OFFICE OF RAIL AND ROAD

# Rolling Stock Maintenance Market Review

## Interim report: Emerging findings and proposed measures for consultation

29 October 2026



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# Executive summary

## Background

Passenger rolling stock maintenance is fundamental to the safe, reliable and efficient operation of the railway. It helps ensure that trains remain available for service and rolling stock assets are maintained in an appropriate condition throughout their operational lives. It is also a major area of expenditure. In the year ending 31 March 2025, contracted Train Operating Companies (TOCs) spent approximately £1.5 billion on maintenance delivered in-house and by third parties, which represents 37% of TOCs' annual expenditure on rolling stock. As a result, even relatively small percentage changes in maintenance expenditure can have implications worth tens of millions of pounds annually for passengers, taxpayers and the wider railway.

In 2025, we reviewed the Rolling Stock Leasing Market Investigation Order 2009 (Transparency Order). During the review, stakeholders raised concerns about long-term maintenance arrangements, the transparency of maintenance charging and the extent to which maintenance remains contestable over the life of a fleet. While the Transparency Order promotes transparency and competition in rolling stock leasing, it was not designed to address any competition issues in the separate market for rolling stock maintenance and applies only to leasing companies.

We therefore launched a review of the passenger rolling stock maintenance market in April 2026 to test these concerns and understand their implications for competition, transparency and value for money. Our emerging findings are set out below.

Drawing on those findings, we have identified a number of potential measures to address the issues raised through the review.

We invite views on the proposed measures set out below, including their effectiveness, practicality and proportionality, and how they could be implemented. Please respond by **11 December 2026** to rollingstock2026@orr.gov.uk and identify any information you consider confidential. We do not intend to publish individual responses, however responses to this interim report and our further stakeholder engagement will inform our final recommendations, which we expect to publish in March 2027.

## Our market review

Our aim with the review is to understand:

- how competition is working;
- what outcomes current market arrangements are producing; and
- what, if any, action may be appropriate to improve market outcomes.

The review drew on evidence from TOCs, Original Equipment Manufacturers (OEMs), Rolling Stock Leasing Companies (ROSCOs), independent maintainers and industry bodies, together with quantitative analysis of maintenance costs and performance outcomes.

In parallel with this review, the Department for Transport (DfT) and DfT Operator Limited (DfTO) have developed Great British Railways' (GBR) Rolling Stock and Infrastructure Strategy (the Strategy), which was published on 28 September 2026 as part of wider rail reform. Our review was initiated independently, and provides an evidence base on competition outcomes across the passenger rolling stock maintenance market. Our intention is that this review can inform potential measures to improve outcomes within the current market structure, and also help inform the implementation of the Strategy.

# Emerging findings

## Competition is effective at the point of initial fleet procurement but weaker thereafter

Competition appears effective when fleets and initial maintenance arrangements are procured together.

However, opportunities to change maintenance provider or model appear more limited once fleets enter service. Only around 30% of vehicles currently maintained under a Train Service Agreement (TSA), where the OEM typically takes responsibility for both maintenance delivery and associated performance obligations, are expected to be subject to a future competitive process. This is a result of a number of interrelated constraints involving depots, access to technical information, software and diagnostics, technical support arrangements, as well as transition requirements and customer capability.

Many of these constraints stem from arrangements put in place when fleets are first procured, often decades ago, meaning that decisions made at fleet procurement can shape competition and maintenance options for many years later. The impact on customer choice is also reflected in TOCs' own assessment of the maintenance options available to them.

## A lack of transparency makes value-for-money assessment difficult

TOCs often lack sufficient visibility of maintenance activities, charges and cost drivers to assess value for money confidently. Although meaningful comparisons must account for differences in fleet characteristics, contractual scope and risk allocation, greater transparency could support more effective benchmarking and commercial challenge.

## The performance advantages associated with OEM-led maintenance appear strongest in early fleet life

Most new vehicles are supported by OEM-led TSAs when they are first introduced into service. Our review found that significant OEM involvement can provide important benefits in early fleet life. These benefits include access to design knowledge, technical expertise, software and diagnostic support, warranties, reliability-growth capability and a single point of accountability.

The evidence is less clear that these advantages persist as fleets mature and maintenance requirements become better understood by TOCs. Our review also found that some of the same software, diagnostic and technical-support arrangements that contribute to these benefits can limit the options available to TOCs should they later wish to review or change their maintenance arrangements or maintainer. This is due to a lack of access to the necessary technical information or software to enable that change.

## Certain maintenance agreements can become relatively costly beyond their initial term

Estimating, and hence comparing, the total maintenance cost of individual rolling stock fleets is inherently difficult, since maintenance costs are influenced by a number of factors relating to fleet characteristics, lifecycle stage and contractual scope. Nevertheless, stakeholders repeatedly questioned whether TSA arrangements continue to represent value for money once the initial contractual protections fall away.

One TOC provided evidence suggesting like-for-like annual savings of around 30% through a mid-life switch from a TSA to an arrangement where maintenance is undertaken by another provider, with the OEM continuing to provide support and spares (in the form of a Technical Support and Spares Supply Agreement (TSSSA)) and with no observable impact on performance. Notwithstanding the challenges in comparing costs, as noted above, there is evidence to suggest that savings of this scale, or higher, may plausibly have wider applicability.

A robust whole-life assessment of the costs and benefits of TSA arrangements would require analysis of costs, performance and risk transfer across multiple fleets over their operational lifecycles, together with consideration of the role of OEMs in depot provision

and wider lifecycle investment decisions. Such an assessment was not feasible as part of this review. Nevertheless, our evidence does indicate that the value for money of these arrangements may change as fleets mature. This strengthens the case for customers to be able to review and test their maintenance arrangements at appropriate points in the fleet lifecycle.

Maintenance decisions have long-term consequences for cost, performance, reliability and ultimately, value for money for passengers, taxpayers and the wider railway. Effective competition can be an important mechanism to deliver those outcomes. However, competition can only be effective where both demand and supply are responsive. Buyers must have the ability and incentives to exercise choice, and suppliers must have the ability and incentives to compete for their business.

In the market for passenger rolling stock maintenance, the buyers are represented by TOCs, including DfTO (in future GBR), franchised operators, open access operators, Transport for Wales, Transport for London, Transport Scotland and Scottish Rail Holdings. On the supplier side, OEMs retain significant involvement in the maintenance of around 80% of vehicles (most of this share is accounted for by Alstom, Siemens and Hitachi), either through comprehensive TSAs or through TSSSA/support arrangements. The remaining 20% of vehicles are maintained by independent maintainers and TOCs.

## Our provisional view on potential measures and next steps

We do not propose to use our formal competition powers to address the issues identified in this review. However, if the proposals set out below do not secure sufficient industry engagement, or if stakeholders are unable to identify a credible route to their implementation, we would revisit this position and consider appropriate interventions.

Drawing on our findings, we have identified five areas for potential action, aimed at improving the conditions that enable customer choice. We set these out below as proposed measures and invite views on their effectiveness, practicality and proportionality, including who is best placed to lead delivery and implementation. Subject to responses to this consultation, we envisage buyers as best placed to be the key drivers and enablers of change.

We consider that, taken together, these measures could form the basis of an industry-wide code of practice, helping to establish common expectations and support their consistent implementation across the passenger rolling stock maintenance market.

**Table 1. Potential measures to improve transparency, competition and value for money in the passenger rolling stock maintenance market**

| Theme | Potential measures | Proposed leads |
|---|---|---|
| **Transparency**<br>Customers have limited transparency of charges, cost drivers and comparative performance, making it difficult to assess value for money or challenge increases. | • **Establish a standard maintenance reporting framework** for the provision of key information such as the services included, principal cost drivers, reasons for material changes, assumptions about future expenditure, and the relationship between charges, risk and performance obligations. This should be used for new procurements and phased into existing contracts where practicable.<br>• **Develop comparable cost and performance measures** to support benchmarking – this should recognise relevant differences between fleets and contracts, while avoiding disproportionate administrative burdens or disclosure of commercially sensitive information. | An appropriate industry body* to:<br>Work with buyers and suppliers to develop common reporting definitions and templates that can be adopted across the market.<br>**ORR will work with industry to identify an industry body with the appropriate independence and expertise.* |
| **Procurement and future flexibility**<br>Decisions made at fleet procurement can narrow the range of credible maintenance options later in the fleet lifecycle. | • Fleet **business cases should assess whole-life maintenance options**, including the cost and feasibility of changing provider or delivery model at appropriate lifecycle points.<br>• Use **clearer and more consistent tender information**; provide information earlier.<br>• Preserve **opportunities to test the market at appropriate lifecycle** | Buyers to:<br>Incorporate the recommended requirements (whole-life maintenance assessments, switching considerations and future flexibility considerations) into business cases, |

| Theme | Potential measures | Proposed leads |
|---|---|---|
| | **points** and **avoid terms that unnecessarily restrict future changes** in provider or maintenance model. | procurement documents and contracts. |
| **Access to technical information, software and diagnostics**<br>Uncertainty over access to technical data, maintenance records, software, diagnostics and intellectual property can prevent potential providers from assessing or delivering an alternative arrangement. | • Include in new and renewed contracts an **information-access schedule** setting out the technical data, maintenance records, software, diagnostic functionality, material specifications, approved suppliers, tooling and repair information to be provided.<br>• **Create a standard bidder information pack** and provide it at the start of market engagement. | Buyers, working with suppliers:<br>Each buyer should specify information and access requirements when procuring or renewing maintenance arrangements.<br>Suppliers:<br>OEMs, independent maintainers and other parties controlling relevant information or systems should provide the agreed information and access within defined timescales and explain any restrictions. |
| **Maintenance transition**<br>Changing provider or maintenance model can involve significant mobilisation costs, operational risk and uncertainty | • Require a **clear and proportionate transition schedule** to be included in contracts, covering records and fleet histories, technical documentation, software and configuration information, continuing technical support, spares, tooling, supply-chain and depot arrangements, access to experienced personnel, allocation of | Buyers to:<br>Work with the incumbent and any new maintenance providers to include proportionate transition requirements in contracts, and review readiness sufficiently in |

| Theme | Potential measures | Proposed leads |
|---|---|---|
| over responsibilities. | responsibilities, acceptance criteria and dispute resolution.<br>• The buyer and incumbent provider should **review the transition plan at agreed points**, including sufficiently in advance of contract expiry to allow due diligence, mobilisation and handover. | advance of contract expiry or transfer.<br>Suppliers, working with buyers:<br>Incumbent maintenance providers and other parties controlling essential information, assets or facilities should cooperate with the transition in accordance with agreed responsibilities and timescales. |
| **Depot arrangements**<br>Depot location, capacity, capability, equipment, workforce and contractual availability can constrain competition and investment. | • Fleet and maintenance strategies should include **a depot options assessment** covering current and forecast capacity, capability, equipment, workforce, access terms, investment needs and the effect of each option on bidder participation and future competition.<br>• Where a depot constraint would materially reduce competition, **require an action plan before procurement launch to secure access**, adapt facilities, phase investment or establish credible alternative provision. | Buyers, working with depot owners:<br>Buyers should assess depot requirements and constraints as part of fleet and maintenance planning.<br>Depot owners should provide current information on capacity, capability, access conditions and investment requirements to support effective planning and assessment of constraints. |

The establishment of DfTO, and in due course GBR, creates an opportunity to strengthen the demand-side of this market. In particular, greater buyer power in future rolling stock and maintenance procurements could help mitigate some of the issues identified in our review. However, the extent of these impacts remains uncertain; GBR will not encompass the whole passenger rolling stock market and many of the issues identified through this review are embedded in existing contractual arrangements.

Our proposed measures therefore address both existing and future arrangements across the wider passenger rolling stock maintenance market. Changes to existing arrangements may require commercial negotiation between the parties involved, but future procurements, contract renewals and other contracting activity may provide opportunities to address issues in existing arrangements, particularly where customers are negotiating with suppliers across a broader portfolio of contracts and services.

# 1. Introduction

## Background

1.1 ORR is the independent economic and safety regulator for the railways in Great Britain. We hold concurrent powers with the Competition and Markets Authority (CMA) to apply competition law in markets for services relating to railways. In support of our statutory duties and strategic objectives, we seek to promote and protect well-functioning, efficient and competitive markets for railway services.

1.2 Section 69 of the Railways Act 1993 requires us to keep railway services under review and collect information to support the exercise of our functions. In fulfilling this duty, we may undertake targeted market reviews to better understand how rail-related services operate in practice, gather evidence and assess whether features of a market may be affecting transparency, efficiency or competition. Market reviews are distinct from market studies under the Enterprise Act 2002, but may inform decisions about whether further regulatory, competition or market-investigation tools should be considered.

1.3 On 29 April 2026, we launched a review of the passenger rolling stock maintenance market in Great Britain. This followed concerns raised by stakeholders during our 2025 review of the Rolling Stock Leasing Market Investigation Order (2009) (the 'Transparency Order') about long-term maintenance arrangements, the transparency of maintenance charges and the extent to which maintenance remains contestable over the life of a fleet.

1.4 Passenger rolling stock maintenance is fundamental to the safe, reliable and efficient operation of the passenger railway. Regular inspection, servicing, repair and overhaul help ensure that trains remain safe and available for service while maximising the life of assets that typically remain in operation for 30 years or more.

1.5 Maintenance is also a significant component of the whole-life cost of rolling stock. ORR's Rail Industry Finance statistics show that franchised passenger train operating companies (TOCs) spent approximately £1.5 billion on maintenance in the year ending 31 March 2025. This includes expenditure on labour, components and materials, depot facilities, technical support, software and diagnostic systems, heavy maintenance, overhaul and refurbishment. This represents approximately 37% of rolling stock expenditure by TOCs.

1.6 On 28 September 2026, DfT Operator Limited (DfTO) and the Department for Transport (DfT) published the Rolling Stock and Infrastructure Strategy (the Strategy). The Strategy sets out how Great British Railways (GBR) intends to take a more integrated, long-term approach to decisions about passenger rolling stock, infrastructure, depots and maintenance. It includes proposals concerning fleet procurement and management, depot control and investment, maintenance arrangements, supply chains and the development of customer capability.

1.7 The Strategy establishes a long-term direction for managing passenger train fleets and their supporting infrastructure, whereas our review draws together evidence on how the market is working and considers potential measures under both existing and future market arrangements.

## Scope and objective of the review

1.8 This review covers passenger rolling stock maintenance in Great Britain, focusing on passenger fleets operated on the national rail network by franchised, public and open-access TOCs. Freight rolling stock, light rail and metro systems are out of scope, except where they provide relevant context or comparator evidence.

1.9 The review considers the commercial arrangements through which maintenance is procured and delivered, including those involving TOCs, rolling stock leasing companies (ROSCOs), original equipment manufacturers (OEMs), and independent maintenance providers.

1.10 The review examines three themes:

- **How competition is working**, including market structure, barriers to entry and expansion, and the extent to which maintenance arrangements remain subject to competitive pressure over the life of a fleet.
- **What outcomes the market produces**, including transparency, performance, and costs.
- **Whether further action may be appropriate**, including opportunities to improve transparency, contestability and wider market outcomes.

## Methodology

1.11 Our review drew on requests for information, stakeholder engagement, fleet-level data, commissioned research, our previous market work, industry studies and

publicly available information. Contributors included TOCs, ROSCOs, OEMs, and independent maintenance providers. A list of stakeholders who contributed to our review is included in Annex B.

# Evidence gathered

## Requests for Information (RFIs)

1.12 On 29 April 2026, we issued Requests for Information (RFIs), seeking data from TOCs (through databooks), and qualitative information from TOCs, ROSCOs, OEMs and independent maintenance providers.

1.13 After reviewing the initial responses, we issued statutory information requests to TOCs on 19 June 2026, under section 80(1) of the Railways Act 1993, in order to obtain information required for the review on a consistent basis.

1.14 The databooks covered fleet characteristics, maintenance arrangements, expenditure, procurement history, contractual structures and performance measures. Written responses provided evidence on the themes set out at paragraph 1.10 above. Together, this evidence enabled us to assess how maintenance arrangements vary across fleets and how they operate in practice.

## Invitation to comment

1.15 Our Statement of Scope included an Invitation to Comment, which generated two submissions from interested stakeholders.

## Stakeholder engagement

1.16 We met TOCs, ROSCOs, OEMs, independent maintenance providers and other stakeholders, which provided important context to the written evidence and helped us understand how maintenance arrangements operate in practice.

# Report structure

1.17 The remainder of this report is structured as follows:

- **Chapter 2** describes the passenger rolling stock maintenance market in Great Britain, including the principal market participants, commercial arrangements and maintenance models.

- **Chapter 3** examines the degree of competition within the market, including customers' ability to choose between maintenance providers and barriers to switching provider or maintenance model.
- **Chapter 4** examines market outcomes, focusing on performance and the level and transparency of costs and charges.
- **Chapter 5** draws together the evidence presented in Chapters 3 and 4 and sets out our emerging findings.
- **Chapter 6** sets out our provisional view on the appropriate next steps, including potential measures that may improve the market, and seeks industry's views on those.

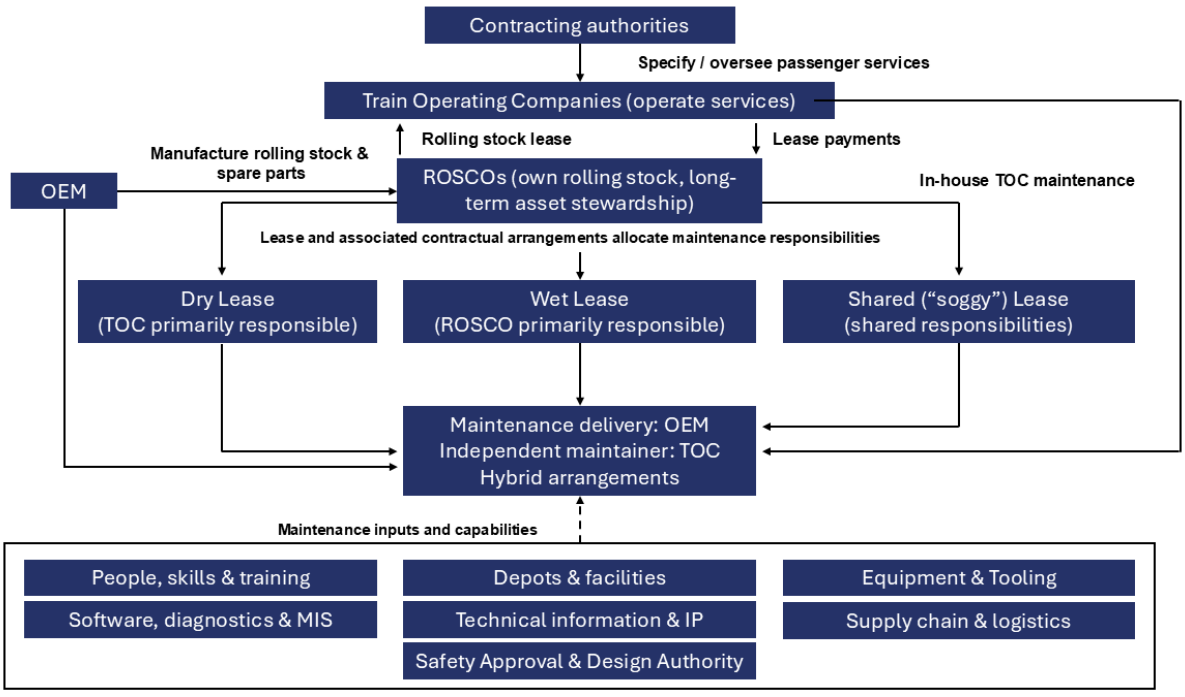
# 2. The rolling stock maintenance market

2.1 Maintenance arrangements for passenger rolling stock in Great Britain are diverse and contracts often cover a significant part of a fleet's operational life. The model chosen varies between fleets and reflects factors such as fleet age, operational and engineering requirements, organisational capability and wider contractual arrangements. This chapter describes the structure of the market, including principal participants, maintenance models, procurement routes, and the implications of the fleet lifecycle.

## Market structure

2.2 The rolling stock maintenance market sits within a wider system for financing, owning and operating rolling stock. Commercial arrangements between TOCs, ROSCOs, OEMs, independent maintenance providers and the wider supply chain determine how responsibility for maintenance is allocated and how services are delivered throughout the operational life of a fleet.

**Figure 2.1: Relationships within the GB passenger rolling stock maintenance market**




*Note: In this figure, MIS stands for management information systems and IP stands for intellectual property.*

2.3 Most passenger services are operated by TOCs using rolling stock leased from ROSCOs. The lease and related contracts determine whether primary responsibility for maintenance rests with the TOC, the ROSCO, or is shared between them.

2.4 Maintenance may be delivered by OEMs, independent providers, TOCs in-house, or through hybrid arrangements involving more than one organisation. Capability to deliver depends on access to depots, engineering systems, spares, technical information, specialist tools and the wider supply chain.

2.5 These arrangements often remain in place for extended periods but may change over a fleet's life as contracts expire, operational needs evolve or commercial terms are renegotiated.

## Key market participants

2.6 Responsibility for financing, owning, operating and maintaining passenger rolling stock is shared among several market participants, supported by a wider supply chain providing the facilities, components and specialist services required to maintain fleets:

- **Contracting authorities** set, procure or oversee arrangements for the provision of passenger services. Depending on the procurement model, they may also influence rolling stock procurement and associated maintenance requirements.
- **TOCs** operate passenger services and are responsible for ensuring that rolling stock is safe, reliable and available. Depending on the contractual arrangements, they may procure and manage maintenance or undertake maintenance in-house.
- **ROSCOs** own and lease most passenger rolling stock and act as long-term asset stewards. They may specify asset-condition requirements, support major refurbishment and life-extension programmes and, in some cases, procure or oversee maintenance activities.
- **OEMs** design and manufacture rolling stock and often provide long-term maintenance, technical support, software management, spare parts and specialist engineering services for the fleets they have supplied.

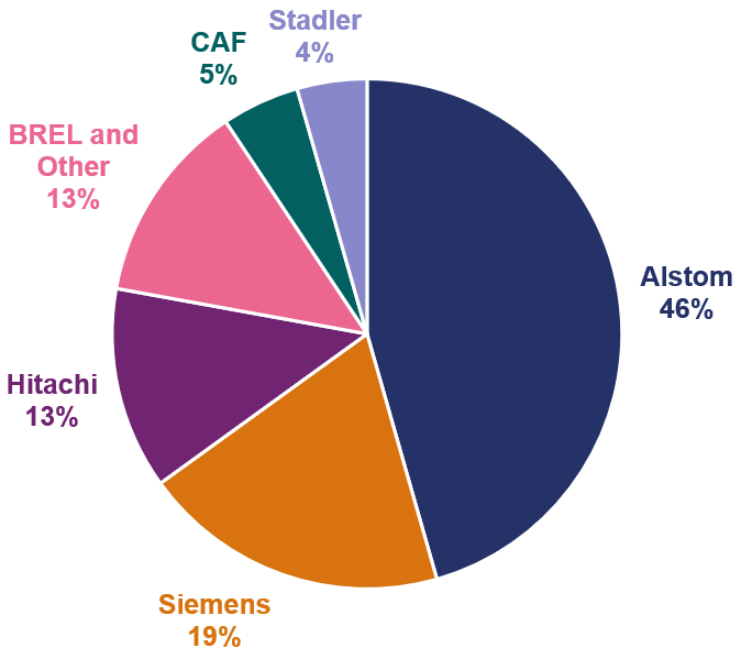
- **Independent maintenance providers** deliver routine and heavy maintenance, component overhaul, refurbishment, modifications and specialist engineering services across a range of fleets.

2.7 The wider supply chain provides the inputs and infrastructure required to support maintenance activities, including depot facilities, components and spare parts, software and diagnostic systems, technical information and specialist engineering services. The suppliers involved, and the extent of their role, depends on the maintenance arrangements for each fleet.

## Fleet composition by OEM

2.8 Data collected for this review shows that the GB mainline fleet remains diverse, with vehicles supplied by a range of OEMs. Alongside legacy British Rail Engineering Limited (BREL) fleets, which continue to account for around 13% of the total vehicles, five major OEMs account for a significant share of the current fleet. Alstom has the largest share, reflecting its acquisition of Bombardier Transportation in 2020. Bombardier had previously been one of the largest manufacturers of GB rolling stock and had established a substantial installed fleet.

**Figure 2.1 GB mainline rolling stock vehicles by OEM**




*Source: ORR analysis of stakeholder submissions*

# Maintenance depots

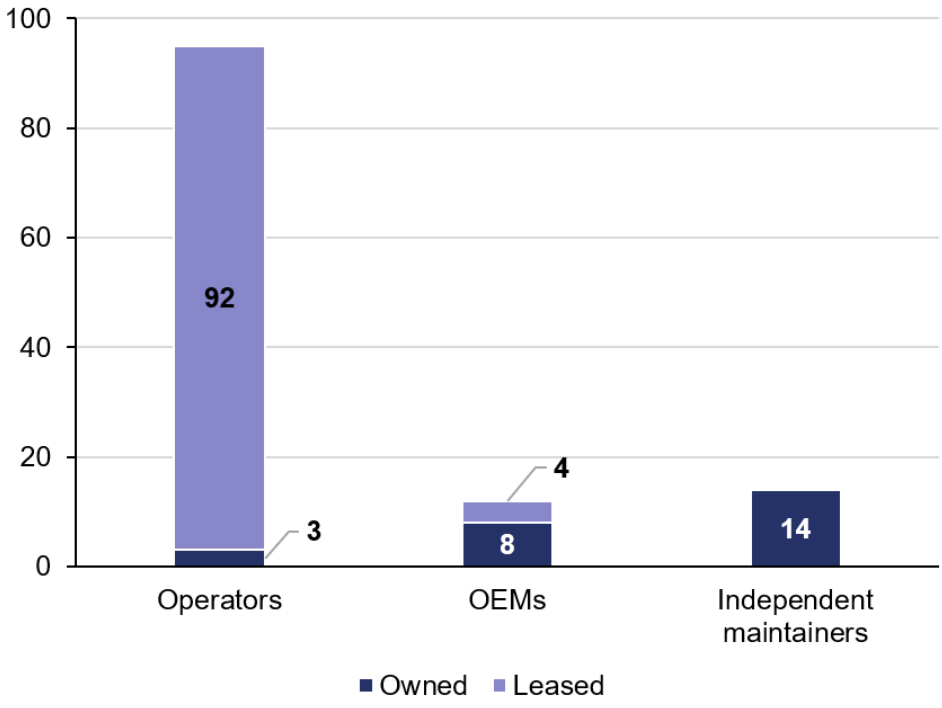
2.9 Rolling stock maintenance is typically carried out at specialised depots which are equipped for routine servicing, inspections, repairs and heavy maintenance. Access to appropriately located facilities, equipment and skilled workers is therefore essential to keeping trains safe, reliable and available.

2.10 Depot ownership, leasing and operation vary across the network, reflecting historic industry structures, fleet procurement decisions and subsequent commercial developments. Depending on the fleet and contractual arrangements, TOCs, ROSCOs, OEMs, independent maintenance providers or other organisations may own, lease or operate depot facilities.

2.11 Stakeholders highlighted that OEMs have in the post-privatisation era made substantial investments in depot facilities and maintenance capability. These investments can provide important operational and technical benefits, particularly during fleet introduction and early-life support, although they may also influence the range of maintenance options available to TOCs over time.

2.12 Network Rail owns the majority of maintenance depots, most of which are leased to TOCs. OEMs and independent maintainers own and lease a modest number of facilities. OEM depots tend to be amongst the largest, newest facilities, often closely associated with specific fleets, and frequently serving as national fleet headquarters, used for the heaviest maintenance such as major overhauls and enhancements. Independent-maintainer facilities are often less closely associated with particular fleets and may generally support a wider range of rolling stock and customers. Conversely, TOCs lease a large number of typically smaller depots for light maintenance tasks such as daily servicing and routine repair and maintenance. These differences mean that the simple totals presented in Figure 2.3 below risk overstating the significance of TOC-controlled depots.

**Figure 2.2 Maintenance depot ownership and leasing arrangement by maintainer type (all facilities; 'leased' facilities owned by Network Rail)**




*Source: ORR analysis of publicly available information*

2.13 Control over depot access does not necessarily follow freehold ownership and can depend on a combination of ownership, leasing and operational arrangements. As a result, maintenance providers seeking access to a suitable depot may need to reach agreement with the parties occupying or controlling that facility. The suitability of a depot will also depend on factors such as location, capacity, specialist equipment, workforce capability and contractual availability. Chapter 3 considers these issues in more detail.

## Maintenance models

2.14 Rolling stock maintenance covers routine servicing, heavy maintenance, overhaul, technical support and spares provision. These activities may be integrated within a single arrangement or procured separately. The scope, and the boundaries between routine maintenance, heavy maintenance and overhaul, vary across fleets and contracts.

2.15 The review focuses on the organisation with primary responsibility for managing and delivering the fleet's overall maintenance package. It does not seek to attribute responsibility for every individual activity or component in the

maintenance value chain, which may be split among several organisations and sub-suppliers.

2.16 Lease arrangements are commonly described as dry, wet, or shared arrangements, according to how responsibility for maintenance is allocated between the ROSCO and TOC:

- **Dry lease:** the ROSCO supplies the rolling stock and the TOC is responsible for undertaking or arranging maintenance. A TOC may maintain an older fleet using its own workforce and facilities, while a newer fleet may be covered by a separate Train Service Agreement (TSA) under which an OEM provides a comprehensive maintenance service.
- **Wet lease:** the ROSCO retains responsibility for specified maintenance activities and procures those services itself.
- **Shared arrangement:** sometimes referred to within the industry as a 'soggy' lease, responsibility is divided between the ROSCO and TOC. Typically, the TOC undertakes or arranges routine maintenance while the ROSCO retains responsibility for specified heavy maintenance.

2.17 These terms describe contractual responsibility under the lease, not necessarily who performs the work. In practice, maintenance may be delivered by OEMs, independent providers or specialist suppliers. For example, a ROSCO may retain responsibility for heavy maintenance while contracting an OEM or independent provider to undertake it.

2.18 Delivery models may also vary. Under a TSA, a lead maintainer, commonly the OEM, provides a broad package of maintenance and may assume agreed performance and availability obligations.

2.19 Alternatively, a TOC may lead maintenance using its own workforce and facilities, while procuring selected support. This may include technical and engineering expertise and spares from an OEM under a Technical Support and Spares Supply Agreement (TSSSA) or spares alone under a narrower Spares Supply Agreement (SSA).

2.20 Independent providers may undertake some or all physical maintenance for TOCs or ROSCOs, while ROSCOs may procure particular maintenance activities where they retain responsibility under the lease. In practice, arrangements may combine

elements of these approaches, with different organisations providing physical maintenance, technical support, software, spare parts and specialist activities.

2.21 The model adopted for a fleet depends on factors including its age and complexity, the TOC's engineering capability, depot arrangements, the allocation of responsibility under the lease and the fleet's procurement history. The following sections explain how these arrangements evolve over the fleet lifecycle and how maintenance is procured.

## Fleet lifecycle

2.22 Passenger rolling stock typically remains in service for several decades. Over that period, maintenance requirements evolve as the fleet moves from introduction and early operation through mature service, periodic overhaul, refurbishment or life extension, and eventual withdrawal or replacement.

2.23 Maintenance arrangements are often established when a fleet is procured. At this stage, the parties may determine the scope and duration of maintenance and technical-support contracts, allocate performance and maintenance risk, and agree arrangements for depots, workforce, spare parts, software and technical information. Warranties and OEM support may also be particularly important during fleet introduction and the initial period of reliability improvement.

2.24 As a fleet matures and/or as its use changes, routine maintenance becomes established and major overhauls, modifications and refurbishment can become more important. Responsibilities may also change when contracts expire, fleets transfer between TOCs or the parties reallocate maintenance activities.

2.25 Later in a fleet's life, TOCs and ROSCOs may need to consider decisions about further overhaul, life extension, redeployment or replacement. The fleet lifecycle is therefore relevant to this review. Choices made at procurement can influence maintenance arrangements and constrain TOCs' options for many years, while specific events later in the lifecycle, such as contract expiry, may create opportunities to retender or restructure maintenance.

## Maintenance procurement routes

2.26 There is no single route through which rolling stock maintenance is procured. For a new fleet, maintenance may form part of or accompany the acquisition of rolling stock through an integrated long-term TSA, a TSSSA, or another combination of maintenance and support services.

2.27 Maintenance can also be procured separately from the purchase of rolling stock, either as an overall package or as individual services such as heavy maintenance, overhaul, refurbishment, technical support, spares or specialist engineering.

2.28 Existing arrangements may also be reconsidered during the life of a fleet, for example when a contract expires, operational requirements change or a fleet transfers to a new TOC. The parties may then renew, extend, or vary the arrangement, or undertake a new procurement.

2.29 The party leading the maintenance procurement depends on the allocation of responsibilities under the lease and associated contractual arrangements. TOCs commonly lead, sometimes with the relevant contracting authority, although a ROSCO may also do so. Some arrangements involve agreements between more than one of these parties and the maintenance provider.

2.30 Services may be bundled in a broad contract or divided into separate packages awarded to different providers. The options available depend on the fleet's age and technical characteristics, the existing maintenance model, depot arrangements and the parties' contractual rights and responsibilities.

## Comparisons with other sectors and jurisdictions

2.31 To provide additional context on the maintenance of complex and safety-critical assets, we considered a number of other sectors and jurisdictions. These comparisons provided useful insight into different approaches to maintenance provision, including the role played by OEMs in supporting these assets, and the extent to which maintenance activities can be undertaken by companies at different parts of the value chain.

2.32 Across the sectors and jurisdictions reviewed, we found examples of complex and safety-critical assets being maintained by organisations other than the OEM. In the automotive sector, independent garages operate alongside the OEM's authorised repair networks despite modern vehicle maintenance having an increased reliance on software, diagnostics, electronics and proprietary systems. This is partly due to legislative provisions requiring OEMs to make certain technical information, diagnostic tools and repair information available to independent maintainers. Consequently, competition may exist between OEM repair networks and independent providers, including where those providers are authorised by the OEM.

2.33 Similarly, in aviation, aircraft and engine OEMs retain important roles in design, software, technical support and continuing airworthiness, while OEM-affiliated and independent maintenance, repair and overhaul (MRO) providers routinely deliver maintenance.

2.34 Both sectors differ from passenger rolling stock maintenance in important respects. As set out previously, passenger rolling stock maintenance involves a complex set of relationships and is typically delivered through long-term contractual arrangements involving TOCs, OEMs, ROSCOs and other parties. In contrast, the automotive maintenance market is simpler in structure and serves a much larger installed base with higher transaction volumes and a steady flow of maintenance demand, creating broader commercial opportunities for independent maintenance providers and specialist repair networks.

2.35 Aviation similarly benefits from globally mobile assets and international maintenance markets. Passenger rolling stock maintenance is more closely tied to route geography, the availability of suitably located depots, stabling arrangements and local operating requirements.

2.36 Nevertheless, both the automotive and aviation sectors show that increasing technological complexity, reliance on software and diagnostics, and the safety-critical nature of an asset do not necessarily preclude maintenance by organisations other than the OEM.

2.37 European passenger rail also uses a range of models. Germany, the Netherlands and Sweden operate modern fleets of comparable technical sophistication to those in Great Britain, but maintain them under a variety of organisational arrangements.

- In Germany, the national operator (Deutsche Bahn) retains substantial maintenance capability within its own maintenance arm, including for maintenance of modern long-distance fleets such as the Siemens-manufactured ICE 4, originally procured around 2008, and introduced into mainline service in 2017.
- Similarly, in the Netherlands, the maintenance arm of the national passenger operator NS, NedTrain, maintains much of the passenger fleet, including the Intercity New Generation fleet, based on Alstom's Coradia Stream platform, which was introduced into passenger service in 2023.

- Sweden uses a mix of OEM and independent providers; for example, EuroMaint is due to assume responsibility from Alstom for maintaining certain regional electric multiple units.

2.38 The European examples suggest that modern passenger fleets can be maintained under a variety of organisational arrangements and that significant OEM involvement in fleet design, software and technical support can coexist with TOC-led or independent maintenance provision.

2.39 The freight rolling stock sector provides a less informative comparator for the purposes of this review. Particularly for older fleets and for wagons (rather than locomotives), OEMs generally play a limited role in freight maintenance, which is commonly undertaken by freight operators or independent providers, while fleets often consist of comparatively standardised assets with long service lives. Freight therefore provides limited insight into the maintenance of newer and more technologically complex fleets where OEMs may retain significant software, diagnostics, technical-support and informational roles.

2.40 The examples reviewed suggest that increasing technological complexity in safety-critical assets alone does not determine who undertakes maintenance or whether OEMs remain the primary maintainer throughout an asset's operational life. These sectors provided useful context for the issues considered in our review, including the role of OEMs, software, technical information and specialist support, as set out in the following chapters.

# 3. How competition is working

3.1 As explained in our Statement of Scope, our focus is on competition between alternative fleet-level maintenance arrangements, rather than competition within individual maintenance activities, services or product markets. Opportunities to compete for fleet-level maintenance arise at certain points during fleet lifetimes, notably when new rolling stock is procured and when existing maintenance contracts expire.

3.2 We first consider competition for maintenance arrangements established with new rolling stock. We then examine competition once fleets are in service, including the extent to which TOCs retender or change their arrangements, the alternatives available to them and the practical barriers to switching maintainer or maintenance model.

3.3 Several of the issues examined in this chapter, including competition during fleet life and barriers affecting alternative maintenance provision, are also considered in the Strategy. Our intention is that this review will provide a complementary evidence base alongside the Strategy, while bringing a competition perspective of this market by assessing whether TOCs can exercise meaningful choice during the life of a fleet, which is likely to be a key driver of the outcomes that the market delivers. Where customers have little or no effective choice, there is an increased risk that competitive pressures will be insufficient to secure good outcomes. We recognise that aspects of the current market structure may reflect legitimate commercial and operational considerations, including TOCs', in historic terms, relatively short planning horizons and limited capitalisation. The purpose of our review is to provide an evidence base on the consequences of these arrangements, rather than to presume that the arrangements themselves are problematic.

## Competition for initial maintenance arrangements

3.4 Initial maintenance arrangements are commonly agreed when new rolling stock is procured. OEMs are often appointed to provide maintenance, technical support, spare parts and related services during fleet introduction. Stakeholders identified a number of benefits including warranty support, responsibility for reliability growth, access to technical expertise, software support and familiarity with the fleet's design and operating characteristics.

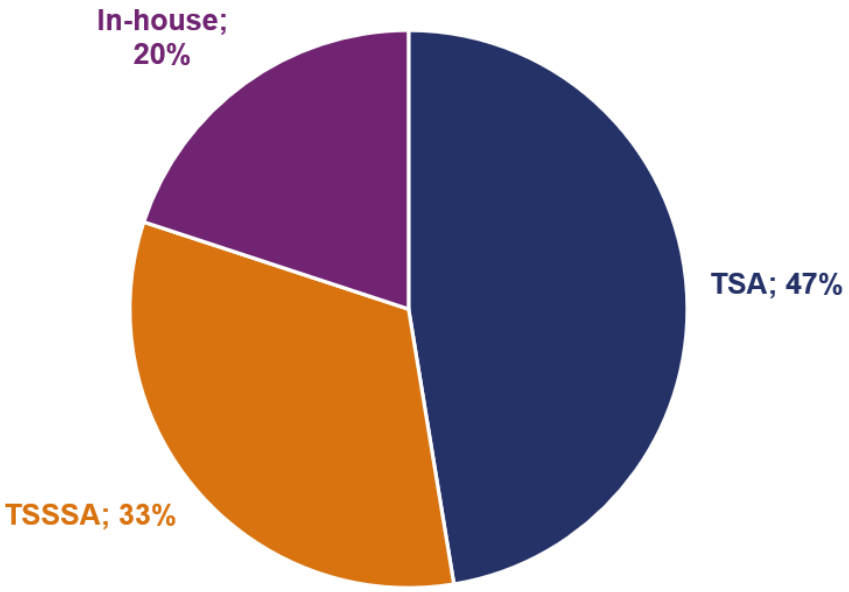
3.5 This affects how competition occurs; where a new fleet is procured with a long-term maintenance, technical support or availability package, competition for maintenance generally takes place within the wider competition for the supply of rolling stock and associated support services rather than through a separate tender. OEMs therefore compete on the pricing of both the capital cost element of trains and also on the pricing, scope, performance commitments, and risk allocation of the associated maintenance package.

3.6 We found no widespread concerns about competition for initial maintenance arrangements. As Figure 2.2 shows, rolling stock is supplied by a number of established OEMs, giving procuring authorities and TOCs a choice of suppliers when new fleets and their associated maintenance arrangements are tendered. Stakeholders did not identify any supplier as holding a particularly strong position at this stage. Their concerns focused instead on contestability after fleets enter service and contractual, technical and operational dependencies become established.

## Competition during fleet lives

3.7 OEMs retain significant involvement in maintaining the GB mainline fleet. Figure 3.1 below shows the proportion of vehicles under each maintenance model. Figures 3.1, 3.2 and 3.3 exclude fleets managed under a Train Availability and Reliability Agreement (TARA) as these arrangements combine fleet provision, maintenance and availability obligations within a wider long-term contractual package and are therefore not directly comparable with the maintenance arrangements considered in these figures. The excluded fleets would otherwise account for 6% of total vehicles.

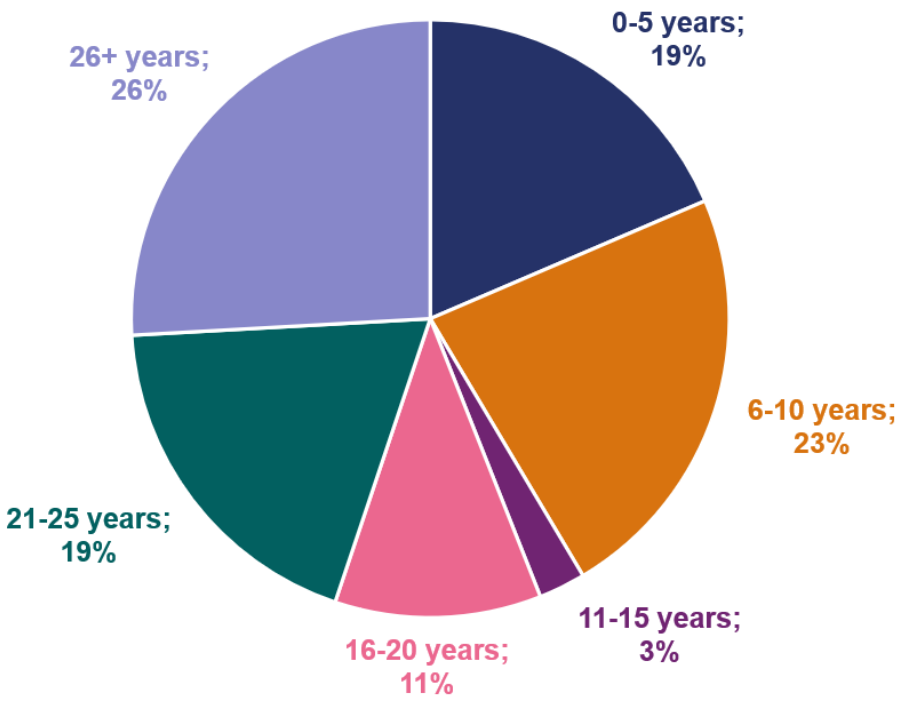
**Figure 3.1 Share of vehicles by maintenance model**




*Source: ORR analysis of stakeholder submissions*

3.8 Fleet age provides important context for these arrangements. As Figure 3.2 below shows, a significant proportion of vehicles remain within their first maintenance contract. Newer fleets are more commonly maintained under OEM-led arrangements because maintenance, technical support and reliability commitments are often procured with the rolling stock.

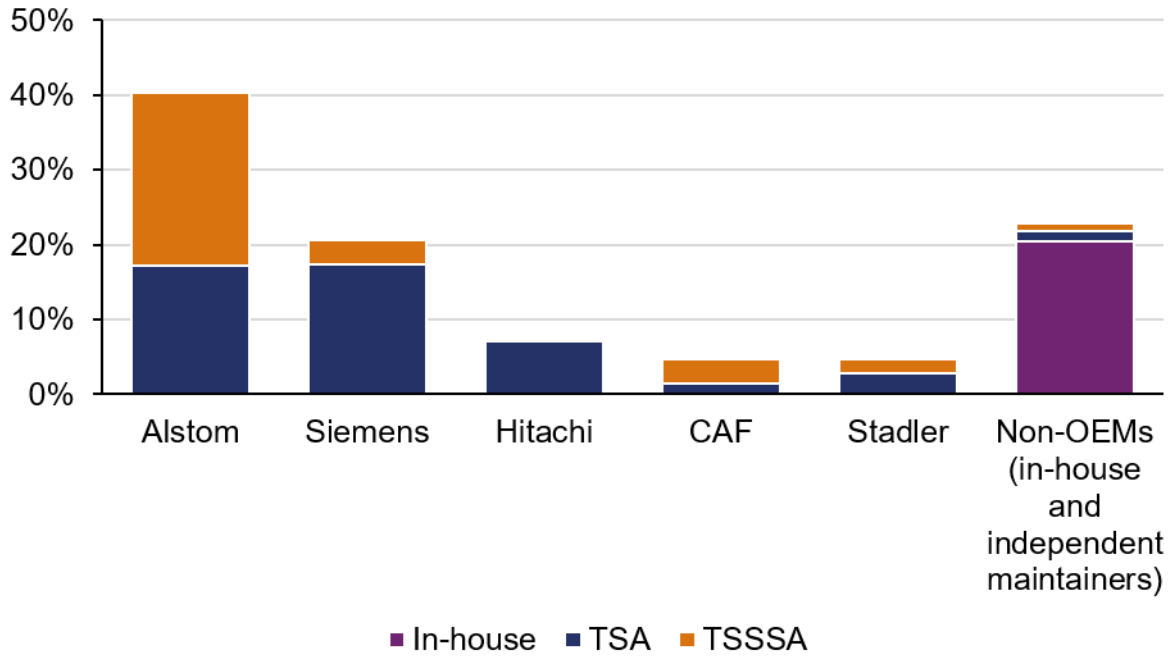
**Figure 3.2 Share of vehicles by fleet age**




*Source: ORR analysis of stakeholder submissions*

3.9 Maintenance arrangements are concentrated among a relatively small number of OEMs. Figure 3.3 shows the share of vehicles associated with each OEM under TSAs and TSSSA arrangements. Alstom has the largest share, at around 40%, followed by Siemens at around 21% and Hitachi at around 7%. CAF and Stadler each account for smaller shares, while TOCs maintain over 20% of vehicles in-house. In addition, around 2% of vehicles are maintained by one TOC on behalf of another TOC. This is illustrated by the TSA and TSSSA segments of the non-OEM category in Figure 3.3.

**Figure 3.3 Share of vehicles maintained by OEM and contract type**




*Source: ORR analysis of stakeholder submissions*

3.10 Given the different roles played by OEMs under TSAs and TSSSAs, Figure 3.3 shows the fleet coverage associated with different OEMs and contract type, rather than the share of maintenance activity, expenditure or revenue for each supplier. It nevertheless demonstrates that a large proportion of the national fleet remains linked to a relatively small number of OEMs through either TSAs or TSSSAs.

3.11 Our review of stakeholder submissions found that most vehicles are maintained under contracts lasting between five and twelve years. The prevalence of relatively long-duration maintenance contracts highlights that opportunities to expose maintenance contracts to renewed competition arise only periodically during the fleet's operational life.

## Choice during a fleet's operational life

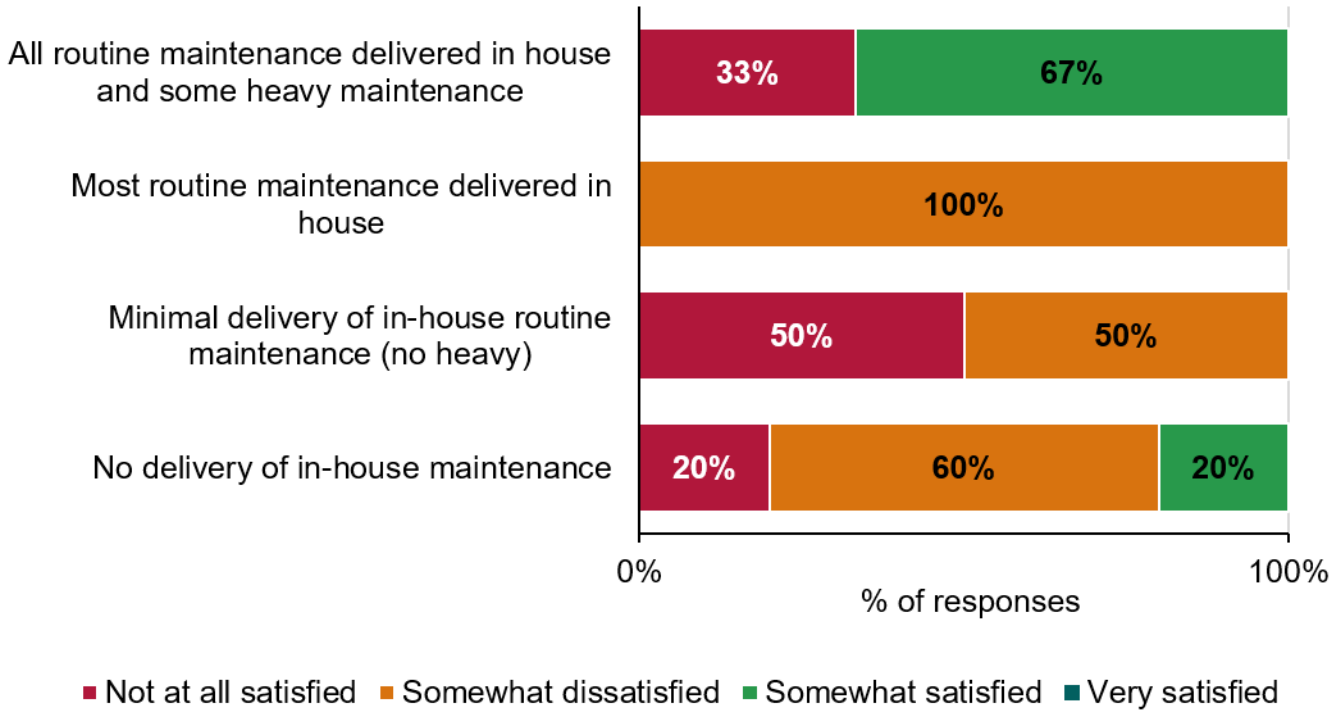
3.12 Stakeholders frequently raised concerns about the choices available once a fleet is in service and its maintenance arrangements are established. We therefore examined TOCs' ability to choose between maintenance models and maintainers after the initial contract term. In our review, 'choice' refers to the ability to reduce OEM involvement, for example by moving from a TSA to a TSSSA arrangement, or by otherwise transferring maintenance responsibilities in-house or to an independent maintainer. The evidence suggests that TOCs often consider these

options to be limited in practice, particularly where arrangements have been embedded for a prolonged period.

3.13 We asked TOCs to rate their level of satisfaction with their ability to choose between maintainers and maintenance models. We considered the responses alongside each TOC's arrangements and grouped TOCs by the extent of maintenance undertaken in-house, to explore whether greater direct involvement in maintenance was associated with more choice and flexibility.

3.14 Whilst TOCs who currently carry out maintenance activities in-house reported relatively high satisfaction with their current maintenance options for existing fleets, those who are fully or partly dependent on OEMs reported low satisfaction scores (0-20%), suggesting that they perceived there to be fewer viable options available to them.

**Figure 3.4 Reported TOC satisfaction with in-life maintenance choices**




*Source: ORR analysis of stakeholder submissions*

3.15 These responses are consistent with wider evidence that switching arrangements may be possible but is often operationally and commercially challenging. The

variation in responses suggests that engineering capability and maintenance experience can help TOCs assess and pursue alternatives.

3.16 We also asked TOCs whether they, or a successor TOC, expected to competitively tender maintenance when each fleet's current contract ended. Although the resulting dataset varied in quality and completeness, it provided a useful indication of expected retendering activity.

3.17 TOCs generally did not expect current maintenance contracts to be competitively retendered at the end of their current term. Of the vehicles covered by our assessment (with a number of exclusions such as vehicles close to life expiry), only around 30% under TSAs and 5% under TSSSAs were expected to be subject to a future competitive process. For the remainder, TOCs expected existing arrangements to be renegotiated rather than being reopened to competition. This result is significant, since without the prospect of competitive retendering, incumbent maintainers face limited competitive pressure from the threat of an alternative provider. TOC submissions additionally described to us situations where, even where they had attempted to use competitive tendering, barriers to switching such as those summarised later in this chapter had made such attempts unsuccessful.

## Competition and switching in practice

3.18 We identified several examples of TOCs competitively retendering, switching or restructuring maintenance arrangements during a fleet's operational life, although these generally involved mature fleets.

3.19 One TOC competitively retendered maintenance for several diesel passenger fleets introduced between the late 1990s and early 2000s. One procurement attracted multiple qualified bidders, and, across the resulting contracts, the TOC reported savings of approximately £7 million per year, alongside efficiencies from aligning maintenance with fleet-refresh activities. This shows that competition can occur for established fleets where TOCs can test the market and credible alternative providers are willing and able to bid.

3.20 In another case, maintenance for a mature fleet moved from a Network Rail-owned depot to one owned by another TOC under a TSA. The process considered both maintenance capability and depot availability, illustrating that switching can occur but may depend on access to suitably qualified providers and appropriate facilities.

3.21 Other examples involved reallocating responsibilities rather than replacing the incumbent provider. TOCs described moving from comprehensive TSAs to TSSSA-style or hybrid models, under which TOCs assumed greater responsibility for routine maintenance or day-to-day control while retaining OEM support for technical information, software, spares or fleet-specific expertise. One TOC transitioned from an OEM-led TSA to a TSSSA-style arrangement for a fleet introduced in the late 2000s following a detailed engineering and commercial assessment. The change required significant procurement effort to address intellectual-property, materials and supply-chain constraints. The example illustrated that maintenance responsibilities can evolve as fleets mature. However, even for a fleet introduced in the late 2000s, the TOC continued to rely on the OEM for certain technical-support and fleet-specific functions, suggesting that the extent to which maintenance can be separated from OEM support may vary across fleets and technologies.

3.22 OEMs also reported pursuing opportunities to maintain fleets built by other OEMs, while ROSCOs referred to retendering exercises associated with lease events, fleet maturity and lifecycle interventions. Independent maintainers described competing mainly for heavy maintenance, overhaul, refurbishment and specialist work procured separately from routine whole-fleet maintenance.

3.23 These examples show that competition and switching can occur during a fleet's operational life. However, the number of credible alternatives varies, and a formal procurement opportunity does not necessarily provide an effective choice of maintainer. The factors that determine whether alternative providers are available in practice are considered below.

## Barriers to switching

3.24 Stakeholders identified a range of interrelated factors that can limit the practical ability to change maintainer or maintenance model during a fleet's life. Their significance varies by fleet.

3.25 Some constraints originate in arrangements established when a fleet is procured, including rights to information, software and diagnostics, technical support and the allocation of future maintenance responsibilities. Procurement decisions can therefore shape the maintenance options available later in the fleet lifecycle.

## Practical ability to switch

3.26 Stakeholders described switching, where feasible, as a managed transition rather than a straightforward substitution of one maintainer for another. TOCs that had assumed greater responsibility over time linked this to growing fleet familiarity and engineering capability as fleets matured. Their objective was often achieving greater control, transparency and flexibility rather than complete independence from OEM support.

3.27 An incoming provider may need to understand the fleet's history, obtain technical information, establish engineering capability, secure depot access, recruit or transfer experienced staff and put supply-chain and technical-support arrangements in place. Switching may therefore be feasible but operationally demanding.

## Intellectual property and technical information

3.28 Stakeholders consistently identified access to intellectual property (IP) and technical information as a factor affecting competition. TOCs and independent maintainers described cases in which limited access to documentation or technical data affected their ability to bid for or deliver maintenance, particularly for newer or more complex fleets.

3.29 Several TOCs referred to IP constraints when discussing the ability to change maintenance arrangements. Several described OEM-controlled IP as a *'material constraint'* when considering alternative maintenance models. These respondents explained that although maintenance responsibilities may be transferable in principle, technical information, support arrangements and software systems can remain tied to the contractual structure established at procurement.

3.30 To assess the significance of these concerns at fleet level, we asked TOCs whether control of maintenance manuals, technical data or related IP could materially prevent a new provider from taking over maintenance. Responses confirmed that this was a widespread concern. TOCs identified this risk for approximately 66% of TSA vehicles and 94% of TSSSA vehicles, which may reflect greater awareness of information dependencies where TOCs retain responsibility for some maintenance activities under TSSSA arrangements.

3.31 One independent maintainer said it provides TSA services for older fleets, where technical information and supply-chain access are available, but cannot offer equivalent services for many modern fleets because material information and design IP rights are not fully accessible.

3.32 Stakeholders nevertheless emphasised that the issue extends beyond IP in its strict legal sense. Several TOCs explained that without access to maintenance histories, engineering records, diagnostics and technical documentation, alternative providers may struggle to assess fleet condition and price the risk of taking on the contract, and accurately cost alternative proposals. One maintainer described access to these elements as its '*single biggest challenge'* when competing for work. Stakeholders also noted that limited or delayed access to such information may preclude alternative providers from mobilising a credible alternative proposition within procurement and transition timescales. Asset owners and maintainers also noted the importance of engineering records and fleet performance information as necessary for supporting reliability improvements and long-term maintenance planning.

3.33 Respondents distinguished access to information from access to expertise. While they considered maintenance manuals, fault-finding guides and engineering records as important, they noted that effective maintenance also depends on other factors, including less easily transferrable knowledge of recurring faults, fleet-specific reliability issues and engineering judgement and operational experience needed to interpret and apply that information. Respondents noted that this expertise is often embodied in experienced personnel rather than formal documentation alone and may be more difficult to transfer where teams are dispersed or key individuals move on over time.

## Software and diagnostics

3.34 Train management systems, diagnostic platforms, configuration controls, and other software-enabled systems often sit outside traditional maintenance documentation and were frequently raised as affecting the availability of alternative maintenance arrangements.

3.35 One TOC described proprietary software as '*the single biggest barrier' to* competition. Even where maintenance moves in-house or to a third party, OEM involvement may remain necessary for fault diagnosis, system updates and configuration management long after a fleet has entered service. This continuing dependency can narrow the credible alternatives available at renewal.

3.36 These issues are most acute for newer and increasingly digital fleets, where software, diagnostics, remote monitoring and engineering approvals play a greater role. In such cases, access to documentation may be insufficient without the associated functionality, diagnostic capability or system-level technical support.

3.37 OEMs linked these arrangements to technical accountability, cybersecurity, engineering assurance and design authority. Software updates, configuration changes and new functionality may require ongoing oversight and approval, while faults can originate elsewhere in an integrated vehicle architecture than where they appear. Some OEMs also told us that involvement across fleets allows lessons from faults and interventions to be applied more widely. In their view, software, diagnostics and system-level expertise remain important throughout a fleet's life.

## Spares and supply chains

3.38 Maintenance depends not only on access to spare parts, but also on approved suppliers, specialist repair networks, technical specifications and overhaul capability. Some maintainers explained that access to these wider arrangements can be as important as the physical availability of the component.

3.39 Newer fleets often depend on OEM-linked supply chains, approved suppliers and specialist support during their early years in service. As fleets mature, alternative supply routes, repair capability and familiarity with components generally develop.

3.40 Older fleets, however, may face an obsolescence challenge. Parts may become scarce, suppliers may leave the market, and components may require redesign, repair, or replacement. In some cases, the original technology, software environments or specialist supplier base may no longer exist, potentially requiring bespoke engineering solutions or the use of alternatives that are less effective from a cost and/or performance perspective. Stakeholders therefore emphasised proactive obsolescence management as a core part of fleet stewardship and lifecycle management.

## Depot arrangements

3.41 Depot availability can also constrain the choices available to TOCs. This is particularly true where a depot is controlled by an OEM. Such control can provide an OEM with significant advantages during maintenance contract negotiations and also limit TOCs' ability to use depots to maintain a wide range of fleets including those built by other OEMs.

3.42 Stakeholder responses indicated that constraints on depot access vary by fleet and may relate to depot control, capacity, capability or location. Several TOCs identified fleets for which only a few locations could meet capacity, specialised facilities or operating requirements and one TOC highlighted that depot constraints prevented it from pursuing its preferred maintenance arrangement.

3.43 A key question is often not only whether another provider can enter the depot but also whether a facility can support that provider's operation. Factors such as capacity, specialist equipment, inspection facilities, workforce capability and operating arrangements may make a depot unsuitable despite being available in principle. However, some constraints may be easier to address than others and there may be circumstances where the benefits of investing in capability or facilities outweigh the cost. Whether such investment is commercially viable in practice may depend on the time available to develop a proposal and the degree of certainty around depot access and associated requirements.

3.44 Depot requirements also differ by activity. Routine maintenance depends on proximity to train operations and daily servicing requirements. By contrast, heavy overhaul, refurbishment and major repairs depend more on engineering capability, capacity and specialist equipment because rolling stock can be more readily moved to a distant facility.

3.45 Integrated depot and maintenance management may nevertheless improve coordination of depot and fleet investment, strengthen end-to-end accountability and reduce hand-offs by co-locating operational support and engineering expertise.

## Skills, capability, and incentives

3.46 Maintenance capability develops through accumulated engineering experience, fleet familiarity and access to information. Stakeholders emphasised knowledge of fleet behaviour, recurring faults and maintenance data as essential to reliable performance.

3.47 TOCs also need in-house expertise to oversee maintenance effectively and act as an 'intelligent customer'. Under the Railways and Other Guided Transport Systems (Safety) Regulations 2006 (ROGS), each mainline vehicle must have an Entity in Charge of Maintenance (ECM) responsible for its safe maintenance, although this need not be the TOC. Separately, TOCs' Safety Management System and licensing obligations require sufficient technical expertise to challenge maintenance decisions, monitor contractors and assure fleet safety, even where maintenance activities are outsourced.

3.48 An incoming provider must also acquire fleet-specific knowledge. This may require understanding maintenance and fault histories, recruiting or transferring experienced staff, and building the capability to diagnose faults and manage reliability. Transferring information alone may therefore be insufficient and

procurements often place considerable weight on experience with similar fleets, systems or components, particularly where providers assume significant performance, reliability or availability obligations. Demonstrated capability can therefore determine whether a bidder is regarded as a credible alternative.

3.49 Modern fleets also require specialist skills, including software-supported maintenance, systems engineering and fault investigation. Stakeholders reported recruitment and retention difficulties which may further limit alternative providers' ability to compete.

3.50 Some stakeholders told us that the historic franchising model may itself have affected TOCs' incentives to develop and retain maintenance capability. Relatively short franchise horizons could encourage TOCs to transfer maintenance responsibilities and associated risks to OEMs rather than invest in the in-house capability needed to manage those risks over the longer life of a fleet. This may also have encouraged decisions to be taken over the timescale of an individual franchise rather than the whole fleet lifecycle.

## Design authority

3.51 The organisation that identifies a fault may not be authorised to determine the remedy. Respondents described situations where a maintainer could diagnose a recurring problem, while engineering changes, software configurations or modifications required approval from the design authority.

3.52 This distinction is particularly relevant to software changes, engineering modifications, recurring technical issues and fleet-wide interventions. Routine servicing and repair may sit with one organisation while technical approval remains connected with the design authority.

3.53 This helps explain why OEM involvement may continue as maintenance responsibilities change. It can preserve clear accountability for engineering decisions, software changes and fleet-wide issues, but also creates interfaces where routine maintenance, technical support and design authority sit with different organisations.

## Lease arrangements

3.54 Lease arrangements can affect the maintenance options available to TOCs. TOCs may inherit maintenance structures, technical-support arrangements and contractual obligations established through earlier procurement or leasing decisions. Requirements relating to maintenance standards, asset condition,

overhaul, return conditions and long-term support may therefore limit the scope to change arrangements during the lease term.

3.55 As long-term asset owners and stewards, ROSCOs can also influence the choice of maintenance model through their requirements for asset condition, major maintenance and end-of-lease obligations. These requirements can influence when and how maintenance expenditure is incurred, because maintenance decisions need to take account of the condition in which assets must be maintained and ultimately returned. Maintenance choices therefore reflect not only current operational needs and TOC preferences, but also the wider asset management and financing arrangements applying to a fleet.

# 4. Outcomes

4.1 This chapter examines the outcomes associated with different maintenance arrangements. It focuses on three themes:

- **Transparency:** TOCs' ability to understand maintenance charges, benchmark suppliers, and compare alternative maintenance models.
- **Performance:** differences in service quality and fleet reliability across maintenance models, with a particular focus on technical failures.
- **Costs:** differences in maintenance costs across fleets, TOCs and maintenance models, and the factors that drive them.

4.2 Maintenance is only one component of a fleet's whole-life costs, alongside TOCs' own costs, infrastructure, capital and financing. These costs vary by fleet characteristics and utilisation, performance requirements, asset condition and contractual arrangements.

4.3 TOCs told us that, where possible, they assess value for money taking account of cost, performance, risk, deliverability and service quality. OEMs told us that they generally treat rolling stock manufacture and maintenance as distinct business activities for profitability purposes. Although the activities are related, this supports considering maintenance costs separately from wider fleet procurement and financing costs, which also have their own distinct cost drivers.

4.4 The quantitative analysis presented later in this chapter is based principally on data covering 1 April 2024 to 31 March 2025 and provides a snapshot rather than a whole-life assessment. It cannot capture the different timing of costs, overhaul requirements and benefits of maintenance decisions over a fleet's lifecycle or establish a causal relationship between maintenance model, competition, expenditure, and operational performance. The results should therefore be interpreted alongside the qualitative evidence.

4.5 The analysis also does not place a monetary value on all differences between maintenance models, including risk allocation, price certainty, accountability and the capability retained by TOCs. Nor did we analyse OEM profit margins at company or divisional level, which would have been disproportionate to the scope of this non-statutory market review given the scale and complexity of the businesses concerned.

# Transparency

4.6 A central question for this review was whether TOCs and funders have sufficient information to assess value for money of existing maintenance arrangements and compare credible alternatives.

4.7 Most TOCs reported limited visibility of the costs underlying TSA charges. These are typically presented as bundled contractual figures, without a clear breakdown of labour, materials, overheads, technical support, margins and risk allowances. TOCs said this makes it difficult to understand how charges were constructed, compare maintenance options, and assess value for money.

4.8 Limited information also constrained TOCs' ability to distinguish efficient delivery costs from supplier margins, risk pricing or other factors. Where alternatives were scarce, some described negotiations with OEMs as effectively '*take it or leave it*'. One TOC similarly characterised many contracts as *'distressed purchases'* without a realistic alternative.

4.9 One respondent noted that suppliers may resist detailed disclosure because of confidentiality obligations to their own suppliers, particularly where component costs would reveal purchase prices and margins. The respondent also considered that maintainers may be reluctant to disclose the uplifts they apply and the value attributed to contractual risks.

4.10 Several TOCs considered transparency to be greater under TSSSA and hybrid arrangements because they retained more visibility of labour deployment, materials procurement and maintenance planning. In their view, this supported more effective commercial challenge and negotiation.

4.11 Independent maintainers raised related concerns, stating that limited access to maintenance data, engineering documentation and cost information hindered benchmarking and effective competition. Some considered that greater transparency could encourage wider participation in procurement and strengthen confidence in value-for-money assessments.

4.12 Many stakeholders reported that maintenance contracts are inherently difficult to compare. Charges reflect factors including fleet age, reliability targets, route intensity, depot configuration, local labour costs, obsolescence management, contractual obligations and scope. Apparent cost differences may therefore reflect different underlying requirements rather than supplier pricing or efficiency alone.

4.13 Despite the potential challenges inherent in cost comparisons, TOCs consistently told us that, in their view, greater visibility of charges and their principal drivers would help TOCs and funders understand how prices are determined, make more informed comparisons and challenge suppliers more effectively.

# Performance

4.14 Cost is an important component of value for money, but it cannot be assessed in isolation. Rolling stock maintenance is safety-critical and affects fleet availability, reliability, operational performance and long-term asset condition.

4.15 Lower costs may therefore represent poor value if they lead to weaker reliability or availability, operational disruption, deferred work, or higher retained oversight costs for TOCs. Conversely, higher costs may be justifiable where they deliver better outcomes, efficiently transfer material risks to maintainers, support better asset stewardship, or reduce whole-life costs.

## Stakeholder views on service quality

4.16 Stakeholders agreed that maintenance delivers value through reliability, availability, safety and operational performance, as well as cost.

4.17 However, performance differences are difficult to interpret. Reliability, availability and service quality reflect fleet design, age and condition, operating requirements and utilisation, as well as the maintenance arrangement.

4.18 OEMs emphasised the potential performance benefits of OEM-led maintenance, including detailed design knowledge, technical expertise and responsibility for fault management. TOCs also identified benefits from significant OEM involvement, including through TSA arrangements, for example during fleet introduction, when access to design authority, technical support and performance accountability can reduce operational risk, and support reliability growth. Stakeholders commonly distinguished between new and mature fleets, with a number of TOCs suggesting that, as fleets mature, maintenance needs become more predictable, technical risks may reduce and TOCs may develop greater capability, making alternative models more viable.

4.19 Several stakeholders therefore questioned whether the same degree of OEM dependency remains necessary throughout a fleet's life. Where OEM support remains essential, for example for software-intensive fleets and proprietary systems, limited opportunities to benchmark costs or introduce competition may make value for money harder to demonstrate.

4.20 Stakeholders also saw competition as a potential driver of efficiency. The ability to benchmark suppliers, re-tender contracts, and challenge incumbents may strengthen incentives for suppliers to improve performance, reduce costs and innovate, although these activities can also impose costs on stakeholders.

4.21 Relatively few respondents provided examples linking innovations to a specific maintenance model. Instead, they identified conditions likely to support innovation, including competition between maintainers, driven by enablers such as access to data and technical information. Examples of innovations that respondents directly associated with contestability included new maintenance technologies, alternative supply chains, condition-based maintenance techniques, and improved procurement strategies.

4.22 One stakeholder observed that competition incentivises suppliers to "*drive up quality"* and bring innovation to the forefront. Others similarly suggested that competition can encourage innovation by creating pressure on suppliers to improve performance, reduce costs and differentiate their offer. Conversely, TOCs told us that where they have limited ability to switch, benchmark performance or challenge incumbents, incentives to innovate may be weaker.

4.23 By contrast, some stakeholders argued that long-term contracts can encourage investment by providing certainty and allowing suppliers to recover investment costs over time. OEMs frequently cited this as a benefit of long-term maintenance arrangements.

## Digital technologies and data-driven maintenance in supporting innovation

4.24 Respondents cited predictive maintenance, condition monitoring, remote diagnostics and AI-enabled fault detection as potentially improving reliability, reducing whole-life costs and optimising interventions. Their adoption, however, may depend on access to operational and diagnostic data, software systems and technical information often controlled by OEMs.

4.25 Some argued that limited access to these inputs can make it more difficult for TOCs and alternative maintenance providers to develop or deploy innovative maintenance solutions. Greater access could enable independent analysis, maintenance optimisation and alternative approaches; restricted access may constrain their development or deployment.

## Insights from publicly available data

4.26 Stakeholders broadly agreed that significant OEM involvement in maintenance can provide performance advantages early in a fleet's life but were in a number of cases cautious about the extent to which such advantages persist as fleets mature. We therefore carried out a light-touch analysis in order to test whether the available data were consistent with those views. We did this by comparing performance outcomes for TSA and non-TSA fleets, whilst noting that TSAs are not the only contractual means by which OEMs can play a key role in fleet maintenance.

4.27 Rolling stock performance can be assessed through reliability, availability, punctuality, safety, and passenger satisfaction. Our quantitative analysis focuses on reliability because comparable data were readily available and stakeholders commonly used reliability measures to assess fleet performance.

4.28 We used the industry-standard Miles per 701D incident (Mp701D) metric. A 701D incident is a rolling stock technical failure that causes three or more minutes of primary delay or full or partial cancellation. These incidents include faults with train equipment such as doors, traction systems or other onboard components. The number of 701D incidents can be used to calculate 'Miles per 701D (Mp701D)', a widely used measure of fleet reliability. Higher values indicate that a fleet travels further between qualifying incidents and is therefore more reliable. This provides a quantitative measure to consider alongside the qualitative stakeholder feedback.

4.29 We combined the Rail Delivery Group (RDG) Mp701D data with fleet-level information collected through our RFIs. The analysis covers 18 TOCs from 1 April 2024 to 31 March 2025. It excludes TARA fleets as their maintenance costs and contractual arrangements are not directly comparable with other fleets.

4.30 A fully comprehensive comparison of performance across maintenance models would be very challenging, since reliability may be influenced by other factors beyond the type of maintenance contract itself. Before comparing maintenance models, we therefore examined the relationship between reliability and rolling stock category and fleet age respectively – two characteristics identified by stakeholders as potentially important.

4.31 We found that reliability varies with these characteristics. In our dataset, Intercity and EMU fleets tend to perform better than DMUs (which amongst other things tend to work on shorter distance services), while the relationship with age is non-linear (the newest and oldest fleets record the lowest rates of Mp701D incident).

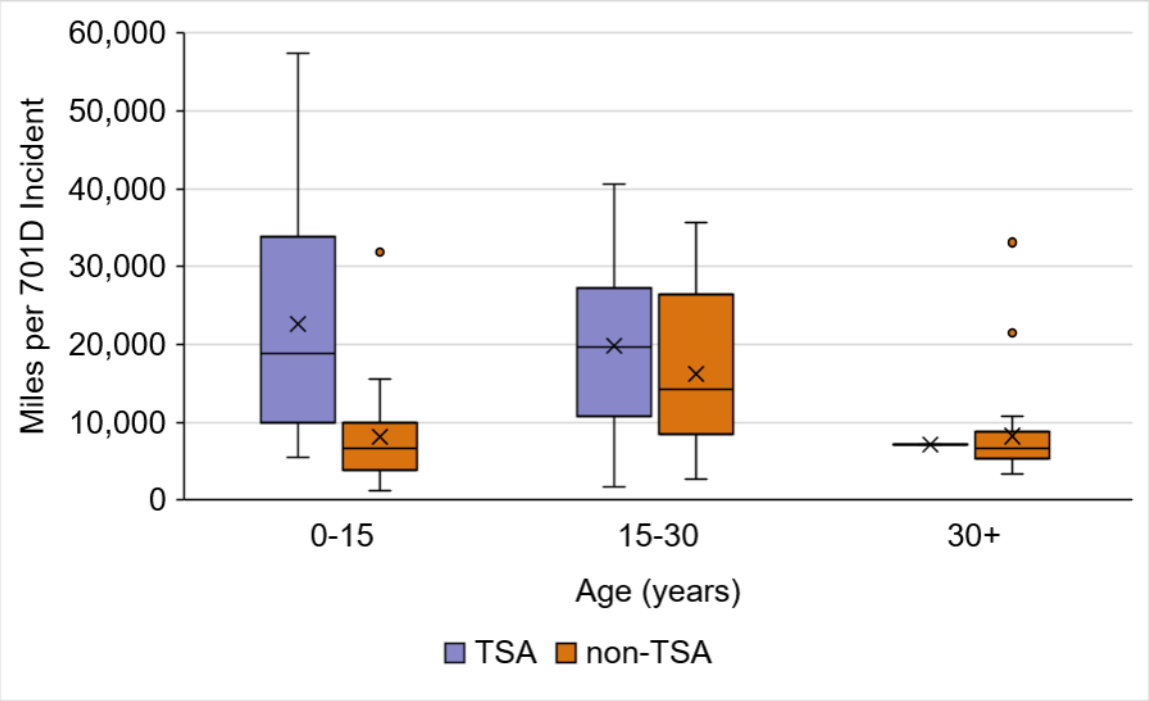
These characteristics are not evenly distributed across maintenance models. Intercity fleets are almost exclusively TSA whereas EMU fleets are maintained under a mix of TSA, TSSSA, and to a lesser extent, in-house models while DMU fleets are predominantly maintained in-house. Similarly, older fleets are predominantly maintained in-house, whereas mid-life and newer fleets are maintained under a mix of TSA and TSSSA arrangements, with TSA fleets tending to be newer on average. As such, a simple comparison of TSA versus non-TSA performance risks attributing to the maintenance model differences that may actually arise from fleet type or age.

4.32 Figure 4.1 shows Mp701D incidents for all of the TSA and non-TSA fleets in our dataset by age. We focus on age because it showed the clearest relationship with Mp701D incidents and enables a more informed comparison between maintenance models at different lifecycle stages.

4.33 Within our dataset:

- **Fleets aged under 15 years:** the dataset contains 18 TSA and 17 non-TSA fleets (i.e. fleets maintained under a TSSSA or fully in-house). Median Mp701D was 18,838 for TSA fleets and 6,695 for non-TSA fleets from 1 April 2024 to 31 March 2025. Performance varied most widely among TSA fleets.
- **Fleets aged 15-30 years:** the dataset contains 12 TSA and 15 non-TSA fleets. Median Mp701D was 19,615 and 14,257, respectively.
- **Fleets aged 30 years or more:** the dataset contains one TSA fleet, with Mp701D of 7,163, and 28 non-TSA fleets with median Mp701D of 6,622.

**Figure 4.1 Mp701D by fleet age and maintenance model, 1 April 2024 to 31 March 2025**




*Source: RDG fleet reliability reports and RFI data*

4.34 The results of our relatively simple data analysis, which relies on one year of data, covers a relatively small number of fleets and does not control for all factors that may affect fleet reliability:

- appear to be consistent with stakeholder submissions on the early fleet life (here 0-15 years) benefits of significant OEM involvement in maintenance; and
- show less clear benefits for fleets aged 15-30 years, where TSA and non-TSA fleets appeared to see broadly similar ranges, albeit with noticeably higher mean and median values for TSA performance.

4.35 These results are also consistent with limited 'before and after' evidence that was supplied to us by stakeholders for fleets whose maintenance model had changed away from a TSA during mid-life and maintained broadly similar performance levels.

# Maintenance costs

4.36 Our review considered the level of total maintenance costs that are incurred by train operating companies. Some of these costs are incurred as charges paid to third-party maintainers under TSAs, TSSSAs and other contracted maintenance arrangements. Other costs are incurred in-house by TOCs where they retain maintenance labour, depot activity, engineering management, fleet technical functions or other activities needed to manage and deliver maintenance.

4.37 This distinction is important when comparing maintenance models. For example, the apparent cost of an outsourced arrangement may not capture the full economic cost to the TOC if the TOC must also retain contract management, supplier assurance, performance monitoring, engineering oversight or technical capability.

4.38 Stakeholders identified a broad and interrelated set of cost drivers:

- Maintainers identified labour and workforce capability; spares, materials and consumables; depots, tooling and infrastructure; technical support, diagnostics and engineering activities; and risk or contingency allowances. They also pointed to lifecycle factors such as fleet condition, utilisation, contractual scope, service specification, performance obligations, contract duration and the allocation of technical and performance risk.
- A range of stakeholders highlighted that modern rolling stock increasingly depends on software, diagnostics, technical data and remote condition monitoring, which can affect both the cost of maintenance and the ability of TOCs to compare or challenge those costs.
- TOCs identified the same themes. They described costs being incurred through labour, materials, facilities, contracted services, technical support, heavy maintenance and additional engineering activities. Some TOCs incur these costs principally through third-party contracts, while others retain substantial in-house capability and buy specific support, materials, heavy maintenance or technical services externally. Several submissions also emphasised that maintenance costs can vary significantly across fleets because of differences in age, traction type, duty cycle, mileage, depot arrangements, fleet condition, maintenance cycle and contractual model.

## Stakeholder views and evidence on the level of maintenance costs

4.39 The transparency issues summarised earlier in this chapter constrained the ability of stakeholders to provide evidenced responses to this review. Respondents consistently reported that maintenance costs are not directly comparable due to fleet age, traction type, mileage, utilisation, maintenance periodicities, contractual scope, depot and lease arrangements and the allocation of risk between parties. Others noted that differences in accounting treatment, maintenance reserves and the inclusion of overhaul costs can further complicate comparisons.

4.40 Responses from TOCs provided qualitative, and limited quantitative, evidence that OEM-led arrangements, particularly TSA-style arrangements, can be a relatively high-cost option where credible alternatives are available. One TOC reported that routine maintenance was covered by its TSA but that services such as software updates, repairs and vandalism rectification attracted additional charges, and that modifications became significantly more expensive once trains entered service. Other TOCs characterised some OEM-led arrangements as substantially more expensive than necessary and suggested that OEMs were able to earn significant profits from long-term maintenance contracts, particularly through modifications and contract variations. However, detailed cost data was not provided to allow for this to be assessed.

4.41 Some TOCs told us that in-house or hybrid models provide greater control over, and visibility of, costs. Some suggested that avoiding supplier profit margins, reducing contract management overheads and exercising greater control over materials procurement could generate savings, although evidence quantifying these benefits was often limited. TOCs need to be appropriately resourced in order to support such approaches.

4.42 One TOC stakeholder submitted a response, supported by case study evidence, suggesting like-for-like annual savings of around 30% per annum through mid-life switching from a TSA to a TSSSA, with no observable impact on performance. Another TOC told us that cost comparisons between TSAs and TSSSAs must be undertaken with care, since, in its experience, OEMs may price TSSSAs at a (high) level in order to discourage TOC switching away from TSAs.

4.43 TOC representations were consistent with the evidence that we received on how the market works, with the level of charges following contract renewal, rather than for initial contracts, being the key focus of their submissions. We were provided with recent examples whereby new TSA terms were agreed with incumbent

OEMs, in market situations where there had been no competing bids, leading to increases in charges of up to 300% over the previous terms.

4.44 Providing a contrasting interpretation of such changes, one TOC argued that recent observed increases in TSA charges should not automatically be interpreted as evidence of OEM market power. In their view, recent increases in maintenance charges in large part reflect wider industry cost pressures arising from factors such as the effects of the pandemic and wider geopolitical events '*as much as*' any features of the maintenance market itself.

4.45 Some TOCs told us that outsourced arrangements can require significant retained engineering, contract management and assurance functions, reducing the potential benefits of moving away from OEM-led models. Others noted that the performance-related contract terms that are often put in place for OEM-led maintenance contracts can be administratively burdensome in ways that may not be justified by service improvements.

4.46 One TOC noted that, for hybrid models, they may remain dependent on OEMs for technical support, materials and components. Where this support is not made available on cost-effective terms, the commercial viability of alternative maintenance providers, and hence competitive pressure, may be weakened.

4.47 Evidence from TOCs with recent experience of agreeing maintenance terms points to an industry perception of an initial '*honeymoon period*', in which maintenance arrangements are priced attractively during fleet introduction before later increasing as fleets mature. Accordingly, value for money is viewed as strongest at initial fleet procurement, when maintenance arrangements form part of a competitively tendered rolling stock package, and may become harder to sustain later in the fleet lifecycle. Several TOCs also expressed concerns that incumbent maintainers may benefit from reduced competitive pressure once fleets become operationally and technically embedded, potentially limiting TOCs' ability to test the market at renewal. For these reasons, some TOCs considered that the first contract renewal represents a point at which competitive pressure may be weaker. As noted, fleets can become increasingly dependent on incumbent suppliers through access to technical information, software, engineering knowledge, approved supply chains and depot arrangements. Accordingly, maintainers may have greater scope to increase charges at contract renewal where alternative maintainers are unable to compete effectively.

4.48 Stakeholders reported interest from prospective independent maintainers and identified opportunities to procure selected TSSSA items directly. They considered

that this could support competition and potentially achieve similar or improved outcomes, but would require additional engineering, procurement and materials-management capability and would need to address warranty, liability and configuration-management risks. For some TOCs, those additional costs and risks may make a fully outsourced TSA preferable.

## Analysis of fleet-level maintenance costs

4.49 We compared maintenance costs across TSA, TSSSA and in-house maintenance models using Pounds Per Vehicle Mile (PPVM), based on cost data provided by 17 TOCs for the period 1 April 2024 to 31 March 2025.

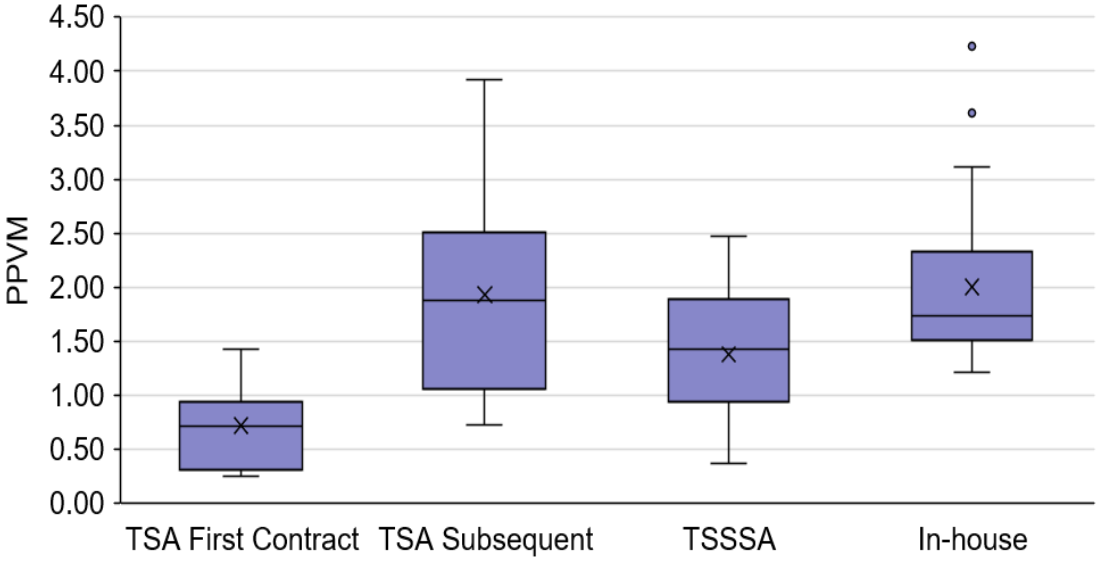
4.50 Where maintenance costs were not recorded at fleet level, we applied reasonable and consistent allocation methods using information provided by TOCs. We took a proportionate approach to data collection and relied on TOCs' best efforts to identify and allocate relevant maintenance costs. We provide more information on our approach to assessing costs in Annex A.

4.51 The results provide a snapshot of costs in a single year and do not capture lifetime maintenance costs, which year to year are influenced by factors including maintenance and payment schedules (for example, some TOCs may spend less on periodic maintenance but pay more in dilapidations, whilst others may have different profiles of expenditure depending on their contracted performance regimes). Differences in accounting approaches, cost allocation, maintenance cycles, and the potential omission of some relevant costs mean that our comparisons between maintenance models must be interpreted with appropriate caution.

4.52 Seeking to test whether fleets maintained under different models had systematically different estimated costs, we first examined simple relationships in the data and then used regression analysis to account for observable differences between fleets.

4.53 Figure 4.2 below illustrates the range of our estimates of fleet-level PPVM cost by maintenance model.

**Figure 4.2 Estimated pounds per vehicle mile (PPVM) cost by maintenance model, 1 April 2024 to 31 March 2025**




*Source: ORR calculations from RFI data. The horizontal line intersecting each of the boxes represents the median PPVM cost estimate and the cross represents the average (mean) PPVM.*

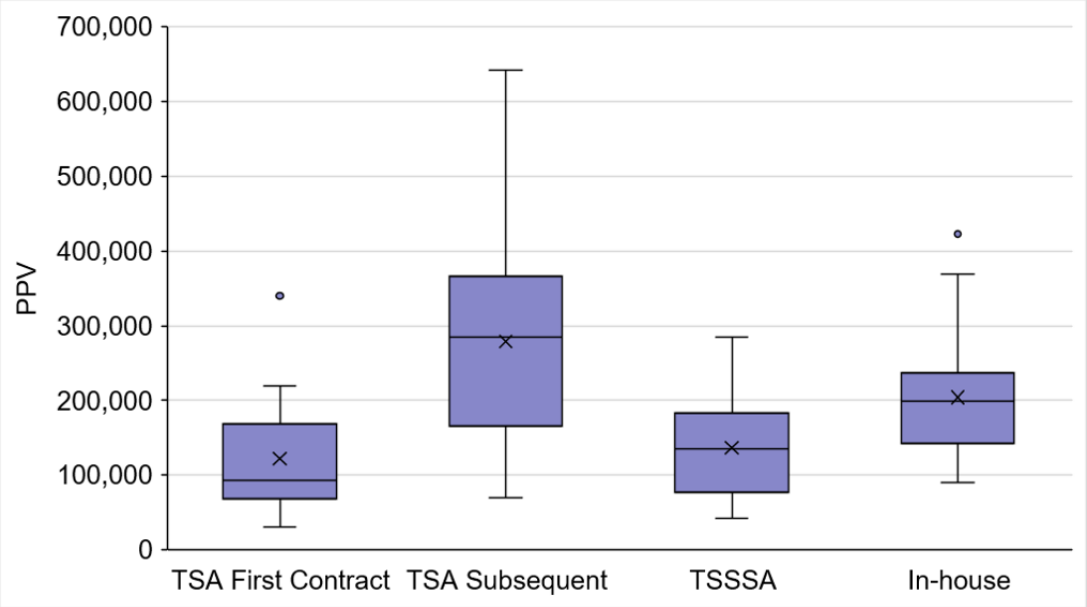
4.54 Figure 4.2 shows substantial variation in estimated fleet-level PPVM cost across all maintenance models.

- TSA fleets in their initial contract term have the lowest median estimated PPVM (£0.72) and exhibit the lowest dispersion in estimated PPVM. This very low estimate may in part reflect some maintenance costs being captured through leasing or warranty arrangements, rather than maintenance contracts.
- TSA fleets outside their initial contract term have the highest median estimated PPVM (£1.88) and exhibit the greatest dispersion in estimated PPVM.
- TSSSA fleets have the lowest median estimated PPVM (£1.42) and show less variation across fleets (when excluding TSA fleets in their initial contract term).
- In-house fleets have a median estimated PPVM of £1.73, between the TSA and TSSSA groups, although some in-house fleets record comparatively high estimated PPVM values.

4.55 TSA fleets maintained outside their initial contract term exhibit a median PPVM that is 32% higher than fleets maintained under a TSSSA contract and 9% higher than fleets maintained in-house. However, stakeholder submissions on cost drivers (and potentially also the wide spread of outcomes observed for each model) suggested that factors other than maintenance model are also important drivers of unit maintenance costs.

4.56 As a first simple sense-check, following informal stakeholder dialogue about approaches to cost estimation, we next estimated costs on a PPV basis, in order to account for the fact that PPVM may overstate the costs of less intensively used fleets. Figure 4.3 shows that, using this alternative metric, TSA fleets outside their first contract have materially higher estimated unit maintenance costs than both TSSSA and in-house fleets.

**Figure 4.3 Estimated pounds per vehicle (PPV) cost by maintenance model, 1 April 2024 to 31 March 2025**




*Source: ORR calculations from RFI data. The horizontal line intersecting each of the boxes represents the median PPV cost estimate and the cross represents the average (mean) PPVM.*

4.57 Figure 4.3 shows substantial variation in estimated fleet-level PPV cost across all maintenance models.

- TSA fleets in their initial contract term have the lowest median estimated PPV (£93,000). This very low estimate may in part reflect some maintenance costs being captured through leasing or warranty arrangements, rather than maintenance contracts.

- TSA fleets outside their initial contract term have the highest median estimated PPV (£285,000) and exhibit the greatest dispersion in estimated PPV.
- TSSSA fleets have the lowest median estimated PPV (£136,000) when excluding TSA fleets in their initial contract term and show less variation across fleets.
- In-house fleets have a median estimated PPV of £199,000 between the TSA and TSSSA groups.

4.58 TSA fleets maintained outside their initial contract term exhibit a median estimated PPV that is 110% higher than fleets maintained under a TSSSA contract and 43% higher than fleets maintained in-house.

4.59 Given our understanding that a wider range of factors beyond vehicle mileage can be important cost drivers, using our dataset, we next undertook a wider analysis of the correlation between unit cost estimates. Table 4.1 below summarises these relationships and shows why unadjusted comparisons between TSA, TSSSA and in-house fleets can be misleading. In this analysis we rely on PPVM as our primary measure of units costs, notwithstanding its potential limitations as described above.

**Table 4.1 Relationship between our per fleet cost estimates (PPVM) and fleet characteristics/maintenance models**

| Variable | Relationship with cost (PPVM) estimates across our dataset | Relationship with maintenance model |
|---|---|---|
| Fleet vehicle mileage | Higher fleet vehicle mileage is associated with lower estimated PPVMs. | TSA fleets tend to have higher total mileage, followed by TSSSA and then in-house. |
| Rolling stock category | Intercity and EMU fleets are associated with lower estimated PPVMs than DMU fleets. | Intercity fleets are almost exclusively maintained under TSA models.<br>EMU fleets are maintained under a mix of TSSSA and TSA maintenance models, with a limited number of fleets maintained in-house.<br>DMU fleets are predominantly maintained in-house, with a limited number of fleets maintained under TSA and TSSSA models. |

| Variable | Relationship with cost (PPVM) estimates across our dataset | Relationship with maintenance model |
|---|---|---|
| Contract length (TSA and TSSA) | Longer contract lengths are weakly associated with lower estimated PPVMs, but there is considerable variation in cost across all contract lengths. | TSA and TSSSA fleets have broadly similar contract lengths (this variable is not applicable to fleets where the overall management of maintenance is carried out by TOCs in-house. |
| Fleet age | Older fleets are weakly associated with higher estimated PPVMs, but there is considerable variation in costs across all ages. | Older fleets are predominantly maintained in-house, whereas mid-life and newer fleets are maintained under a mix of TSA and TSSSA arrangements, with TSA fleets tending to be newer on average. |

4.60 These results provide important context for the results summarised in Figure 4.2 and Figure 4.3 above. Differences in costs across TSA, TSSSA and in-house arrangements can often reflect differences in the underlying characteristics of the fleets operated under those arrangements, rather than differences in the maintenance models themselves. As an extension of our simple cost comparisons, we therefore used regression analysis to test whether the observed relationship with maintenance models remained after controlling for these characteristics. We provide more detail on our regression analysis in Annex A.

4.61 We summarise the results of our regression analysis in table 4.2 below.

**Table 4.2 Regression results: PPVM cost estimated as a function of contractual arrangements and other factors**

| Variable | Direction | Statistical significance |
|---|---|---|
| TSA – first term | Consistently associated with lower estimated PPVM than fleets maintained in-house | Significant across most specifications |
| TSA – subsequent term | Consistently associated with higher estimated PPVM than fleets maintained in-house | Significant across most specifications |
| TSSSA | Generally associated with lower estimated PPVM than fleets maintained in-house | Significance varies across specifications |
| Vehicle mileage | Consistently negatively associated with estimated PPVM across all specifications | Highly significant across all specifications. |

| Variable | Direction | Statistical significance |
|---|---|---|
| Rolling stock category | Intercity and EMU fleets are consistently associated with lower estimated PPVM than DMU fleets across all specifications | Intercity and EMUs are consistently significant across most specifications |
| Contract length | Negatively associated with estimated PPVM when included as a robustness check | Not significant when included as a robustness check |
| Age | Negatively associated with estimated PPVM when included as a robustness check | Not significant when included as a robustness check |
| Fleet size | Positively associated with estimated PPVM when included as a robustness check | Highly significant when included as a robustness check but strongly correlated with vehicle mileage. |

4.62 The statistical significance of multiple explanatory variables is consistent with stakeholder submissions on the importance of fleet characteristics as cost drivers. Mileage and rolling stock category are important determinants of PPVM cost, reinforcing the need to avoid attributing all observed cost differences to the maintenance model.

4.63 Taken together, as set out at paragraphs 4.39 to 4.62 above, the evidence shows that maintenance costs can differ materially between fleets and between maintenance arrangements, but that these differences need to be interpreted with caution.

4.64 In particular, our analysis of fleet-level maintenance costs was based on a single year of data, and our results were in part driven by factors that cannot all be observed or controlled for. Our analysis therefore identifies associations rather than establishing that maintenance models cause differences in cost.

4.65 It is significant, however, that several strands of evidence appear to point in a consistent direction:

- TOC submissions voiced widespread concerns about TSA charges and provided examples of material changes in costs associated with maintenance arrangements, both of cost reductions resulting from mid-life moves from TSA to TSSSA, and of cost increases where TSA arrangements were renewed without competing bids. These individual cases cannot be assumed to be precisely representative of the wider market but demonstrate the potential scale of the differences involved.

- Our descriptive analysis of fleet level data provides broader support for these concerns. Figures 4.2 and 4.3 show that, whilst our estimates of early life unit costs were low, TSA fleets beyond their initial contract term had higher median estimated costs than TSSSA and in-house fleets on both a PPVM and PPV basis.

- Given the wide range of potential drivers of unit costs, we used a regression analysis to attempt to control for some of the clearest observable differences between fleets. As summarised in Table 4.2, this analysis found that TSA fleets beyond their initial contract term remained associated with higher estimated PPVM costs than, in particular, in-house fleets across most specifications.

- Taken as a whole, the evidence is in our view consistent with concerns that TSA arrangements can become relatively costly beyond their initial term, without definitively establishing the magnitude of any causal cost effect attributable to the maintenance model itself.

- As noted earlier in this chapter, one TOC stakeholder submitted a response, supported by case study evidence, suggesting like-for-like annual savings of around 30% per annum through mid-life switching from a TSA to a TSSSA, with no observable impact on performance. Notwithstanding its limitations as summarised above, the balance of the other evidence including our analysis of fleet-level data suggested to us that savings of this scale, or higher, could plausibly have wider applicability.

4.66 Our review did not attempt to review the whole-life costs and benefits of TSA arrangements. Such an analysis would require evidence over the fleet lifecycle on factors including costs, performance, and risk transfer. It would also take into account OEMs' roles in depots, encompassing both the benefits brought about by external investment and the costs, and opportunity costs, brought about by OEM control. What our evidence does attempt to demonstrate is the extent to which the value for money of these arrangements may change as fleets mature, strengthening the case for customers to be able to review and test their maintenance arrangements at appropriate points in the fleet lifecycle.

# 5. Assessment of the evidence and our emerging findings

5.1 This chapter sets out our assessment and emerging findings on the basis of the evidence set out in in Chapters 3 and 4.

## How competition is working

### Competition is effective at initial fleet procurement

5.2 Competition appears to work most effectively when rolling stock and initial maintenance arrangements are first procured. Customers can choose between competing suppliers for wider fleet packages that may include maintenance and technical support. The concerns raised during the review related much more consistently to what happens once fleets enter service and maintenance arrangements become established.

5.3 However, many of the factors affecting future maintenance options are established at procurement. Information rights, software and diagnostic arrangements, technical-support structures, depot arrangements and maintenance responsibilities are often agreed when fleets are first procured, and can continue to influence maintenance options many years later. By the time TOCs begin considering whether alternative arrangements may offer better value, the practical choices available to them may already have been shaped by decisions taken much earlier in a fleet's life.

### Competition during fleet life is less consistently effective

5.4 We found examples of maintenance contracts being competitively retendered or restructured, including cases where competitive challenge delivered material savings.

5.5 However, we found that TOCs' ability to exercise choice varies considerably between fleets. TOCs reported widespread dissatisfaction with the options available for some fleets, and told us that they expected many existing arrangements, especially for newer fleets, to continue without meaningful viable alternatives.

### Competition is affected by a number of barriers to switching

5.6 We did not find evidence of any single barrier to switching acting as the primary driver of the issues identified. Instead, a number of technical, commercial and operational factors can combine to reduce the number of credible alternatives that are available. These include access to technical information and maintenance histories, software and diagnostics, supply chains and tooling, suitable depot facilities, engineering capability and fleet-specific knowledge, as well as the time and resources needed to mobilise an alternative. In some cases, the practical ability to exercise competition is affected not by absolute barriers to obtaining inputs but rather the timing of availability, since inputs provided too late can preclude the development of credible alternative arrangements in time to meet procurement and transition timescales.

5.7 We found that, in some instances, TOCs and independent maintainers have the commercial appetite and potential to develop capability for a wider range of fleets than they currently maintain, but that their ability to invest in and exercise that capability is constrained by barriers such as the ones listed in the previous paragraph.

5.8 It is clear that some restrictions on access to information or software may be legitimate, where justified by considerations such as safety, cybersecurity, intellectual property protection, or the need to maintain asset integrity. However, where restrictions go beyond what is necessary to address those considerations, they may unnecessarily constrain customers' ability to consider alternative maintenance arrangements.

5.9 These factors have implications not only for current competition, but also for the long-term development of maintenance capability within the market, since investment in facilities, expertise, and other aspects of maintenance capability depend on a realistic prospect of future opportunities.

## What outcomes the market produces

### Transparency

5.10 Limited transparency appears to be a significant weakness in current arrangements. TOCs consistently reported that bundled charges provide insufficient visibility of what is being paid for, principal cost drivers and reasons for material changes. This limits customers’ ability to benchmark expenditure, challenge suppliers and assess whether existing or alternative arrangements represent value for money.

5.11 We consider this to be significant, as TOCs remain responsible for the management and operation of complex, safety-critical assets and are ultimately accountable for many of the decisions taken in relation to those. In that context, transparency and access to information do not simply support commercial decision-making; they also help TOCs understand, challenge and oversee the arrangements on which they rely. Where visibility of costs, technical information or maintenance activities is limited, TOCs may face greater difficulty exercising informed judgement about both value for money and wider asset-management decisions.

5.12 Comparisons nevertheless require care because fleets and contracts differ in scope, performance obligations, fleet characteristics, depot arrangements and risk allocation. Greater transparency would support better-informed benchmarking, but would not lend itself to simple comparisons.

## Performance

5.13 Stakeholder evidence and our analysis of performance data point broadly in the same direction.

5.14 OEM-led TSAs can deliver particular performance and operational benefits when a fleet is first introduced. Access to design knowledge, technical expertise, software and diagnostic support, warranties and reliability-growth capability can be important for supporting performance, especially for recently manufactured fleets. Integrated arrangements can also simplify contractual interfaces by providing a single point of accountability and transfer some maintenance and performance risk to the maintainer and away from the TOC.

5.15 We found less clear evidence that these advantages necessarily persist throughout the life of a fleet. Many stakeholders considered alternative maintenance arrangements to become increasingly attractive as fleets mature and maintenance requirements become better understood. Consistently, we found examples of TOCs assuming greater responsibility for maintenance while continuing to rely on OEM support for particular technical functions. The question raised by the evidence is therefore which functions genuinely require continuing OEM involvement, and which can realistically be undertaken by TOCs or alternative providers, where there is commercial desire by the TOC to exercise choice as a customer.

## Costs

5.16 Estimating the cost of rolling stock maintenance is inherently difficult, since maintenance costs are influenced by a number of factors relating to fleet characteristics, lifecycle stage and contractual scope.

5.17 Subject to this caveat, concerns about the cost of TSA arrangements beyond their initial term were a recurring theme of our evidence review. These concerns were supported both by quantitative evidence supplied by TOCs and our own quantitative analysis, although neither were capable of definitively establishing that different maintenance models systematically drive differences in total maintenance cost.

5.18 Taken as a whole, our evidence base in our view is consistent with concerns that TSA arrangements can become relatively costly beyond their initial term, without definitively establishing the magnitude of any causal cost effect attributable to the maintenance model itself.

5.19 Costs should not be considered in isolation and must be viewed alongside performance, risk allocation and the responsibilities retained by TOCs. Given that rolling stock remains in service for decades, maintenance arrangements must support not only current operational requirements but also long-term asset stewardship, reliability and residual value. Nonetheless, the balance of our evidence suggests that maintenance choices can have material financial consequences and that different approaches can produce materially different value-for-money outcomes.

5.20 The practical ability to review and challenge existing arrangements is therefore of crucial importance. This includes being able to challenge arrangements that may be underperforming or represent poor value. In a market involving approximately £1.5 billion of annual expenditure, even relatively modest differences in value for money can have significant implications for passengers and taxpayers.

5.21 Overall, our review suggests that the central issue is not whether OEM-led, independent or TOC-led maintenance is inherently preferable. Different maintenance models appear capable of delivering effective outcomes and may be appropriate in different circumstances. In our view, the more significant issue is whether TOCs have sufficient information, flexibility and practical opportunities to assess alternatives and make informed choices throughout the life of a fleet. Currently, the ability to exercise choice appears consistently at procurement, but less consistently so thereafter.

5.22 We consider this important because transparency, informed customer choice and effective competition can strengthen incentives for efficiency, innovation, and value for money. These benefits extend beyond competition between existing providers. They can also encourage investment in facilities, depots, skills, expertise and wider maintenance capability. As such, they can influence whether the market develops and retains the capability and resilience needed to support sustainable, long-term growth in the sector.

# 6. Provisional view on further action

6.1 Where we identify competition concerns in railway markets, we have a range of formal competition tools available, including enforcement powers under the Competition Act 1998 (CA98) and market study powers under the Enterprise Act 2002. We do not, however, propose to use these powers at this stage.

6.2 The evidence does not currently point to concerns arising principally from the conduct of a single firm or a particular agreement between market participants, meaning that CA98 is not at this stage a suitable tool for addressing these issues.

6.3 The issues that we have identified are broad and market-wide in nature, and therefore capable of being considered through our market study powers, but our provisional view is that they are capable of being addressed through the targeted measures that we propose later in this chapter. We are also mindful that some of the issues identified through this review are being considered alongside wider industry reform, including implementation of the Strategy, as discussed below.

6.4 Stakeholder responses will inform both our final recommendations and any further assessment of whether formal intervention is warranted. If the proposals summarised in this chapter do not secure sufficient industry engagement, or if stakeholders are unable to identify a credible route to their implementation, we would revisit our position on the use of formal powers, and consider appropriate interventions.

## Relationship with the Strategy

6.5 The Strategy sets out a direction of travel for GBR, and in doing so considers a number of issues relevant to this review. Broadly, the Strategy proposes a more integrated, long-term approach to decisions across rolling stock and infrastructure. It envisages GBR managing train fleets as a national portfolio, with greater standardisation through a smaller number of fleet families, and aligning decisions on fleet procurement, refurbishment, life extension, replacement and redeployment with decisions on infrastructure, electrification, traction power and digital signalling. It also proposes a stronger and more coordinated approach to procurement, ownership and financing, alongside a long-term Fleet & Infrastructure Plan intended to provide a more stable and deliverable pipeline of investment for funders and suppliers.

6.6 For new fleets, the Strategy recognises the value of OEM support during fleet introduction, while stating that procurement should secure the knowledge, information, software access, tooling and supply arrangements needed to preserve options later in the fleet lifecycle.

6.7 The Strategy also proposes a more integrated approach to depots, maintenance, materials and logistics. This includes strengthening GBR's control over depot arrangements, avoiding unnecessary exclusivity or long-term lock-in, and reviewing existing arrangements when contracts, leases or renewals provide an appropriate opportunity.

6.8 The Strategy states that its depot and maintenance proposals will be reviewed to take account of our review. Further, the establishment of GBR creates an opportunity to strengthen buyer power in future rolling stock and maintenance procurements, which could help secure some of the outcomes identified through this review. Our intention is that our potential measures may inform the implementation of the Strategy, whilst also applying to current conditions in the wider passenger rolling stock maintenance market. Some of the measures we propose are primarily relevant to future arrangements, while others may also benefit existing fleets and maintenance arrangements. Changes to existing arrangements may require commercial negotiation between the parties involved. Future procurements, contract renewals and wider contracting activity may provide opportunities to address issues in those arrangements where appropriate.

## Stakeholder views on opportunities for better outcomes

6.9 During our review, stakeholders proposed a range of measures to address the issues identified in Chapters 3 and 4. Although views reflected their different roles, a number of common themes emerged. Specifically:

- improving transparency and customers' ability to assess value for money;
- strengthening benchmarking and comparison between maintenance arrangements;
- providing greater clarity regarding technical information, software, diagnostics and technical-support arrangements;
- preserving future maintenance options through procurement, contractual arrangements and market testing;

- improving the practical ability to review, change or restructure maintenance arrangements; and
- addressing the role of depot arrangements in shaping future maintenance options.

6.10 Stakeholders stressed that any changes to current practices must also preserve the most important strengths of the status quo, including technical accountability, intellectual property, safety, cybersecurity, configuration control, appropriate risk allocation, incentives to invest and innovate, operational performance and long-term asset stewardship.

6.11 We have taken these views into account, alongside the wider evidence gathered through our review, in developing the potential measures set out below.

## Potential measures

6.12 Drawing on our findings, we have identified five areas for potential action, aimed at improving the conditions that enable customer choice. We set these out in Table 6.1 below as proposed measures and invite views on their effectiveness, practicality and proportionality, including who is best placed to lead delivery and implementation. Subject to responses to this consultation, we envisage buyers as best placed to be the key drivers and enablers of change.

6.13 We consider that, taken together, these measures could form the basis of an industry-wide code of practice, helping to establish common expectations and support their consistent implementation across the passenger rolling stock maintenance market.

**Table 6.1 Potential measures to improve transparency, competition, and value for money in the passenger rolling stock maintenance market**

| Theme | Potential measures | Proposed leads |
|---|---|---|
| **Transparency**<br>Customers have limited transparency of charges, cost drivers and comparative performance, making it difficult to assess value for money or challenge increases. | • **Establish a standard maintenance reporting framework** for the provision of key information such as the services included, principal cost drivers, reasons for material changes, assumptions about future expenditure, and the relationship between charges, risk and performance obligations. This should be used for new procurements and phased into existing contracts where practicable.<br>• **Develop comparable cost and performance measures** to support benchmarking – this should recognise relevant differences between fleets and contracts, while avoiding disproportionate administrative burdens or disclosure of commercially sensitive information. | An appropriate industry body* to:<br>Work with buyers and suppliers to develop common reporting definitions and templates that can be adopted across the market.<br>**ORR will work with industry to identify an industry body with the appropriate independence and expertise.* |
| **Procurement and future flexibility**<br>Decisions made at fleet procurement can narrow the range of credible maintenance options later in the fleet lifecycle. | • Fleet **business cases should assess whole-life maintenance options**, including the cost and feasibility of changing provider or delivery model at appropriate lifecycle points.<br>• Use **clearer and more consistent tender information**; provide information earlier.<br>• Preserve **opportunities to test the market at appropriate lifecycle points** and **avoid terms that unnecessarily restrict future** | Buyers to:<br>Incorporate the recommended requirements (whole-life maintenance assessments, switching considerations and future flexibility considerations) into business cases, procurement |

| Theme | Potential measures | Proposed leads |
|---|---|---|
| | **changes** in provider or maintenance model. | documents and contracts. |
| **Access to technical information, software and diagnostics**<br>Uncertainty over access to technical data, maintenance records, software, diagnostics and intellectual property can prevent potential providers from assessing or delivering an alternative arrangement. | • Include in new and renewed contracts an **information-access schedule** setting out the technical data, maintenance records, software, diagnostic functionality, material specifications, approved suppliers, tooling and repair information to be provided.<br>• **Create a standard bidder information pack** and provide it at the start of market engagement. | Buyers, working with suppliers:<br>Each buyer should specify information and access requirements when procuring or renewing maintenance arrangements.<br>Suppliers:<br>OEMs, independent maintainers and other parties controlling relevant information or systems should provide the agreed information and access within defined timescales and explain any restrictions. |
| **Maintenance transition**<br>Changing provider or maintenance model can involve significant mobilisation costs, operational risk and uncertainty over responsibilities. | • Require a **clear and proportionate transition schedule** to be included in contracts, covering records and fleet histories, technical documentation, software and configuration information, continuing technical support, spares, tooling, supply-chain and depot arrangements, access to experienced personnel, allocation of | Buyers to:<br>Work with the incumbent and any new maintenance providers to include proportionate transition requirements in contracts, and review readiness sufficiently |

| Theme | Potential measures | Proposed leads |
|---|---|---|
| | responsibilities, acceptance criteria and dispute resolution.<br><br>• The buyer and incumbent provider should **review the transition plan at agreed points**, including sufficiently in advance of contract expiry to allow due diligence, mobilisation and handover. | in advance of contract expiry or transfer.<br><br>Suppliers, working with buyers:<br><br>Incumbent maintenance providers and other parties controlling essential information, assets or facilities should cooperate with the transition in accordance with agreed responsibilities and timescales. |
| **Depot arrangements**<br><br>Depot location, capacity, capability, equipment, workforce and contractual availability can constrain competition and investment. | • Fleet and maintenance strategies should include **a depot options assessment** covering current and forecast capacity, capability, equipment, workforce, access terms, investment needs and the effect of each option on bidder participation and future competition.<br><br>• Where a depot constraint would materially reduce competition, **require an action plan before procurement launch to secure access**, adapt facilities, phase investment or establish credible alternative provision. | Buyers, working with depot owners:<br><br>Buyers should assess depot requirements and constraints as part of fleet and maintenance planning.<br><br>Depot owners should provide current information on capacity, capability, access conditions and investment requirements to support effective planning and assessment of constraints. |

6.14 We welcome views on the potential measures and any supporting evidence. In particular, for each measure, we welcome views on:

- how essential the measure is for addressing the issues identified through this review, its likely effectiveness, and any changes that would make it more effective;
- its practicality and proportionality, including any implementation barriers, costs, consequences and examples of relevant good practice;
- the organisations proposed to lead delivery, the support required from others and the potential role of industry guidance and/or a code of practice;
- which of our suggested measures could improve outcomes within existing arrangements, and which are more appropriately addressed through future procurement, contract renewal, implementation of the Rolling Stock and Infrastructure Strategy or wider rail reform; and
- any alternative measures that may better address the issues.

## Next steps

6.15 Please provide responses and any additional comments or evidence by **11 December 2026** to rollingstock2026@orr.gov.uk and identify any information you consider confidential. We do not intend to publish individual responses, however responses to this interim report and further stakeholder engagement will inform our final recommendations, which we expect to publish in March 2027.

6.16 Formal competition enforcement and market-study tools remain available to us. We will consider whether stakeholder responses and subsequent engagement provide grounds for their use to help towards addressing the issues identified.

# Annex A: Analysis of costs

A.1 This annex provides further detail on our analysis of fleet-level maintenance costs.

## Descriptive analysis

A.2 We used Pounds Per Vehicle Mile (PPVM) to compare estimated costs across TSA, TSSSA and in-house fleets. PPVM is familiar to industry stakeholders and provides a common basis for comparison, but it is not a complete measure: fixed costs can make smaller or less intensively utilised fleets appear more expensive per mile. To account for this, we therefore estimated Pounds Per Vehicle (PPV) as a sensitivity check.

A.3 To keep data collection proportionate, we collected data for a single year (1 April 2024 to 31 March 2025). The dataset comprises returns from 17 TOCs covering 87 fleets and excludes TARA fleets, as their maintenance costs and contractual arrangements are not directly comparable with those of other fleets. TOCs reported contractual charges and other maintenance expenditure, including labour, spares and materials, depot costs, and other maintenance-related activities.

A.4 Some costs were not always recorded at fleet level. We therefore discussed TOCs' allocation approaches with them and, where necessary, applied reasonable and consistent assumptions to allocate costs to individual fleets. For example, where depot costs were incurred jointly across multiple fleets, we used information provided on depot usage and allocated costs in proportion to the number of vehicles in each fleet.

A.5 Our single-year (1 April 2024 to 31 March 2025) approach inevitably provides a snapshot of costs rather than capturing the full lifetime cost of maintaining a fleet. In particular, TSA contracts may smooth some heavy maintenance and overhaul costs through regular contractual payments, whereas fleets maintained in-house may incur these costs on a more intermittent basis, with expenditure varying significantly between years depending on the timing of maintenance activities. Whilst this may affect the costs observed for individual fleets, we would expect some of these effects to balance out across the wider sample.

A.6 We relied on TOCs to make best efforts to identify and allocate relevant maintenance costs, rather than undertaking a more detailed audit or verification of

submissions. Stakeholder engagement suggested that this approach may have resulted in some relevant costs being omitted from the data provided.

A.7 Given the limitations of a single year approach and the challenges associated with identifying and allocating costs across fleets, comparisons between maintenance models should be interpreted with caution.

## Regression analysis

A.8 We also used ordinary least squares (OLS) regression analysis to assess how costs vary across contract type when controlling for fleet characteristics. This analysis used the same fleet-level dataset described above, consisting of 87 fleet-level observations from a single year.

A.9 Our primary regression specification consisted of the logarithm of estimated cost (in PPVM terms) as the dependent variable. Our explanatory variables included the logarithm of vehicle mileage together with dummy variables for rolling stock category, contract type and contract iteration. We chose these variables in the light of economic reasoning and stakeholder submissions. We recognise that other variables could potentially also influence costs, for example, all else being equal, fleets comprising longer units might be expected to have lower maintenance costs per vehicle, where some maintenance activities and costs arise at unit rather than vehicle level.

A.10 To assess the consistency of our findings, we also estimated a range of alternative model specifications and robustness checks. This included varying the set of explanatory variables (i.e. adding in contract length, age and fleet size as additional variables) and restricting the sample to particular subsets of fleets (i.e. limiting the sample to include only intercity and EMU fleets). We also tested alternative specifications of maintenance arrangements, including a model that distinguished between TSA fleets in their initial contract term and TSA fleets not in their initial contract term, rather than modelling maintenance model and contract iteration as separate variables. The purpose of these checks was to examine whether the estimated relationship between maintenance model and PPVM was sensitive to modelling assumptions or sample composition. We summarise the results of our regression analysis in Table 4.2.

A.11 Whilst the regression can identify whether fleets under certain contract types are associated with systematically higher or lower maintenance costs, after controlling for observable characteristics, it cannot establish causation. Furthermore, it cannot account for factors that are not observed within the dataset (for example depot

arrangements, contractual performance requirements or other operational differences between fleets). Finally, the relatively small number of observations in some contract type and category combinations means that corresponding estimates are subject to greater uncertainty. Overall, these findings should be viewed as indicative of relationships observed in the data, rather than definitive evidence of the effect of any particular maintenance model on costs.

# Annex B: List of stakeholders

B.1 The following organisations contributed to our review by responding to our request for information and invitation to comment and/or by meeting with us.

Agility Trains
Alstom
ALLRAIL
Angel Trains
Arriva Train Care
Arriva Trains
Avanti West Coast
Beacon Rail (Eversholt)
Brodie Engineering
Buckland Rail
c2c
CAF
Chiltern Railways
CrossCountry Trains
DB Cargo UK
Department for Transport
DfT Operator Ltd
First Group
Gemini
Govia Thameslink Railway
Greater Anglia
Great Western Railway
Hitachi Rail
London North Eastern Railway
Northern Trains
Porterbrook
Railway Industry Association
ScotRail
Siemens Mobility
Southeastern
South Western Railway
Stadler Rail
TBM Rail
TransPennine Express
Transport for London
Transport for Wales
Transport UK
Swedish Transport Agency (Transportstyrelsen)
UK Rail Leasing
West Midlands Trains
Wyss & Lila

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