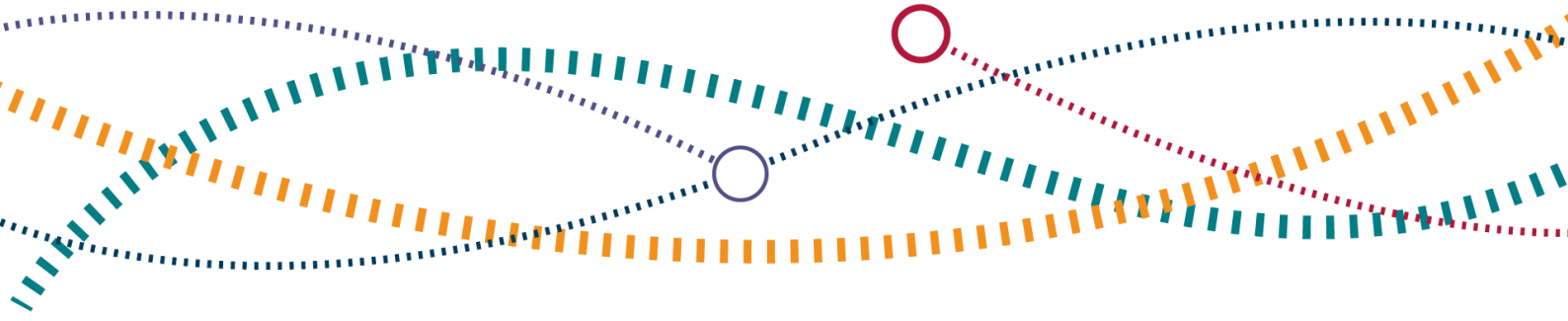
OFFICE OF RAIL AND ROAD

OTM Stoneblower – Procurement of new fleet

Targeted Assurance Review



Contents

Glossary of Terms

Abbreviation / Acronym	Description
ABP	Activity based plans.
CSI	Composite Sustainability Index. A composite measure of remaining life of a number of Network Rail's key assets.
DU	Delivery unit.
GTG	Good Track Geometry.
MDU	Maintenance Delivery Unit.
ORR	Office of Rail & Road. The independent safety and economic regulator for Britain's railways.
OTM	On-track machines.
PTG	Poor Track Geometry. A percentage representation of track that has geometry non-compliant to Network Rail standards (i.e. 'very poor' and 'super-red').
QLM	Quarterly Liaison Meeting.
RAM	Route Asset Manager / Regional Asset Manager
RF11	An annual reforecasting activity undertaken by Network Rail in period 11. Actuals versus plans are reported for maintenance and renewals delivery and the remaining years plans are reforecast.
RFI	Request for Information.
ROTME	Route On-Track Machine Engineer
RPP	Railway Planning & Performance.
SBP	Strategic Business Plan. The plans through which Network Rail sets out their strategy in the Control Period for each business area.
TAR	Targeted Assurance Review.

TME	Track Maintenance Engineer.
VTISM	Vehicle Track Interaction Strategic Model. Network Rail's whole life cost model for the vehicle – track system.

Executive Summary

Purpose

Stoneblowing machines are track geometry maintenance machines that act as an alternative to tamping and are useful in intervening where ballast has become significantly fouled and tamping no longer produces the required result.

Network Rail's existing fleet of stoneblowers are becoming life expired. Along with greater requirements highlighted within the Control Period 6 Strategic Business Plans, the decision was made to renew the existing fleet.

In the first year of Control Period 6, through our maintenance data reporting, we found that the stoneblowers were being significantly under-utilised against the proposed volumes and that the procurement of the new fleet of stoneblowers had been delayed. The immediate justification for this under-delivery was not clear; whether it was failure to plan, reliability of the machine, over-planning within the SBPs or issues with the data.

As part of our Targeted Assurance Review (TAR) programme, we decided to review the procurement of the new stoneblower fleet, also looking at associated standards and guidance, how track geometry is managed at Maintenance Delivery Units and how these activities are monitored and assured locally.

Due to the scope of the review, the findings have been split into two reports. This first report focuses on the review of the business case for the procurement of, and the implementation of the new fleet.

Objectives

The objectives of this TAR were to assure us that:

(a) A coherent business plan had been produced and approved for the investment in the new stoneblower fleet;

(b) There is sufficient accountability for the deliverables of this business plan;

(c) There is a plan for implementation for the arrival of the new fleet, relating to the business case;

(d) The impacts of any late delivery have been quantified and are actively being managed;

(e) There are appropriate training and development measures in place to ensure optimisation from the investment; and

Conclusions

From our review, we have drawn several conclusions:

- Stoneblowing provides a method of intervention that allows for deferral of renewal and restoration of track geometry where tamping is no longer effective. We recognise that ballast life has generally been deteriorating across the network, but track geometry continues to be maintained at a high level.
- The purchasing of the new fleet of stoneblowers is being done on a 'like-for-like' basis. This did not see the production of a detailed business case that would typically be required for a new investment. We found difficulty in verifying stated demand against that stated within Activity Based Plans.
- The purchase addresses the immediate business need, but we saw no evidence to suggest that this had been considered holistically within the track asset, taking into account improvements in other plant and technology since the original purchase of the fleet.
- There is evidence of the planned rollout of the new fleet of machines but no evidence to suggest that regions have plans in place for their introduction. Consequently, it is difficult to discern exactly what benefit the new fleet would bring.
- There are notable issues with the data assessed within this review. There is inconsistency across different plans and inaccuracy in the reported maintenance data. Given these issues, it is difficult to see how parts of this can be used to make meaningful decisions.

We have made three recommendations based on our findings:

Recommendation 1

Network Rail should establish a process for ensuring detailed business cases are completed for replacement fleets. These should establish the demand and requirements from the regions and understand the impact of other developments within the track or other asset areas. This process definition should be issued to us by March 2022.

Recommendation 2

Network Rail should define the minimum data quality requirements required to support business cases for the procurement of new fleets. This requirement should be incorporated into the process supporting creation of business cases.

Recommendation 3

Network Rail should re-assess the requirements for the new stoneblower fleet, ensuring that demand is accurate, that there is quantifiable benefit and is supported by effective implementation plans within the regions. This should consider the effect of the delays to delivery and provide assurance that benefit from the investment will be realised.

We will review the responses to these recommendations and the state of progress in March 2022.

The findings of this review and output of these recommendations will be used for our ongoing holding of Network Rail to account. We will test for improvements of the supporting maintenance data through our ongoing reforecast reviews. This will inform our Periodic Review 2023 assessment for Control Period 7 in ensuring greater clarity, transparency and justification within maintenance requirements and planning.

New or replacement fleets will be identified through our ongoing liaison with Network Rail and as part of our Periodic Review 2023 for Control Period 7. We will use our findings from this review to scrutinise and assure that an appropriate business case is in place for these investments.

1. Introduction

Purpose

1.1 This Targeted Assurance Review (TAR) was undertaken into Network Rail's procurement and utilisation of the On-Track Machine (OTM) stoneblower fleet from late 2020 to early 2021. The Office of Rail and Road (ORR) sought assurance that there is a coherent business plan for the procurement of the new stoneblowing fleet and that there is sufficient guidance and assurance around the management of track geometry and utilisation of on-track machines.

1.2 Given the scope of the review, the TAR is split into two reports covering;

(a) The procurement of the new fleet of OTM stoneblowers.

(b) The management of track geometry and associated OTM.

1.3 This document provides a record of the strategy, findings, analysis and recommendations for "The procurement of the new fleet of OTM stoneblowers". The TAR was based on responses to requests for information (RFI), as well as supplementary meetings with key personnel.

Background

1.4 The ORR's Railway Planning & Performance (RPP) directorate is responsible for the monitoring and holding to account of Network Rail for the delivery of its outputs and obligations set out in the Periodic Reviews.

1.5 OTM activity is reported through Network Rail's maintenance data. As part of the Periodic Review 2018 (PR18), Network Rail submitted 'Activity Based Plans' (ABP), which forecasts maintenance activities broken down by job codes. Based on required volumes inputted by the routes, the tool calculates 'Time on Tools' (TOT) hours and labour costs from a normalised activity time and a local labour rate. This is completed for each of the Delivery Units.

1.6 The ABP is reviewed and updated on an annual basis to match volumes achieved and any variations in maintenance volume. This is typically shared annually with the ORR at Reforecast Period 11 (RF11), in preparation for the release of the updated Delivery Plans at the end of the financial year.

1.7 Network Rail report against these planned volumes throughout the financial year.

1.8 In our review of the 2019/20 RF11 ABP submissions, we noted that there was a planned significant increase in the amount of stoneblowing volume nationally going into CP6, as can be seen in Figure 1.1 and 1.2 below. An abnormal spike was noted in North West and Central in 2018-19; this looked to be due to underlying data issues but was not justified otherwise.

Figure 1.1 MNT005 – Stoneblown Track using OTM, 2019-20 RF11 Activity Based Plans

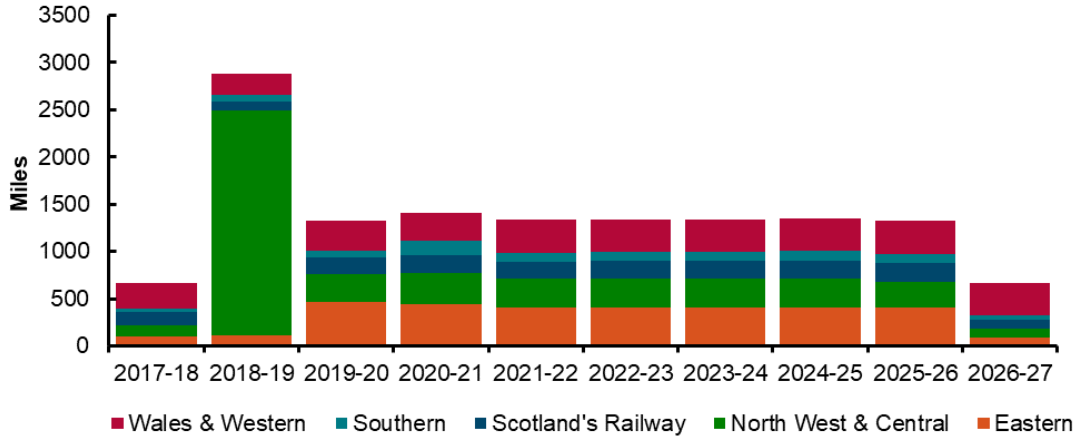
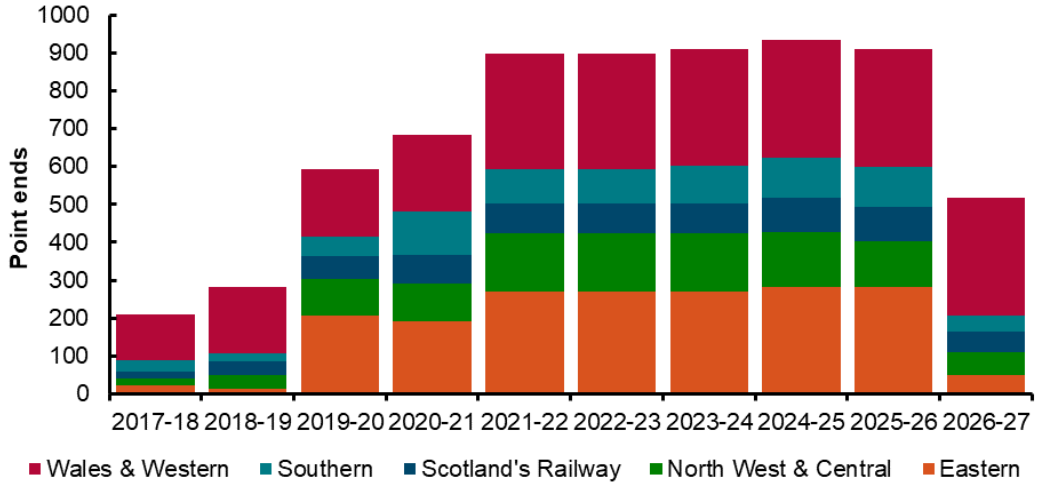


Figure 1.2 MNT124 – Stoneblown S&C using OTM, 2019-20 RF11 Activity Based Plans



1.9 Network Rail reported against its year-to-date maintenance delivery in the 2019/20 RF11 submission. These are shown in Figures 1.3 and 1.4 below. It was noted that accomplished volume was significantly less than planned. The justification for

this is unclear – whether it was underutilisation, under-delivery on site, issues with the underlying data or any other potential reason.

Figure 1.3 MNT005 – Stoneblown Track using OTM, Maintenance Volumes Report 2019-20 P11

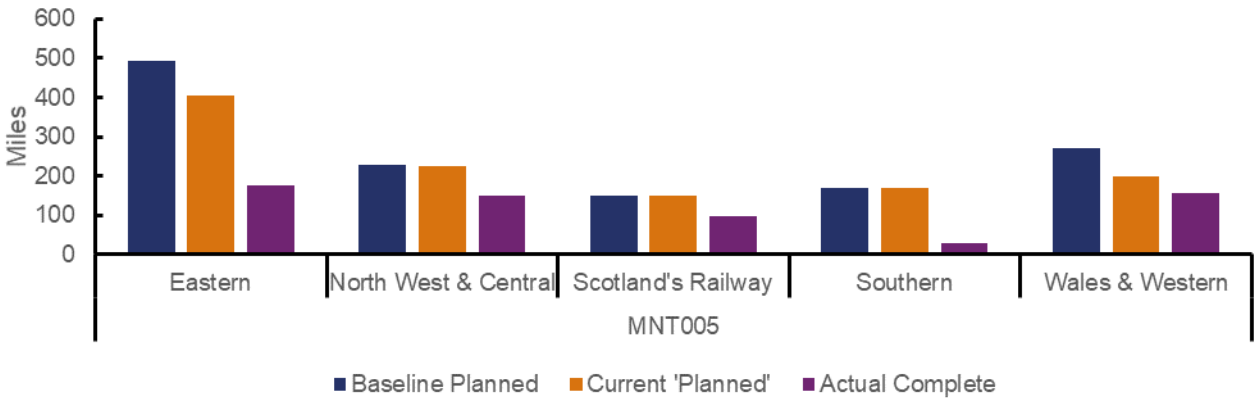
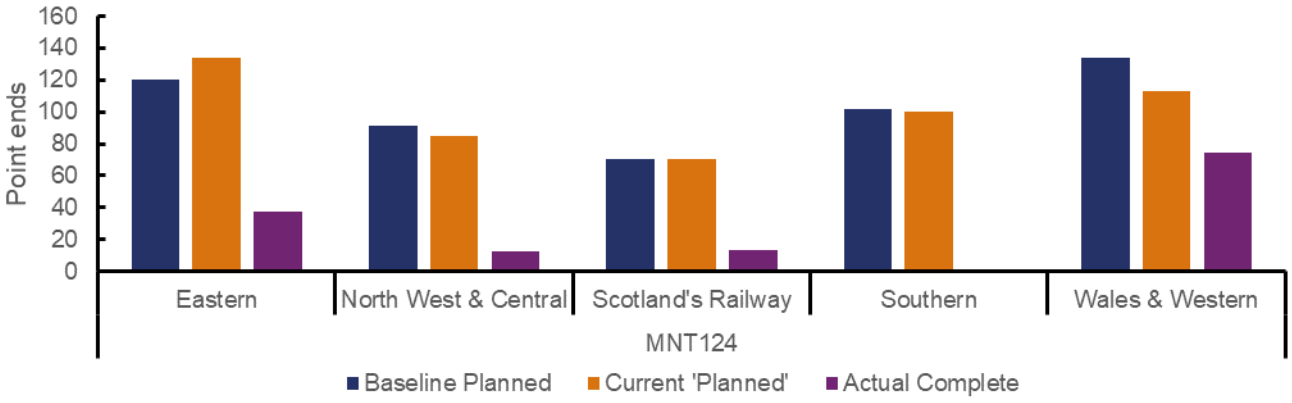


Figure 1.4 MNT124 – Stoneblown S&C using OTM, Maintenance Volumes Report 2019-20 P11



1.10 Through our ongoing liaison meetings with the Fleet Engineering team in Network Rail, we were also aware that Network Rail had begun the process to procure a new fleet of stoneblowers. Phased over several years, this would replace the existing fleet. However, this was also noted to be delayed.

1.11 We are aware of history within Network Rail of procuring yellow plant that has not subsequently achieved its desired utilisation. There is notable variation across the regions in terms of planned and actual use of tampers and stoneblowers, without any immediate justification. Consequently, we sought assurance that:

(a) A coherent business plan had been produced and approved for the investment in the new stoneblower fleet;

(b) There is sufficient accountability for the deliverables of this business plan;

(c) There is a plan for implementation for the arrival of the new fleet, relating to the business case;

(d) The impacts of any late delivery have been quantified and are actively being managed; and

(e) There are appropriate training and development measures in place to ensure optimisation from the investment.

Approach

1.12 Our approach was to create and distribute a set of questionnaires addressing the issues described in 1.11. To increase clarity, the responses were followed up by meeting with key individuals.

1.13 A review of information submitted through PR18 and Delivery Plan submissions, (including asset policies, cost & volume data) informed our approach.

1.14 An RFI was sent to both the Technical Authority and Route Services. This sought information on:

- Details of success criteria, productivity and reliability data for OTM activities;
- Associated business case for the procurement of the new fleet;
- Factors for cost variance between different machines; and
- Implementation plans for new machines / technology.

2. Findings

Desktop Study

CP6 Track Asset Policy

2.1 The CP6 Track Asset Policy sets out tamping and stoneblowing activities as the two primary means of managing track geometry by the effective reset of short-term ballast settlement.

2.2 Each type of machine is targeted based on site conditions.

(a) **Tamping** is the preferred method of track geometry maintenance and operates by lifting the track to its desired position and then packing ballast beneath the sleeper. Whilst tamping can re-align track to a high degree of accuracy, as the underlying ballast breaks down and becomes more fouled it becomes difficult to achieve a high quality and long-lasting result. Continued tamping will contribute to the deterioration of the track as ballast will be crushed when packed.

(b) **Stoneblowing** is an alternative to tamping. This process operates by lifting the track and blowing stone chippings underneath the sleeper. Further settlement will then occur under traffic. Stoneblowing is typically used where the ballast is significantly fouled and tamping no longer produces the required results.

2.3 The asset policy notes the interaction of on-track machines with the Vehicle Track Integration Strategic Model (VTISM). VTISM is a modelling tool, used for scenario modelling. Parts of the model are derived from the geometry data from the track quality database, combined with the tamping and stoneblowing records from Ellipse.

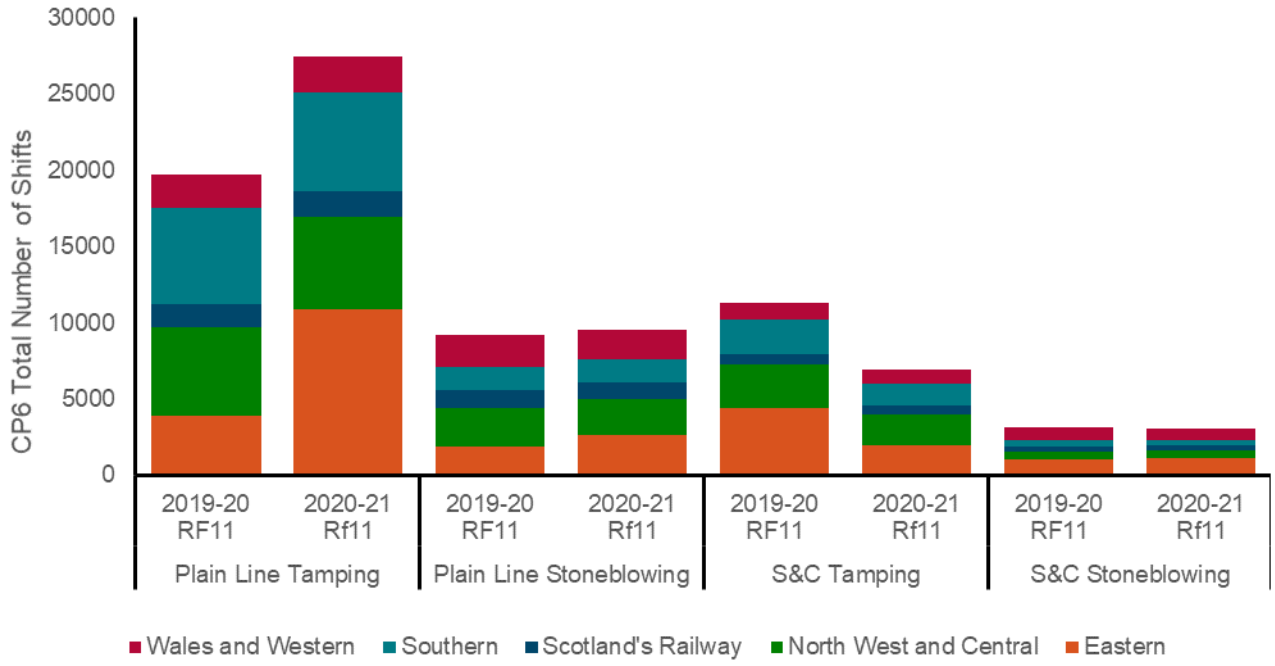
2.4 CP6 modelled volumes of tamping and stoneblowing varied depending on the various funding scenarios. Lower ballast renewal would necessitate higher levels of tamping and stoneblowing to maintain track condition. However, it was recognised that this would not be sustainable in the long run.

2.5 The policy highlights a desired shift towards more pro-active maintenance. This would requisite more targeted and higher quality tamping and stoneblowing, which would be facilitated by better asset information and access to decision support tools for the teams.

Activity Based Plans

2.6 In addition to plans submitted by each route, there is a plan produced for the allocation of plant across the network, detailing numbers of shifts per DU, the proposed volumes and associated costs. The 'Plant ABP' submitted at 2019/20 RF11 was analysed as part of the desktop study. This has been subsequently updated to the 2020/21 RF11 figures. Figure 2.1 below shows the numbers of shifts for each machine, across the different regions.

Figure 2.1 Number of shifts of plain line tamping & stoneblowing and S&C tamping and stoneblowing, 2019-20 RF11 Plant ABP and 2020-21 RF11 Plant ABP



2.7 Between the submissions, there was a substantial change in numbers of shifts for 'Plain Line Tamping' and 'S&C Tamping' across CP6.

(a) For plain line tamping, this is primarily due to changes in number of shifts against Eastern. However, it is noted within the 19/20 RF11 submission that no activity was allocated against the 'North East' route DUs, with York and Middlesborough DU missing entirely.

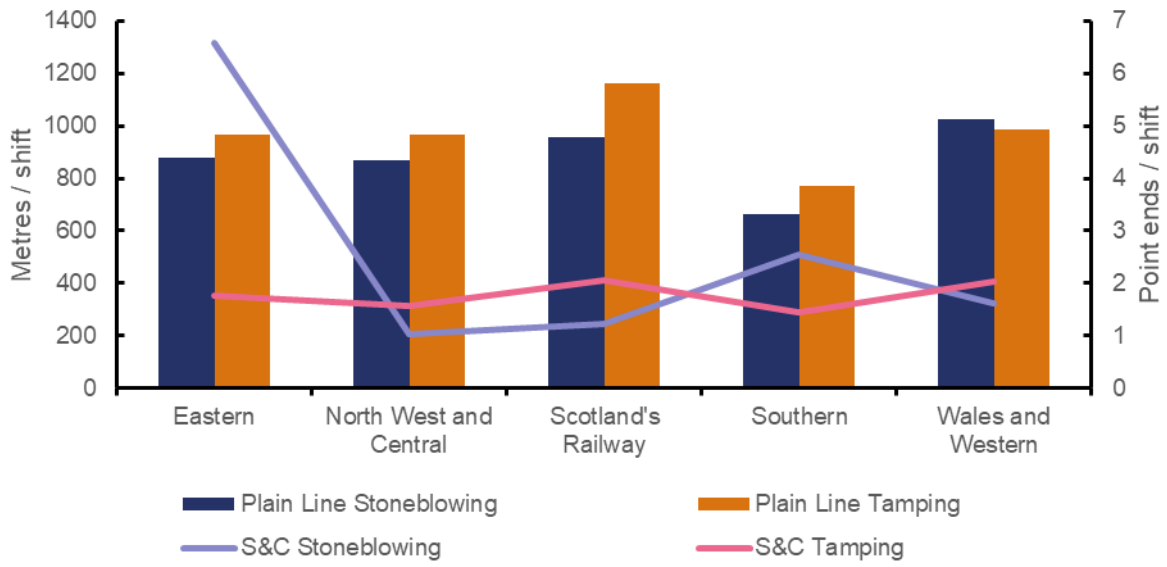
(b) Projected numbers of planned shifts for S&C tamping in the Control Period decreased across all regions between submissions. This was accompanied

by a significant reduction in planned volume. It was unclear from the documentation assessed what the justification was for this.

Observation 01 – Network Rail should clarify the significant reduction in numbers of planned S&C tamping shifts. It is unclear whether there was sufficient capacity to undertake the original planned numbers, whether there is now significant under-utilisation or if there are errors in the submissions.

2.8 Using the 2020-21 RF11 ABP Plant data, we assessed the approximate production rate of the machines by dividing the CP6 planned volume by number of planned shifts. This is shown in Figure 2.2 below.

Figure 2.2 Average CP6 volume per shift rates, 2020-21 Plant ABP

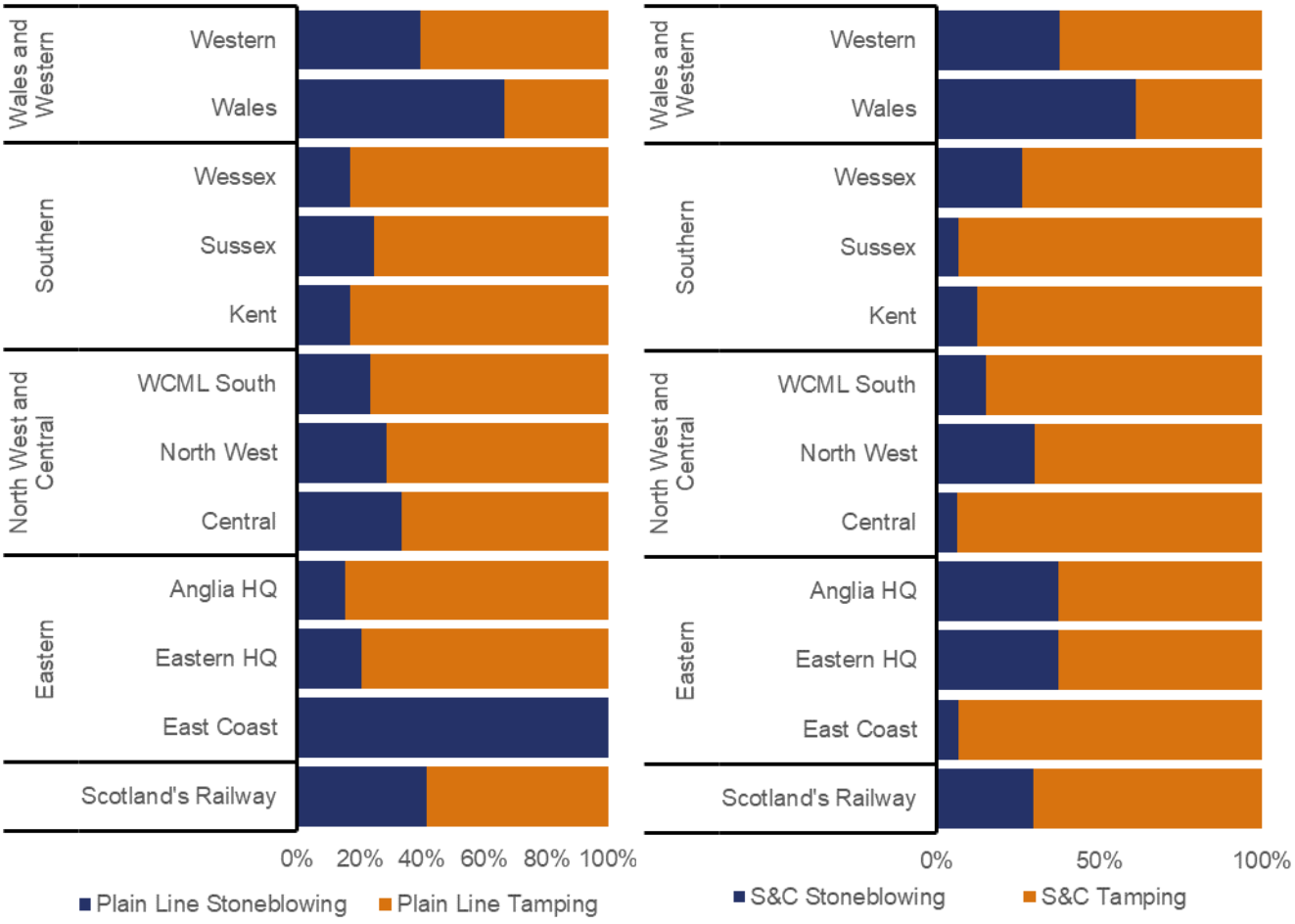


2.9 Average planned shift rates for both plain line tamping and stoneblowing were broadly similar, with tamping displaying a slightly higher volume output on average. S&C treatment volumes were also broadly similar though the average volume displayed for S&C stoneblowing in Eastern looked to be erroneous with an average of over 6-point ends treated per shift. This appeared to be driven by Anglia's plans which displayed very high volumes in this area.

Observation 02 – The volume per shift for S&C Stoneblowing was found to be very high, particularly for Eastern region. It is unclear whether Eastern's volumes are incorrect or if there are sufficient shifts to meet demand.

2.10 A proportional comparison of numbers of shifts for similar asset interventions (tamping versus stoneblowing for both plain line and S&C) was undertaken. This can be found, broken down by routes, in Figure 2.3 below. There are expected variations due to different track categories and conditions. This led us to consider whether there is consistency in approach for specification of type of intervention, whether there is sufficient machine availability or if there is more local opinion driving decisions.

Figure 2.3 Percentage comparison of tamping versus stoneblowing for plain line and S&C activities for 2020-21 to 2023-24, 2020-21 Plant ABP



Note: This covers the final four years of CP6 only (FY21 – FY24). Eastern manage their OTM requirements centrally (shown as 'Eastern HQ' and 'Anglia HQ' on the figures above). East Coast route have an additional allocation in the final two years of CP6 and so are shown above. It is unclear why this allocation is shown for the final two years only.

2.11 The Plant ABP, along with the East Coast and North East route's ABP, indicate that plain line tamping will be undertaken by S&C tampers. It is apparent that they have allocated miles of plain line tamped to the S&C point ends tamped code (MNT007).

Observation 03 – Whilst recognising that S&C machines may additionally complete plain line volume, DUs should capture the relevant volume against the appropriate maintenance code.

2.12 'FY21 RF11 ABP Volumes – Actual vs Plan' was submitted by Network Rail in February 2021 as part of the 2020/21 RF11 submission. This was analysed to understand current performance against plan and check for data quality, which has been raised as an issue previously. There was noted improvement in the recent submission around in-built assurance and quality of the data, compared to those received in the past. However, significant discrepancies were still noted, such as 5861.9 miles of plain line stoneblowing being reported in Cardiff DU, against a planned volume of 31.77 miles.

Observation 04 – Significant errors were found within the maintenance data reviewed. These conflate the volumes at the region and national level and cause difficulty in ensuring that planned levels of activities are being adhered to.

2.13 A direct comparison of the stoneblowing volumes was undertaken of the most recent submitted Plant ABP and the DU ABPs. We recognise that these volumes are derived from different sources but expect them to be broadly similar. These have been presented in Figure 2.4 below.

Figure 2.4 Comparison between Plant and DU ABP plain line stoneblowing volumes, 2020-21 Plant ABP and 2020-21 ABP (Consolidated DUs)

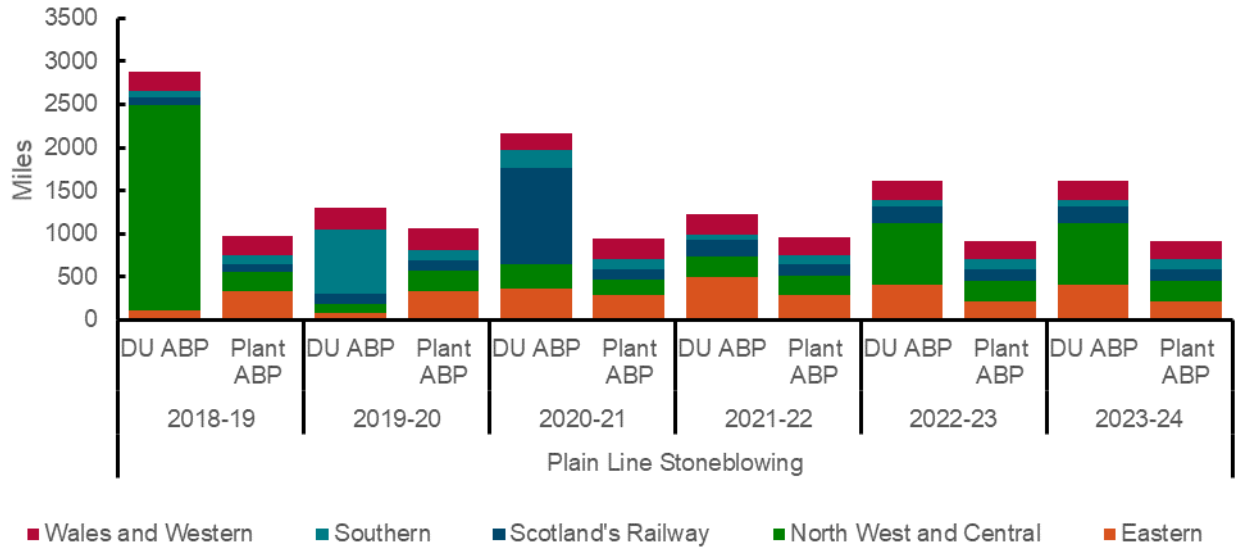
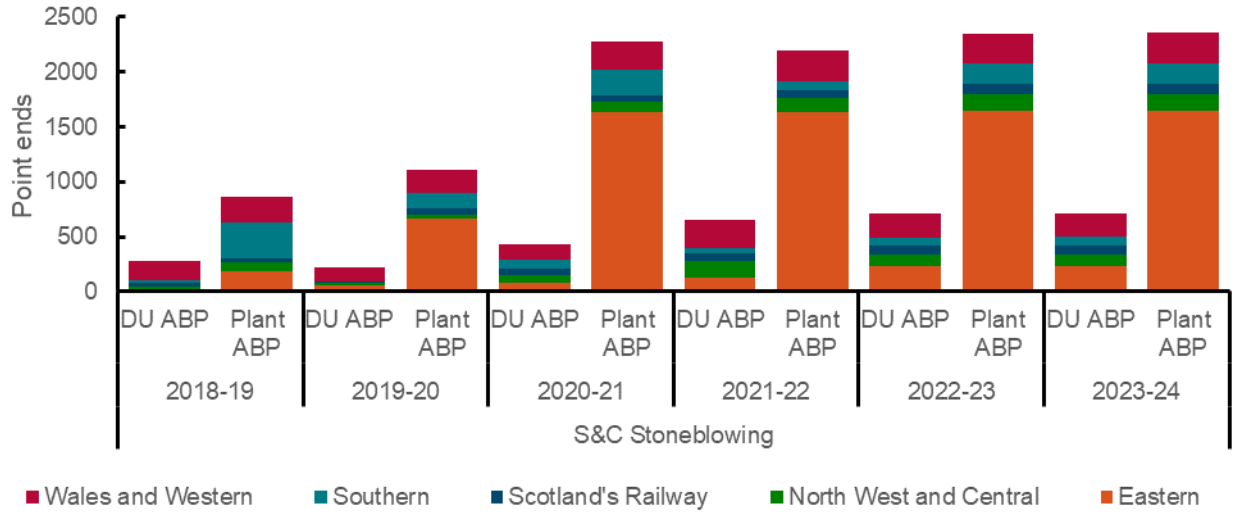


Figure 2.5 Comparison between Plant and DU ABP S&C stoneblowing volumes, 2020-21 Plant ABP and 2020-21 ABP (Consolidated DUs)



2.14 Substantial variations were noted between these two datasets. This may be due to underlying errors in the datasets. For example, within plain line activity, there were several incredibly large volumes inputted (i.e. 1791 miles for one DU in FY19 and 1044 miles for another in FY21), that have led to inflated volumes. Within S&C, the significant volumes are down to Anglia within Eastern.

2.15 Volumes within the DU and Plant ABPs for stoneblowing activities are captured as two different units; the DU ABP captures in miles and the Plant ABP captures in yards. All volumes were converted to miles to allow for comparison.

Observation 05 – Volumes that should align within the different ABPs are captured in different units and so do allow immediate comparison and may lead to data errors due to inconsistency. These should be sought to be made consistent with one another in the future.

Ballast Life and Track Quality

2.16 The annual return is the primary means by which Network Rail report progress in delivering outputs established in the last periodic review and it provides an important reference for stakeholders. The Annual Return reports on several key metrics that relate to the management of their assets. (Annual return - Network Rail)

2.17 Asset sustainability is calculated on an annual basis. For track, this is broken down into several key components: rails, sleepers, ballast and switches & crossings. The metric takes the form of "% used life", so increasing numbers indicate a degrading asset and vice versa. The following table shows the change in ballast '% used life' over time. Graphs for each region can be found in Appendix 02. Due to the changes in organisation structure, the historical route information was taken from the 2018/19 Annual Return.

Figure 2.6 % Used Life – Ballast, 'Network Rail Infrastructure Limited – Annual Return 2020 – data tables' and 'Annual Return 2019 – data tables'

Route	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Network-wide	49.5%	49.2%	49.5%	50.3%	51.6%	**52.4%**
Eastern						**51.4%**
Anglia	49.5%	48.6%	48.2%	49.2%	49.6%	
East Midlands	43.9%	44.0%	44.6%	45.6%	47.2%	
LNE	51.2%	50.5%	50.2%	51.1%	52.7%	
North West & Central	42.0%	42.2%	42.9%	44.7%	46.2%	**47.1%**

Route	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Scotland	55.5%	54.5%	54.0%	53.5%	54.7%	**55.0%**
Southern						**60.9%**
Kent	54.6%	55.3%	56.5%	57.3%	58.3%	
Sussex	60.7%	61.7%	61.5%	62.1%	63.5%	
Wessex	54.1%	54.4%	55.3%	56.6%	58.3%	
Wales & Western						**50.8%**
Wales	53.6%	53.2%	53.5%	54.0%	56.2%	
Western	44.2%	43.9%	44.4%	44.9%	45.5%	

2.18 Barring Scotland, all routes have seen an increasing % used life of their ballast over time. All the route constituents of Southern are noted to have a high % used life of their ballast, with Sussex top nationally. Wales and Scotland also show high % used life ballast. However, the criticality of routes affects maintenance and renewal interventions and with a lower average criticality, it is expected for Wales and Scotland to have higher % used life in general.

2.19 Good Track Geometry (GTG) and Poor Track Geometry (PTG) are high level metrics that look at the percentage of track that fits into different bandings. They are useful in assessing long term trends, as well as the impact of events, such as seasonal changes. They provide a view of how well Network Rail are managing their track geometry at a high level, and by association, the effectiveness of their OTM planning and utilisation. These are reported on via Network Rail's Annual Return and data is also made available to ORR on a periodic basis.

2.20 Long term trends for both GTG and PTG can be found in Appendix 03. These show a positive picture over time and that track geometry is being maintained at near 'best-ever' levels. The effect of hot weather periods can also clearly be seen.

RFI – Technical Authority & Route Services

2.21 Following our desktop analysis, an RFI was sent to the Network Technical Head of Track in Network Rail's Technical Authority and the Director of Fleet and

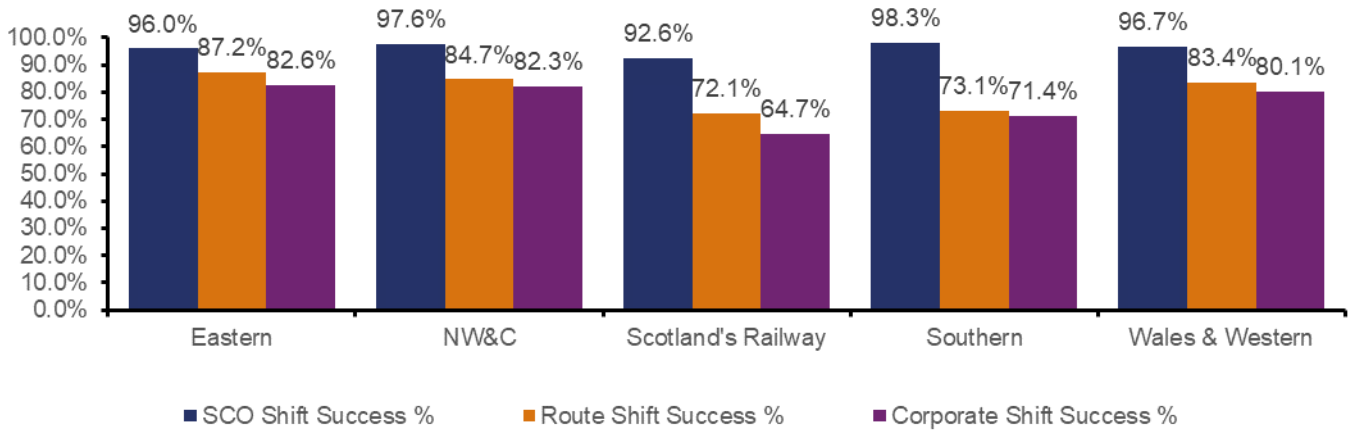
Engineering in the Route Services directorate. The themes of the RFI and responses have been summarised below.

Success criteria and quality management

2.22 Machine data sheets were shared, with a detailed breakdown of capability of each machine. This also detailed the contracted outputs, which for tampers are broken down by quality of track, whether third rail was present or if it is a '1st run'. In addition, S&C machines had varying outputs depending on the size of the switch being treated. Stoneblower rates were made based on quantity of chippings being injected (2t/km for 'Good Track' and 6t/km for 'Medium Track'), with a flat 10% reduction assumed for third rail sites. It was noted that the rates of the MPSB were approximately 10-25% lower, based on the required level of intervention, compared to the plain line machines.

2.23 Reliability of output from the various OTMs was also highlighted to be monitored through the Track Maintenance Engineer (TME) Track Quality reviews along with the Route On-Track Machine Engineer (ROTME). Route Services monitor the reliability and availability of all Network Rail owned OTM types utilising a PowerBi dashboard. Daily Work Return (DWR) records are captured centrally and monitored for any shortfalls and required attribution. The data for the stoneblower fleet for 2019-20 was shared. 'Shift success' is displayed in Figure 3.7 below – this is broken down by Supply Chain Operations (SCO) success, route success and an overall corporate success.

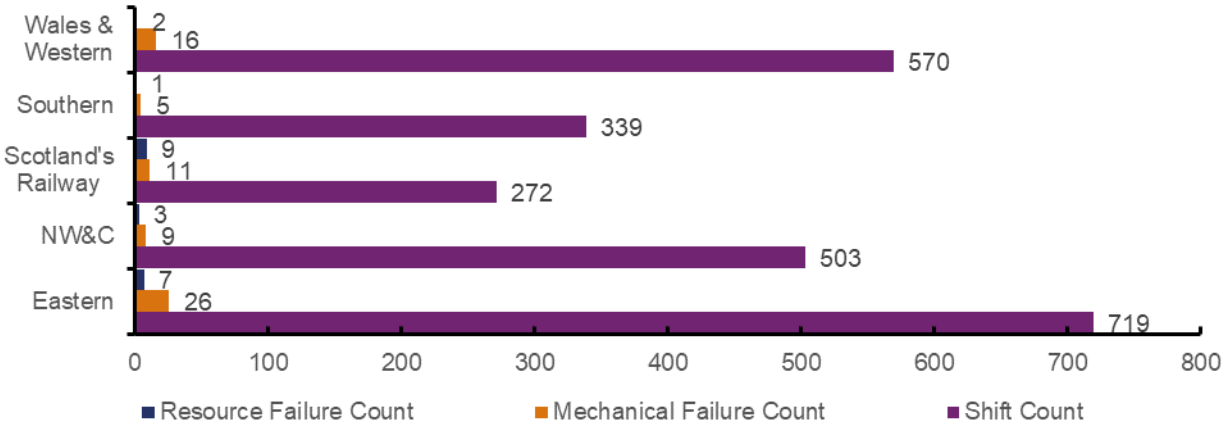
Figure 2.7 % Shift Success, Network Rail Daily Work Return records



2.24 Figure 3.8 shows the count of mechanical and resource failures against total numbers of shifts in 2019-20. Whilst the data shows a slight reduction in

availability and reliability of the stoneblower fleet, it does not currently demonstrate particular cause for concern.

Figure 2.8 Numbers of stoneblower shifts and 'failure' count by region, Network Rail Daily Work Return records



On-track machine planning

2.25 Various factors were highlighted around driving the differences in price per shift. These included:

(a) Depreciated value of machines (tampers)

(b) Size of crews required to operate the machines;

(c) Geographic area required to cover, which in turn drives requirement for larger pools of staff with greater route knowledge and learning;

(d) Consumption rates of fuel;

(e) Utilisation of machine & how many shifts have been purchased per machine;

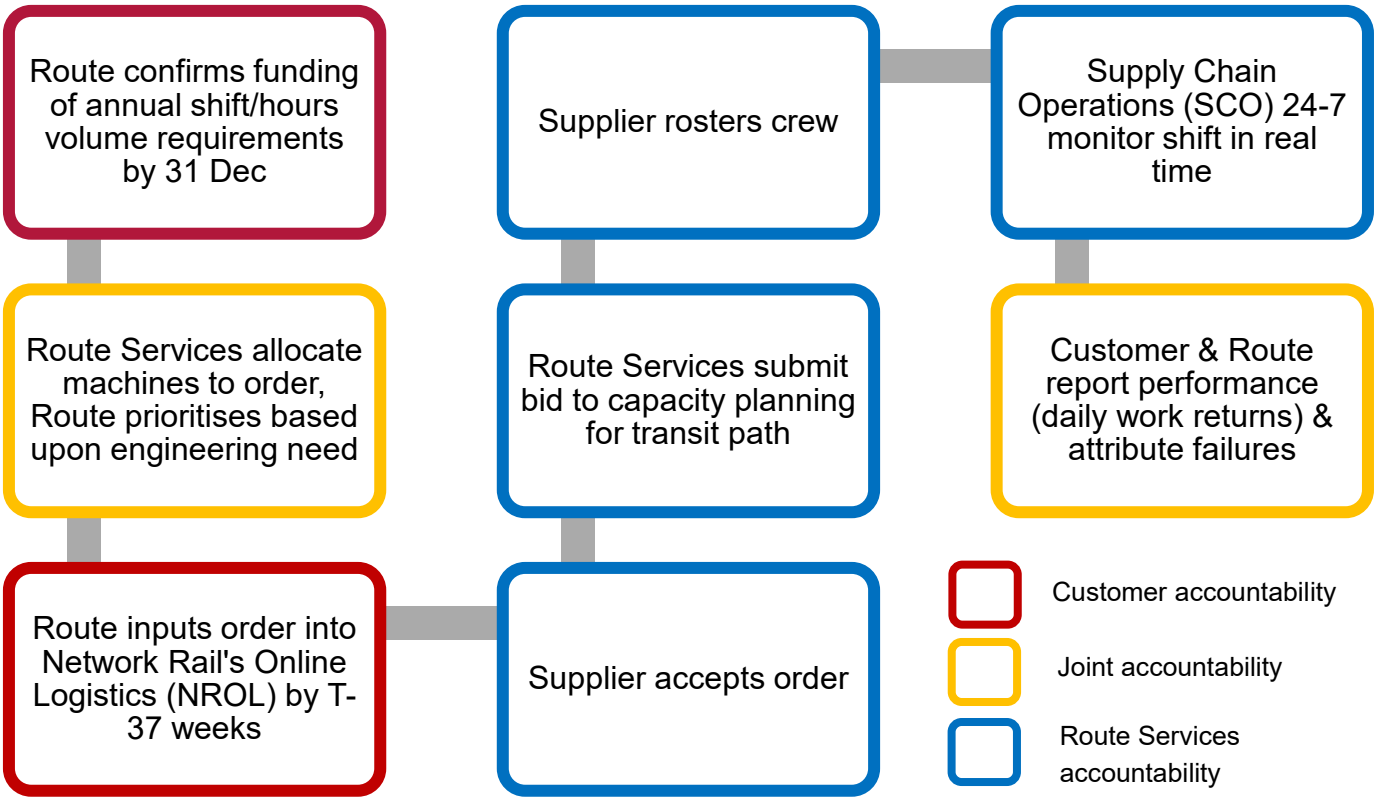
(f) How many transits ('non-productive' shifts) are undertaken; and

(g) Depot space and number of staff required to maintain the machine.

2.26 Due to the constrained resource of S&C stoneblowers, little consideration is required around variations in price between the multipurpose and plain line machines. Tampers are assigned based on requirements and site conditions. Prices per shift are based on averaged rates, determined by Route Services in their charging model. The cost per tamping shift to the end user does not vary by type. Planners will allocate the most suitable machine to the job.

2.27 A breakdown of the process for planning of OTM within regions was shared by Route Services and is summarised in the provided Figure 3.7 below. The Customer refers to the end user in this instance.

Figure 2.9 Planning process for On-Track Machines, Network Rail Route Services RFI response



Business case for new stoneblower fleet

2.28 The business case for the procurement of the new machines was requested as part of our review. Initially, investment papers were shared which were requesting the authority to procure an additional four machines, on top of the seven already authorised. This would replace the four remaining plain line machines.

2.29 Justification was based on:

- Current fleet reaching end of economic life and not meeting customer satisfaction with current levels of reliability;

- The existing machines being delivered in 2003/2004 and therefore would be reaching approximately 20 years old by time of the proposed renewal. The machines have a guaranteed main frame fatigue life of 15 years, but are expected to reach 19-20 years before suffering major issues;
- The existing fleet being based on electronics and control systems from the early 1990s and now suffering from obsolescence type issues; and
- CP6 Strategic Business Plans showing significant increase in stoneblowing demand and requiring a fleet of 14 to deliver the demand.

2.30 The lack of presentation of a formal business case was raised in follow up correspondence. It was highlighted that the main requirement for the renewal of plant is to demonstrate the cost of replacement is affordable and there is effective demand to show the plant will be utilised. Additionally, it was raised that correspondence was held with ORR during PR18 which assessed this investment and had reached the conclusion that they were effectively replacements for what was already owned, but with higher capability. As such, it was deemed that there was no requirement for a specific business plan, as if it were a new piece of plant. It was requested that this correspondence was shared.

2.31 Responses to ORR's 'deep dive' follow-up questions into Wheeled Plant for PR18 was shared (dated 16th February 2018). Two questions related to the procurement of the new fleet:

(a) *'Worked example of cost comparison between maintaining life expired plant and purchasing new'*

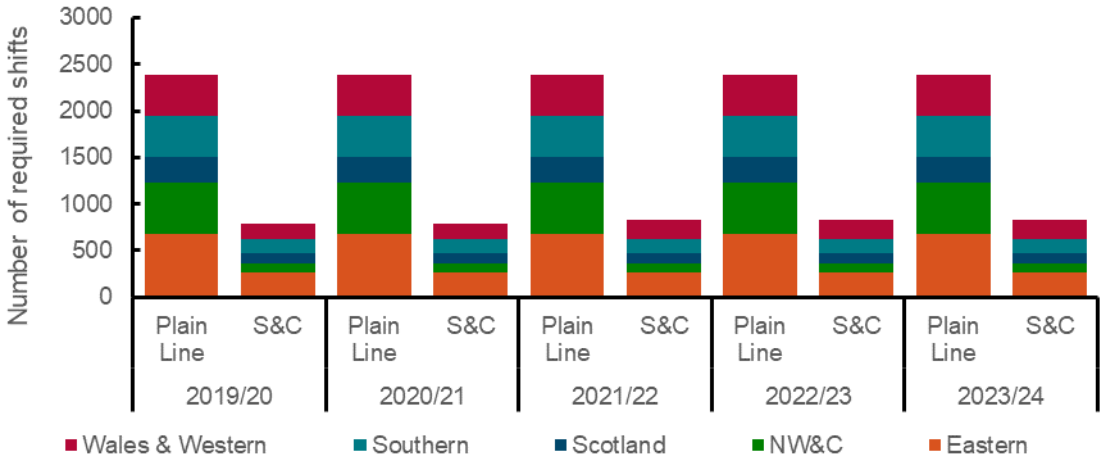
This detailed the issue with the existing fleet of stoneblowers and options to overhaul versus purchasing new. The overhaul option was suggested to require extensive work, which would include updating control & warning systems, new rail vehicle bogies and drive systems, re-wiring and re-hosing, with additional works to maintain reliability and compliance. It was thought this would only extend the asset life by approximately seven years, based on the life of the vehicle's mainframe.

A graph displaying the cost comparison between overhaul and renewal was also shown. This suggested that, whilst renewal costs would be higher than overhaul, the associated life costs would be even by 2029/30, with renewal proving cheaper from then on.

(b) *'Planned stoneblowing volumes through CP6 by year (including detail of planned fleet increases)'*

The CP6 stoneblowing demand from the routes was provided, with numbers of shifts for both plain line and S&C. These are shown in Figure 2.8 below.

Figure 2.10 Required shifts for plain line and S&C stoneblowing, Network Rail response to ORR PR18 Deep Dive



This showed a requirement of approximately 2400 plain line shifts and 800 S&C shifts per year. It highlighted that the existing multipurpose fleet only had capacity for approximately 700 shifts per year and with the plan at the time, would not be able to meet demand until 2021/22 when the new machines would start to be introduced.

Observation 06 – The demand of shift numbers for both plain line and S&C provided in the response to the PR18 deep dive vary substantially from the requirements noted within the ABPs (see Figure 2.1). The ABPs highlight a requirement for 1800-2000 shifts plain line shifts per year, whilst the response states approximately 2400 required. 800 S&C shifts were highlighted as required per year whilst the ABP fluctuates around 600 per year.

2.32 A slide deck that was presented to the National Supply Chain Panel in October 2015 for the original investment into the machines was also provided. This detailed:

(a) The current in-service fleet, split of plain line/MPSB and allocation across the network.

(b) Some of the benefits that can be achieved through these machines, particularly within S&C management. The traces of several interventions

were shown to restore the geometry of problematic S&C to the best levels it had seen in a length of time and the savings from being able to defer associated renewals.

(c) Discussions with RAM stakeholders through the Track Leadership Group, where endorsement was received. This suggested that 7 new machines was a good 'starting point' for resource levels.

(d) Commercial options. Looking at options to overhaul versus renew the machines, whether to lease or buy and expected budgets.

Observation 07 – Whilst this presentation presents the benefit from the machines, it does not evidence the decision around requirements.

Introduction plans for new stoneblowing fleet

2.33 A deployment plan for the introduction of the new OTM stoneblowing fleet was shared. This displayed the indicative roll-out of each of the machines across each of the regions. Roll-out was scheduled to commence from April 2021, with approximately 2-3 months between each machine being introduced. Eastern region would be the first to receive their allotted machines. The plan was based on current underwritten volumes from the routes and was subject to change depending on variances of these volumes at a later date.

2.34 Training requirements for the operators & maintainers of the new equipment were noted and underwritten within the contracts for the new machines. No training was highlighted as being required for the customers as the planning and on-site management requirements were to be unchanged. Technical planning would be undertaken by the Route Services team.

2.35 Delays of approximately a year to the introduction of the new fleet were highlighted through the Fleet Quarterly Liaison Meeting (QLM) forum. This had been notified to each of the ROTMEs through the 2021 calendar year planning. Potential repercussions were noted around an increased requirement to undertake S&C maintenance in midweek blocks, opposed to weekends, which can be less efficient. Routes that had also been planning to switch S&C units to stoneblowing would also have to continue maintenance via tamping.

RFI – Network Rail regions

2.36 Following on from the engagement with the Technical Authority and Route Services directorate, an RFI was distributed to selected Network Rail regions.

Whilst this primarily covered Track Geometry management (which is not covered in this report), we sought to understand the changes in OTM demand, the noted under-delivery in first years of CP6, the introduction of the new fleet and any impact of delays.

2.37 The following routes were selected;

- Kent and Sussex routes (Southern region)
- Wales route (Wales and Western region)
- Scotland route (Scotland's Railway)

The RFI was sent to the relevant Route Asset Manager (Track).

2.38 The themes of the questions and responses have been summarised below.

Investment decision making

2.39 Responses around establishing the Control Period maintenance volumes varied. Scotland's initial volumes were proposed to be around sustainability and criticality modelling, which were then checked by the ROTME and TME against previous planned and delivered volumes. Southern's response focussed more on previous years deliverables, looking at opportunities, resources and available plant with consideration given to the machine's output.

2.40 Little evidence of how ballast condition influenced OTM requirements was provided. Overall condition was highlighted to through TME and Section Manager inspections, in tandem with frequency track geometry reviews. Ballast fouling index was also highlighted as a measure of monitoring condition, but it was unclear of the suitability or governance around this. Wales detailed monitoring through track quality deterioration rates and associated predictions of quality. This would drive the timeline for intervention.

Success criteria and quality management

2.41 Regions were challenged on their achieved volumes of plain line and S&C stoneblowing in 2019/20, as detailed in Section 2.9 above.

2.42 Scotland highlighted an increasing trend of reliability issues with the existing fleet of stoneblowers. The 'planned/actual' volumes presented were challenged by both Scotland and Wales. Different planned/actuals than those previously reported were provided, which whilst still below target were much more favourable. This

was suggested to potentially be due to variances in Ellipse that may stem from a lag in reporting.

2.43 South East route reported the primary factors for shortfall for all OTMs in 2020/21 in their submission. The top five issues, which constitute 90% of the lost volume are noted below:

(a) Insufficient time

(b) Machine unavailable

(c) Weather

(d) Site not prepped

(e) Site conditions

Implementation plan

2.44 Enquiries were made to the regions around the implementation of the new fleet of stoneblowers. This included how sighted the regions were of the business case, whether their needs had been accurately captured and what the effect was of the delay in delivery. We also queried the perceived value of the new fleet to the regions and how it would affect future asset management plans, particularly around the enhanced capability to treat S&C.

2.45 Visibility of the business case varied across regions. Most regions were well sighted on the business case and had fed in their initial and ongoing requirements from a RAM perspective. Wales highlighted that they had been less sighted of the business case and were unclear whether needs had been captured, though they were content that a better balance of tampers and stoneblowers had been achieved in CP6. This was due to both RAM and ROTME taking up post following the production of the initial business case.

2.46 Effect of delay in delivery of the machines focussed on the reliability of the existing machines. Delay in delivery was said to be offset by the continued availability of the existing fleet.

2.47 Benefit of the new machines was expected to come from improved output, quality and reliability. More flexibility around S&C treatment was noted, particularly in Southern with timber layouts on poor ballast. The machines were highlighted to allow a greater degree of maintenance for existing poor assets to allow for better prioritisation of renewals. Ability to reduce manual intervention and removing staff

from the railway was also noted. Wales did not state their perceived benefit due to lack of sight on the original business case by the current RAM team but noted it would have been captured at the time. Wales highlighted a shift to utilisation of the MPSB in treatment of S&C several years ago.

2.48 As noted in Section 2.8, the review of the ABP noted increases in planned volumes of stoneblowing going into CP6. Information was sought on the justification behind this, what level of planning it entailed and how often the plan was reviewed and recalibrated.

2.49 The increase in volumes were attributed to the perceived benefit that stoneblowing brought, around being able to hold sites effectively and offsetting the continued degradation of ballast nationally. Southern highlighted that these increases in output would be achieved by better planning, changes in the rulebook allowing for more efficient possession management and refined targeting of deployment from better data management.

2.50 Each region highlighted that the ongoing maintenance programme was live, frequently reviewed and would fluctuate depending on renewals plans / site deterioration.

3. Conclusions

3.1 From review of the submitted material and meetings held, we have drawn several conclusions relating to the procurement and utilisation of OTM stoneblowers. At a high level, we have come to the following conclusions:

(a) The stoneblower fleet provides a method of intervention to Network Rail and allows for deferral of renewal and restoration of track geometry where tamping is no longer effective. We recognise that ballast life has generally been deteriorating across the network, but track geometry continues to be maintained at a high level.

(b) The purchasing of the new fleet of stoneblowers is being done on a near 'like-for-like' basis. This is based on the existing machines coming to the end of their operational life and the suggested increase in demand from the regions. This did not see the production of a detailed business case that would be typically required for a new investment. However, we found difficulty in demonstrating the true demand from the information at our disposal. As such, we were unable to verify that the proposed quantity of machines was accurate.

(c) That there are several other developments within the track system that may influence the future requirement of the stoneblower fleet but we did not see any evidence to suggest that this was considered holistically.

(d) That there is evidence of the planned rollout of the new fleet of machines but no evidence to suggest that regions have plans in place for their introduction. Consequently, it is difficult to discern exactly what benefit the new fleet would bring.

(e) There are issues with the data assessed within this review. Whilst there is ongoing work to improve the accuracy of the reporting of maintenance volumes taken from Ellipse, we found significant variations between ABPs and planned/actuals that were not substantiated.

3.2 Specifically relating to the themes identified within the scope of our review, we have made the following conclusions:

Capital investment decision making

3.3 We found the decision to replace the existing fleet of stoneblowers to be a ‘like-for-like’ basis.

3.4 We saw some evidence in the benefits that the fleet of stoneblowers brings, around managing track geometry where tamping is no longer fit for purpose and allowing deferral of associated renewals. This was of particular interest for S&C, which would be further enabled by the increased capability of the new fleet. However, we saw little to no quantification of the benefit this entails.

3.5 We found the reliability of the existing fleet of stoneblowers to be within reasonable limits, with low shortfall rates due to machine failure reported within the 2019-20 data. This did not align with the original business justification for replacement of the machines.

3.6 We were unable to establish the true demand requirements for the stoneblowing fleet across the various datasets available. The demand suggested within the response to our PR18 deep dive was higher than that noted within the ABPs. This appears to be higher than that which is being delivered on site. These discrepancies were not clarified.

3.7 We saw no evidence for the justification of quantity of replacement for the new fleet. This was seemingly done on a ‘like-for-like’ basis, whilst improving the capability. This suggested that the decision to replace the fleet had not looked at the impact of other technological developments in this area, such as:

(i) Improving refurbishment activities, with bolstered plant capabilities;

(ii) Improved asset resilience through introduction of items such as under-sleeper pads;

(iii) Introduction of smarter tools to help inform decision making and allow earlier, proactive intervention; and

(iv) Innovations in tamping technology.

Implementation plan

3.8 From the regions sampled, there was support for the introduction of the new fleet and a generally good awareness and confidence that requirements had been captured.

3.9 No evidence was shown to suggest that regions had any specific plans for the introduction of the new fleet and that it would effectively be ‘business-as-usual’ until they were to arrive. This meant that there were no indications on what the introduction of the fleet may have on future renewal plans, especially within S&C, where it was highlighted as having lots of potential.

3.10 The delays to the delivery of the new fleet were noted; the details of which were not investigated as part of this review. Regions were generally aware of these delays when asked and there was a generally minimal risk of impact perceived. There was a potential impact to delivery through ongoing reliability of the machines highlighted.

Data & information management

3.11 Several OTM datasets were analysed as part of this review. We found difficulty in matching up the data within each. Significant changes were noted between revisions of documents, with little justification or commentary to demonstrate why. We struggle to see how some of these datasets would be used to make meaningful decisions, or whether they are used at all.

3.12 Planned versus actual data taken from the maintenance volume reports was used to challenge the region on under-delivery. However, these were disputed in places, with regions providing their own numbers. This was another discrepancy that could not be clarified.

3.13 A number of data quality issues were noted within the maintenance volumes submitted from Ellipse. These have been flagged to Network Rail in the past and we recognise that they are currently implementing new reports and assurance reviews to control this.

4. Recommendations

4.1 Based on our findings and the evidence presented, we have made three recommendations.

The intent of this recommendation is to ensure the adequacy of new fleets or vehicles. This should accurately establish demand, ensure ongoing utility and the benefit of investments.

Recommendation 1

Network Rail should establish a process for ensuring detailed business cases are completed for replacement fleets. These should establish the demand and requirements from the regions and understand the impact of other developments within the track or other asset areas. This process definition should be issued to us by March 2022.

The intent of this recommendation is to improve the accuracy and transparency of reporting within Network Rail. This is to ensure that decision making is undertaken on accurate data and in compliance with requirements within their Network Licence.

Recommendation 2

Network Rail should define the minimum data quality requirements required to support business cases for the procurement of new fleets. This requirement should be incorporated into the process supporting creation of business cases.

The intent of this recommendation is to establish value for money for the ongoing replacement of the stoneblower fleet. This seeks to ensure that delays to the delivery of the fleet have been mitigated and that ongoing utility of the machines is assured.

Recommendation 3

Network Rail should re-assess the requirements for the new stoneblower fleet, ensuring that demand is accurate, that there is quantifiable benefit and is supported by effective implementation plans within the regions. This should consider the effect of the delays to delivery and provide assurance that benefit from the investment will be realised.

4.2 We will review the responses to these recommendations and the state of progress in March 2022.

4.3 The findings of this review and output of these recommendations will be used for our ongoing holding of Network Rail to account. We will test for improvements of the supporting maintenance data through our ongoing reforecast reviews. This will inform our Periodic Review 2023 assessment for Control Period 7 in ensuring greater clarity, transparency and justification within maintenance requirements and planning.

4.4 New or replacement fleets will be identified through our ongoing liaison with Network Rail and as part of our Periodic Review 2023 for Control Period 7. We will use our findings from this review to scrutinise and assure that an appropriate business case is in place for these investments.

5. Appendices

Appendix 01 – Asset sustainability graphs

Figure 5.1 % Used Life – Ballast, Eastern region, Network Rail Annual Return 2020 data tables and Annual Return 2019 data tables

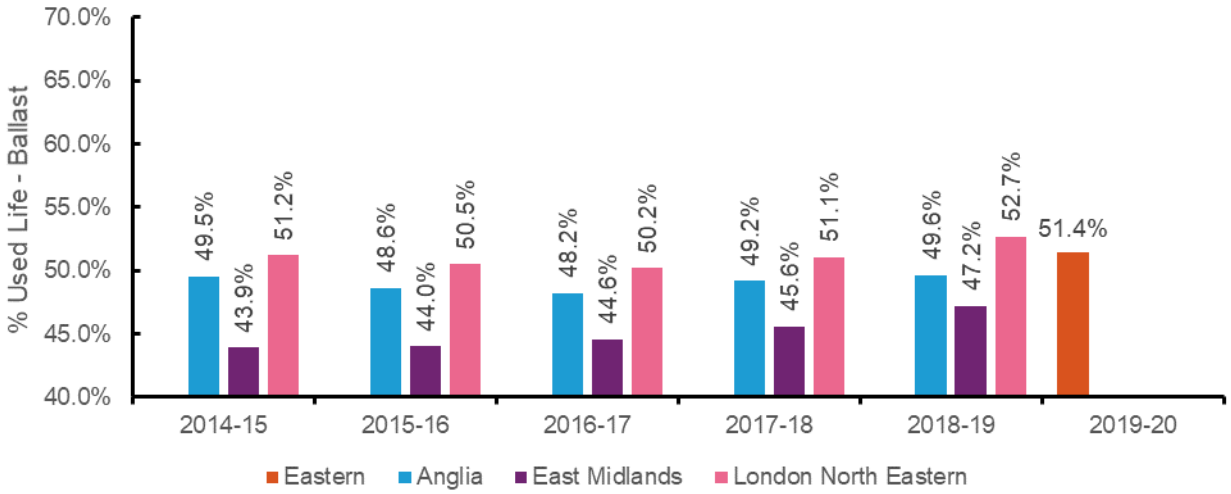


Figure 5.2 % Used Life – Ballast, North West & Central region, Network Rail Annual Return 2020 data tables and Annual Return 2019 data tables

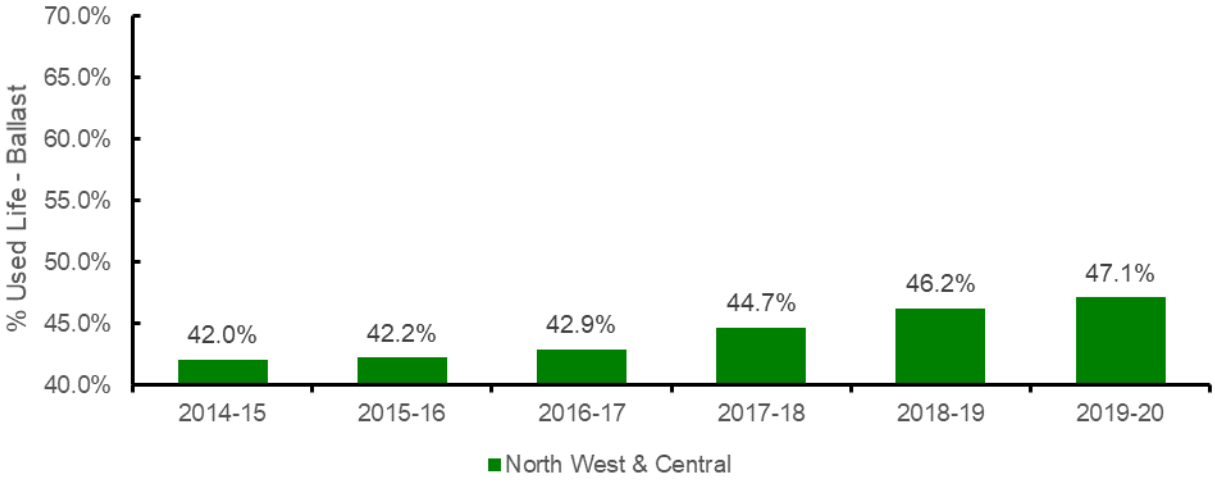


Figure 5.3 % Used Life – Ballast, Scotland's Railway, Network Rail Annual Return 2020 data tables and Annual Return 2019 data tables

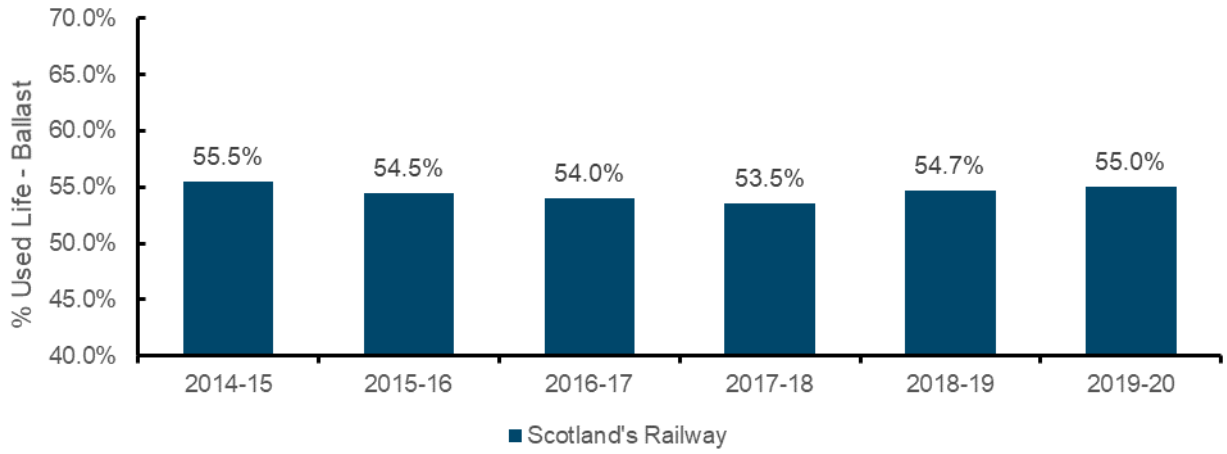


Figure 5.4 % Used Life – Ballast, Southern region, Network Rail Annual Return 2020 data tables and Annual Return 2019 data tables

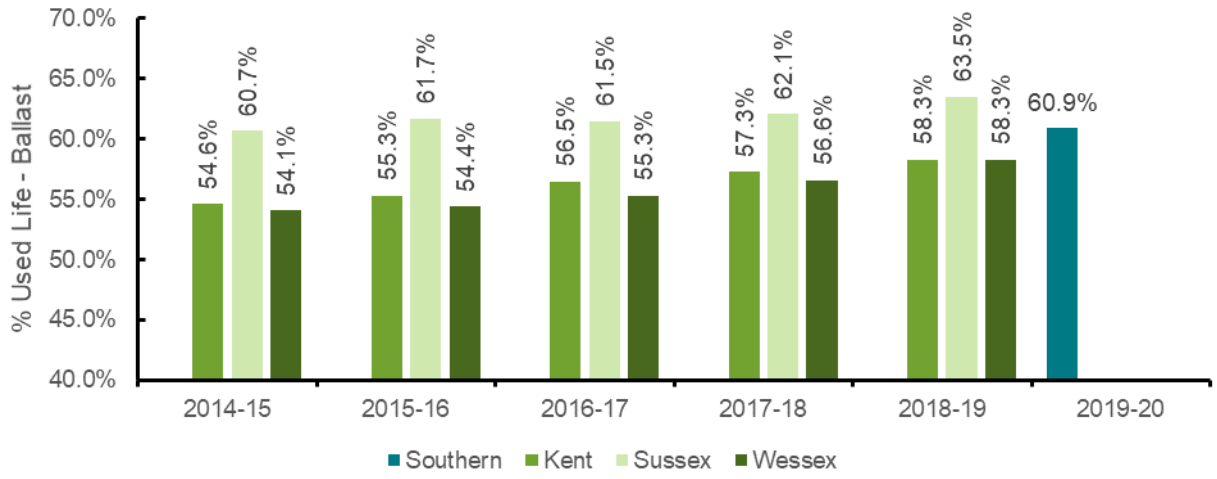


Figure 5.5 % Used Life – Ballast, Wales & Western region, Network Rail Annual Return 2020 data tables and Annual Return 2019 data tables

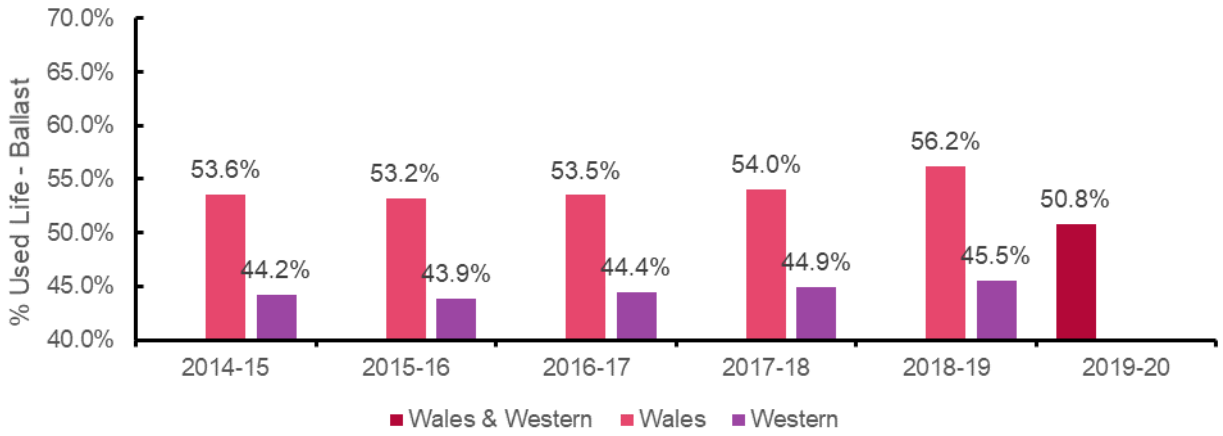
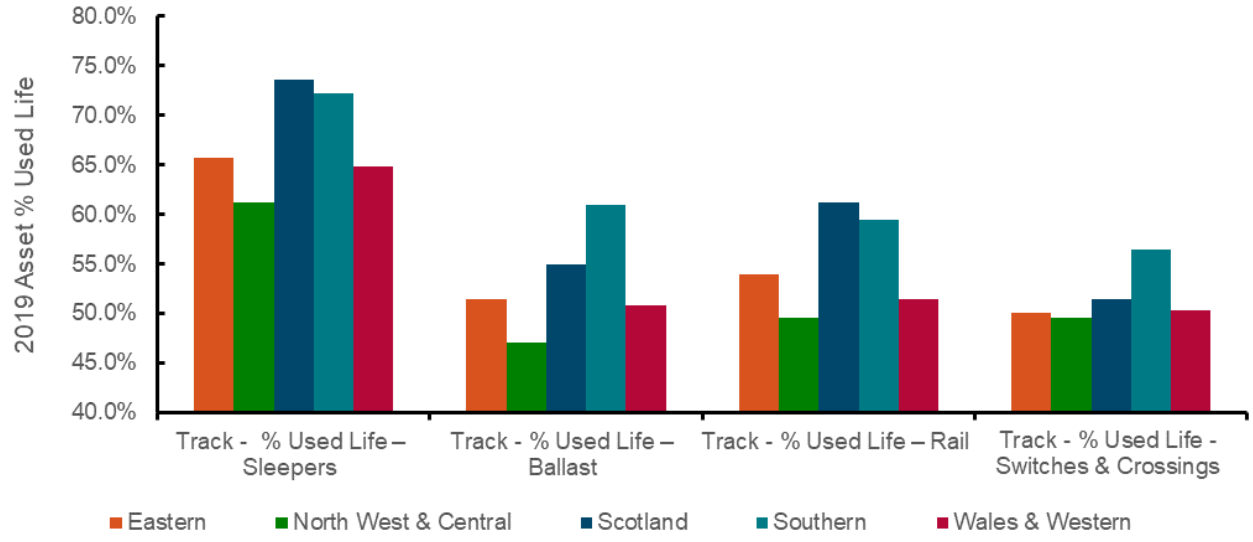


Figure 5.6 % Used Life – Track assets, Network Rail Annual Return 2020 data tables



Appendix 02 – GTG and PTG long-term trends

Figure 5.7 Good Track Geometry %, Network, P10 Full Track QSR Pack 2020-21 v5

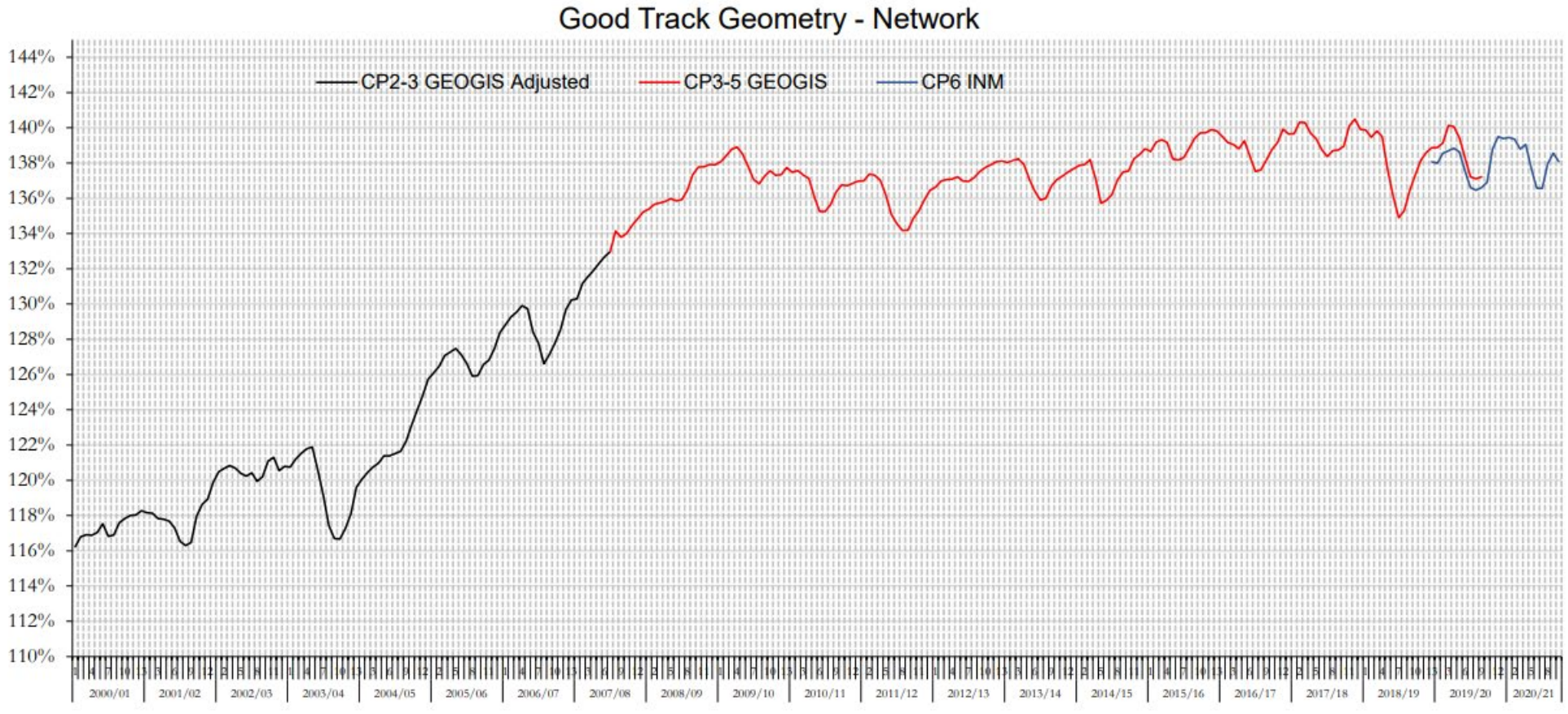
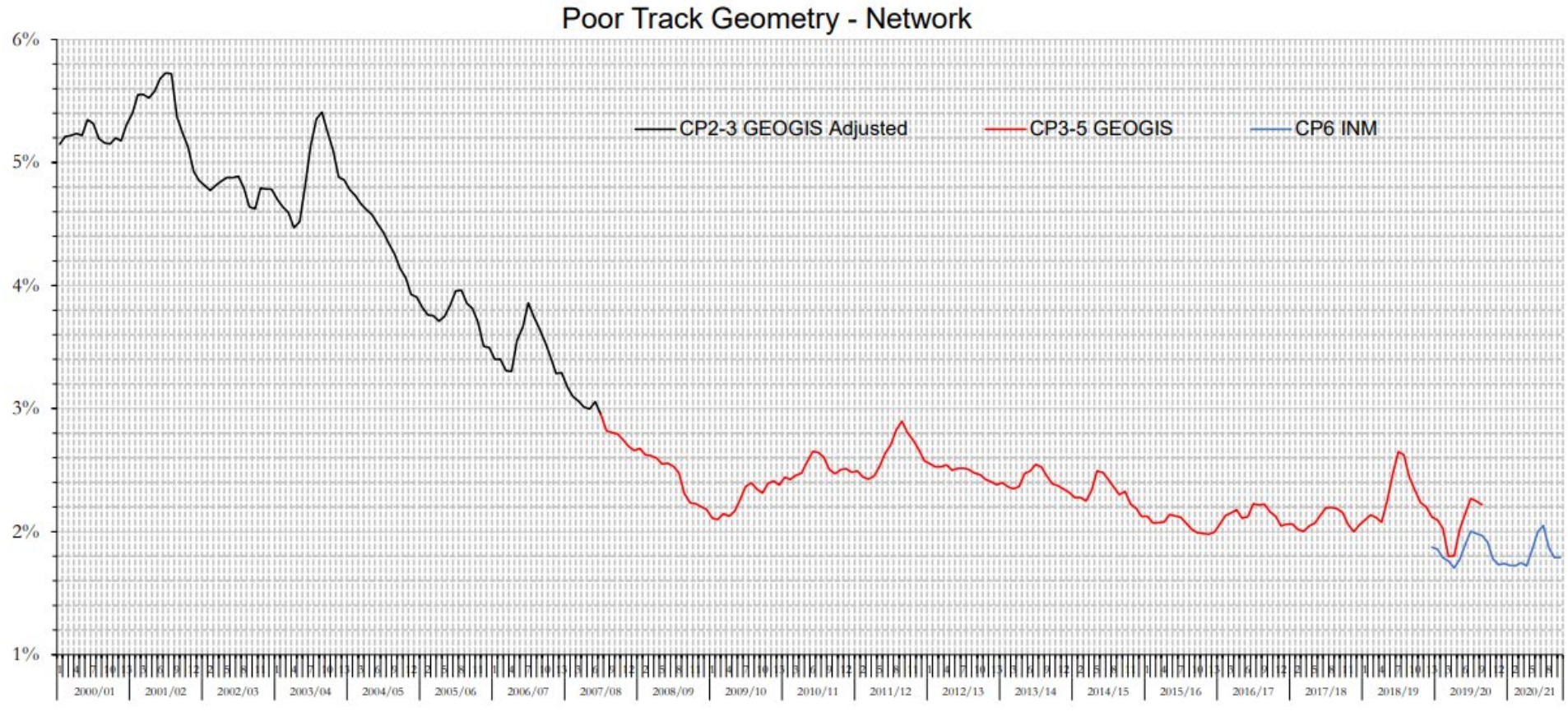


Figure 5.8 Poor Track Geometry %, Network, P10 Full Track QSR Pack 2020-21 v5



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