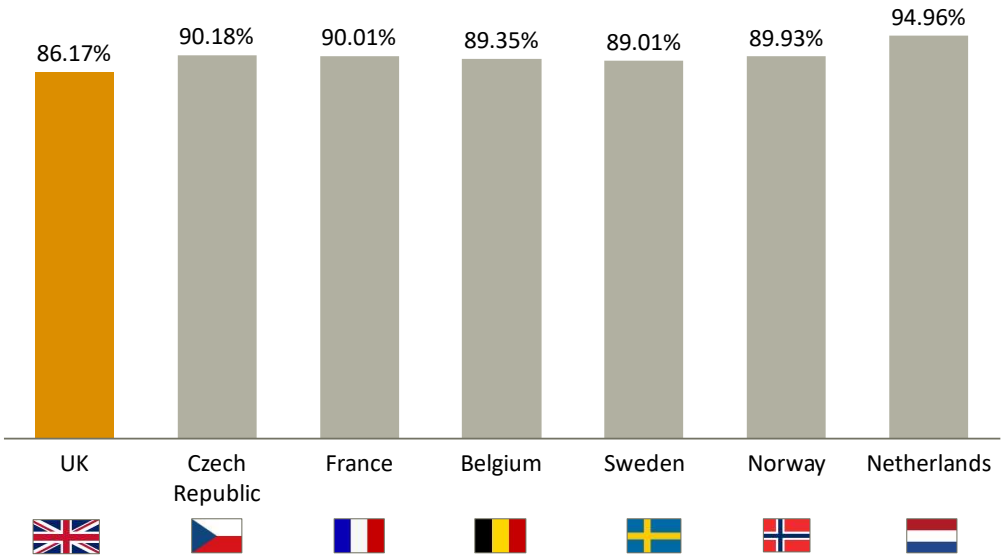
Network performance

5.23 The following performance indicators are taken from the Rail Market Monitoring (RMMS) Seventh Monitoring Report on Rail Market Development from the Commission to the European Parliament and the European Council, published in 2021.

5.24 Punctuality, defined as passenger services with a delay of five minutes or less, is an important indicator of operational performance that may also be reflected in costs (with better performance requiring greater maintenance and renewal expenditure and/or investment in improved train control technology).

5.25 For regional and local passenger services, the UK had the worst performance of the peer group, with 86.17% of trains arriving within 5 minutes of their scheduled time (2018 figures), whereas the Netherlands achieved a punctuality of 94.96%, despite high network utilisation. It should be noted that the Rail Market Monitoring System, most recently reported in 2018, and from which this data is taken, does not include data for Switzerland, although it is part of our benchmarking peer group.

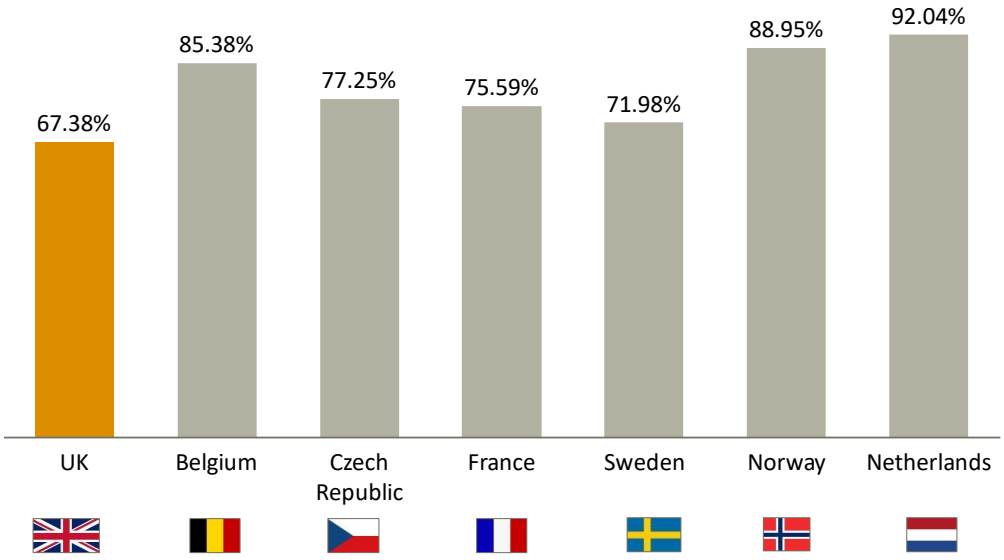
Figure 5-11: Punctuality of regional and local passenger services per country (2018)



Source: Rail Market Monitoring System Report, 2020

5.26 For long-distance and high-speed passenger services, the UK also reported the lowest punctuality of the participating countries, at just 67.38%, whereas Norway and the Netherlands performed best, achieving around 90%.

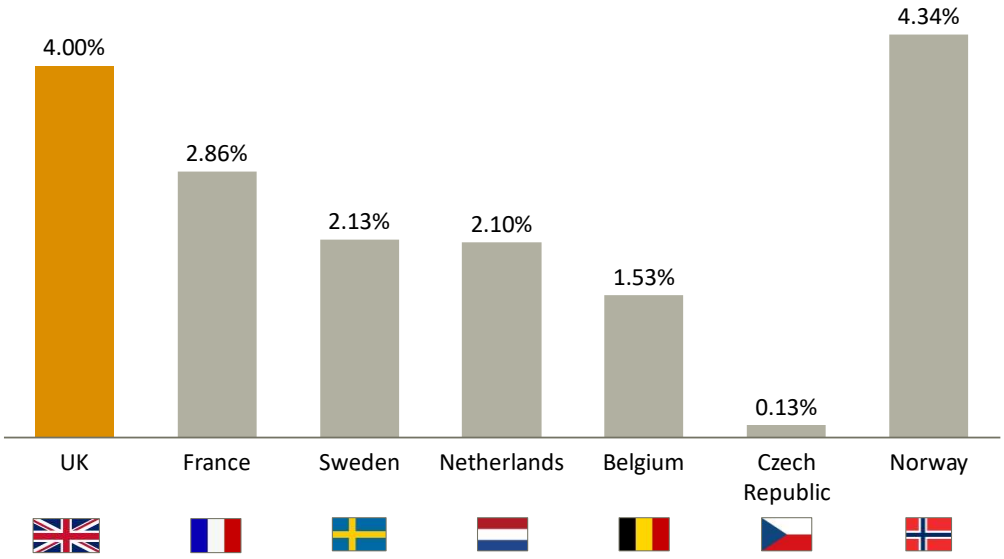
Figure 5-12: Punctuality of long-distance and high-speed passenger services per country (2018)



Source: Rail Market Monitoring System Report, 2020

5.27 Another indicator for operational performance is reliability, measured as the share of cancelled services in the total number operated. In the following figure, a higher bar indicates a higher percentage of services cancelled in total and thus lower reliability. For regional and local passenger services, Norway and the UK reported the worst reliability in 2018.

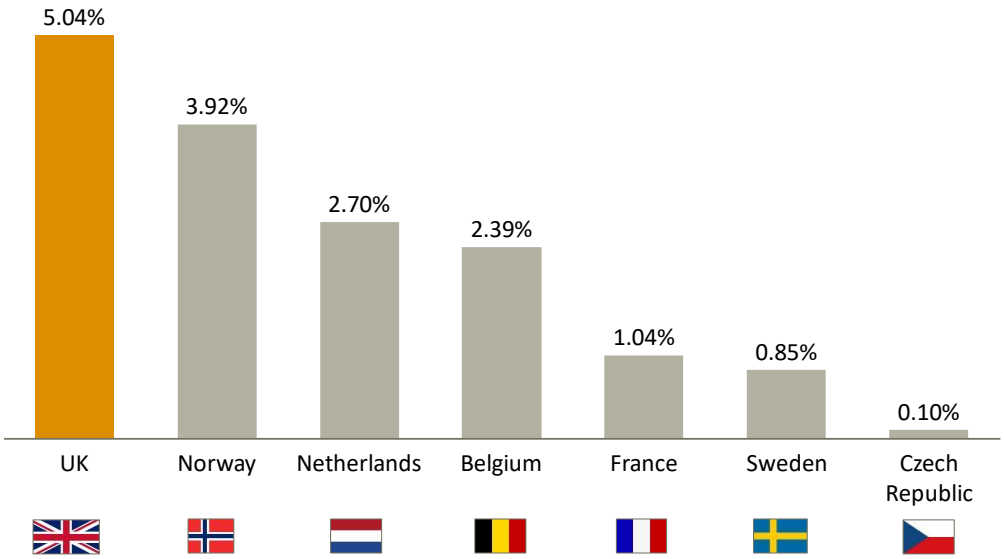
Figure 5-13: Reliability of regional and local passenger services per country (2018)



Source: Rail Market Monitoring System Report, 2020

5.28 For long-distance and high-speed passenger services the picture is similar, although in this case the UK performed worst, with 5.05% of passenger services cancelled.

Figure 5-14: Reliability of long-distance and high-speed passenger services per country (%, 2018)



Source: Rail Market Monitoring System Report, 2020

5.29 In summary, Network Rail operates high volumes of train services, across one of the largest networks in Europe, but it does so at a relatively high level of cost. The size and spread of its network will bring challenges – and other factors will influence performance – but neither its comparative levels of network utilisation nor complexity should be a barrier to efficiency, and its overall punctuality and reliability does not compare favourably with peers. As such, there should be opportunities to deliver more efficient operations that, at the very least, do not come at the expense of network performance.

Network Rail operations functions benchmarked

5.30 The definition of the operations functions benchmarked as part of this study was set out in detail in Section 2. The table below summarises the key facts on costs and staff in scope for each area of operations.

Table 5-1: Summary of Network Rail operations functions in scope

Function	Annual cost[1]	Benchmarked cost[2]		Benchmarked staff[2]		Staff cost proportion[4]
		£	% share[3]	Number	% share[3]	
Signalling	£292m	£292m	59%	4,064	65%	99%
Train control	£70m	£70m	14%	527	8%	71%
Electrical Control	£22m	£22m	4%	193	3%	100%
Station Operations	£82m	£50m	10%	525	8%	43%
Train Planning	N/A	£16m	3%	383	6%	91%
Mobile Operations Management	£48m	£48m	10%	601	10%	97%

[1] where it is specifically identified in Network Rail's Regulatory Financial Statement, 2021/22. **Excludes Operations Management** (£87 million)

[2] from Network Rail data provided for this benchmarking, for the defined activities and costs in scope

[3] proportion of the total provided by Network Rail for all of the operations costs and staff in scope

[4] proportion of the total cost for this function that is staff costs

5.31 In the next section, benchmarks for each area of operations costs in scope are analysed in turn, with differences explained and potential areas for action identified.

Benchmarking signalling costs

Explaining the benchmarking figures

5.32 Unless otherwise stated, in the figures presented in this section:

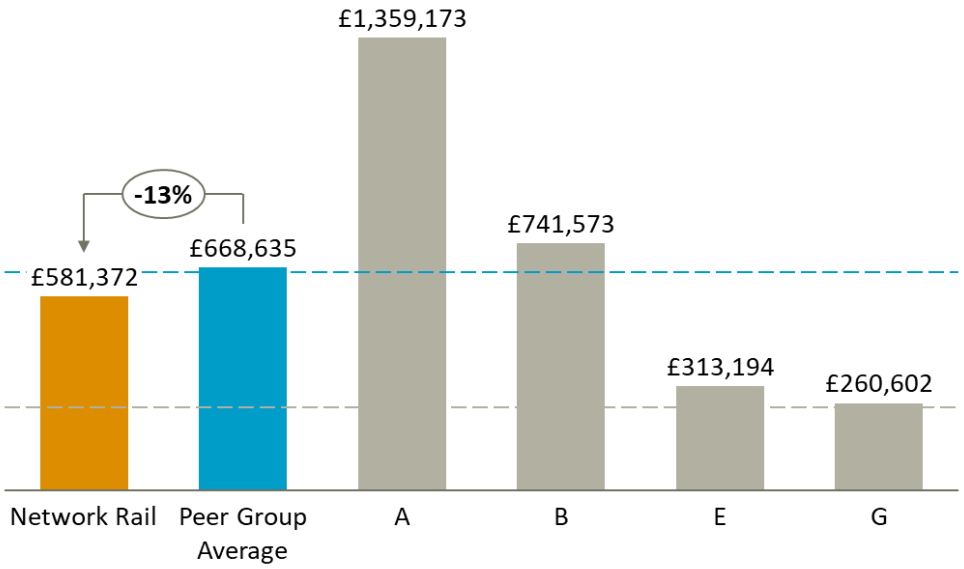
- Network Rail and peer group average benchmarks, are displayed by the orange and blue bars, respectively
- Peer group (peer) organisations are shown by the grey bars
- If there are 2 bars included in the figures, the darker shades (of orange, blue and grey) represent total costs, and the lighter shades represent staff costs
- The dotted blue line illustrates the peer group average level for the benchmark (where there is more than one peer organisation shown)
- The dotted grey line illustrates the most efficient benchmark level within the peer group
- The percentage arrow illustrates that difference between the benchmark value of Network Rail and that of the peer group average
- The legend key should be referred to for any other colours present in figures

Signalling cost analysis

5.33 In line with the agreed definition of signalling activity, this assessment includes all employees directly engaged in the operation of signalling and level crossing equipment on the railway infrastructure. The main tasks are keeping track of train operations, giving movement authorities to trains and communicating with train drivers. In addition, signallers intervene in case of incidents and escalate problems to controllers.

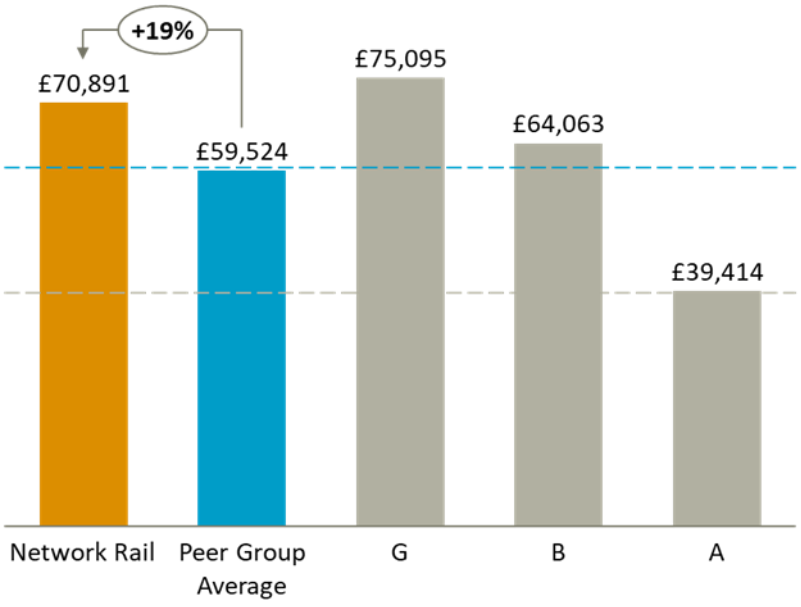
5.34 Network Rail's signalling staff costs account for 98% of total signalling expenditure (the peer group average is 93%), which also include ancillary and other non-staff costs. As can be seen in the next figure, Network Rail's staff costs per million train-km are 13% lower than the average for the peer group. This shows that for the current levels of signalling technology, and given the current level of traffic density, Network Rail's operations costs per train-km are favourable compared with some of the peers included in this study. However, its costs are significantly higher than peers E and G, both of which have carried out significant simplification of their networks in recent years and have greater automation of signalling than Network Rail.

Figure 5-15: Signalling staff costs / m train-km



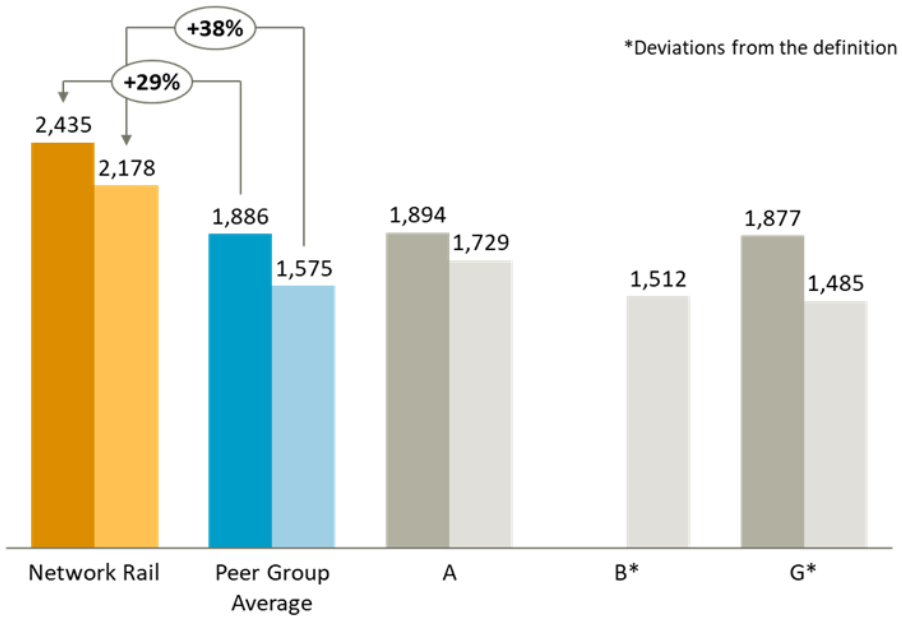
5.35 In contrast, at £70,891 per year, Network Rail's unit labour costs (which include insurance payments, overtime and sick pay) for signallers are 19% higher than the peer group average (£59,524). It should be noted that the IDR/Steer review of rail industry employment costs, conducted on behalf of ORR, found that signallers' total reward was below market.

Figure 5-16: Signalling unit labour cost [staff costs / FTE]



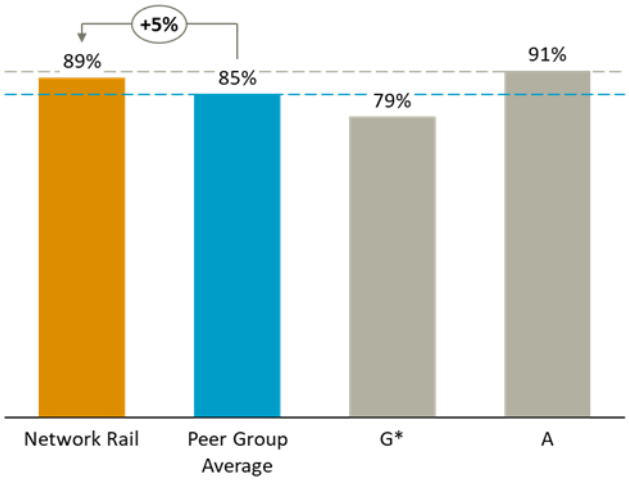
5.36 Net working time deducts bank holidays, individual holidays, sick leave and other absences such as travel times and training from gross working time. Among the peer group, Network Rail has the highest levels of annual gross and net working time. Its annual figure of 2,435 hours per FTE, shown below, equates to a gross working time per week of over 46 hours, which, driven by overtime, is substantially higher than that of the peer group average of 36 hours and would reflect a resourcing gap. However, peer organisations B and G were not able to provide supporting data on overtime, and peer organisation B could only provide figures for net working hours. Therefore, the difference in gross and net working time for Network Rail compared to these peers is likely to be lower than indicated in the figure.

Figure 5-17: Signalling annual gross & net working time [h / FTE]



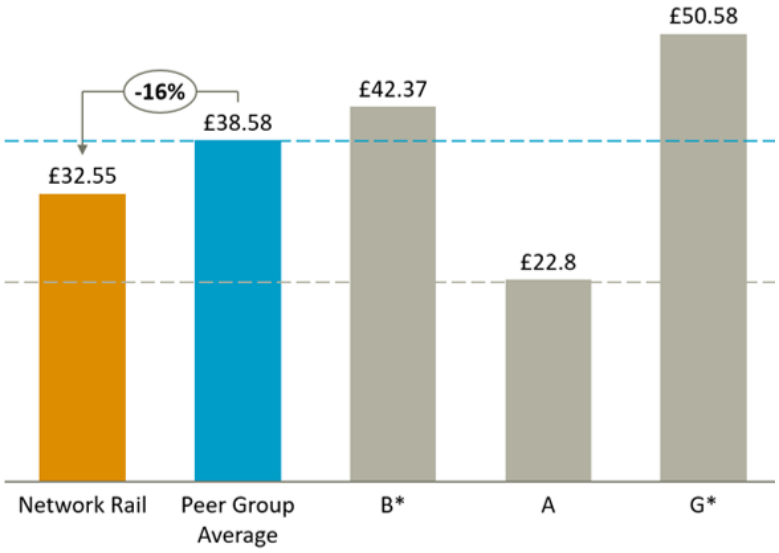
5.37 Network Rail has a high proportion of net working (i.e. productive) time to gross working time. Net working time deducts bank holidays, individual holidays, sick leave and other absences such as travel times and training from gross working time. Therefore, all other things being equal, Network Rail's proportion of 89%, 5% above the peer group average, would be a positive indicator of productivity. Peer organisation B is not included in the figure below, as it was only able to provide data for net working hours.

Figure 5-18: Signalling share of net working time [net working time / gross working time]



5.38 As a result of high levels of productive time, at £32.55 per hour, Network Rail's cost per net working hour for signallers is lower than most peers, except for organisation A.

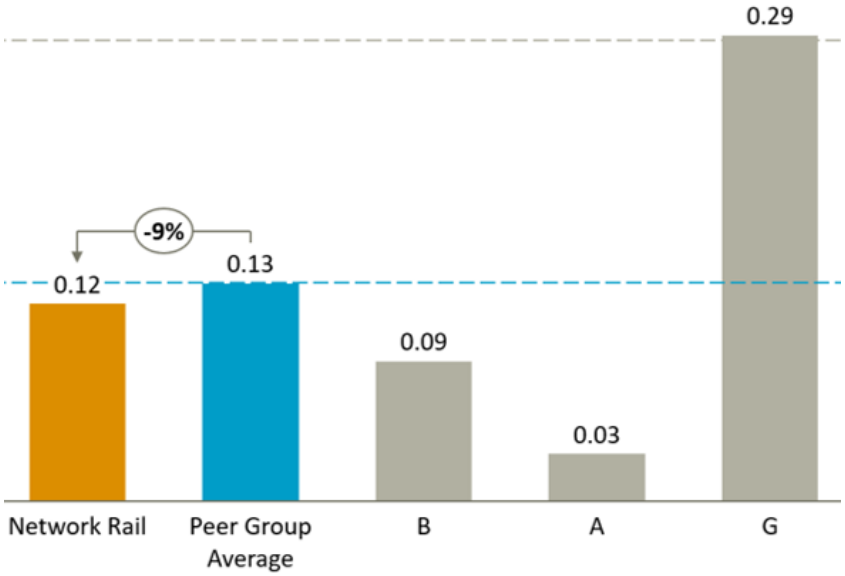
Figure 5-19: Signalling net working hour cost [staff costs / annual net working hours]



5.39 The analysis of signalling costs so far suggests that, although Network Rail's costs per FTE are comparatively high, the level of productive time per signaller offsets this to achieve a relatively good level of efficiency as a cost per hour input. It is important, therefore, to consider these costs in relation to the outputs delivered.

5.40 In terms of the productivity of signalling, expressed in million train-km per FTE, Network Rail is close to the average, as shown in the figure below. However, peer organisation G shows the potential to achieve productivity levels more than twice the average value. A key driver of productivity is the degree of automation and consolidation/centralisation of the signalling system, which determines the number of signallers required.

Figure 5-20: Signalling productivity [m train-km / FTE]



5.41 In summary, looking across signalling costs benchmarks:

- Network Rail's costs per FTE are comparatively high, driven by levels of overtime;
- High levels of productive net working time offset this to achieve a relatively good level of efficiency as a cost per hour input; and
- As a result, Network Rail's overall signalling productivity in relation to outputs delivered (m train-km) is average for the peer group, with a material gap to the best in class

Explaining differences in signalling costs

5.42 Peers with significantly lower unit costs per train-km have less complex networks (as measured by signalling assets per track-km) and more centralised network control arrangements with far fewer staffed control points. This suggests that cost savings could be achieved by reducing the number of signal boxes and staffed control points and thereby extending each signaller's span of control.

5.43 Peer organisations are either in the process of centralising or have already fully centralised their network control. They have also all reduced the number of signal boxes, reflected in lower FTEs per m train km. This explains why peer organisation G achieves significantly higher productivity. Despite higher unit labour costs and a lower share of net working time, organisation G's labour costs per train-km are lower than those of Network Rail.

5.44 The impact of consolidating network control on signalling productivity is further evidenced by the fact that peer organisation A, the lowest performing in this category, still has a very decentralised network, with old electromechanical safety devices and a very high density of stations. It has few remote-control centres, which are mainly responsible for high-speed corridors, and two thirds of the network is locally controlled.

5.45 Network Rail's significantly lower productivity compared to the best in class is due primarily to its high number of staffed control points. This suggests that greater technology migration and consolidation of signalling could lead to significant productivity improvements and ultimately to cost savings in network operations.

5.46 We should also consider punctuality and reliability as the key output for rail users. In this context, better-performing peers have focused on the integration of traffic management with the signalling system. This integration enables real-time data exchange, facilitating traffic management decisions and enhancing the overall efficiency of the system. These benefits have been demonstrated in investment undertaken by at least one of Network Rail's peers.

5.47 In particular, SBB has developed a new Traffic Management System called Rail Control System (RCS) to regulate and monitor its network. The system allows conflicts to be detected quickly and accurately and includes Automatic Route Setting and algorithm-based decision support tools that can improve the signalling process. This reduces the dependency on manual interventions, with benefits for workload and productivity. Furthermore, it has the potential for better performance outcomes once successfully implemented.

Areas for action on signalling costs

5.48 Considering the productivity gap to the best in class, upgrading the signalling system is a significant area to consider in reducing operations costs. Eliminating outdated electronic mechanical interlockings and adopting advanced signalling systems like the European Train Control System (ETCS) enables wireless communication, precise train positioning, and real-time data exchange, leading to improved safety, increased capacity, and enhanced operational efficiency, in terms of m train-km per FTE. SBB has already equipped its entire network, and Infrabel and ProRail are in the process of deploying ETCS on a large scale. Furthermore,

consolidating the number of signal boxes and centralising control in fewer operating locations can yield substantial cost savings. By consolidating control and reducing physical infrastructure, Network Rail could reduce staff requirements and improve resource allocation.

5.49 We note that while Network Rail has begun its journey to greater digitisation, automation and consolidation through the Digital Railway Programme, the full implementation of ETCS in the next Control Period is unlikely. Moreover, although the intention is to move to a situation in which use of digital technology is the norm, there may be parts of the network where full digitisation and consolidation of signalling technology are not affordable or cost effective. The Digital Railway Programme has therefore identified areas of the network that would benefit most from the early deployment of digital train control. In the meantime, Network Rail should focus on and accelerate the integration of traffic management and decision support tools.

5.50 Whereas Network Rail's overall level of complexity, in terms of signalling assets per track-km, is relatively low, there may still be further efficiency opportunities as they have low utilisation levels compared with some infrastructure managers with similar network complexity. Infrastructure managers such as ProRail have high network utilisation and have still reduced numbers of switches, crossings, and level crossings significantly through a comprehensive programme of network redesign and optimisation. This simplifies the signalling infrastructure, reduces maintenance requirements, and enhances system reliability.

5.51 Finally, with average gross staff working time over 46 hours per week, Network Rail relies heavily on overtime. The organisation should aim to reduce this reliance through continued improvements in signaller recruitment and training, thereby reducing unit labour costs in the next control period.

Table 5-2: Areas of focus for signalling

Metric	Key focus area
Staff costs / m train-km	Further reducing the number of signalling boxes and staffed control points
Unit labour cost	Reducing overtime, which is paid at a higher hourly rate
Annual gross & net working time	Aiming to reduce the reliance on overtime through continued improvements in signaller recruitment and training
Productivity	Implementation of algorithm-based decision support tools Review opportunities for network simplification

Benchmarking train control costs

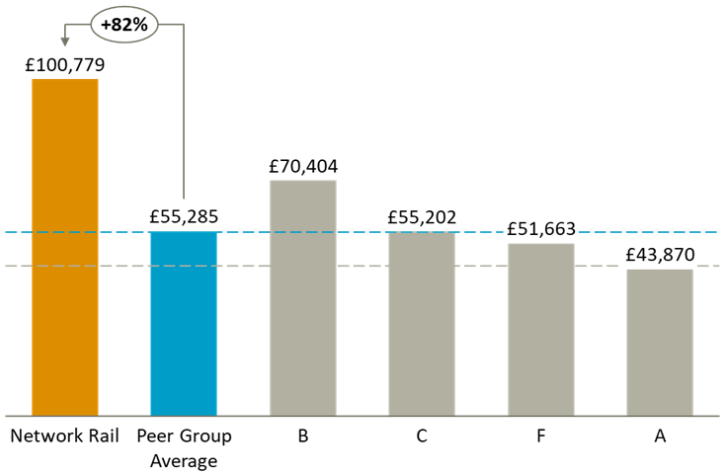
Train control cost analysis

5.52 Train control includes controller-grade staff directly engaged in operational route and incident control. Train controllers oversee the effective delivery and performance of the network in real-time and assume different roles: incident controllers are responsible for the coordination of failures and incidents in the railway network; route controllers focus on route operation and the effective delivery and performance of the network in real-time; and information controllers cascade information through the organisation and inform train operating companies, although not communicating directly with passengers on trains or at stations.

5.53 Network Rail's train control staff costs account for 71.3% of total train control expenditure, a lower proportion than for the rest of the peer group. Staff costs for train control per million train-km, at £100,779/m train-km, are high compared to the peer group average of £55,285/m

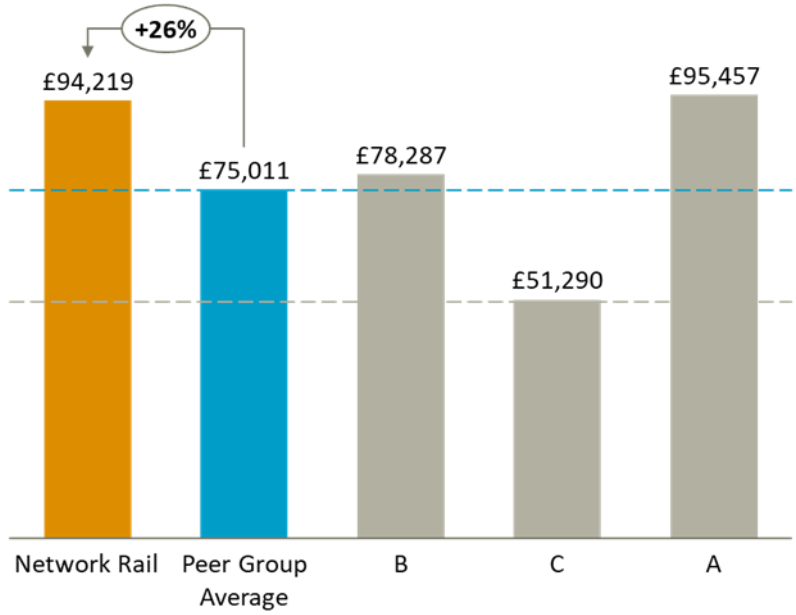
train-km. The high staff costs can be explained by the higher degree of centralisation of traffic control centres among several peers, as well as lower staff costs.

Figure 5-21: Train control staff costs / m train-km



5.54 Network Rail's unit labour costs for train controllers, at £94,219 per year, are 26% above the peer group average of £75,011. The IDR/Steer review of rail industry employment costs found that total reward for Controller grade staff at Network Rail was above market.

Figure 5-22: Train control unit labour cost [staff costs / FTE]



5.55 Network Rail's annual gross working time is 21% higher than the average of its peers, and at over 44 hours its weekly gross working time is the highest among all the organisations compared. Moreover, its 89% share of networking time (i.e. the share of productive hours) is above that achieved by all of its peers.

Figure 5-23: Train control annual gross & net working time [h / FTE]

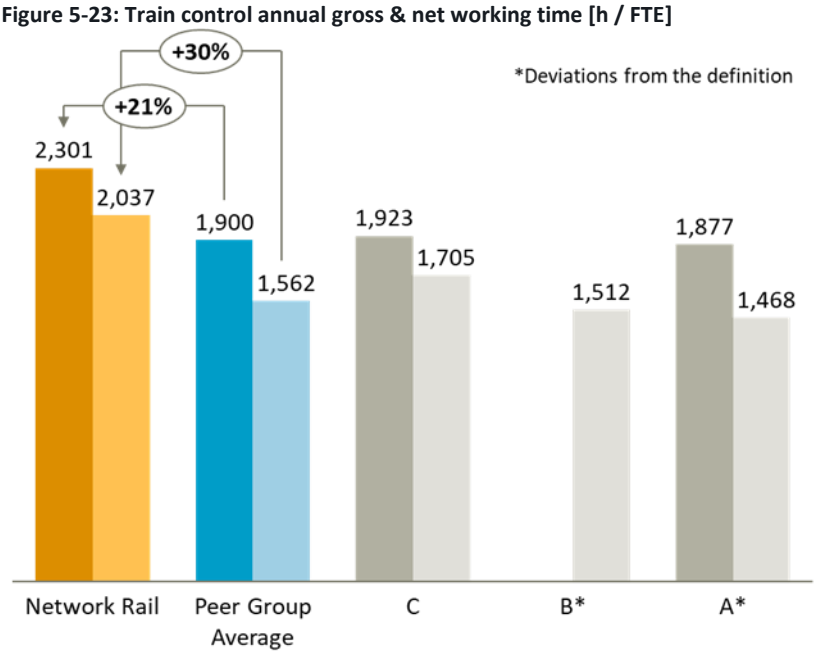
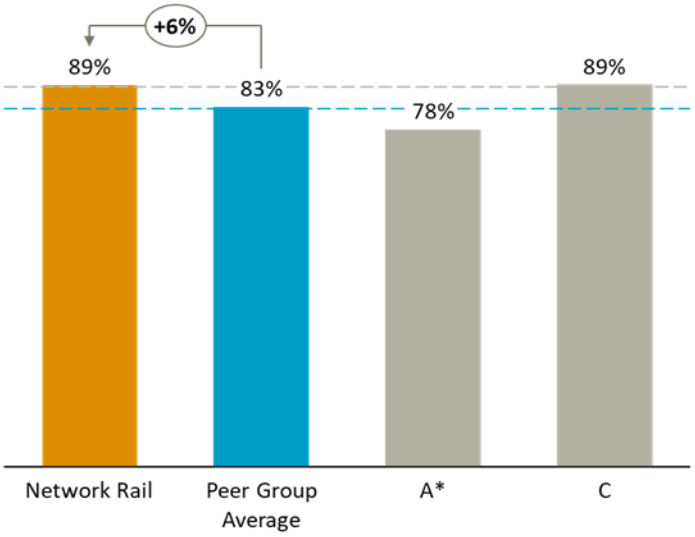
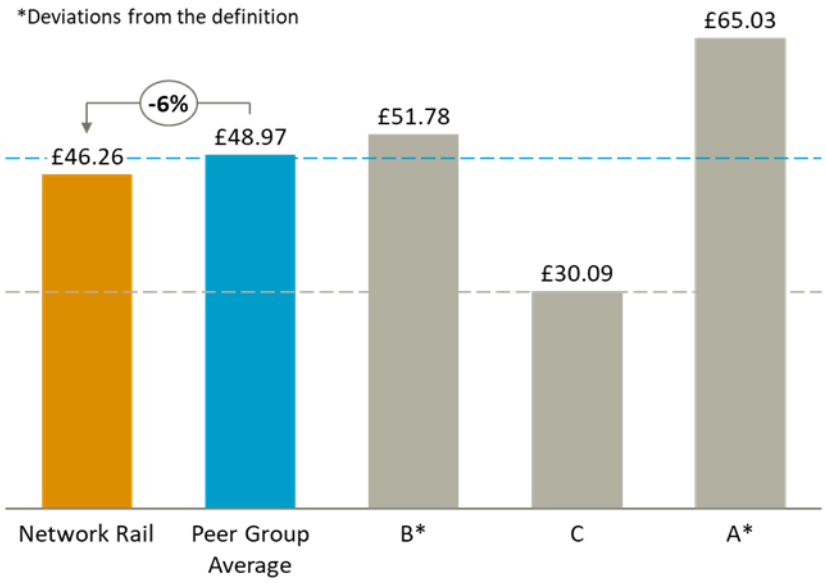


Figure 5-24: Train control share of net working time [net working time / gross working time]



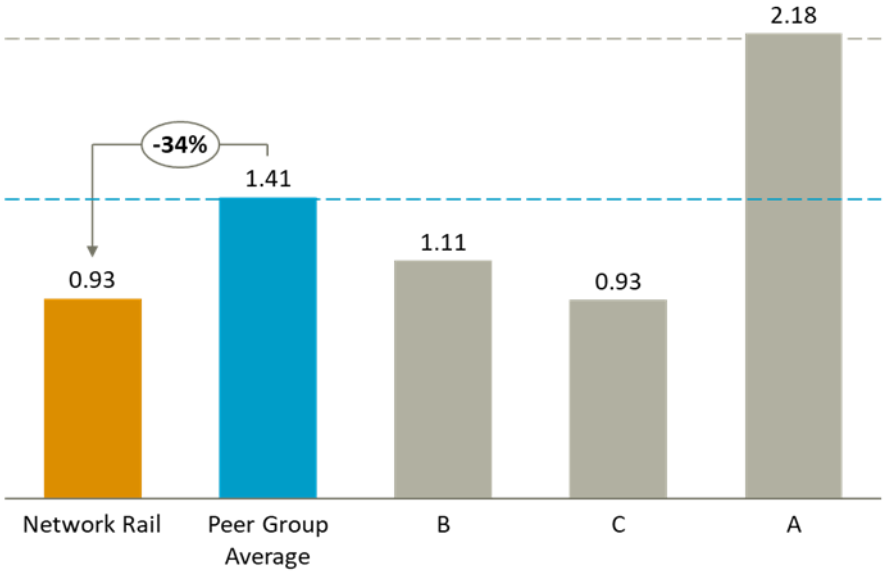
5.56 As a result of high levels of net working hours balancing high unit labour costs, Network Rail's cost per net working hour for controllers is comparable to the peer group's average, at £48.97 / hour.

Figure 5-25: Train control net working hour cost [staff costs / annual net working hours]



5.57 Network Rail's train control staff productivity, expressed in million train-km per FTE, is lower than the peer group average of 1.41, as shown in the figure below. Despite similar unit labour costs and net working hours, peer organisation A was able to achieve a level of productivity more than twice that of Network Rail.

Figure 5-26: Train control productivity [m train-km / FTE]



5.58 In summary, looking across train control costs benchmarks:

- Similar to the picture for signalling, Network Rail's costs per FTE are comparatively high, driven by levels of overtime;
- High levels of productive net working time offset this to bring staff costs per net working hour in line with peers; however
- The overall level of productivity for Network Rail train control is below average for the peer group, and significantly behind the best in class

Explaining differences in train control costs

5.59 This key difference in train control productivity can be explained by peers' higher degree of remote control, centralisation of control centres, and to an extent smaller networks, all of which requires fewer staff with a wider span of control. This is exemplified by the level of control achieved by organisation A.

5.60 As with signalling, Network Rail has a relatively high number of staffed control points, despite a level of network complexity (as measured by the number of signalling assets per track-km) in line with the average for the peer group.

5.61 In contrast, organisation A has reduced its number of traffic management control centres to one national and a few regional centres, which allows it to manage the network with relatively few controllers focused on improving the tracking of disruption, especially in the regions. Organisation A is planning to further increase network utilisation by 30%, with smart solvers and new technology for communication between traffic managers and drivers without direct verbal contact.

5.62 Peer organisation B has also reduced its number of control centres, and even considered further consolidation within a single centre. However, after taking account of recruitment issues, workload/fatigue and territorial balance, it decided to refrain from further centralisation and retain several centres across the network. Nevertheless, the degree of centralisation achieved, and the staff savings made, by organisation B contrast with the extra hours, high annual working time and high unit labour cost experienced by Network Rail.

5.63 Furthermore, the relative levels of performance described earlier in Chapter 5 suggest that Network Rail's controller workload is also driven by a comparatively high level of intervention required to manage performance incidents. In addition, staff costs per million train-km are relatively high.

Areas for action on train control costs

5.64 Centralisation plays a crucial role in reducing train control costs as it enhances coordination and communication between different control points, leading to improved efficiency and cost savings. Therefore, plans to consolidate control and reduce the number of staffed control points should be accelerated.

5.65 Control costs may also be reduced by upgrading the communication technology between train controllers and train drivers and replacing outdated radio transmission systems with new technology for communication without direct verbal contact. This enables secure and efficient information exchange, reducing communication errors and improving coordination.

5.66 Likewise, and as noted for signalling, the integration of traffic management and advanced decision support tools should also drive productivity improvements. By automating routine tasks and leveraging software and simulation solutions, control processes can be improved and manual interventions reduced. The direct savings in staff numbers and costs delivered by such solutions may only be relatively small, however they would also support improvements in train service performance and cost-efficiency.

Table 5-3: Areas of focus for train control

Metric	Key area
Staff costs / m train-km	Further consolidating control of the network and reducing the number of traffic management control centres

Metric	Key area
Unit labour cost	Increasing remote control and lowering overtime, paid on a premium rate
Annual gross & net working time	Automation of routine tasks and leveraging advanced software
Productivity	Implementing new communication technology to enable communication between controllers and drivers without direct verbal contact

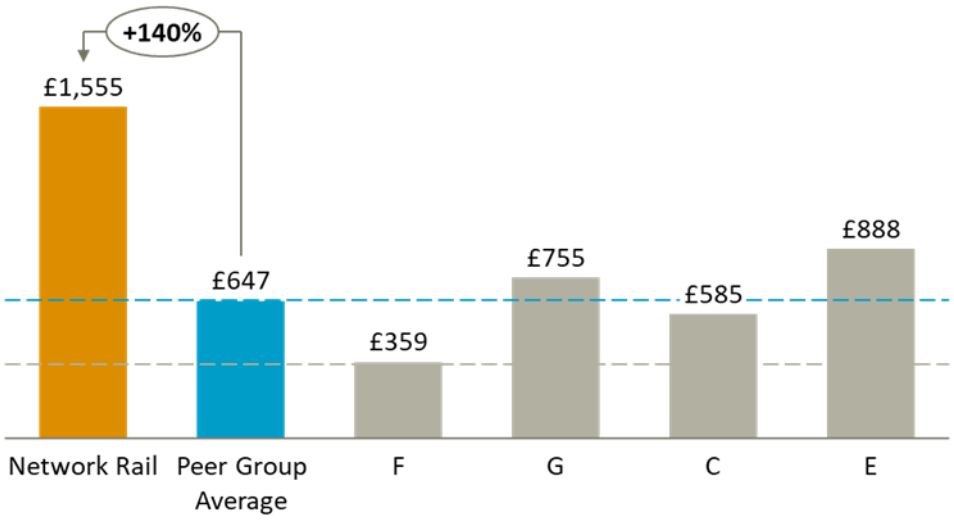
Benchmarking electrical control costs

Electrical control cost analysis

5.67 This function includes all staff engaged in controlling electrical operations, including management of power supply and isolations on the railway infrastructure for maintenance or renewals activities.

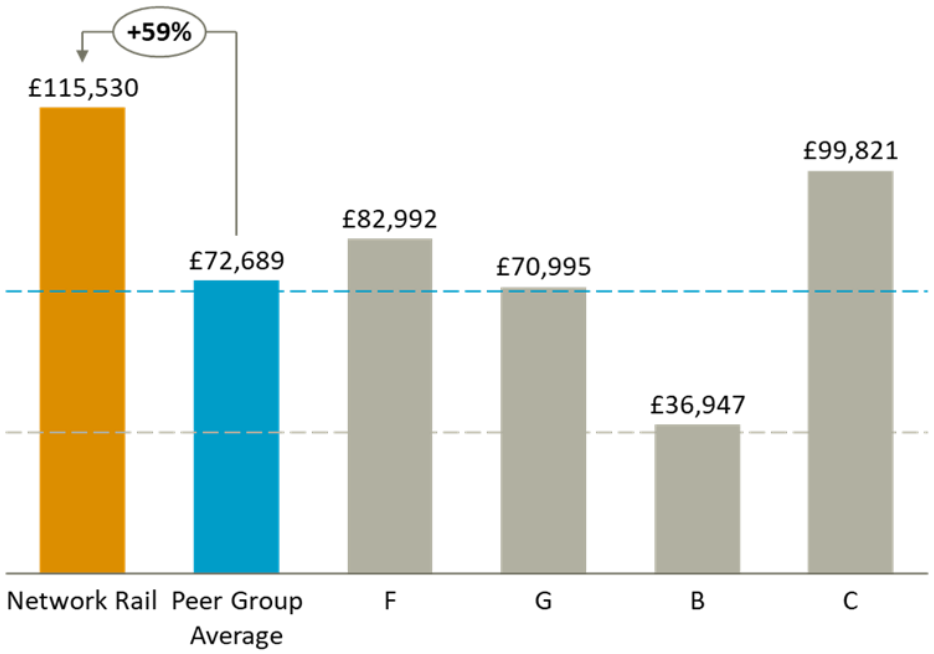
5.68 Network Rail's staff costs for electrical control per electrified track-km are 140% above the peer group average. These results are influenced by the size of the workforce and the level of labour costs as well as the extent of electrification of the network.

Figure 5-27: Electrical control staff costs / electrified track-km



5.69 Network Rail's unit labour cost for electrical controllers of £115,530 per year is the highest among the peer group. As this figure appears particularly high, we have sought to clarify with Network Rail that the source data for staff costs and FTEs is accurate. We have also compared this figure with results from the Review of rail industry employment costs (published on orr.gov.uk) conducted by IDR and Steer in October 2022 on behalf of ORR. This previous study also indicated a high cost for electrical controller roles, and only included spot rates for basic pay for all ECRO and median total reward for ECRO grades 5-7. Therefore a figure of £115,000 would need to be explained by high levels of working hours and overtime pay.

Figure 5-28: Electrical control unit labour cost [staff costs / FTE]



5.70 Network Rail's annual gross working time is 45% higher than that of its peers, a difference driven mainly by overtime (resulting in weekly gross working time of 53.98 hours compared to the peer group average of 37.12 hours). Consequently, the share of net working time for Network Rail is more than 10 percentage points higher than the average of 80.5%. This high average working week would also explain the high unit labour costs seen above.

Figure 5-29: Electrical control annual gross & net working time [h / FTE]

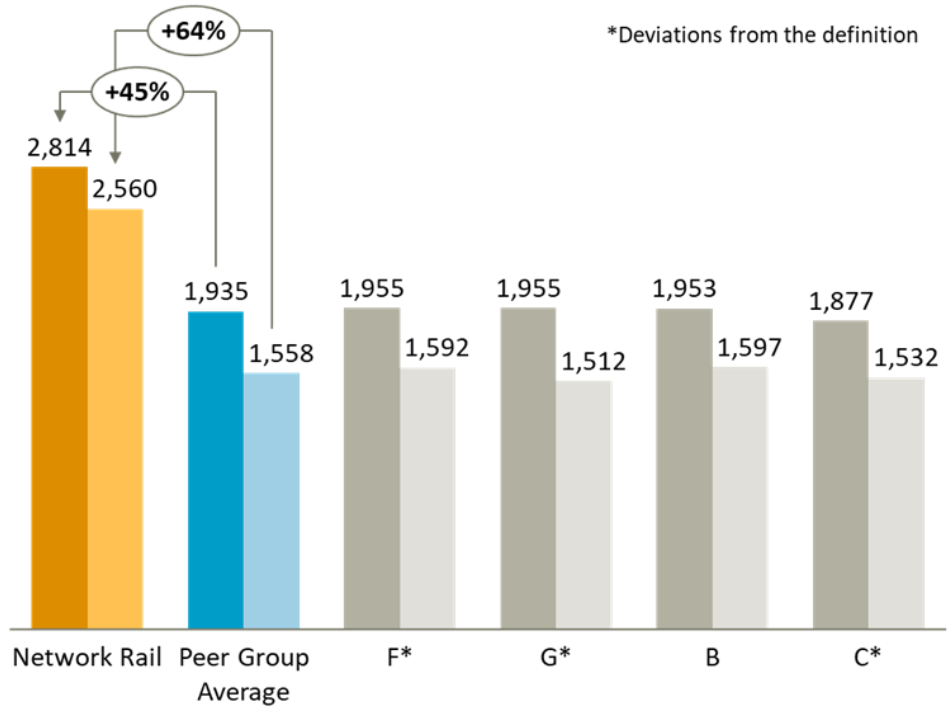
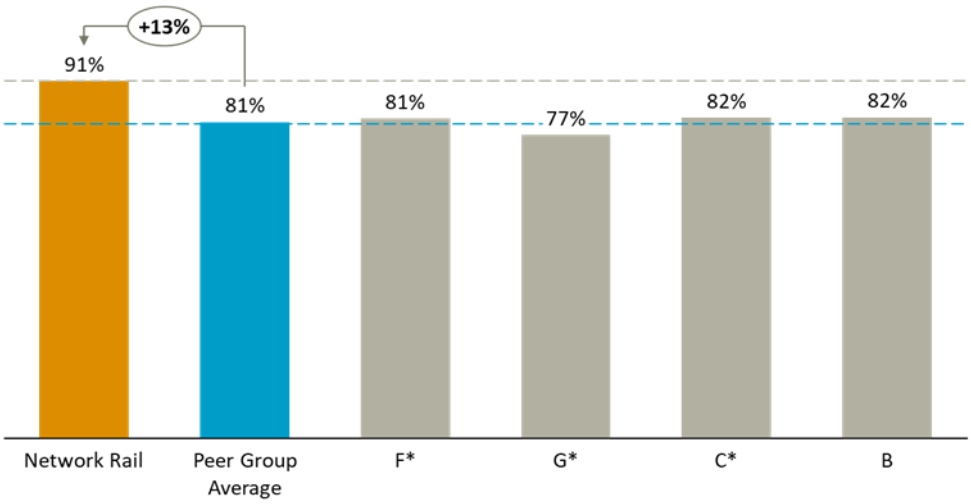
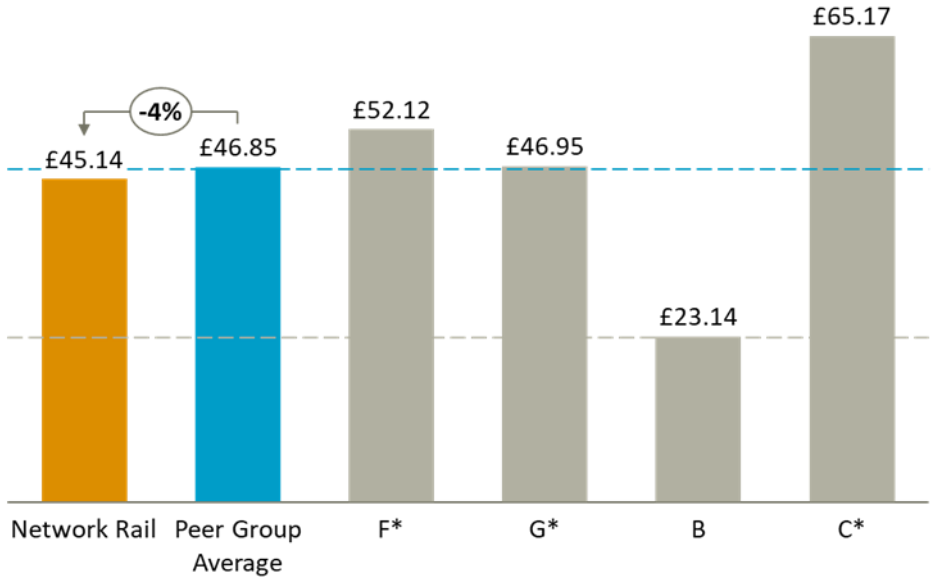


Figure 5-30: Electrical control share of net working time [net working time / gross working time]



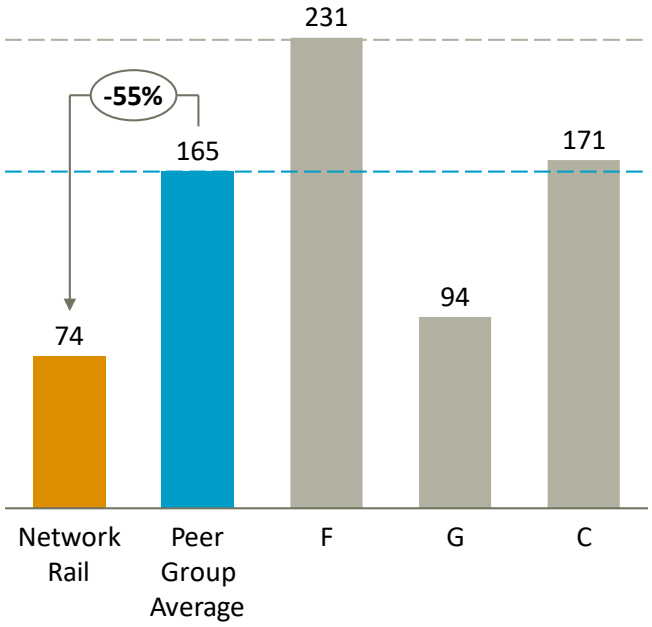
5.71 Despite the very high unit labour costs, the cost per net working hours of electrical controllers at Network Rail is comparable to the peer group average. This is due to the high net working hours at Network Rail, which have the effect of balancing high unit labour costs.

Figure 5-31: Electrical control net working hour cost [staff costs / annual net working hours]



5.72 However, Network Rail's electrical control productivity, expressed in electrified track-km per FTE, is significantly lower than the average, and particularly low compared to the productivity achieved by peer organisations F and C. Peer organisation C, for example, has a highly centralised system with a high share of electrification.

Figure 5-32: Electrical control productivity [track-km electrified / FTE]



5.73 The summary across electrical control costs benchmarks is not dissimilar to the position for signalling and train control, leading to a material efficiency gap in terms of overall productivity:

- Network Rail's costs per FTE are comparatively high, driven by levels of overtime as well as, in this case, high employment costs;
- High levels of productive net working time offset this somewhat to bring staff costs per net working hour in line with peers as equivalent staff in the peer organisations work fewer hours; however
- The overall level of productivity for Network Rail train control is considerably below average for the peer group, and well behind the best in class

Explaining differences in electrical control costs

5.74 The benchmarking results suggest that Network Rail's unit labour costs per FTE are materially higher than its peers. This may be due to the specialised role and high salary costs for electrical engineers among this professional group in the United Kingdom. Unit labour costs are also driven by the costs associated with extra working hours, as electrical controller workload for planned isolations typically peaks on weekends.

5.75 Network Rail differs from other peers in operating both AC and DC networks simultaneously. Using two systems represents an additional layer of complexity, and the co-existence of AC and DC networks requires the management of different equipment, signalling systems and safety protocols. Recognising that DC electrification is concentrated in particular self-contained areas of the network (Merseyside and London and the South East), this will contribute to differences in FTE per train-km, as well as perhaps to employment costs.

5.76 Alongside this, overall only 46% of Network Rail's network is electrified. Consequently, the productivity of Network Rail's electrical control function is relatively low. Productivity is further reduced by staff intensity as, for example, electrical control roles on AC-electrified routes in the UK are double-staffed for emergency situations – whilst Infrastructure Managers in other countries are not required to have such high staffing ratios.

5.77 Network Rail has started the implementation of a Supervisory Control and Data Acquisition (SCADA) Programme, a control system that monitors and regulates industrial processes. This programme is expected to have further positive impacts on workload requirements, possibly comparable to those experienced by some of its peers (for example peer organisation B, which has concentrated its electrical controllers in fewer centres and reduced net working hours).

Areas for action on electrical control cost

5.78 Network Rail should continue, and potentially accelerate, the implementation of the Supervisory Control and Data Acquisition (SCADA) programme as this system enables real-time monitoring and control of electrical assets for more efficient operation and maintenance.

Furthermore, with process standardisation, Network Rail could increase the efficiency and effectiveness of isolations. It should also aim to harmonise traction power systems, as this has enabled other peers to realise more efficient levels of track-km per FTE and working hours. Network Rail could also improve efficiency in terms of track-km per FTE as part of further electrification of its network.

5.79 There may also be incremental efficiencies to be gained in terms of electrical control workload through measures primarily aimed at improving the management and resilience of overhead contact line systems and traction power supply, and reducing disruption requiring unplanned isolations, such as:

- Redundancy on critical components, regular inspections, and proactive maintenance practices;
- Investing in robust equipment and proactive maintenance strategies, reducing the frequency and duration of power-related faults, resulting in improved system reliability and therefore reducing the number of staff required to monitor and operate electrical supply; and
- Implementing intelligent control systems that optimise power consumption across the electrified railway. By using advanced algorithms and data analytics, Network Rail can optimise power distribution and usage and ensure efficient energy management.

Table 5-4: Areas of focus for electrical control

Metric	Key area
Staff costs / m train-km	Implementing intelligent control systems that optimise power consumption across the electrified railway, which can also enable a lower staffing ratio
Unit labour cost	Increasing process standardisation to improve isolation work efficiency and reduce overtime to lower costs
Annual gross & net working time	Investing in robust equipment and proactive maintenance strategies to reduce failures
Productivity	Accelerating the implementation of SCADA to control electrical assets more efficient

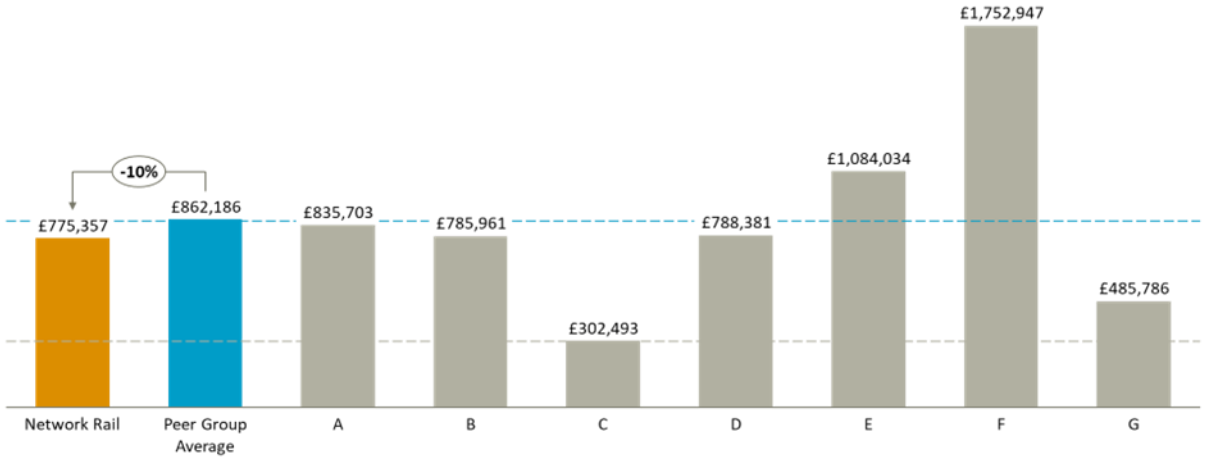
Benchmarking combined traffic management costs for signalling, train control and electrical control

Combined signalling, train control and electrical control cost analysis

5.80 This section considers combined costs for the traffic management-related functions of signalling, train control and electrical control, as several Infrastructure Managers were not able to provide separate data on each of these functions.

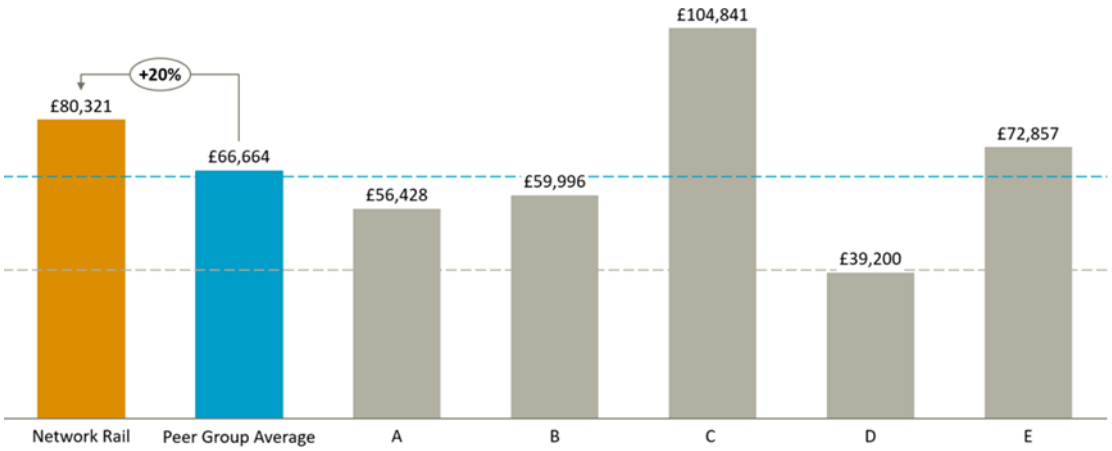
5.81 Network Rail's staff costs account for 93.9% of the total costs across these combined functions, which is comparable to the peer group average of 92.6%. As can be seen in the figure below, Network Rail's staff costs per million train-km are comparable to most peer organisations. Organisation F has by far the highest staff costs per train-km.

Figure 5-33: Combined traffic management staff costs / m train-km



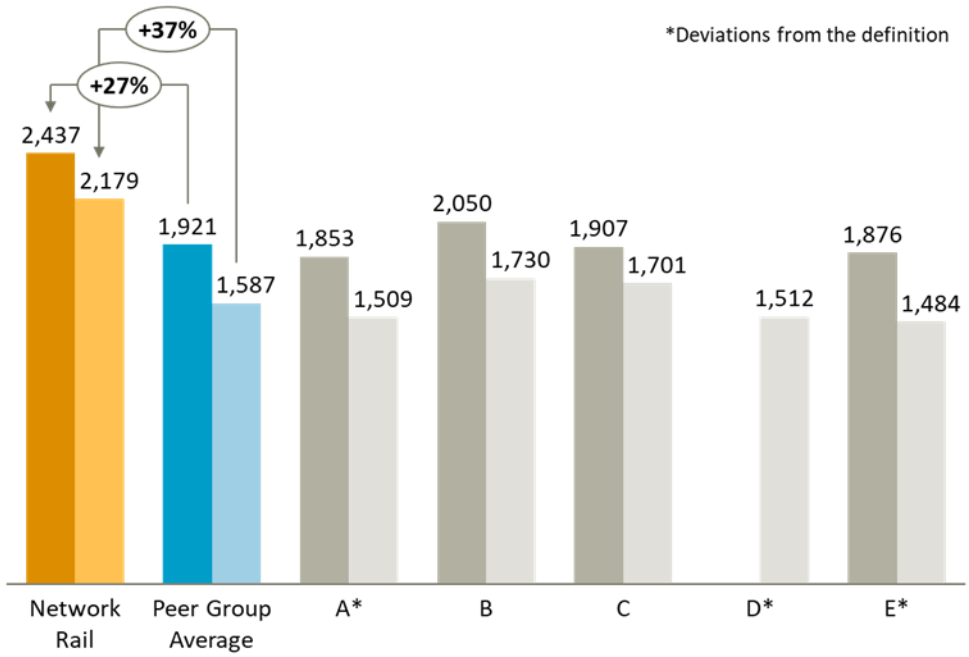
5.82 Network Rail's unit labour costs per FTE for traffic management are 20% higher than the peer group's average of £66,664. A similar difference was found in costs per FTE for signalling and train control staff.

Figure 5-34: Combined traffic management unit labour cost [staff costs / FTE]



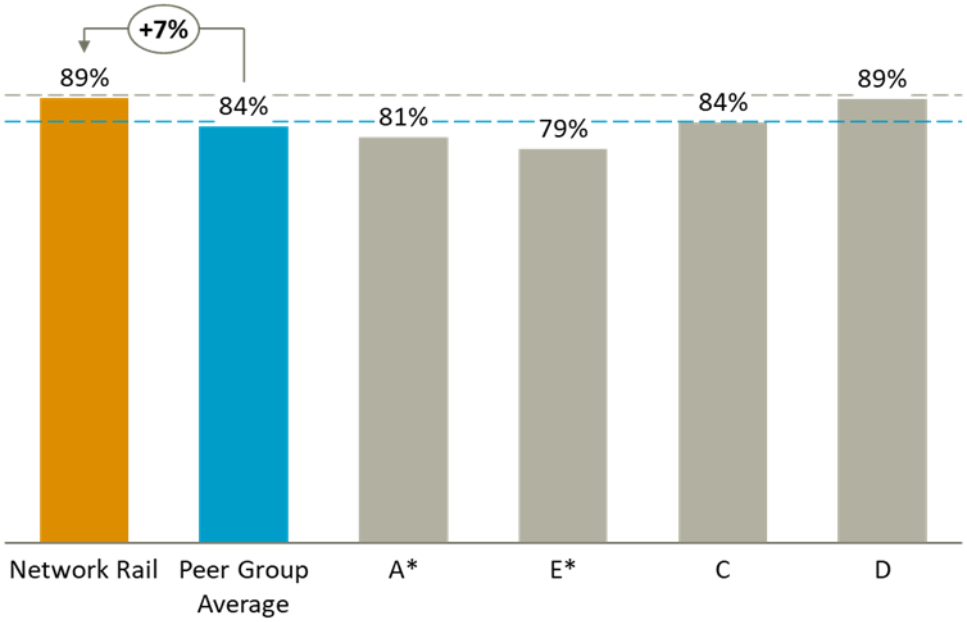
5.83 Network Rail has the highest number of both gross and net working hours compared to the peer group. Network Rail's gross working time per FTE per week is over 46 hours (based on an annual average of 2,437 hours), compared to an average of 37 for the peer group (1,921 hours annually).

Figure 5-35: Combined traffic management annual gross & net working time [h / FTE]



5.84 Network Rail has the highest share of net working time, at 89.4% it is 7% more than the peer group average. In line with the analysis above for signalling, train control and electrical control, this indicates a high level of productivity, driven to an extent by overtime.

Figure 5-36: Combined traffic management share of net working time in %

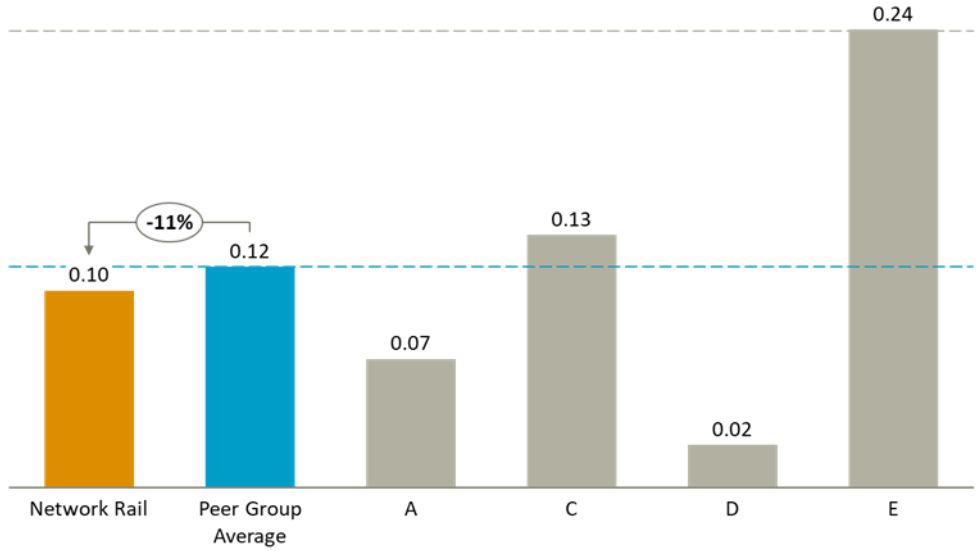


5.85 At 36.86 GPB per hour, Network Rail's cost per net working hour for combined traffic management activities is close to the average across this group of peers. However, there is considerable variation across the group and organisations A and D have a much lower net working hour cost of only £23.04 per hour.

Figure 5-37: Combined traffic management net working hour cost [Unit labour cost / annual net working hours]

5.86 Given relatively high unit labour costs, but high net working hours, Network Rail's overall productivity across combined traffic management activities is comparable close to the peer group average. However, the performance of peer organisation E in particular reflects the potential for material improvements, with a productivity of 0.24, more than twice that of Network Rail, reflecting efficiency achieved through automated and centralised traffic management systems.

Figure 5-38: Combined traffic management productivity [m train-km / FTE]



5.87 This combined analysis reflects the themes identified across each of the previous areas of benchmarking: Other Infrastructure Managers have benefited from a greater degree of consolidation and centralisation of network control than Network Rail, and a greater degree of technology adoption across control systems and processes. However, these are long term, strategic investments that are subject to constraints on affordability and deliverability.

5.88 Furthermore, as we have seen across these areas of activity, Network Rail has relatively high unit labour costs per FTE, and relies on high net working hours to achieve reasonable levels of staff productivity. While beyond the scope of this study, it should be noted that high reliance on overtime, even if it supports cost efficiency, may have wider implications for organisational performance.

Benchmarking station operations costs

Station operations cost analysis

5.89 As noted in detail in Chapter 2, making comparisons even within Network Rail's managed stations portfolio would require a more detailed breakdown of costs by activity than is currently available. In Chapter 4 we also highlighted that making comparisons with peers is even more challenging, with most European Infrastructure Managers not directly managing stations, and those that do operating very different station portfolios, and undertaking a very different profile of activities.

5.90 The analysis we are able to provide in this section is therefore constrained by the absence of data:

1. For Network Rail costs by station operations activity;
2. For comparable station operations activities among peers; and
3. For either Network Rail or peers that allows normalisation by station size.

5.91 The available data does indicate that, in station operations as in other operations functions, Network Rail has high unit labour costs and high levels of working time. In this case:

- Unit labour costs of £40,650 per FTE, which are 12% higher than those of the only comparable peer with available data; and
- Average gross working hours of over 51 hours per FTE per week.

5.92 As a result of these high net working hours, Network Rail's net working cost per hour is almost 20% lower than the other peer, which has significantly lower working hours per FTE.

5.93 For a more in-depth assessment, as noted above, more specific breakdown of costs and FTE per task would be required from Network Rail and other Infrastructure Managers.

Areas of focus on stations costs

5.94 While the conclusions we can draw in terms of any actionable efficiency gaps in this area are limited at this stage, with detailed, focused review there may be opportunities for Network Rail to further standardise its own station model to realise efficiencies and economies of scale. Moreover, Network Rail may be able to reduce the costs of station operations with the help of data-driven resource optimisation. Through the optimal allocation of resources, productivity can be increased and working time reduced in order to decrease reliance on overtime. This could involve, for example, adapting cleaning routines and security measures in line with demand. In addition, there may be opportunities to outsource further tasks and benefit from strategic partnerships to reduce staff costs. The potential of such opportunities could be explored further through a dedicated benchmarking exercise for stations.

Benchmarking train planning costs

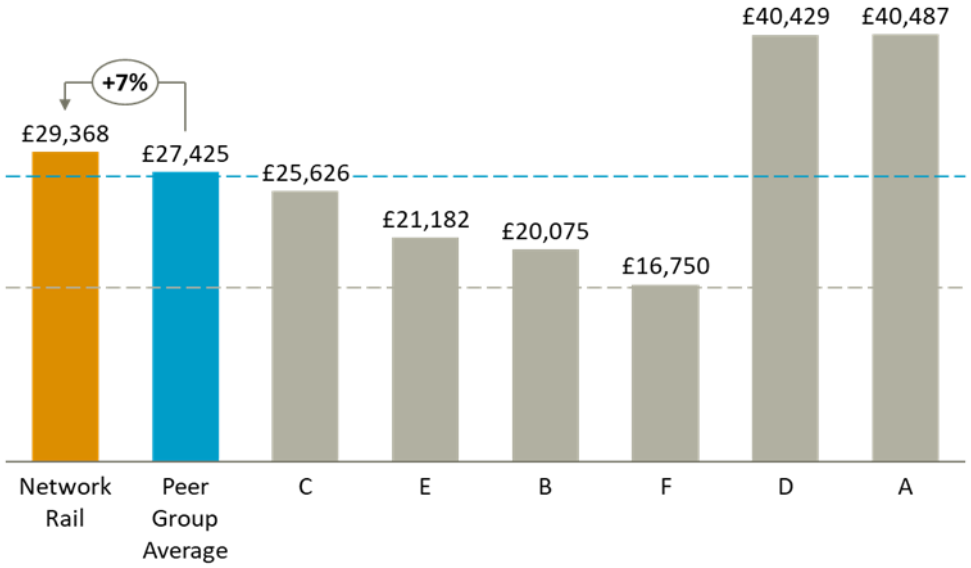
Train planning cost analysis

5.95 This function includes timetable planners and their teams, including managers, directly engaged in the continuous planning of all annual timetables, conflict resolution and validation. Access planning for maintenance and renewal works are excluded from this assessment.

5.96 In the case of Network Rail, staff costs account for 91.3 % of the overall costs of this function, which is slightly lower share than the average of 95.8% for the peer group.

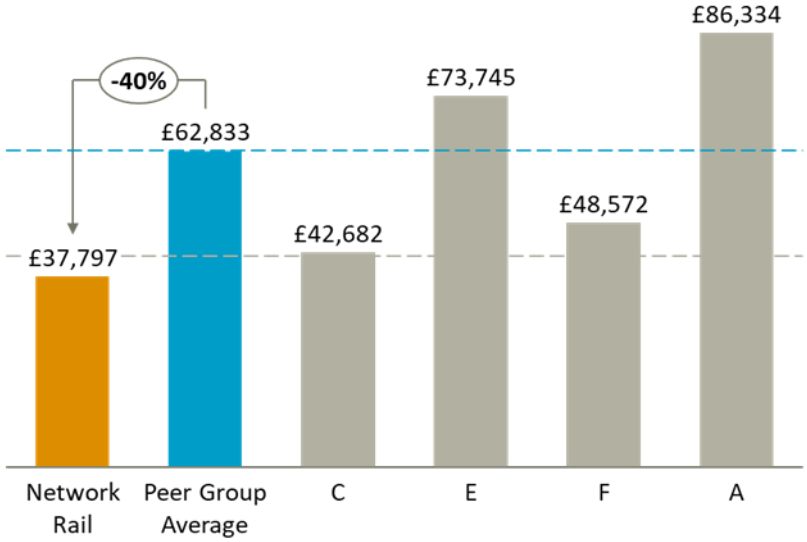
5.97 Network Rail's staff costs for train planners per million train-km are comparable to the higher end of the peer group, with only organisations A and D having higher costs. Peer organisation F is at the lower end, with a cost of £16,750 / train-km, driven by higher productivity.

Figure 5-39: Train planning staff costs / m train-km



5.98 Network Rail has the lowest unit labour costs, at £37,797 per year, some 40% below the peer group average.

Figure 5-40: Train planning unit labour cost [staff costs / FTE]



5.99 Network Rail's annual gross and net working time is comparable to the corresponding values for the peer group. Similarly, the share of net working time of 81% for Network Rail is in line with the peer group average, as well as with corresponding values for individual peers. The gross working time for Network Rail, at 35.8 hours per week, is slightly lower than the peer group average of 37.0 hours. Note that in the case of this function, no overtime is included in either Network Rail's staff costs or its working hours, as overtime is neither paid nor recorded.

Figure 5-41: Train planning annual gross & net working time [h / FTE]

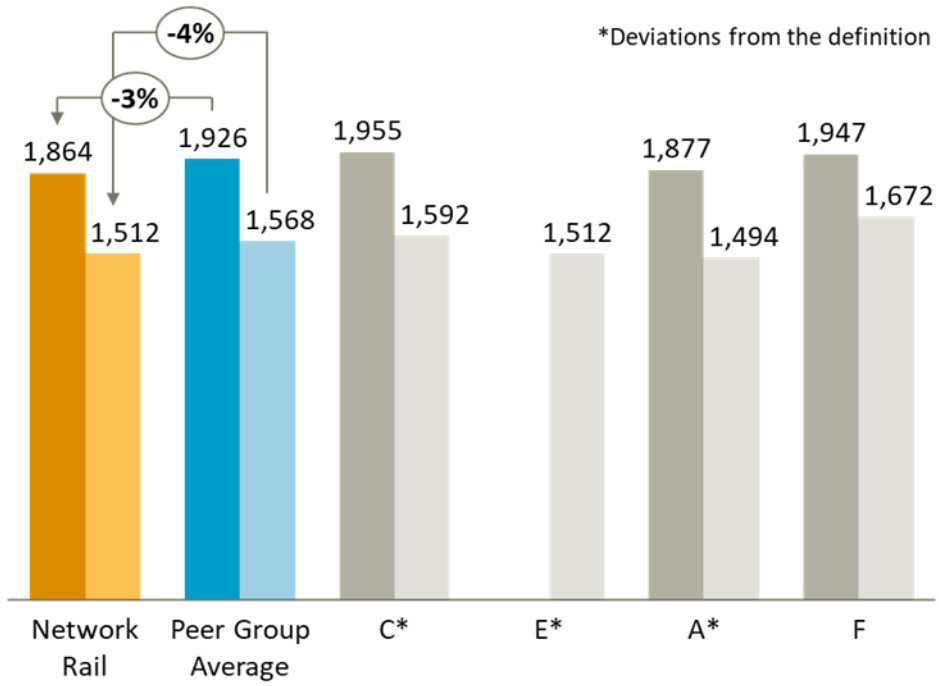
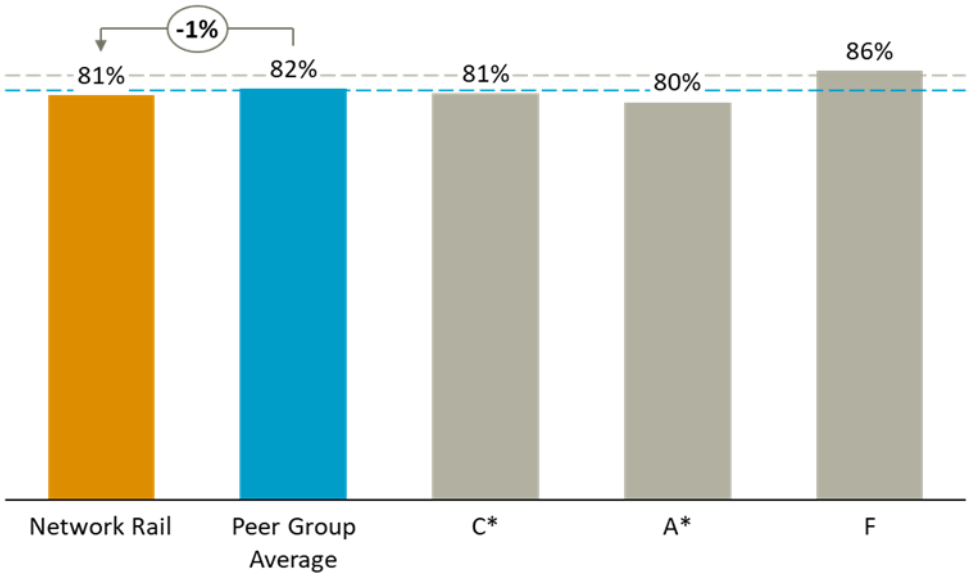
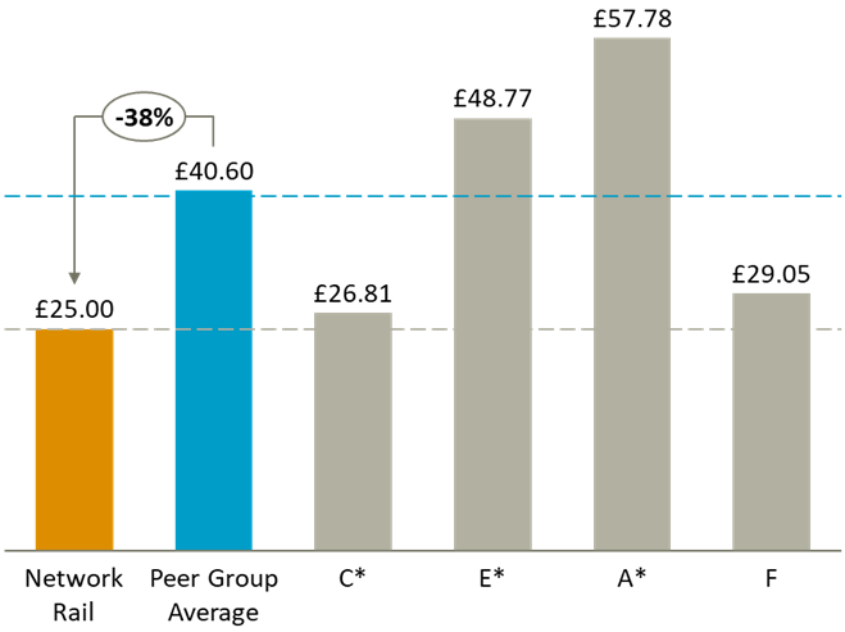


Figure 5-42: Train planning share of net working time [net working time / gross working time]



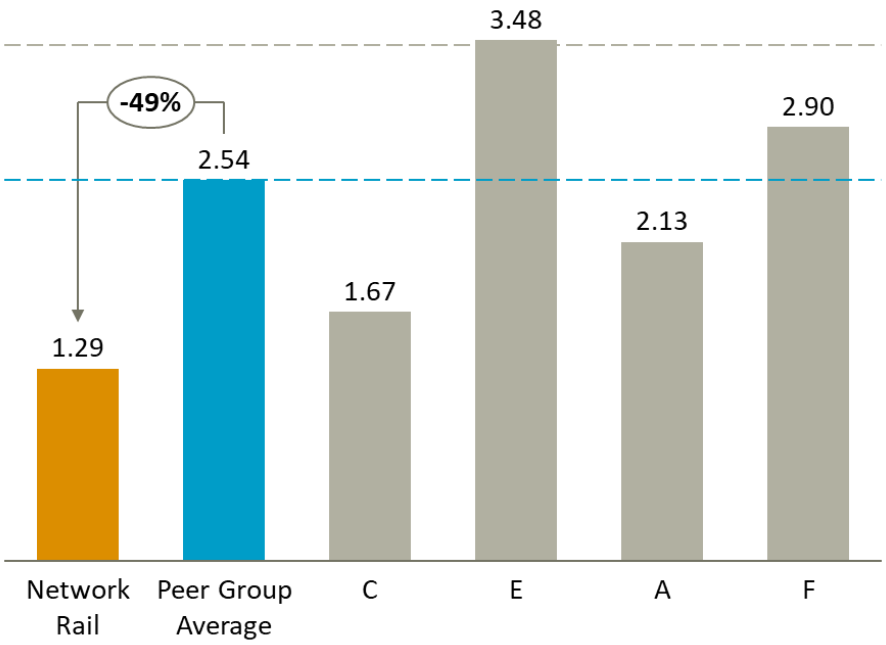
5.100 In line with the very low unit labour cost, the cost per net working hour for Network Rail's train planners compares with the lower end of the peer group.

Figure 5-43: Train planning net working hour cost [staff costs / annual net working hours]



5.101 In terms of cost per hour input, Network Rail's train planning productivity appears high. However, expressed in million train-km per FTE, it is lower than that of most peer organisations. In particular, organisations E and F have very high productivity by this measure as they require relatively few FTEs relative to the traffic volumes on the network.

Figure 5-44: Train planning productivity [m train-km / FTE]



5.102 In summary, despite low unit labour costs that are 40% below peers, Network Rail's staff costs for train planners per million train-km are at the higher end of the peer group.

5.103 As a result, train planning productivity, in terms of train planners compared to traffic volumes, is lower than most peer organisations, and significantly worse than the best in class

Explaining differences in train planning costs

5.104 The low cost per FTE for Network Rail is likely to be explained by the high proportion of relatively junior train planners, with relatively low entry-level salaries. Train planners get paid a fixed salary and do not receive overtime, with many planners regarding the role as a steppingstone to other positions. Network Rail has sought to close its vacancy gap with improved campaign recruitment and introducing better technical and management career paths for train planners.

5.105 Network Rail employs a comparatively high number of train planners, the result of a complex and resource intensive timetable planning process with a high level and frequency of change. Despite developments in technology and process, timetable development requires manual intervention for compliance and conflict checking, as well as extensive engagement with operators across routes.

5.106 Peer organisation A, which also sees below-average productivity, has similarly explained that conflict resolution requires many train planners, with costs exacerbated by network complexity.

5.107 Network Rail's train planning activity is managed across 5 regionally aligned teams, producing two timetables per year in May and December. Other IMs report that, typically, one main annual timetable is developed and only slightly modified later in the year and ad hoc requests for spot traffic are managed at short notice.

5.108 Network Rail has committed to train planning efficiencies through the course of CP7, including FTE reductions, some of which will be enabled by improved systems and technology.

5.109 In the European Union the timetabling procedures have evolved nationally and, despite EU path coordination rules, still lack Europe-wide harmonisation. Nevertheless, European Infrastructure Managers are implementing systems and processes to improve their planning of network capacity, with the Timetabling and Capacity Redesign for Smart Capacity Management (TTR) in development since 2014. Peer organisations advised they are planning to introduce TTR in the next 5 years and anticipating its use to increase available capacity, which would be reflected in productivity benchmarks.

5.110 In Switzerland, with timetabling decentralised into 4 regions and only one annual timetable produced, SBB is implementing a Train Management System to be completed in 2033, with the aim of further integrating traffic management and timetabling to improve the efficiency and effectiveness of its train planning.

Areas for action on train planning cost

Network Rail should explore further opportunities to review processes and reduce manual interventions. This will require increased standardisation and implementation of decision support tools, improved data systems, and collaboration with train operators.

There is also a potential trade-off between unit labour costs and the productivity and effectiveness of train planning. Network Rail should continue to invest in improved training and professional development for staff, to support the building and retention of knowledge, skills and experience that will drive the productivity and quality of train planning.

5.111 Network Rail should implement improved data systems to support timetabling and use automated and predictive timetabling software and simulation capabilities. Data exchange should be streamlined by identifying and reducing manual interfaces, which often introduce errors and delays. By implementing automated processes and integrated systems, the

accuracy and efficiency of train planning could be improved, supporting FTE savings and/or improved productivity.

5.112 Manual interfaces might also be reduced as a result of process improvements, including interfaces and collaboration with train operating companies.

Table 5-5: Areas of focus for train planning

Metric	Key area
Staff costs / m train-km	Adopting a process-oriented organisational structure instead of a functional division to reduce manual interfaces
Unit labour cost	-
Annual gross & net working time	Implementing automated processes and integrated systems to increase accuracy and efficiency in train planning
Productivity	Increasing standardisation and implementation of support tools to reduce manual interventions; Conducting specific, focused benchmarking

Benchmarking mobile operations management costs

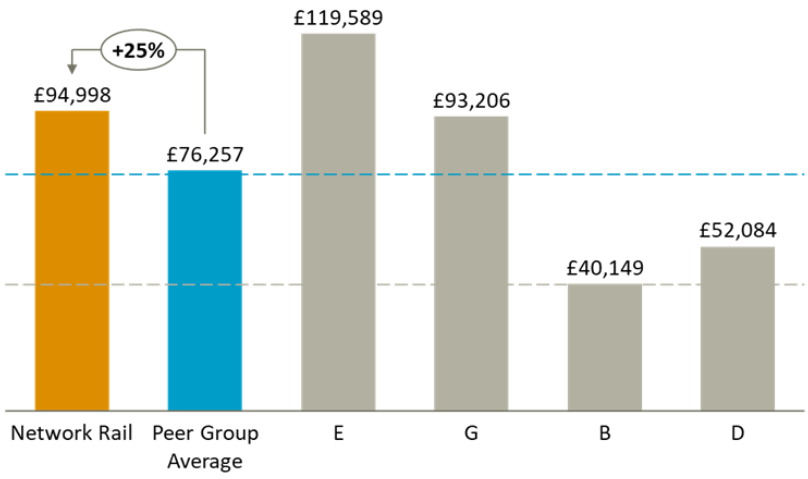
Analysis of mobile operations management costs

5.113 Mobile operations management includes all employees who are responsible for ensuring that during service disruption or "incidents with the potential to cause disruption", incidents are managed effectively with the aim of minimising delay and recovering the service promptly.

5.114 Staff costs for mobile operations management account for 97.1% of total costs of that function, which is slightly higher than the peer group average of 93.3%.

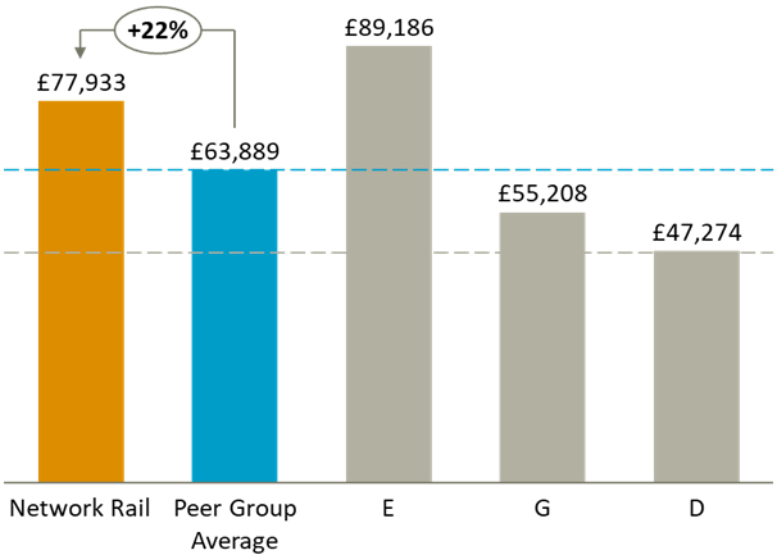
5.115 At £94,998 / train-km, the staff costs for mobile operations managers (MOMs) per million train-km are higher than those for most of the peer organisations. The FTE cost, and hence total staff costs for this function, are determined by the size, spread and accessibility of the rail network, the number of incidents and the topography and weather conditions of the country. Comparator B's significantly lower cost per train km can be explained by topographical conditions, the size of its network, and their approach to incident resolution.

Figure 5-45: MOM staff costs / m train-km



5.116 Similarly, Network Rail's unit labour cost of £77,933 per year is higher than that of most peer organisations.

Figure 5-46: MOM unit labour cost [staff costs / FTE]



5.117 Network Rail's annual gross and net working time are, respectively, 25% and 38% higher than the peer group average. This leads to a comparably high gross working time of 46.45 hours per week, mainly driven by overtime, compared to the average for the peer group of 36.9. In addition, the share of net working time is highest among the peers, with 89.8%.

Figure 5-47: MOM annual gross & net working time [h / FTE]

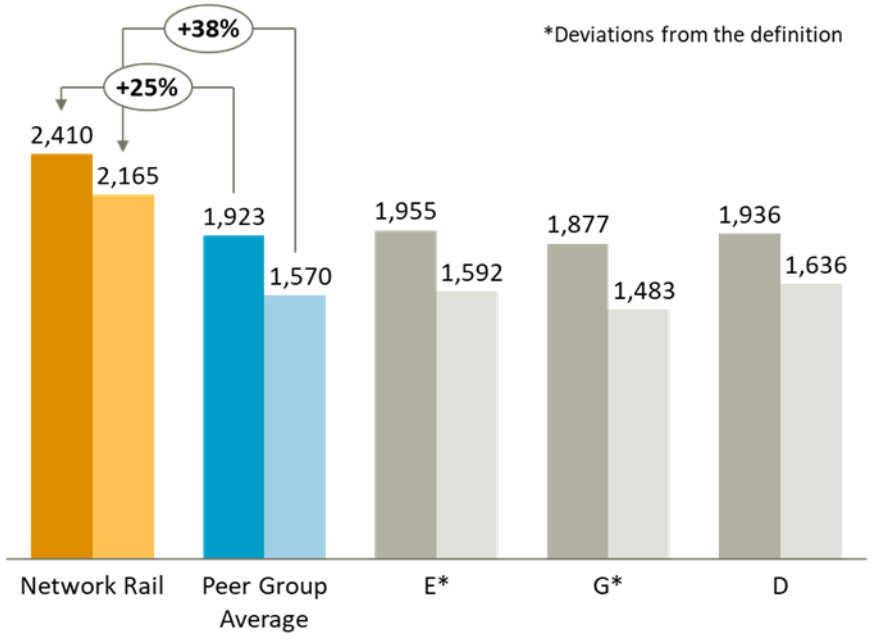
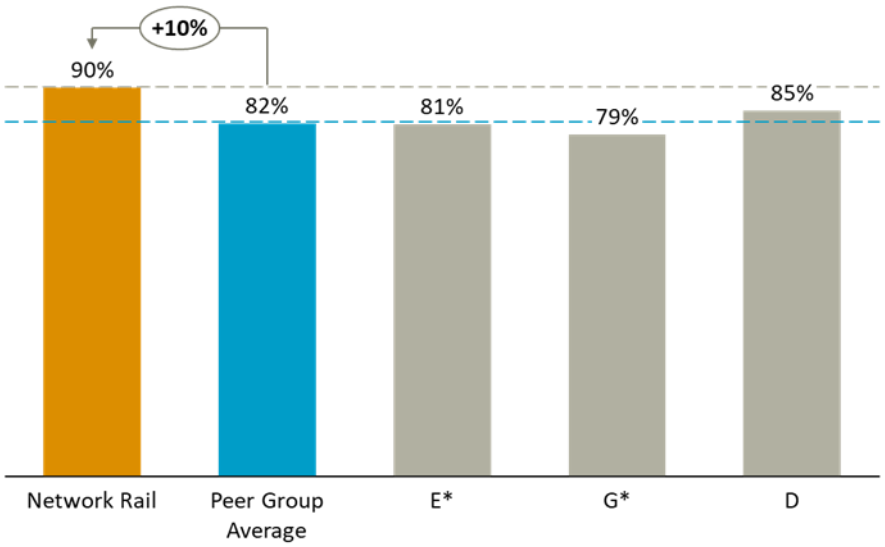
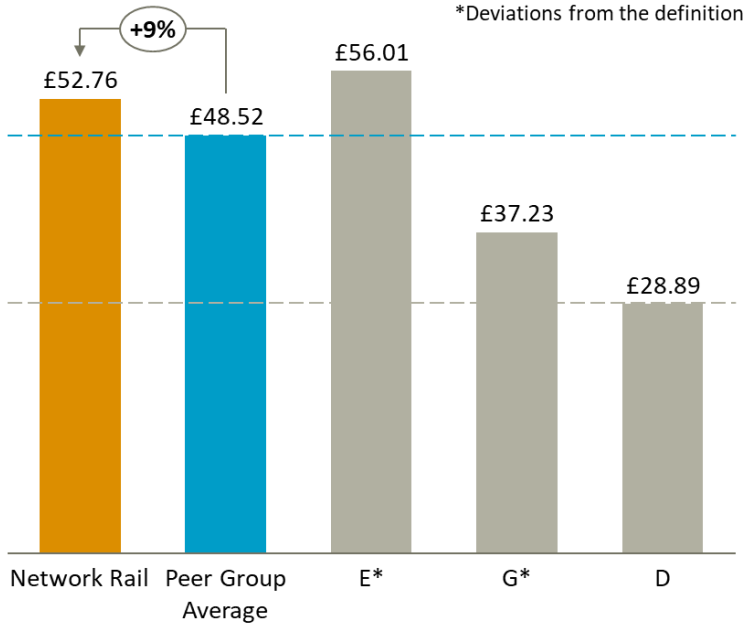


Figure 5-48: MOM share of net working time [net working time / gross working time]



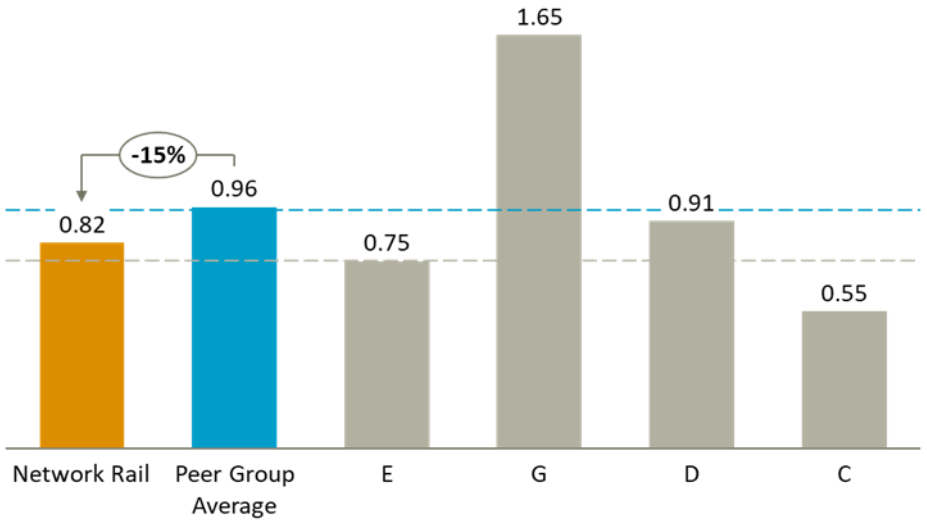
5.118 Relatively high unit labour costs and net working hours lead to a higher net working hour cost than for peers G and D. However, part of the unit labour cost difference is offset by Network Rail's high annual net working hours.

Figure 5-49: MOM net working hour cost [staff costs / annual net working hours]



5.119 The productivity of Network Rail's mobile operations management is comparable to that of organisations E and D. Organisation G has the highest productivity, which is helped by a network that is more geographically concentrated and accessible, as well as relatively benign weather conditions that reduce the mobile incident response requirements.

Figure 5-50: MOM productivity [m train-km / FTE]



5.120 In summary, Network Rail's normalised staff costs and unit labour costs per FTE for mobile operations management are each more than 20% higher than the peer group. This means that, despite relatively high net working hours, productivity in this area of operations activity is worse than the best in class.

Explaining differences in mobile operations management costs

5.121 At Network Rail, incident response is handled through mobile operation managers and local incident response teams. No common service level agreements are in place regarding mobile response arrangements and response times: they are determined according to local factors and decision-making. Network Rail's staff costs per train-km are relatively high and can be explained at least in part by the size and spread of the network and the comparatively low levels of performance to respond to and manage. Again, the high unit labour costs for Network Rail are driven largely by the high level of overtime hours.

5.122 Most peer organisations handle their incident management locally. The higher staff costs for organisation F can be explained by the size of the network and challenging cold weather conditions. Organisation G has the highest productivity, which can be partly explained by a concentrated and accessible network, as well as topography and weather conditions that are more favourable than those experienced by most of the peers. This means that the organisation requires fewer FTEs relative to the size of its network. At the same time, it ensures a high quality, 24/7 service through the deployment of flexible regional teams (typically 4-5 staff per unit but varying according to the incident) equipped with road vehicles (some of which can also use the tracks) and capable of meeting maximum response times of one hour. Weather is also a key driver, as extremes of wind, rain, heat and/or cold all drive the number and type of incidents that require a mobile operations response.

Areas for action on mobile operations management costs

5.123 Networks Rail should analyse the current staffing levels for mobile operations managers and response teams given, as with other key areas of operations, it relies on significant overtime. The workload, incident frequency, and severity should be assessed to determine if adjustments can be made to optimise the number of staff members required.

5.124 Additionally, the feasibility of outsourcing certain specialised tasks within mobile operations management should be considered and analysed. As an example, one peer outsources

vegetation work and handling of suicides, as these represent a significant workload that requires specialist tools and expertise.

5.125 Furthermore, incident response arrangements should be reviewed and optimised to ensure quality of service in terms of response times during service disruptions or incidents.

Table 5-6: Areas of focus for mobile operations

Metric	Key area
Staff costs / m train-km	Consider the potential for outsourcing certain specialised tasks to improve efficiency
Unit labour cost	Reducing overtime, which is paid at a higher hourly rate
Annual gross & net working time	Aim to reduce the reliance on overtime through continued improvements in recruitment and training
Productivity	Network Rail Routes should review their response arrangements, to enable a high quality, 24/7 response service through flexible, well-equipped teams in line with the best in class

6 Benchmarking Network Rail Support Costs

6.1 This section sets out the benchmarking and analysis undertaken to compare Network Rail's costs for Support activities with those of other comparable organisations. It identifies efficiency gaps in comparison to peers, and the likely reasons for differences between Network Rail and other organisations. Finally, it identifies areas of action which could improve Network Rail's cost efficiency compared to other IMs in the short, medium and long term.

The peer group for support cost benchmarking

6.2 As set out in Chapter 4, the benchmarking of support costs uses a different group of peer organisations to that for the benchmarking of operations costs in chapter 5 above. Only 2 European rail Infrastructure Managers were able to provide sufficient data on support costs to be included within the benchmarking analysis. However, National Highways is also included in the group of peer organisations for support costs benchmarking. The list of peer organisations for support costs are shown in Table 6-1.

Table 6-1: Support costs benchmarking peer organisations

Organisation	Country/sector
BaneNOR	Norway rail infrastructure management
National Highways	UK Highways
ProRail	Netherlands rail infrastructure management

Comparing peer organisations' structure to Network Rail

6.3 To reach informed conclusions from benchmarking exercise, it is important to understand both the structure of the organisations being compared and any differences in their approach to delivery of both core outputs and support functions. Two key differences in the structure and service delivery model of Network Rail when compared to the members of the peer group are:

- **Delivery of network maintenance -** Since the early 2000s, when it was in-sourced following significant safety incidents and performance issues related to maintenance failings, Network Rail carries out the majority of its maintenance of the rail network in-house. This includes employing the staff who carry out maintenance activity, whereas the members of the peer group all contract out a significant proportion of their maintenance.
- **Structure and level of delegation** - Network Rail has moved over time to a structure in which decision-making authority is devolved to routes and regional business units, each with considerable autonomy while being accountable for operational, commercial and financial outcomes.

Delivery of Maintenance

6.4 As Network Rail delivers a majority of its maintenance using directly employed staff, it employs more staff per network km than members of the peer group who outsource a

substantial proportion of maintenance activity. The number of Network Rail maintenance FTEs is significant (over 16,000 FTEs in 2020/21), with maintenance FTEs accounting for over a third of total FTEs. This is in line with observations from one organisation within the peer group, which noted that prior to a recent contracting out of maintenance activity its maintenance staff accounted for approximately one third of the organisation's total FTEs.

6.5 Hence, when measuring and comparing efficiency on a per FTE or per employee basis, it is important to recognise that Network Rail will directly employ more staff to achieve a given level of output (for example track or train kilometre) than the peer group. Metrics of this kind should therefore be interpreted with care and cannot be used to infer that Network Rail is more or less efficient than its peers.

Structure and level of delegation

6.6 As part of its Putting Passengers First (PPF) re-organisation in 2019-2020, Network Rail took further steps towards a structure based on devolved authority, reinforcing previous organisational change intended to move away from highly centralised decision-making. In order to support decision-making by the Regions, regional management teams and service directorates have staff delivering some support services alongside the central teams also undertaking key support functions. By contrast, organisations within the peer group have largely chosen to centralise support functions.

6.7 The results of some efficiency benchmarks may indicate that Network Rail is delivering its support functions less efficiently than its peers. However, any apparent inefficiency arising from a degree of duplication of support function activity across the organisation needs to be balanced against the benefits of the devolved authority afforded by the current structure, and the potential role of support costs devolution in facilitating this. Benefits anticipated as a result of the PPF re-organisation include the ability of regions to respond to customer requirements with greater agility and less need for approval from the centre. It is beyond the scope of a benchmarking exercise focused on costs to assess these benefits, and the degree to which they are facilitated by the devolution of support functions, but they should nevertheless be borne in mind when drawing conclusions from the benchmarking results themselves.

Modernisation at Network Rail

6.8 Over the last 2 years Network Rail have been implementing a modernisation programme which has been focused on modernising Network Rail's ways of working to deliver railway activities more efficiently. The implementation of this this programme has impacted both operations and support staff at Network Rail.

6.9 For support staff, this has resulted in a reduction in support staff of approximately 5%, largely from management grades. This reduction in staff started to take place towards the end of 2021/22 with a majority of the implementation happening in 2022/23, as a result the cost savings from these changes are largely excluded from the Network Rail numbers used in our benchmarking analysis. However, from 2023/24 onwards these savings could materially change the costs associated with the delivery of its support functions, in particular where staff costs are the majority of total costs.

6.10 When reviewing the results of the benchmarking analysis it should be considered that the results for Network Rail represent support costs prior to these changes being implemented. Therefore, if the benchmarking analysis indicates that Network Rail is less efficient than the peer group in the delivery of some support functions it is possible that with its modernisation changes that Network Rail has closed this apparent efficiency gap.

Size of Network Rail

6.11 Independently of how the Network Rail and the peer organisations are structured, it is worth noting that Network Rail is a significantly larger organisation than all of the peer organisations contributing data on support costs. As an example, Network Rail's operating costs of roughly £6.5bn are significantly greater than the largest peer organisation (c.£2bn). A table showing how Network Rail compares to the largest peer organisation in a number of key measures of organisation size can be found below.

Table 6-2: Measures of organisation size for Network Rail and largest peer organisation

Metric	Network Rail (2021/22)	Largest peer organisation* (National Highways: 2021/22, BaneNOR and ProRail: 2021)
FTE	44,255	6,036
Total operating costs (normalised £m nominal)	6,594	2,300
Total Revenue (normalised £m nominal)	9,553	1,978
Total train kilometres (millions)	496	160
Network kilometres	15,847	7,324

* Note largest organisation maybe different for each metric

Network Rail support functions benchmarked

6.12 The definition of the support functions benchmarked as part of this study was set out in detail in Section 2. The table below summarises the key facts on costs and staff in scope for each area of support costs.

Table 6-3: Summary of Network Rail support functions in scope

Function	Annual cost[1]	Benchmarked cost[2]		Benchmarked staff[2]		Staff cost proportion[4]
		£	% share[3]	Number	% share[3]	
Human Resources	£60	£104 million	20%	1,187	23%	69%
Information Management	£127 million (IT & business services)	£162 million	31%	897	18%	41%
Finance	£60	£76 million	15%	1,047	20%	101%
Procurement	N/A	£49 million	9%	399	8%	85%
Other corporate services	N/A	£126 million	24%	1,578	31%	48%

[1] where specifically identified in Network Rail's Regulatory Financial Statement, 2021/22. Includes central and regional costs, with Finance & Legal costs being combined in the statement of regional costs

As stated in Section 2, the categories of support cost in Network Rail's Regulatory Financial Statement do not match our defined functions, and general costs across functions total over 40% of support costs

[2] from Network Rail data provided for this benchmarking, for the defined activities and costs in scope. For comparability in benchmarking this includes training (which is elsewhere in Network Rail's regulatory accounts and removes off-charging of services to other functions. Staff costs include permanent and agency staff

[3] proportion of the total provided by Network Rail for all of the operations costs and staff in scope

[4] proportion of the total cost for this function that is staff costs

Explaining the benchmarking figures

6.13 We note that the support costs presented in this section for peer organisation B only include the support costs associated with covering the operating cost activities. Therefore, unlike Network Rail and peer organisations A and C, the figures presented in this section for peer organisation B do not include any support costs associated with capital expenditure. Based on the information provided this appears to have a small impact on Human Resources, but a material impact on all other support functions. For reference, the support costs related to capital expenditure activities for Network Rail account for less than 10% of the overall Human Resources, Finance and Other corporate services support function costs, for roughly 30% of the Information Management function costs and for approximately 45% of the procurement function costs.

6.14 Unless otherwise stated, and consistent with the operations costs benchmarking, in the figures presented in this section:

- Network Rail and peer group average benchmarks, are displayed by the orange and blue bars, respectively
- Peer group (peer) organisations are shown by the grey bars
- If there are 2 bars included in the figures, the darker shades (of orange, blue and grey) represent total costs, and the lighter shades represent staff costs
- The dotted blue line illustrates the peer group average level for the benchmark (where there is more than one peer organisation shown)
- The dotted grey line illustrates the lowest/most efficient benchmark level (within the peer group)
- The percentage arrow illustrates that difference between the benchmark value of Network Rail and that of the peer group average
- The legend key should be referred to for any other colours present in figures

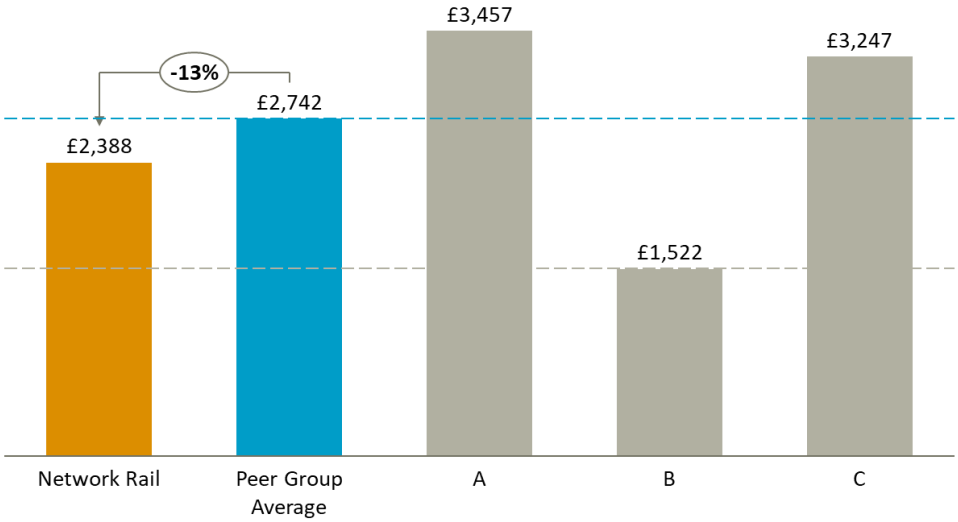
Benchmarking Human Resources costs

6.15 In an organisation the Human Resources (HR) support function is focused on managing the contract and employment arrangements of employees rather than day-to-day line management and management of employees work tasks and schedule. The HR function includes the following key roles:

- Employee contractual management
- Employee training
- Employee recruitment
- Payroll

Human Resources cost analysis

Figure 6-1: HR total cost per Organisation Headcount



6.16 Per organisational employee (i.e. headcount for the whole company), Network Rail's overall Human Resources (HR) costs are 13% lower than the average of the peers. This includes staff and non-staff costs such as training expenses. The breakdown of this lower cost is explored in Figure 6-2 (showing HR staff costs per organisational employee) and Figure 6-3 (showing HR non-staff costs per organisational employee).

Figure 6-2: HR staff costs per organisational employee

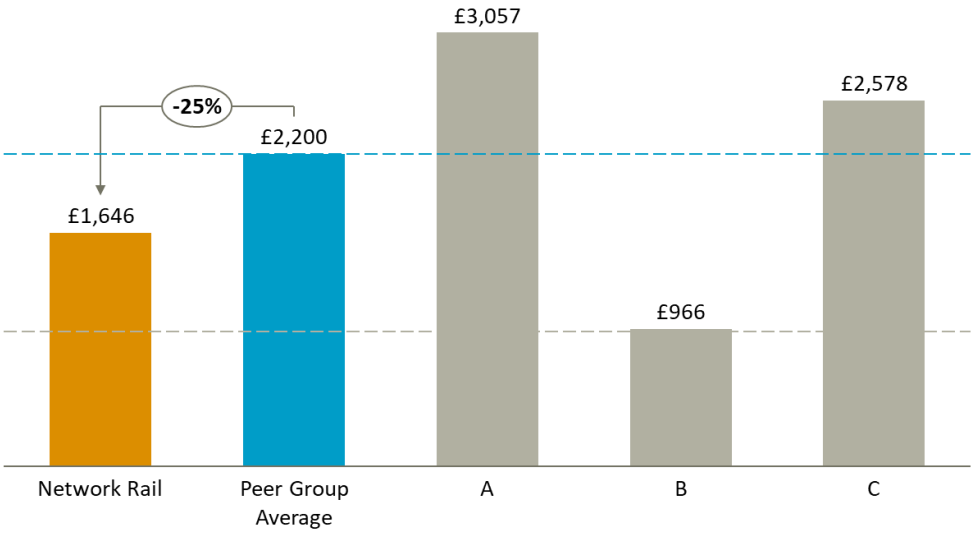
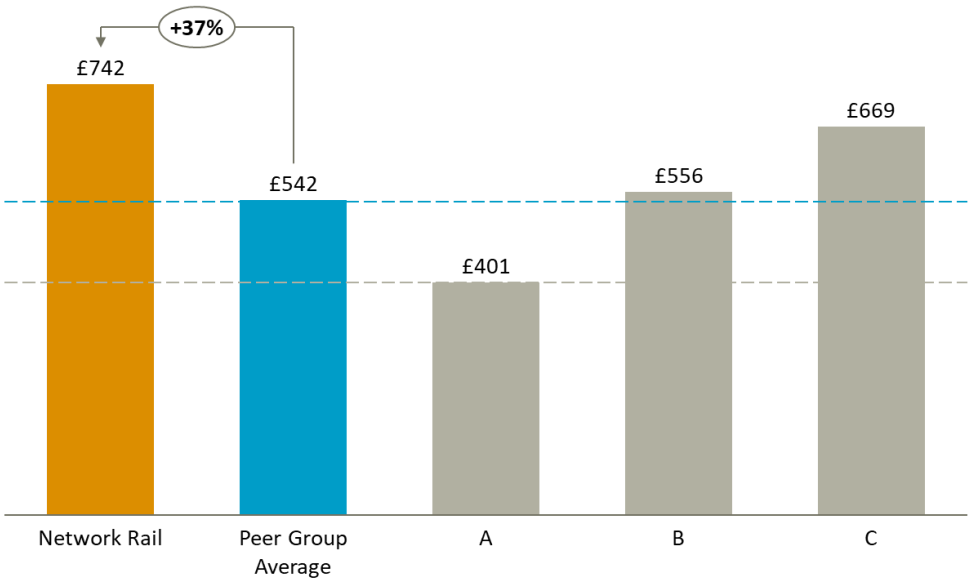
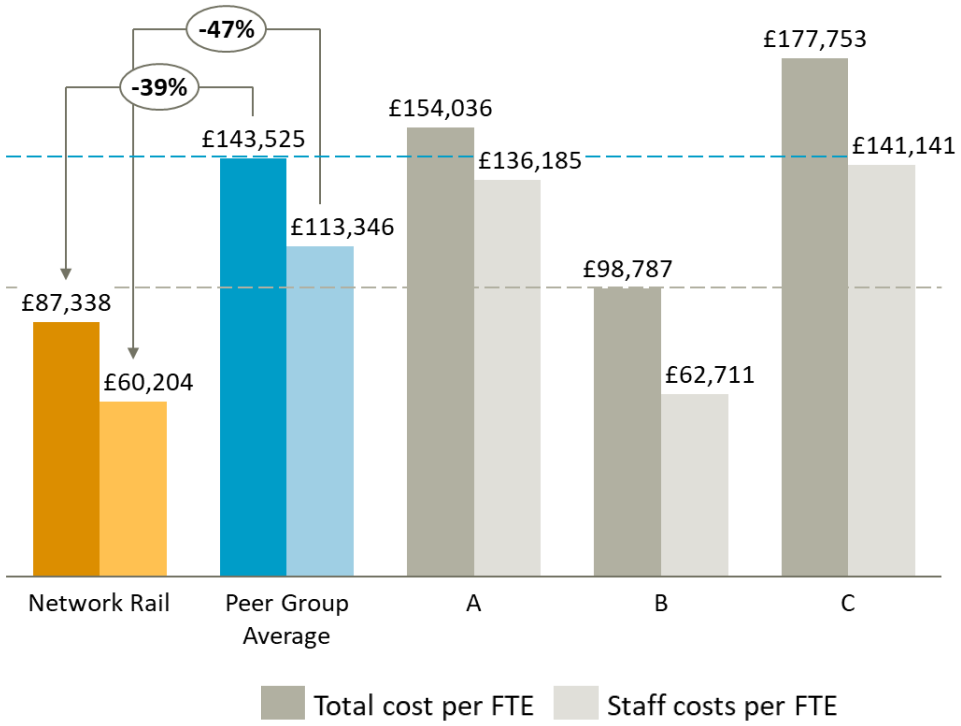


Figure 6-3: HR non-staff costs per Organisational employee



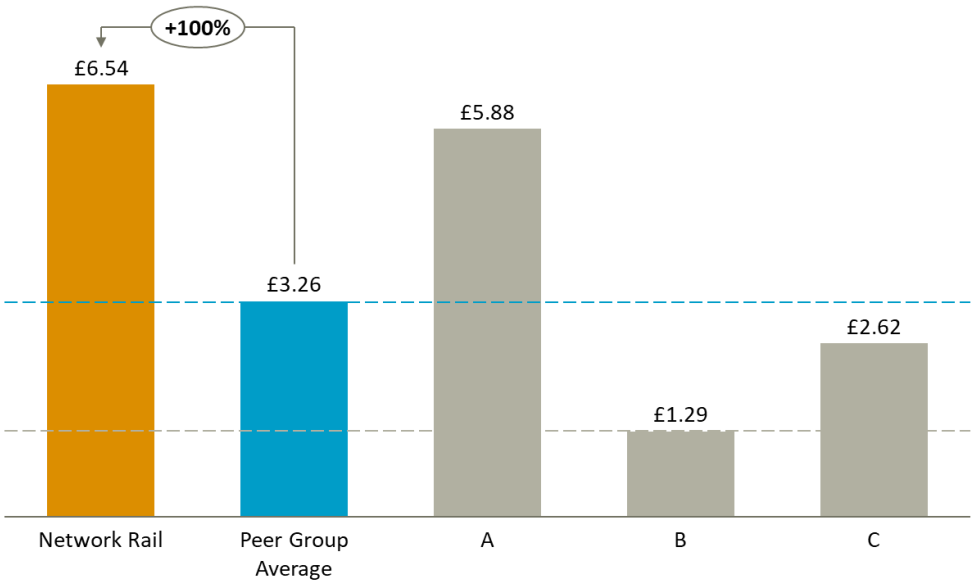
6.17 As can be seen in Figure 6-2, Network Rail's HR staff costs are 25% lower than the peer group average. Figure 6-3 shows that Network Rail's HR non-staff costs are 37% higher than the peer group average, however HR total costs per organisational employee are 13% lower (as staff costs are the majority of HR costs).

Figure 6-4: HR costs per FTE (Total, staff costs and non-staff costs)



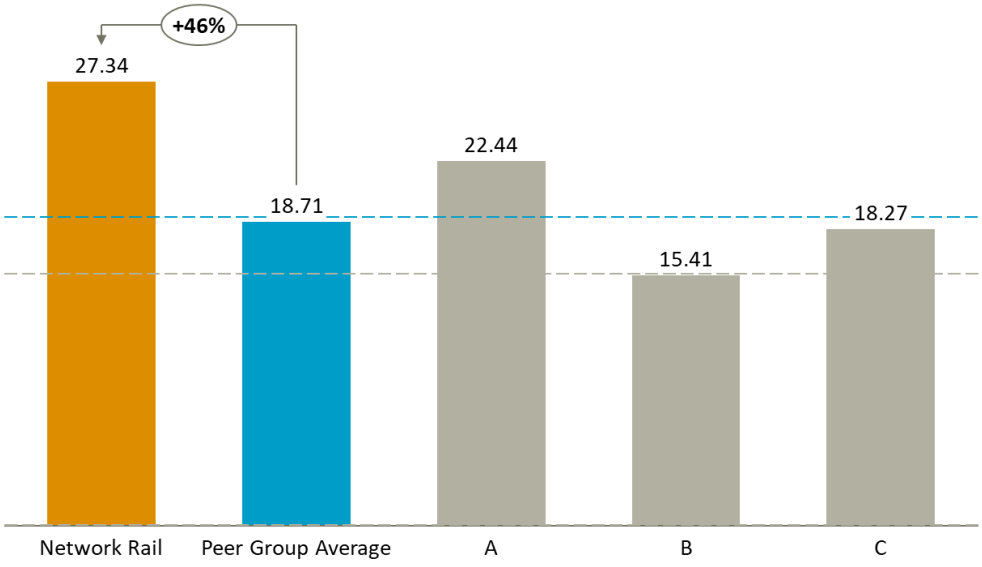
6.18 Figure **6-4** shows the HR costs per FTE in the HR function, for each organisation. It shows that Network Rail's HR costs per FTE are roughly half of the peer group average.

Figure 6-5: HR total cost per thousand network km



6.19 In contrast to the Figure 6-1, Figure **6-5** shows that Network Rail's HR function appears to be less efficient than the corresponding function within the members of the peer group when measured on a cost per network km basis (i.e. an organisational output). The potential reasons for this difference in the assessment of the HR's function's efficiency are outlined in the following section.

Figure 6-6: HR FTEs per thousand organisational employees



6.20 Figure **6-6** shows how many HR FTEs each organisation employs to support every thousand employees. The results show that, compared to the peer group average, Network Rail requires almost 50% more HR FTEs per employee. Some explanatory factors that could contribute to the requirement for more HR staff per employee are described in the section below.

Explaining differences in HR costs

6.21 As noted above, Network Rail directly employs a majority of the staff undertaking maintenance work. This means that roughly a third of the employment contracts managed by Network Rail's HR department relate to maintenance staff. Maintenance staff work shifts, often work overtime and also frequently work unsocial hours. Within Network Rail there is

also a wide range of maintenance staff Terms and Conditions (T&Cs) with, in some cases, variations in these T&Cs even amongst staff undertaking similar roles (and sometimes even on the same shifts)[1]. Such variations can include differences in working hours, overtime pay per additional hour and unsocial hours payments. The level and complexity of HR and employee relations workload for these employees is likely to be significantly greater than for staff on less complex terms and conditions (e.g. support and administrative staff). Discussions with peer group organisations indicate that, unlike Network Rail, they do not have a wide range of terms and conditions. This is therefore likely to contribute significantly to the higher level of HR staff per employee shown in Figure **6-6**.

6.22 Figure **6-4** shows that Network Rail's HR staff cost per HR FTE is roughly half that of two of the peer organisations. In order to gain further understanding of whether these staff costs are close to those for similar staff in the UK we have referred to the IDR/Steer review of rail industry employment costs**.** However, the sample size for HR staff in the IDR/Steer review, which specified a different level of disaggregation, was limited to just 69 employees across three job titles (compared to c.400 FTEs in Regional and Central HR teams and a further c.800 FTEs delivering other HR functions such as training, recruitment and payroll). Therefore, a like-for-like comparison is not possible, but the limited data on basic pay available for those 3 roles may suggest that Network Rail's staff cost per FTE is closer to that for the UK 'market' than the peers with double the staff costs of Network Rail. As a result, it is difficult to draw any definitive conclusions on Network Rail's efficiency from the comparison of HR staff costs per HR FTE with those of peer group members. However, it is understood from peer group interviews that, in their smaller organisations, the roles of HR staff tend to be relatively senior. This is due to the higher proportion of junior HR roles within the structure of larger organisations, with more middle-management and analysts within their HR, in addition to senior management.

6.23 At the same time, from our experience working on the IDR/Steer review of rail industry employment costs we are aware that Network Rail operates 2 payroll systems for its staff (one for maintenance staff and one for all other staff). While this arrangement is partly a result of Network Rail brining maintenance staff in-house, it is likely to be less efficient than the payroll arrangements for peers, and is likely a contributor to the greater non-staff costs per employee shown in Figure 6-3. However, we recognise that making the changes to realise these savings could be costly and potentially high risk given that Network Rail's payroll systems are both complex and business-critical.

6.24 Comparing HR costs based on a per headcount and per network km basis give different indications of whether Network Rail's HR services are provided efficiently. This is due to Network Rail employing more staff per network km than comparators, as it outsources less of its maintenance activities. This greater number of staff employed per network km then leads to higher HR costs on a network km basis. Therefore, this higher HR cost per network km, despite a lower HR cost per headcount, makes sense given Network Rail's structure and how that compares with the peer organisations.

Benchmarking Finance costs

6.25 Network Rail's finance function carries out all financial reporting and management on behalf of the business. Key activities within the finance function include:

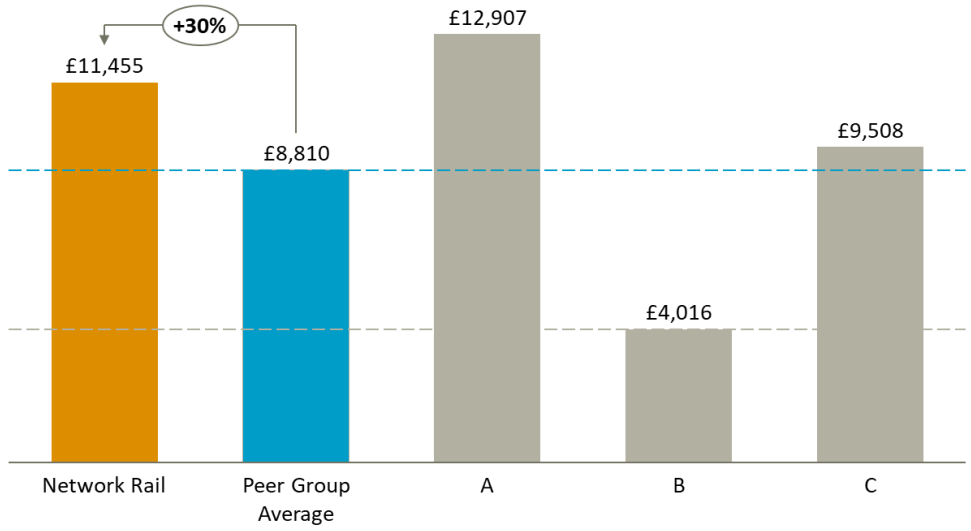
[1] One of the main reasons for the variety of terms and conditions for maintenance staff at Network Rail is that infrastructure maintenance used to be contracted out, and when the work was brought in-house, the terms and conditions of employees of the (c20) different contractors was not harmonised.

- Transactional services (accounts payable and receivable)
- Control & risk management
- Financial planning and analysis
- Commercial finance functions, including financial reporting)
- Investment centre of excellence

Finance cost analysis

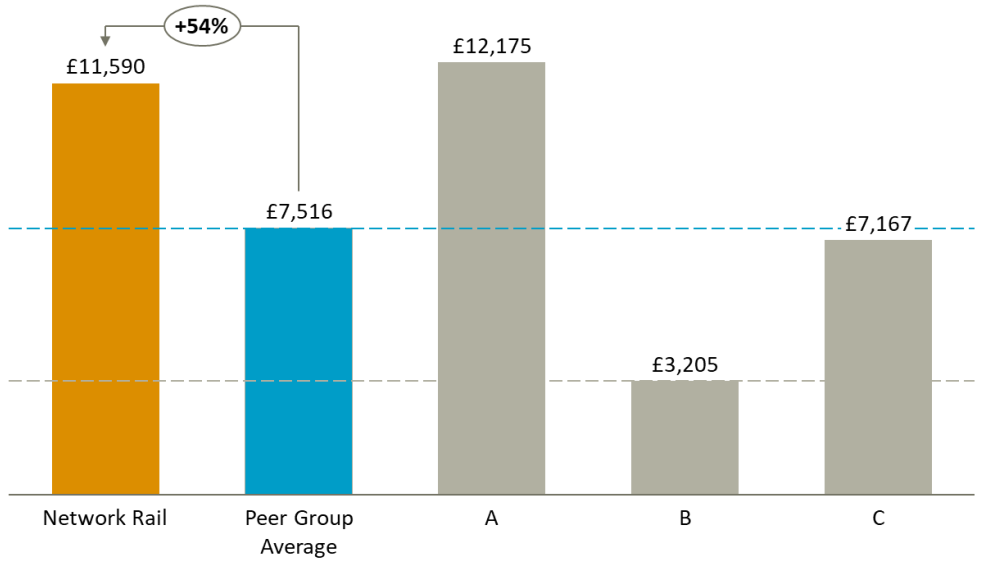
6.26 As seen in Figure 6-7, Network Rail's finance costs per £ of operating costs are 30% higher than the peer group average.

Figure 6-7: Finance total cost per £ total operating costs



6.27 Figure 6-8 shows a similar position when just considering staff costs, which is the majority of Network Rail's finance costs.

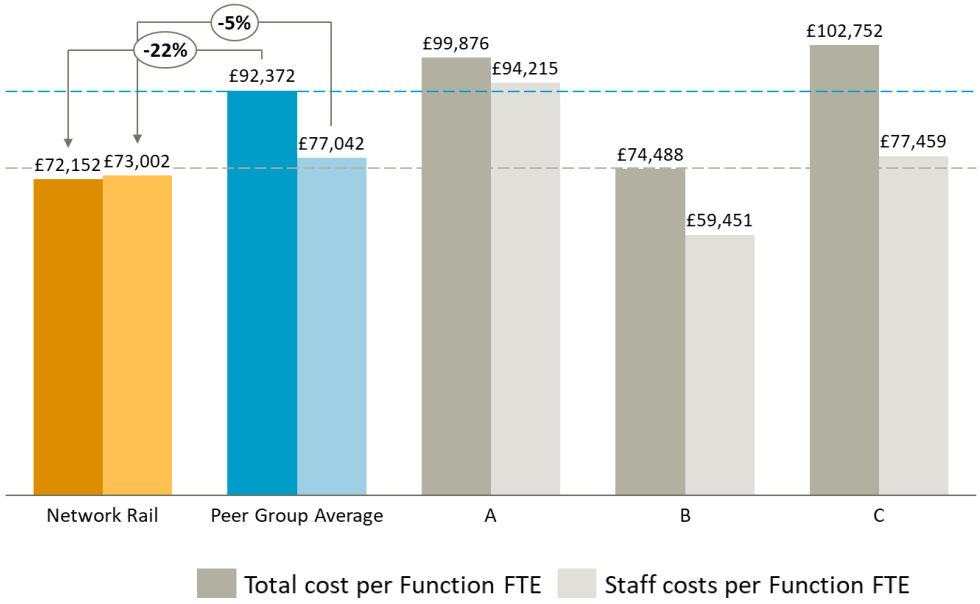
Figure 6-8: Finance staff costs per £ total operating costs



6.28 Figure 6-8 shows that Network Rail's finance function staff costs per £ operating costs are 54% above the peer group average. They are significantly above those of peer organisations B and

C, while only slightly below that of peer organisation A. Network Rail highlighted that this may be a result of the differing roles and accountabilities of finance teams across the peer group.

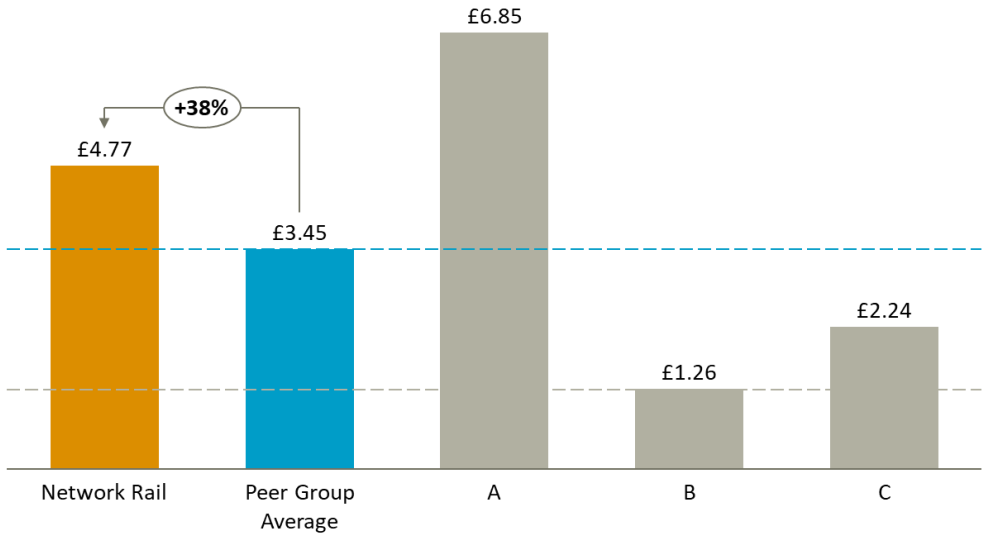
Figure 6-9: Finance costs per Finance FTE (Total, staff costs and other costs)



6.29 Figure 6-9 shows that, while Network Rail finance staff costs per finance FTE are greater than those of peer organisation B, they are less than those of peer organisations A and C. As a result, they are 5% below the peer group average. This is more in line with confidential independent benchmarking previously conducted for Network Rail, shared with the study team. This previous report found that, compared with a customised peer group selected to reflect industry complexity, Network Rail labour rates were lower than peers and this offset higher headcount.

6.30 It should be noted that network Rail's total finance costs per FTE are lower than staff costs because of negative non-staff costs (i.e. an income) for accounting charges associated with services provided by the finance function to other parts of Network Rail.

Figure 6-10: Finance total cost per thousand network km



6.31 When measuring finance costs on a per network km basis, Network Rail's finance function costs are 38% higher than the peer group average.

Explaining differences in Finance costs

6.32 The different structure of Network Rail in comparison to that of the peer group organisations is likely to contribute to its higher total finance function costs, normalised for network size, as shown in Figure 6-7 and Figure 6-10.

6.33 As a result of Network Rail's different structure, whereas the peer organisations carry out all of their finance functions centrally, Network Rail has central, directorate-based and regional finance teams. Each of these teams contributes to higher total and staff costs per £ operating costs seen in Figure 6-8 (despite lower staff costs per finance FTE, shown in Figure 6-9). The presence of these additional finance teams implies a trade-off between pure functional efficiency, on the one hand, and having the resources at region/route level needed to support effective decision-making, on the other.

6.34 Conversely, we would expect the organisation's greater size, as noted above, to allow it to exploit economies of scale by spreading fixed costs over a greater level of activity. However, despite the potential for Network Rail to exploit economies of scale overall financial costs, normalised for network size, are greater than those of the peer organisations.

6.35 Previous benchmarking on behalf of Network Rail, noted in 6.29 above, concluded that Network Rail's Finance costs were 33% more efficient than a customised peer group and 1% better than 'world-class' levels. However, it also noted that headcount was 32% higher than world-class peers and concluded Network Rail was 'more efficient than effective'.

Benchmarking Information Management costs

6.36 The Information Management (IM) function at Network Rail is often referred to as Information Technology (IT), or Digital Services, in other organisations. This support function is responsible for the provision of computers and computer services to the organisation. There are a variety of different models to procure these services which means most organisations procure these functions differently, for example purchasing servers versus paying an annual fee to rent server space. It is common for organisations to outsource key parts of the IM function's activities.

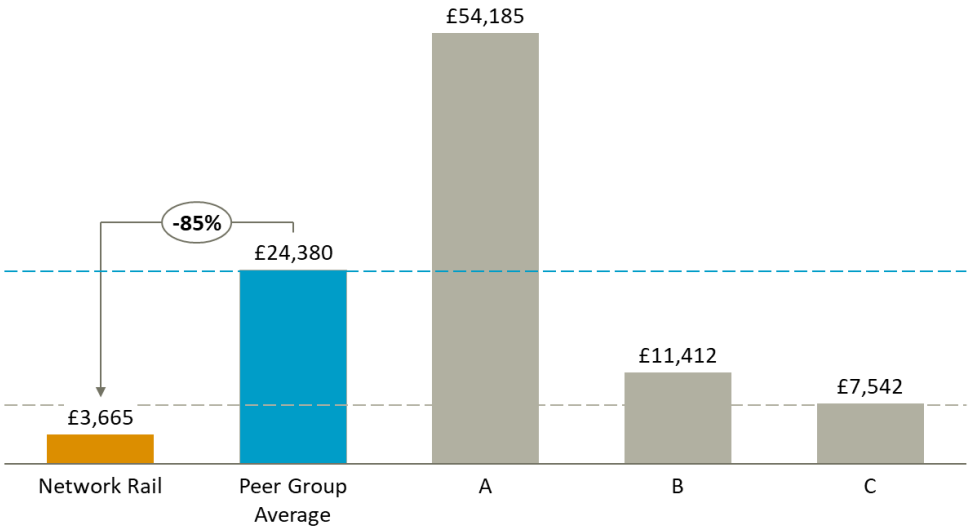
6.37 The key activities included within Network Rail's IM function are:

- Provision of computer hardware to employees
- Provision of computer software to employees
- Provision of computer helpdesk services for employees
- Provision of server storage and processing
- Computer system maintenance and security
- Cybersecurity

Information Management cost analysis

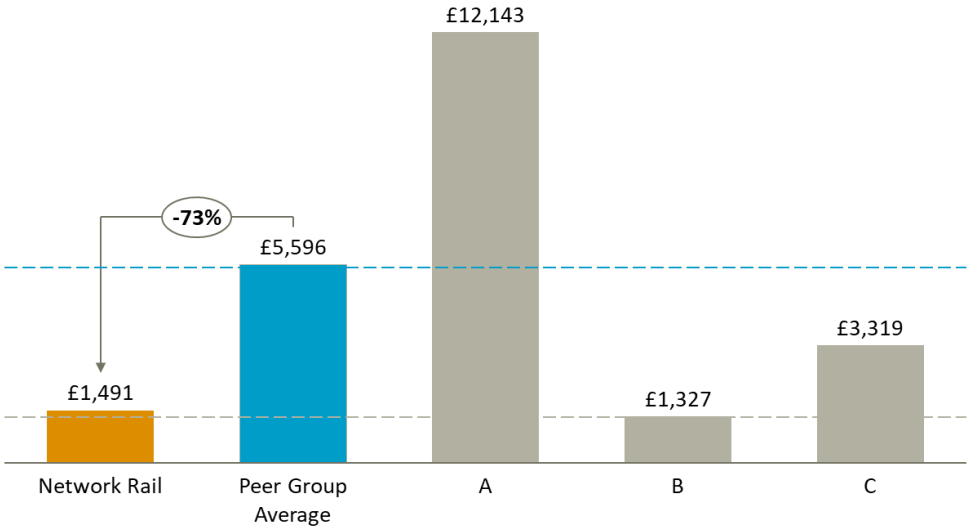
6.38 Network Rail's Information Management (IM) costs per organisational FTE are 85% less than the peer group average (see Figure 6-11).

Figure 6-11: Information Management total cost per Organisational FTE



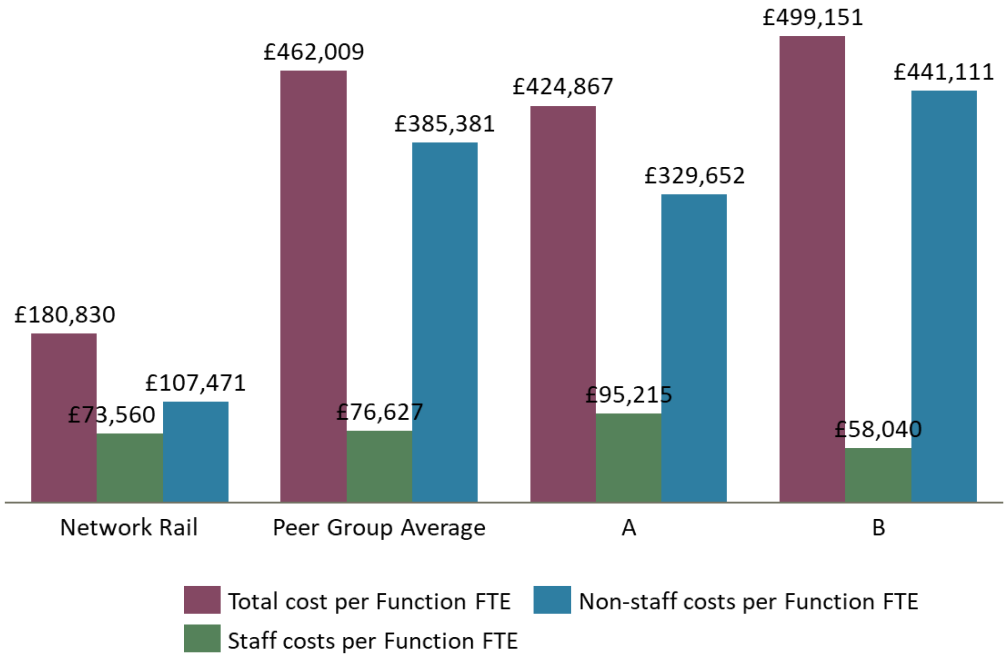
6.39 Although the peer average is strongly influenced by the particularly high IM costs of organisation A, we note that Network Rail has a significantly lower cost than even the lowest cost member of the peer group.

Figure 6-12: IM staff costs per Organisational FTE



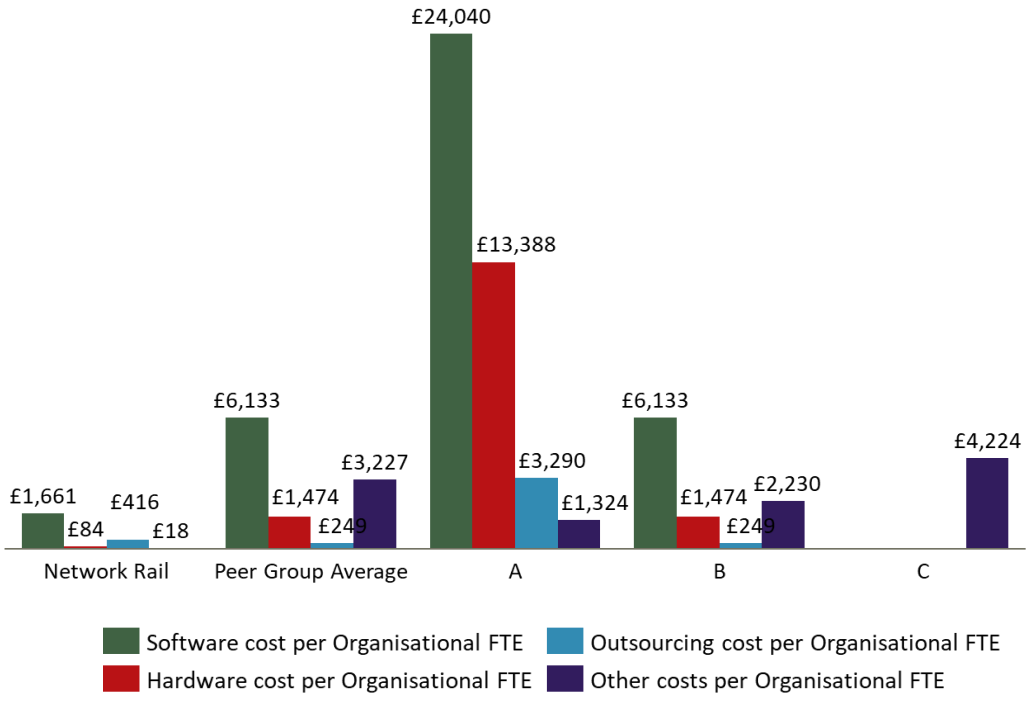
6.40 As seen in Figure 6-12 above, IM staff costs per organisational FTE for Network Rail are 73% less than the peer group average.

Figure 6-13**: IM Total, Staff and Non-Staff cost per IM FTE**



6.41 Figure **6-13** shows that, for all of the organisations, non-staff costs (outsourcing, software, hardware, and other) are the majority of IM costs. Network Rail's IM non-staff costs per IM FTE are significantly less than those of the peer group organisations. This indicates that differences in non-staff costs are the primary driver of Network Rail's lower IM costs. Peer organisation C was unable to provide any FTE numbers for its IT function and is therefore not shown in the figure.

Figure 6-14**: IM costs per costs per Organisational FTE (Software, Hardware, Outsourcing, and Other costs)**

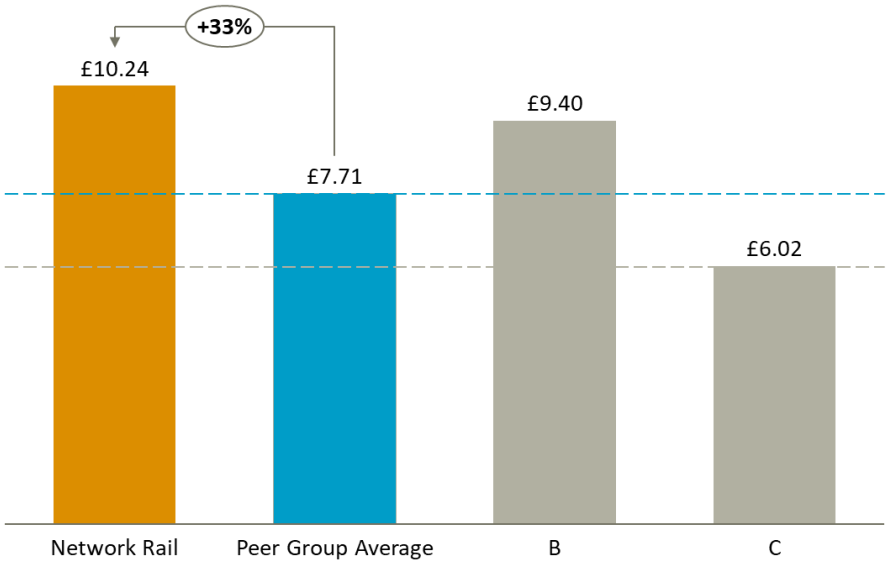


6.42 Figure **6-14** shows IM non-staff costs split by type of IT cost (software, hardware, outsourcing and other). This chart indicates that each organisation provides its IT services in a different

manner, although software is the costliest item for all of the organisations. Note that a breakdown of non-staff IT costs is not available for peer organisation C so all non-staff costs have been included in the 'Other' category in Figure **6-14**.

6.43 Peer organisation A's IM costs are significantly higher than those for the other organisations because the data used from peer organisation A also includes significant IT costs associated with the operational network. They have been unable to separate these operational costs from their support costs. As a result, we have excluded peer organisation A from the peer group average.

Figure 6-15**: IM total cost per thousand network km**



6.44 Network Rail's total Information Management cost per network km shown in Figure **6-15** is higher than both peer organisations B and C. As noted in paragraph 6.42 above, peer organisation A's IM costs are very high due to the inclusion of additional activities and for this reason it has been excluded from Figure **6-15** and the peer group average in the figure. Once peer organisation A is excluded, the cost on a per network km basis indicates that Network Rail provides its Information Management function less efficiently than all of the peer organisations. Potential reasons for difference in efficiency observed between Network Rail and the peer group are outlined below.

Explaining differences in Information Management costs

6.45 Given the nature of IT systems, with significant costs in procuring hardware (or the use of hardware) and software licences, we would expect non-staff costs to account for a majority of Information Management costs. The significant hardware and software costs incurred by all of the peer organisations (Figure **6-14**) are similarly in line with our expectations.

6.46 In addition, as IT costs are largely related to the purchase of hardware, we expected Network Rail's greater ability to exploit economies of scale to have a significant impact on its unit costs relative to those of other organisations. This contributes to the lower Information Management function costs on a per organisational FTE basis observed.

6.47 However, on a per network km basis, Network Rail has higher IT costs than a majority of the peer group. Although the reason for this higher cost is unclear, it may be due to additional IT support requirements that Network Rail has as a result of carrying out a majority of its maintenance in-house.

6.48 During the study, we were also provided with the results of an exercise to benchmark IT costs commissioned by Network Rail in 2021. This compared Network Rail to other large organisations expected to experience similar economies of scale.

6.49 The 2021 study undertaken considered whether, in the absence of any scale advantage, Network Rail's Information Management function is cost efficient. It examined Network Rail's IM organisation, FTEs and expenditure in addition to Network Rail's four major IT contracts. The results suggested that Network Rail's IM expenditure was lower than that of its peers. However, the study also stated that this low level of expenditure had likely affected Network Rail's delivery of quality of IT services, in particular digital transformation. It also suggested that three of the four major contracts provided good value for money. The fourth contract related to legacy systems, and changing supplier in search of better value was expected to be complex and difficult to achieve.

Benchmarking procurement costs

6.50 The procurement support function is responsible for all activities related to the procurement of most goods and services by the organisation ranging from large IT contracts to maintenance materials. The activities of the procurement function include:

- Issuing tender documents to potential suppliers
- Managing supplier frameworks (if the organisation has these)
- Ensuring that contracts are signed and terms and conditions are agreed for work awarded
- On-going management of existing portfolio of client contracts

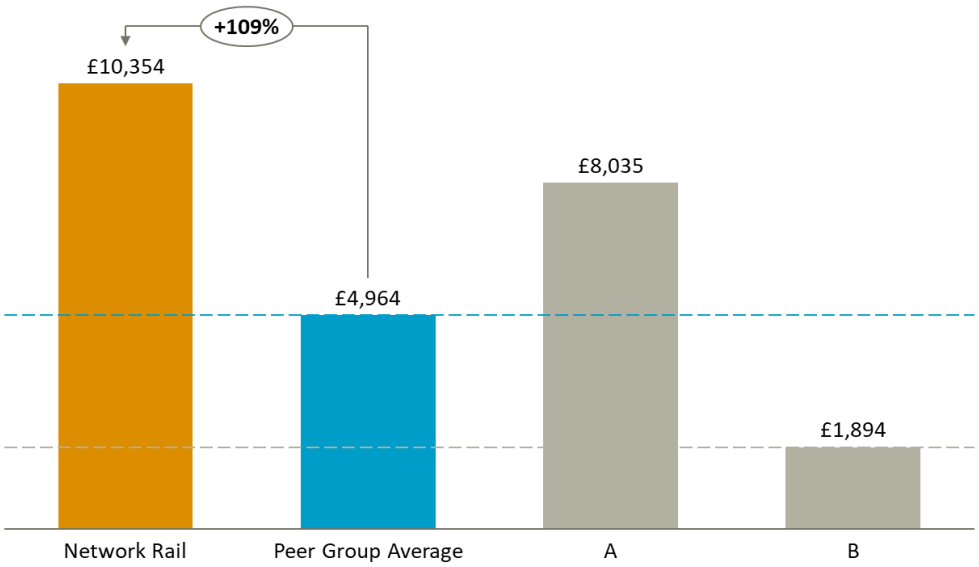
Procurement cost analysis

6.51 For our analysis of procurement costs, we have used the measure of costs per £ of contract awarded as a benchmark to compare organisations. This represents the value of the contracts signed by the organisation in the year, with an annual average value used for multi-year contracts.

6.52 Network Rail's procurement costs per £ of contract awarded, shown in

6.53 Figure **6-16**, are significantly above those of both peer organisations A and B.

Figure 6-16: Procurement total cost per £ of Contract awarded

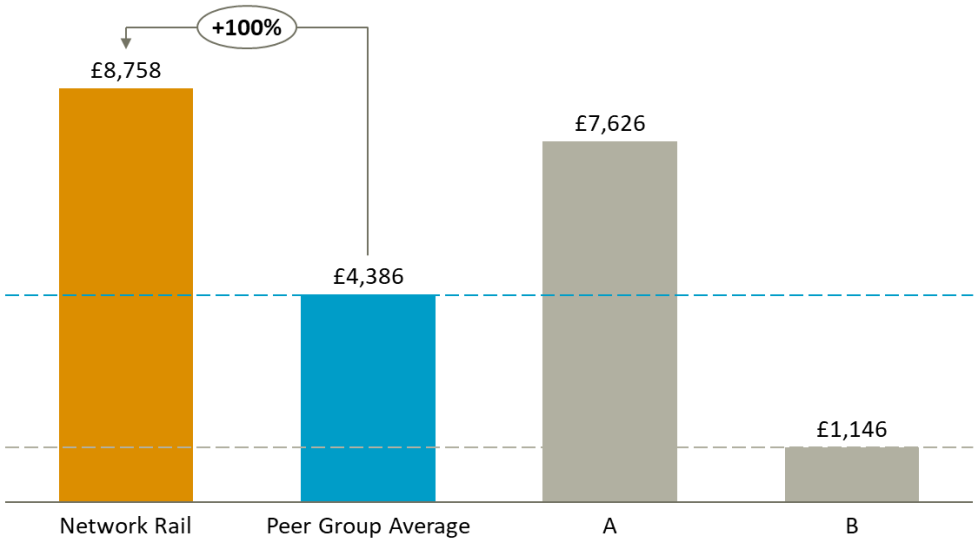


6.54 Peer organisation C was unable to provide information on the value of contracts awarded. Network Rail has advised that in 2021/22 a significantly lower value of contracts were awarded than would have been in a 'normal' year (and provided an indicative figure for this). The indicative figure for contracts awarded per 'normal' year was £7.75bn (compared to £4.7bn in 2021/22). If this figure was used, Network Rail's cost per £ contract awarded would be c.£6,300, between peer organisations A and B.

6.55 The distribution of the difference shown in

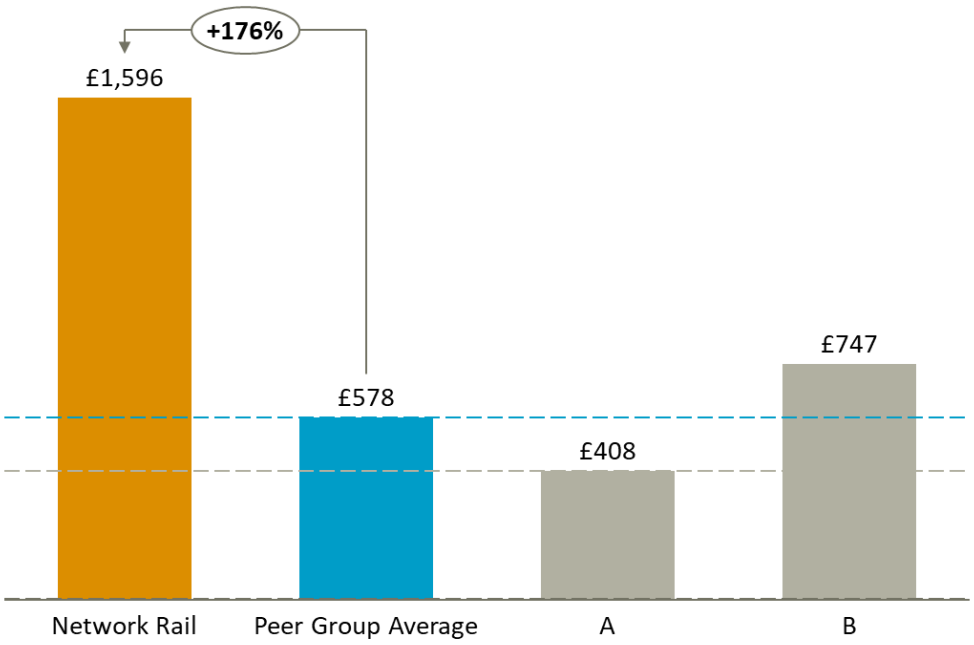
6.56 Figure **6-16** between staff and non-staff procurement costs, is shown below in Figure 6-17 (staff costs) and Figure 6-18 (non-staff costs).

Figure 6-17: Procurement staff costs per £ of contract awarded



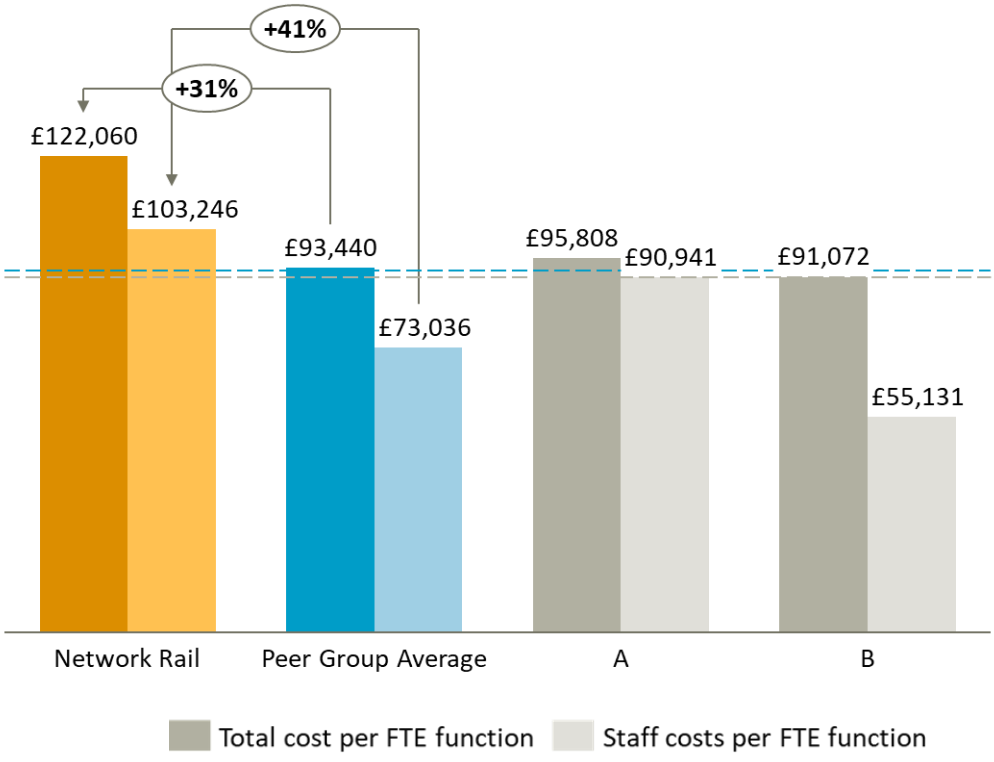
6.57 Procurement staff costs per £ of contract awarded for Network Rail are greater than both peer organisations A and B, as indicated in Figure 6-17 above. Given that procurement costs are mostly staff costs, this is in line with our expectation that the difference in staff costs accounts for more than 80% of the difference in total procurement costs per £ contract awarded.

Figure 6-18: Procurement non-staff costs per £ of Contract awarded



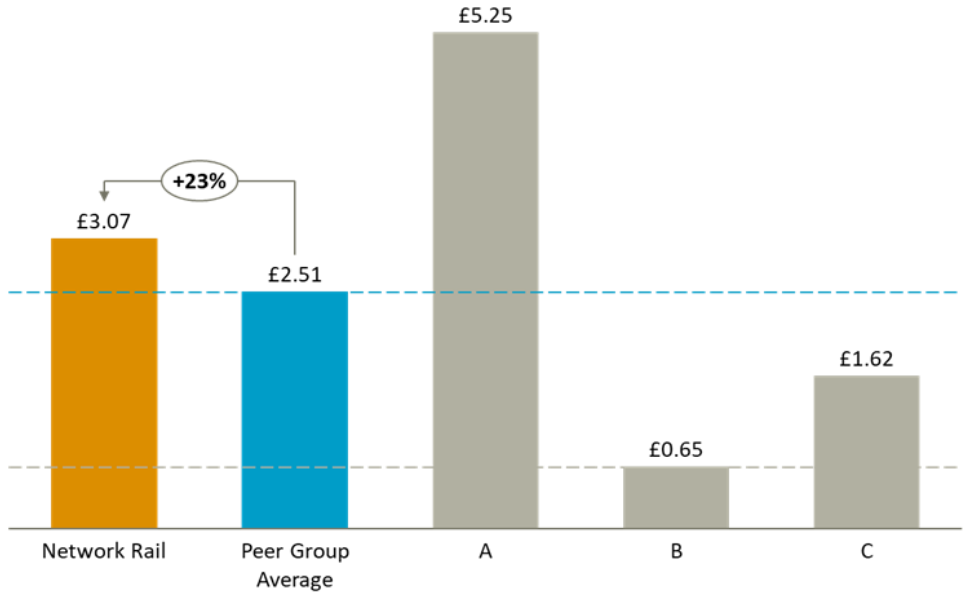
6.58 While procurement non-staff costs are a relatively small proportion of total procurement costs, because Network Rail's procurement non-staff costs are significantly above both peer organisations A and B average (as can be seen in Figure 6-18), these account for nearly 20% of the difference in procurement costs between Network Rail and the peer group average.

Figure 6-19**: Procurement costs per procurement FTE (Total, staff and non-staff costs)**



6.59 As seen in Figure **6-19**, both Network Rail's procurement total and staff costs per procurement FTE are greater than both peer organisations A and B. Peer organisation C was unable to provide any FTEs for its procurement function.

Figure 6-20: Procurement total cost per thousand network-km



6.60 When Network Rail's procurement costs are compared on a per network km basis, as shown in Figure 6-20 above, its procurement function appears to be less efficient than peer organisations B and C but more efficient than peer organisation A.

Explaining differences between Network Rail and other organisations

6.61 From our engagement with the peer organisations, we understand that they all outsource a significantly higher proportion of their maintenance of the network than Network Rail. As a result, the procurement departments in these organisations carry out significantly more work relative to the size of the organisation than Network Rail's. As an indication of the significance of this workload, following a recent change from carrying out maintenance in-house to outsourcing, one peer saw their procurement team's costs increased by 50%. This peer indicated that the outsourcing of maintenance, which accounts for roughly a quarter of their contract spend managed, was a significant cause of this increase. Its decision to outsource maintenance had been taken in order to introduce competition in the procurement of maintenance services, which was expected to reduce cost and/or improve quality. However, the peer organisation is now in the process of bringing delivery back in-house, so it is likely that this outsourcing has not produced the intended results.

6.62 With regard to the benchmarking of costs per £ of contract awarded, Network Rail informed us that, in the year for which we collected data, the number and value of contracts awarded was lower than average, as it was the middle year of Control Period 6 and therefore outside the normal peak levels of procurement activity at the start or end of a Control Period. The impact of using an indicative figure for a 'normal' year is outlined above – it would place Network Rail in the middle of the peer group. In addition, frameworks were not included in the value of contracts awarded that was provided by Network Rail. The inclusion of these would further lower Network Rail's procurement cost per £ contract awarded, although we have not been provided with a value to show the impact of this.

6.63 In addition, Network Rail suggested that for the purposes of benchmarking we should use £ expenditure on contracts managed, which better represented the workload of their procurement team. However, given we only had one peer with this information available, this further assessment of NR's efficiency could not be undertaken.

6.64 The benchmark comparisons indicate that peer organisation B's procurement costs are significantly lower than those of other organisations. This is because the procurement team at peer organisation B has different responsibilities from those of its peers. For example, Network Rail's procurement team, unlike organisation B, is responsible not only for purchasing maintenance materials but also ensuring they are delivered to the relevant worksite.

6.65 On its own, £ of contracts awarded/managed is not a complete measure of the workload of a procurement team as it does not capture the complexity of managing procurement expenditure. We hypothesised that managing a greater number of contracts would increase complexity, but when this measure was used instead of £ contract awarded the results were similar to those previously obtained. In addition, from discussions with Network Rail we understand that whether a contract is single tender or is valued above procurement regulation thresholds can also affect the complexity and resource-intensiveness of the procurement process. While the difficulty of managing a large contract portfolio is clearly important, there is no common, viable measure for the complexity of contracts with data consistently available among the peer group, so this factor has not been fully controlled for in our benchmarking.

6.66 In our engagement with Network Rail's procurement team, they suggested that their compliance with UK public procurement and Cabinet Office rules created additional work in comparison to peer organisations. Based on our engagement with peer organisations, we know that two of these are subject to similar public sector procurement rules. A third peer organisation is also government owned and likely to be subject to public sector procurement rules of some form. Therefore, we do not consider the differences in procurement rules between Network Rail and the members of the peer group to be likely to result in a material difference in the procurement function's costs.

6.67 Network Rail also provided benchmarking work carried out in 2022 that compared the efficiency of its procurement function with that of various UK public sector bodies also subject to UK public procurement and Cabinet Office rules. This study concluded that Network Rail's procurement team was in the upper quartile of public bodies and also 'outperformed' the government average.

6.68 Figure **6-19** shows that Network Rail's procurement staff cost per procurement FTE is double the peer group average. When we looked at the procurement staff in the IDR/Steer review of rail industry employment costs to provide a point of reference for Network Rail's staff costs we found that the study was based on a sample of 66 FTEs (out of a total of c.400 FTEs within procurement). This means it difficult to draw clear conclusions, despite this previous review suggesting that procurement staff pay is 'within market'.

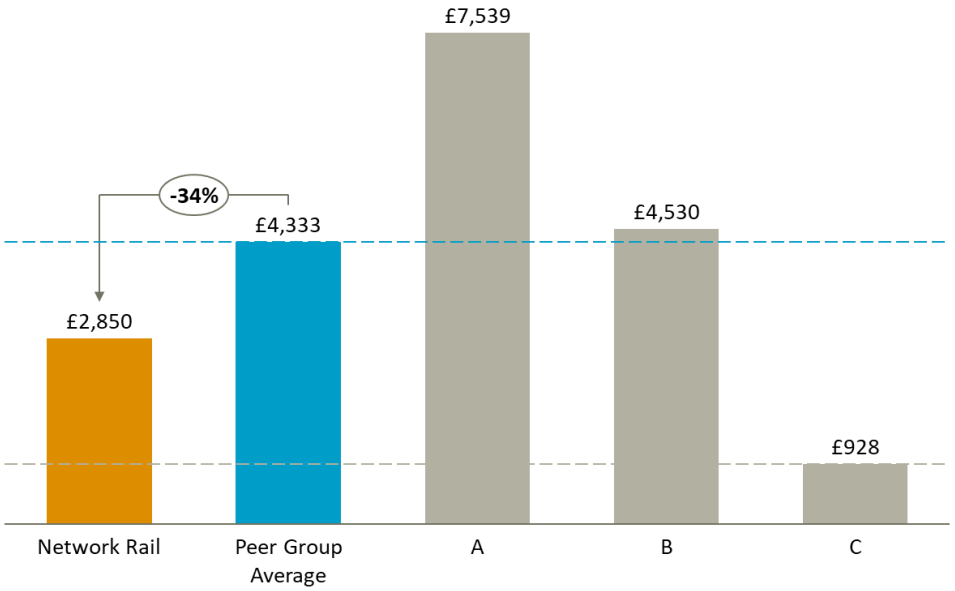
Benchmarking other support and corporate services costs

6.69 In addition to the activities included in the HR, finance, IM and procurement functions, there are additional support activities carried out by Network Rail and other organisations. Though this is varies between different organisations, the relevant activities identified for Network Rail and peers include:

- Executive office and administration
- Legal
- Communications (both internal and external)
- Health & safety

Other support cost analysis

Figure 6-21: Other support total cost per Organisational FTE



6.70 As shown in Figure 6-21, Network Rail's other support costs per organisational FTE are less than peer organisations A and B but above C. Peer organisation C has significantly lower costs as it does not contain executive and administrative costs.

Figure 6-22: Other support staff costs per Organisational FTE

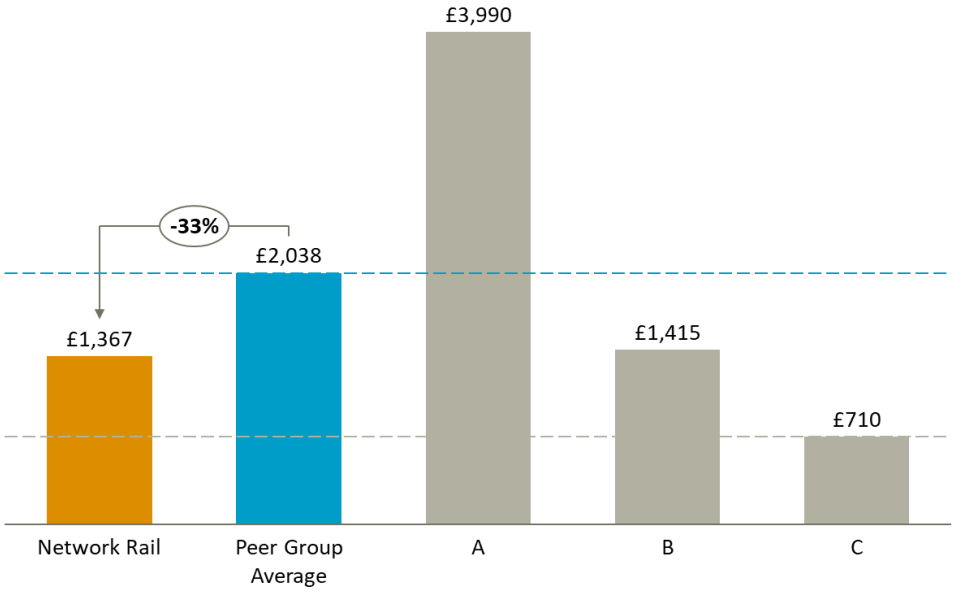
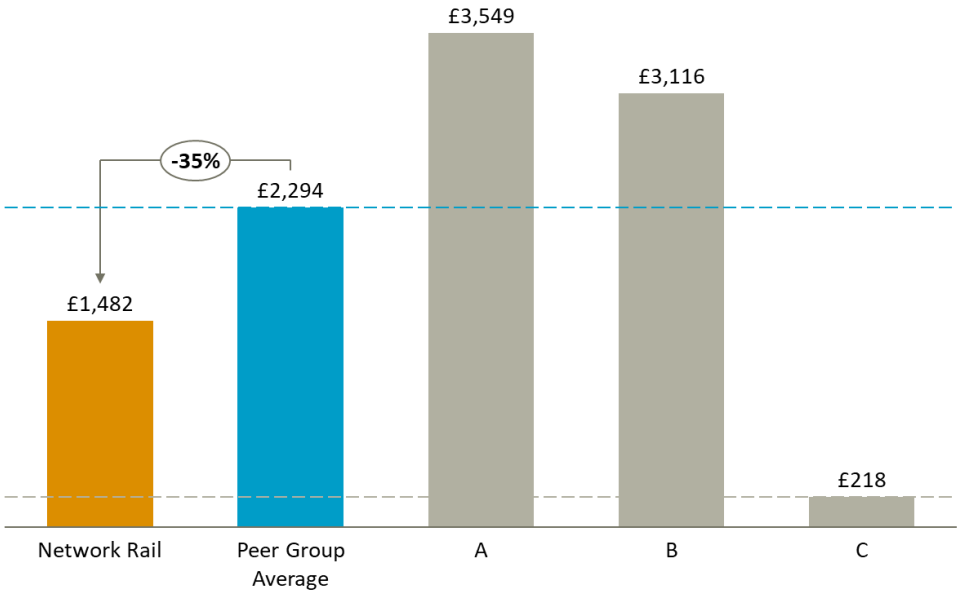
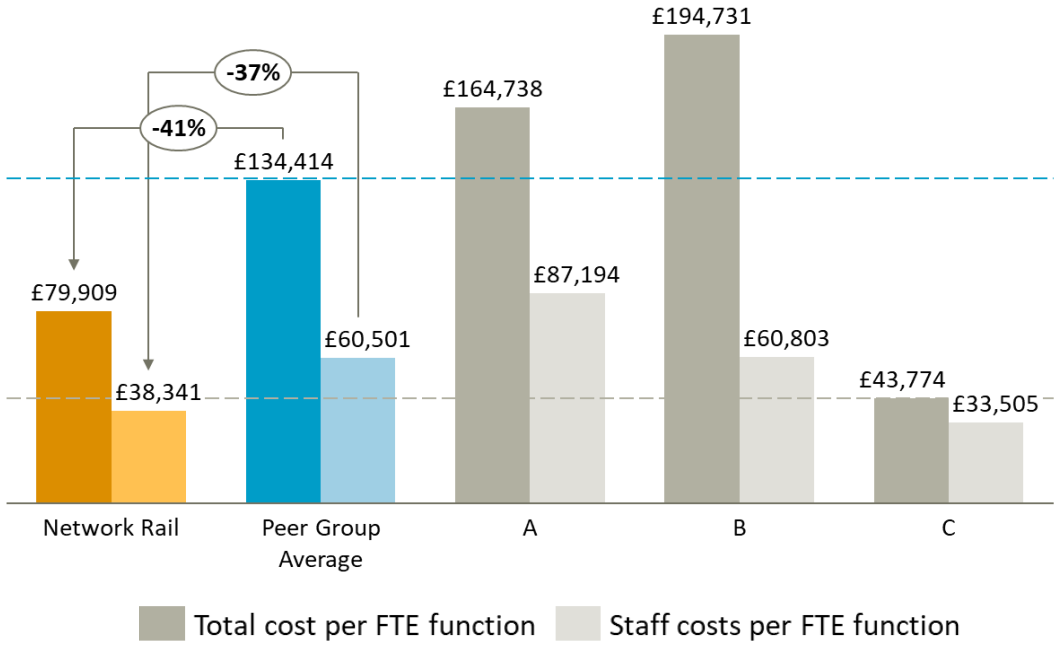


Figure 6-23: Other support non-staff costs per Organisational FTE



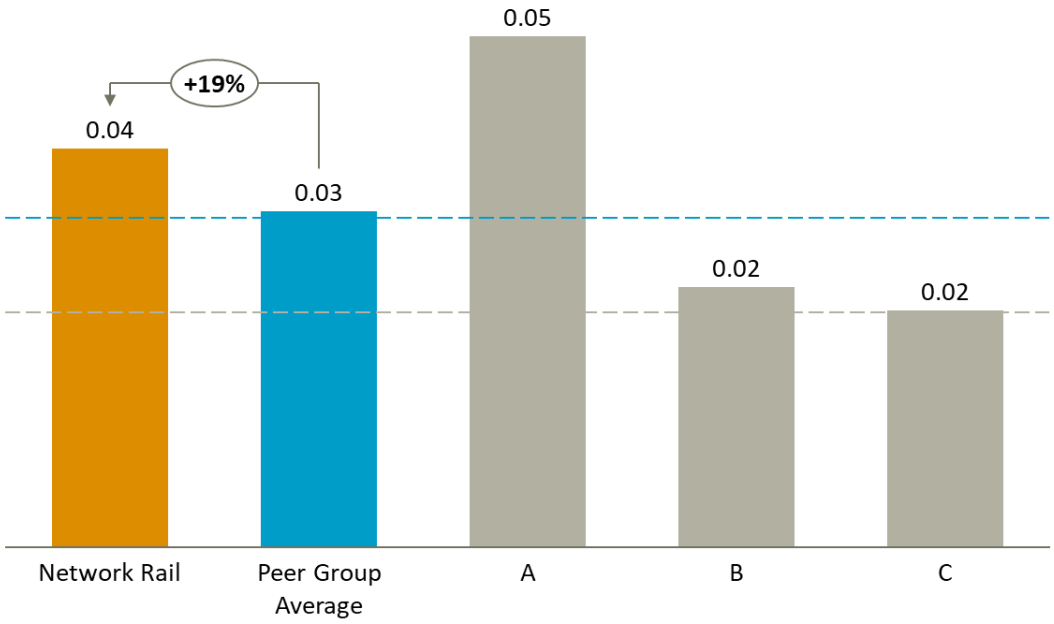
6.71 Figure 6-22 and Figure 6-23 show that Network Rail has a lower staff cost per FTE than peer organisation A but similar to B, and non-staff costs significantly below A and B. This suggests that while both staff and non-staff costs make a material contribution to Network Rail's lower "other support costs per organisational FTE" compared to the peer group, non-staff costs makes the greater contribution.

Figure 6-24**: Other support total and staff costs per function FTE**



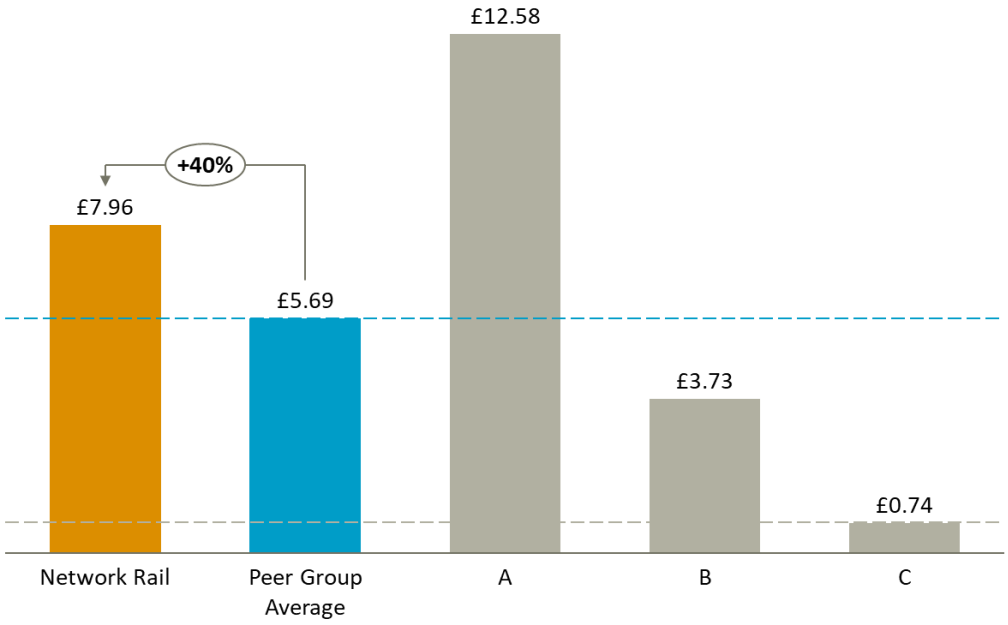
6.72 Figure **6-24** shows that Network Rail has lower other support staff and non-staff costs compared to the peer group average (both approximately 40% lower). On this basis, lower other support staff and non-staff costs per other support FTE make a material contribution to the lower Network Rail cost per organisational FTE.

Figure 6-25: Other support FTEs per Organisational FTE



6.73 Figure 6-25 above shows the other support FTEs per Organisational FTE. Using this measure, Network Rail appears to need 19% more other support FTEs than the peer group average.

Figure 6-26**: Total cost per thousand network track-km**



6.74 Similar to the measures based on FTEs in the figures above, when related to network size rather than the size of the organisation Figure **6-26** suggests that cost of providing other support functions is greater for Network Rail than organisations B and C (though C excludes executives and associated administrative support) but less than that for organisation A.

Explaining differences between Network Rail and other organisations

6.75 Peer organisation C's other corporate services costs are significantly lower as the information they provided does not contain executives and administrative services, which account for roughly two thirds of Network Rail's other support costs and c.80% of costs for one of the peer

organisations. The significantly lower costs for peer organisation C compared to the other organisations observed are therefore in line with expectations.

6.76 Based on the underlying information for Network Rail and one of the peer organisations, it is likely that the level of other corporate support costs largely reflects executive and administrative pay and work requirements. It is unclear whether FTEs or network km is more likely to affect executive pay and work requirements (and therefore which is the more appropriate basis for normalisation), but it is likely that how the organisation chooses to organise itself to meet the particular requirements of its executive and corporate secretariat functions has a more significant impact.

6.77 Figure **6-24** shows that the Network Rail other support staff cost per other support FTE is below the peer group average. We referred to the IDR/Steer review of rail industry employment costs and found comparisons for Admin (1,456 FTE, 1,600 other corporate services FTEs), Legal (albeit with a small sample of 10, of 55 legal FTEs) and health and safety staff (47 FTE). Given that administrative and health and safety roles appear to be a majority of the FTEs in this area, the conclusions from the review are relevant. The applicable admin and health and safety roles were identified in the study as 'above market', compared to similar roles in the UK. It is worth noting that the IDR/Steer review did not cover executive costs so we do not have a clear view about how Network Rail executive pay compares to that for the peer group.

Areas for action on support costs

Network Rail's complex employee terms and conditions arrangements

6.78 The cost benchmarking results for Human Resources indicate that the complex staff contracts that Network Rail have (these include a wide range of employee terms and conditions and payment types that can be different for people working in similar roles) creates human resources inefficiency.

6.79 If measures are taken to reduce the number of terms and conditions, for example through the development of a new 'model contract' for all new recruits to maintenance roles, Network Rail should include savings in HR costs in the business case for harmonisation and then monitor to ensure the savings can be delivered. In addition, independently of any specific measures taken to reduce the complexity of contracts, Network Rail could review whether it is delivering HR services in the most efficient way possible, for example by considering whether the current 2 separate payroll systems can be reduced to a single system.

Network Rail's organisational structure

6.80 For some functions Network Rail has multiple teams (i.e. central, regional and directorate teams). Although, this is likely to result in increased costs, these must be set against the potential for devolved support services to facilitate agile and effective decision-making by Regions to better service the needs of their customers.

6.81 Accordingly, Network Rail should track the improvement in efficiency and quality of its service delivery, in particular the impact of the Putting Passengers First re-organisation, quantifying the associated benefits wherever possible. This would facilitate an assessment of benefits against costs and inform further consideration of the appropriate balance of centralised and devolved support functions.

Economies of Scale

6.82 As mentioned in the comparison of Network Rail's structure, it is significantly larger than all of the peer organisations. The larger size of Network Rail is expected to lead to economies of scale through spreading of fixed costs over a greater level of activity.

6.83 Economies of scale appear to be a significant factor in the costs of delivering some support functions, in particular Information Management. While we have used network size and organisational FTEs as scaling factors, this is not sufficient to control for the impact of economies of scale, which is influenced by other factors. In order to control for economies of scale, either benchmarking studies including organisations that are similar in size to Network Rail need to be carried out or greater use needs to be made of benchmarking work commissioned by Network Rail (which has already provided us with useful information for this benchmarking study).

Focus on quality of delivery for support functions as well as their cost

6.84 Over multiple Control Periods Network Rail has been asked to reduce costs within its organisation, and savings have been partly made through reductions in expenditure on support functions. In addition, since 2021/22 changes from a recent management re-organisation have been implemented, which are likely to lead to a further reduction in support costs.

6.85 While ORR measures the performance of Network Rail's infrastructure services (for example measuring operational performance on the rail network), it is less clear whether any measurement of the performance of support functions is carried out. Future benchmarking should consider the quality and effectiveness of support services against relevant peer organisations.

6.86 In relation to the quality of support services, delivery concerns have already been flagged in the IT and Finance benchmarking studies that Network Rail have commissioned. The IT benchmarking study indicated that the organisation's low level of IT expenditure had likely affected its delivery of quality of IT services (particularly digital transformation). In addition, the finance benchmarking study indicated that too much of the Finance team's time is spent on reporting rather than generating insight, and this is reinforced in the survey carried out, the results of which indicated that other parts of Network Rail do not see the Finance team as providing effective support for their work.

7 Conclusions and recommendations

Operations costs conclusions and recommendations

7.1 Our analysis shows a material efficiency gap in unit staff costs for **signalling and train control**, driven by a reliance on overtime.

7.2 Likewise, there are material gaps to the best in class when it comes to Network Rail's productivity for signalling and train control staff.

7.3 As such, we recommend that:

- In the short term, Network Rail should continue to focus on improvements in signaller recruitment and training to reduce its reliance on overtime
- Network Rail could benefit from accelerating the integration of traffic management solutions and decision support tools across signalling and control, leveraging advanced software and simulation, automating routine tasks and reducing manual interventions
- Over a longer term, subject to affordability and deliverability, there are significant cost-efficiency opportunities for Network Rail from further consolidation of the operation and control of the network, enabled by digital technology

7.4 There is an apparent, material efficiency gap in Network Rail's costs and productivity associated with **electrical control** activities. Part of this productivity gap can be explained by the demands of managing dual electrification systems and the relative lack of economies of scale, with less than half of its network electrified.

7.5 However, there appear to be further actionable opportunities to improve efficiency in this area, so we therefore recommend that:

- Alongside the effective implementation of a Supervisory Control and Data Acquisition (SCADA) system, Network Rail looks to simplify workloads and safely reduce the intensity of staffing requirements
- Alongside SCADA project implementation, Network Rail should establish – and give significant effort and emphasis to – benefits realisation plans to track, capture and assure efficiency improvements. This should likewise be a focus for the delivery of further network electrification in future.

7.6 Due to the level, complexity and often manual and iterative nature of the timetable planning process, **train planning** productivity compared to traffic volumes is lower than the group average, and significantly lower than the best in class. This is also despite relatively low unit labour costs for train planners.

7.7 As such we recommend that:

- Network Rail should explore further opportunities to review processes and reduce manual interventions in the train planning process
- This will require increased standardisation and implementation of decision support tools, improved data systems, and collaboration with train operators
- Network Rail should also continue to invest in improved training and professional development for train planning staff
- Given its importance to network operations, the effectiveness and quality of train planning should be assessed as part of a programme of Network Rail benchmarking in CP7

With very few peers – and with those that do carry out **station operations** having very different station portfolios and activities – plus no breakdown of costs by station operations activity existing for Network Rail, the station benchmarking available is very limited.

7.8 Therefore, our key recommendation in this area is that:

- A future programme of Network Rail benchmarking should include a specific, focused exercise to benchmark station operations, between Network Rail stations and, if possible, a wider station portfolio/other relevant peers – this exercise will need careful design and planning

7.9 Despite relatively high net working hours, and due to the level and nature of the response requirement, Network Rail's labour costs for **mobile operations management** are high and there is an efficiency gap to the best in class.

7.10 We therefore recommend that:

- Network Rail Routes review and optimise their response arrangements, to enable a high quality, 24/7 response service through flexible, well-equipped response teams
- Alongside this, improvements in recruitment and training are made to reduce the reliance on overtime

Support costs conclusions and recommendations

7.11 Across support functions, Network Rail benefits from the potential for significant economies of scale, in comparison to peer organisations which are much smaller in size.

7.12 Some ad-hoc benchmarking has been undertaken by Network Rail for specific support functions, including Information Management (IM), Finance and Procurement studies which have usefully been provided in support of this work. This should be built on and developed.

7.13 Network Rail has also implemented significant management headcount reductions, across support functions in particular, which should increase cost-efficiency in CP7.

7.14 Therefore, across Network Rail support costs, we recommend that:

- The *efficiency* benefits of Network Rail's management headcount reductions should be assessed through further analysis and benchmarking in CP7
- In parallel, through CP7, a systematic approach should be taken to benchmarking the *effectiveness* and quality of delivery across Network Rail's support functions, to assure value for money, targeting organisations of comparative size across sectors

7.15 Subject to the realisation of further efficiencies from management headcount reductions, the complexity of the demand on **HR** professionals, including legacy systems, processes, and terms

and conditions, appear to be driving a comparatively high requirement for HR resource to support the business.

7.16 As such, in addition to the above overall recommendations for the benchmarking of support costs, we recommend that:

- As and when terms and conditions and/or other areas of business management are simplified, Network Rail should assure the realisation of associated HR savings
- Network Rail should review the efficiency of its HR services, including the potential for streamlining and reducing the duplication of its systems

7.17 The strategic choice to devolve accountability and decision-making to regional business units appears to drive a trade-off with comparatively high **finance** costs for the size of the network. We would expect this to be balanced by the realisation of further efficiencies from the management headcount reductions Network Rail has implemented.

7.18 Therefore, we further recommend that:

- The effectiveness and quality of Finance support across Network Rail should be assessed as part of a programme of benchmarking through CP7

7.19 Network Rail's benchmarked **Information Management** costs appear to be lower than peers, but this may represent a trade-off with the quality of services and extent of digital transformation.

7.20 As such, we recommend that:

- The effectiveness and quality of IM services across Network Rail should be assessed as part of a programme of benchmarking through CP7

7.21 Considering our analysis alongside previous benchmarking studies, there does not appear to be a clear efficiency gap in Network Rail's **procurement** activities.

7.22 Previous benchmarking studies have respectively concluded that procurement staff pay is 'within market', and that Network Rail's procurement was in the upper quartile of UK public sector bodies for efficiency.

7.23 Therefore, we recommend that:

- Network Rail should continue to benchmark the efficiency and effectiveness of its procurement, against other UK public sector bodies and other relevant peers, as part of a programme of benchmarking through CP7

Appendices

A Quality assurance undertaken

Approach to quality assurance

A.1 In our interim report to ORR in May 2022, we set out the principles guiding our approach to quality assurance, highlighting the tests for reasonableness, robustness, and level uncertainty that we have applied throughout the project. We also prepared a quality plan to ensure systematic monitoring and control of all analysis and outputs. Accordingly, the following paragraphs set out the quality assurance activities that we have undertaken, and who was responsible for ensuring that they were undertaken. We discuss outline the quality assurance undertaken for analytical work and documented outputs.

Analytical work

A.2 All analytical work has been subject to a six-stage quality assurance process, as described below. As lead, Amberside/Steer is responsible for ensuring the application of the process, working with civity Management Consultants to apply consistently across both main areas of analysis (network operations costs and support costs).

A.3 Our methodology was defined by our technical leads agreed with ORR by our Project Manager and documented in our Interim Report to ORR on progress.

Stage 1 – Data-gathering

A.4 Data was collected through excel templates, to make responding to the data request as simple as possible and avoid the risks that undue complexity or double handling of data introduces errors. The templates covered both quantitative data (e.g., annual expenditure by cost category/activity, outputs for each activity, track and train kilometres and number of assets by type) and qualitative information (e.g., signalling technologies in use). We populated the template as far as possible before requesting further data. Data received was reviewed and checked for plausibility and gaps by the workstream leads for each area.

Stage 2 - Preparation of analytical tools

A.5 Using the methodology defined by our technical leads, agreed and documented with ORR, our workstream leads were responsible for the preparation of the principal analytical tools to be used for the benchmarking, drawing on support from experienced analysts during the construction of spreadsheets and marshalling of input data. Our Project Manager ensured that they were fully informed of the purpose of the tools and their expected application. The workstream leads liaised on the development of each tool and ensured consistency as appropriate (e.g., in the application of PPP exchange rates to input values expressed in a foreign currency), exchanged drafts for review, and discussed analytical issues that are relevant to both network operations and support costs.

A.6 All tools were prepared in Excel and in accordance with spreadsheet modelling best practice (SMBP) with a view to aiding ORR's understanding of assumptions and calculations and minimising the risk of error. More specifically, application of SMBP involved:

- Planning the development and application of the model over the project life cycle, taking account of the timing of data availability;
- Clearly separating inputs, calculations, and outputs, ensuring that each element is visible to both the tool developers and team members responsible for reviewing outputs;
- Using consistent formulae across arrays to facilitate tool review and minimise the risk of errors; and
- Including inbuilt checks into tools so that errors are flagged as they occur.

Stage 3 - Application of tools

A.7 During the application of analytical tools, the workstream leads were responsible for:

- Checking that data has been inputted correctly;
- Ensuring that key parameter values have been correctly applied; and
- Reviewing outputs to ensure that they appear reasonable.

A.8 Our Project Manager and/or Project Director reviewed all analytical outputs shared with ORR before they are submitted. Key results were also peer reviewed by technical leads as part of their respective quality assurance roles.

A.9 This included a review of base data, assumptions, the methodology underpinning the calculations and the robustness of the outputs as well as an assessment of how the outputs should be presented in reports and presentations (e.g., highlighting the important caveats or presenting ranges rather than point estimates).

Stage 4 – Independent review

A.10 The analytical tools were also subject to independent review by senior consultants in each of Amberside/Steer and civity, who are experts in the design of spreadsheet tools for benchmarking and other types of analysis. Each of these expert peer reviewers were independent from the project and its analysis, and therefore subjected the analytical work to objective scrutiny.

A.11 While no material issues were identified as a result of this review, if it were necessary the responsible workstream leaders for the relevant tool were ready to address and confirm action on any issues, discussing options with the independent reviewers and technical leads where appropriate.

A.12 For the avoidance of doubt, these reviews have confirmed that there are no material issues that need resolution before reporting and submitting analytical tools to ORR.

Stage 5 – Final review and sign-off of analytical tools

A.13 Following the independent review of the tools, which focused on the integrity of the spreadsheets and transfer of input data, our technical leads, project manager and project director have reviewed the outputs. The focus of this stage was on whether the outputs make sense rather than on whether the input values/calculations are correct. Again, any issues were logged and discussed with workstream leads, with the latter resolving specific concerns before finalising the outputs for delivery to ORR.

A.14 Our Project Director has ensured that this process is complete and undertaken a final review of the outputs included in this report.

Stage 6 – Assurance documentation

A.15 As part of the assurance process, we have captured a project assurance plan, with named responsible individuals, confirming and documenting completion of the activities associated with stages 1-5. Confirmation of completed assurance activities have been provided by email to the Project Manager and/or Project Director as appropriate.

Quality assurance of reports and presentations

A.16 All of the final documented outputs provided to ORR have been reviewed by Project Manager, Project Director and technical leads before their submission. The purpose of the review process can be summarised as ensuring:

- That the assumptions, methodology, findings, and conclusions are clearly described;
- That any risks surrounding the analysis and findings have been explained; and
- That the document is clearly written, using plain English as far as possible.

A.17 All final deliverables will include a control sheet identifying the contributors to the document and those responsible for reviewing it as well as a file name indicating the version in question.

A.18 It has been appropriate and helpful to share work in progress with ORR before it has been subject to full quality assurance, allowing the client team to provide feedback in a timely and efficient way. The following principles for the level of quality assurance applied in these circumstances have been followed:

Table 7-1: Levels of quality assurance

Assurance grade	Level of assurance/review	Context
0	None	E-mail and other general correspondence. The Project Director and Project Manager will be aware of the correspondence but will generally not have reviewed it.
1	Reviewed by task leader	Draft working notes or sections of a report intended to support discussions and illustrate progress. Meeting notes capturing evidence provided by participants at interview.
2	Reviewed by the Project Manager or Project Director	Completed working notes or sections of a report intended to describe evidence or findings in specific areas.
3	Reviewed by the Project Manager and Project Director	Full draft reports setting out the approach to the study and the key findings.
4	Subject to previous levels of review and review by the quality assurance team.	Final reports and presentation materials.

B Network Rail operations locations

Table 7-2: Network Rail's Regions and Routes

Network Rail Regions	Routes
Scotland	Scotland
Eastern	North East
	East Coast Main Line
	East Midlands
	Anglia
North West & Central	North West
	Central
	West Coast Main Line
Wales & Western	Wales
	Western
Southern	Kent
	Sussex
	Wessex
	NR High Speed
5	**14**

Table 7-3: Network Rail's Railway Operating Centres

Railway Operating Centres	Route
Ashford	Kent
Basingstoke	Wessex
Cardiff	Wales
Edinburgh	Scotland (East)
Cowlairs	Scotland (West)
Derby	East Midlands
Didcot	Western
Gillingham	Kent
Manchester	North West
Romford	Anglia
Rugby	West Coast Main Line
Saltley	Central
Three Bridges	Sussex

Railway Operating Centres	Route
York	East Coast Main Line
14	

Table 7-4: Network Rail Electrical Control Rooms

Electrical Control Rooms	AC	DC
Romford	1	
York	1	1
Rugby	1	1
Crewe	1	
Cathcart	1	
Lewisham		1
Selhurst		1
Raynes Park		1
Eastleigh		1
Brighton		1
Paddock Wood		1
Canterbury		1
Sandhills (for Merseyrail)		1
Total locations: 13	**5**	**10**

Table 7-5: Network Rail's 'managed stations'

Network managed stations
Birmingham New Street
Bristol Temple Meads
Clapham Junction
Edinburgh Waverley
Glasgow Central
Guildford
Leeds City
Liverpool Lime Street
London Bridge
London Cannon Street
London Charing Cross
London Euston
London King's Cross
London Liverpool Street
London Paddington
London St Pancras International
London Victoria
London Waterloo
Manchester Piccadilly
Reading
20

C European infrastructure manager key facts

Organisation	Country	Mainline route km	Stations	Stations / route km	Total bn gtk	Passenger train million km	FTEs
Network Rail	**UK**	**15,847**	**2,570**	**0.16**			**44,255**
Adif	Spain	15,893	1,502	0.09	58	125	10,968
Bane Nor	**Norway**	**4,134**	**334**	**0.08**	**17**	**36**	**3,426**
Banedanmark	Denmark	2,519	452	0.18	17	61	2,367
DB Netz	Germany	39,299	7,033	0.18		794	50,330
HZ Infrastruktura	Croatia	2,605	546	0.21	8	13	4,888
Irish Rail	Ireland	2,045	145	0.07	5	15	1,738
Infraestructuras de Portugal	Portugal	2,527	563	0.22	7	22	3,563
Infrabel	**Belgium**	**3,602**	**554**	**0.15**		**77**	**9,955**
Lisea	France	669			3	5	31
PKP PLK	Poland	18,536	2,774	0.15	142	157	38,834
Prorail	**Netherlands**	**3,220**	**399**	**0.12**	**51**	**135**	**4,518**
RFI	Italy	16,781	2,395	0.14	137	251	26,293
SBB	**Switzerland**	**5,215**	**1,735**	**0.33**	**71**	**149**	**9,978**
SNCF Reseau	**France**	**27,594**	**2,966**	**0.11**		**297**	**52,748**
Sprava zeleznic	Czech Republic	9,406	2,579	0.27	57	132	17,128
Trafikverket	**Sweden**	**10,906**	**673**	**0.06**	**69**	**112**	**8,739**
ZSR	Slovakia	3,627	703	0.19		29	13,704
Latvijas dzelzcels	Latvia	1,860	143	0.08	16	6	3,650
LTG Infra	Lithuania	1,911	136	0.07	30	6	3,178
OBB	**Austria**						

Participating organisations highlighted in bold
IMs not approached in grey

Data for European IMs from PRIME 2020; OBB not included in PRIME 2020
2022 figures for Network Rail (freight is reported in net tonne kilometres, not gross tonne kilometres

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