Office of Rail Regulation,
Network Rail

**Part A Reporter
Mandate AO/004: Data
Assurance for
Possession Disruption
Indices**

Data Assurance

Office of Rail Regulation, Network Rail

Part A Reporter Mandate AO/004: Data Assurance for Possession Disruption Indices

Data Assurance

November 2009

Job number   209830-04

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1   Background

While it is essential that the maintenance, renewal and enhancement of the railway network is conducted efficiently and safely, trends in recent years towards longer engineering possessions and route blockades have led to increasing levels of disruption to passenger and freight rail services, and it has been agreed within the industry that these levels of disruption are no longer acceptable.

In order to improve network availability and move towards a 'seven-day railway', and as part of ORR's 2008 Periodic Review of Network Rail's outputs and funding for Control Period 4 (2009-2014), Network Rail is required to produce Possession Disruption Indices (PDIs), to ensure these are reduced from 2009/10 for passenger traffic, to ensure no increase for freight traffic, and to specify in its Delivery Plan how these targets will be achieved. A draft Network Availability Delivery Plan has been published by Network Rail, and the company produces Possession Indicator Reports, covering the recorded and target PDI values and the values of the associated KPIs, and also providing a commentary on the results and details of the planned Programme of Improvements.

The Possession Disruption Indices for Passenger and Freight services (PDI-P and PDI-F, respectively) are calculated using the Network Availability model developed by Steer Davies Gleave (SDG) for ORR, and subsequently adapted by both ORR and Network Rail for their respective purposes and use. In addition to the spreadsheet forming the forecast Network Availability model, several additional databases and spreadsheets are used to calculate historic PDI-P and PDI-F values, based on actual historic data, rather than the predicted levels of possession activity that provide much of the input to the main model.

Additionally NR has developed a series of supporting KPIs which are reported periodically. These are intended to give a view of the underpinning factors which support the achievement of the regulatory targets.

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2   Introduction

The PDIs and associated KPIs are reviewed by ORR, and will routinely be checked by Arup on behalf of ORR and Network Rail in our role as Independent Reporter (Part A). However, the comparative novelty of the PDIs and some of the supporting KPIs has led to some queries about the data and calculations used. In order to provide confidence and assurance for industry stakeholders, ORR asked Arup to conduct a full review of the PDI models, data and associated KPI data, building upon and incorporating the findings of the work already conducted under the terms of mandate AO/002: Network Availability, during which familiarisation was gained with the Network Availability model, and some problems experienced by Network Rail in the reproduction of the historic freight PDI (i.e. PDI-F) values were resolved.

The project remit was set out in Mandate AO/004, received by Arup on 5 October 2009. The objective of the project is "to provide assurance [to ORR] as to the quality, accuracy and reliability of Network Rail's data used in the computation of the Possession Disruption Indices for both Passenger and Freight."

The agreed specific objectives of the mandate are as follows:-

1. To ascertain whether the data input to the Network Availability model and used to generate the PDIs and associated KPIs accurately reflect the possession-related situation 'on the ground';

2. To check that the input data are being correctly manipulated and processed by the Network Availability model and associated databases, spreadsheets and processes;

3. To verify that the contents of the Possession Indicator Report accurately reflect the underlying data, models and processes used; and

4. To describe the processes used in the checking process and the findings obtained, and to present these in a report suitable for publication on the ORR website.

The mandate has been divided into two sub-components: Data Assurance, covering objective 1, above, and Computational Checks, covering objective 2; both components cover elements of objectives 3 and 4, in that both the underlying data and the computational processes used feed the Possession Indicator Report, and the checking processes used, and the findings obtained, are being recorded and presented for both components.

This report covers the data assurance component of the mandate.

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3   Approach

The review focused on the collation of data used by the National 7-Day Railway Programme Team based currently in Melton Street. The review covered the data used in the creation of all the indicators reported in the Possession Indicator Report used to measure progress in delivering the regulatory targets.

The KPIs covered by this report are:-

- Possession Disruption Index - Passenger (PDI-P)

- Possession Disruption Index - Freight (PDI-F)

- WTT Weekend Compliance

- Rail Replacement Bus Hours

- Possession Planning - Possession Notification Discount factor

- Late Possession and Very Late Possession Charges

- Possessions Involving Single Line Working

- Possession Incidents - Delay Minutes due to Possession Overrun

- Possession Incidents - Cancellations (deemed minutes) due to Possession Overrun

- Possession Incidents - Temporary Speed Restrictions

The first 2 KPIs are used to measure the formal regulatory targets set by ORR for CP4, namely a 37% reduction in PDI-P and that PDI-F is no worse than at the start of CP4. The rest of the KPIs have been developed as supporting measures to assist NR in managing network availability using a series of more transparent measures. They are not in themselves constituent elements of PDI-P and PDI-F.

This part of the review has concentrated on the process by which data is collected and not how that data is processed by the 7-Day Railway Programme Team. A series of meetings were undertaken to support the review as data is provided by various parts of the NR team as follows:-

Date	Meeting
14th October	Tony Roberts/Temidayo Amusu, 7-Day Railway Programme Team
3rd November	Business Manager (Compensation), Network Delivery Service (NDS)
3rd November	Business Manager, National Plan Integration
5th November	Business Improvement Specialist, NDS
6th November	Head of Network Access Unit (NAU)
6th November	Possession Systems Support Specialist, NAU
7th November	Operational Planning Support Unit (OPSU)
10th November	Project Manager, National TSR Avoidance, Maintenance Improvement Team
11th November	National Performance Team
12th November	Tony Roberts/Temidayo Amusu

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The initial meeting with the 7-Day Programme Team was used to understand the reporting pack and identify the suppliers of data used to produce the reporting pack. The final meeting was to review draft findings and explore arising issues.

Each of the subsequent meetings consisted of an interview to explore how data was collected, processed and supplied to the national team (the last two were phone conferences). Where appropriate, samples of data were requested. Within each of the KPIs the assessors sought to understand how well defined and documented the data requirements were and the actual method of data collection, whether from a defined system or from any manual sources and the actual data that was submitted to the 7 Day Railway Programme Team.

A copy of the remit issued prior to the key meetings is attached in Appendix A. Its purpose was to ensure that there was an understanding of the type of questions the assessors would be asking and allowing the attendees to plan any material in advance.

All interviews were carried out by Phil Dargue and Keith Winder.

Due to the timescales for this audit it was not possible to complete detailed checks on base data. For example, there has been no reconciliation between actual possessions taken against those reported through PPS. It is recommended that this review is completed as part of next year's audit when more time will be available.

4   Findings

4.1   Supporting KPIs

4.1.1   WTT Weekend Compliance

The data is compiled by the Operational Planning Support Unit (OPSU), currently based in Leeds. The source of the information supplied is the current national timetable planning system, Trainplan.

The KPI is defined in the reporting pack as:-

The percentage of weekend schedules by train operator (taken from Trainplan) operated as trains and shown as a percentage of the total number of schedules (whether planned to be operated by trains or buses). Weekend is defined as services scheduled to depart or arrive after midnight on a Friday and before midnight on a Sunday.
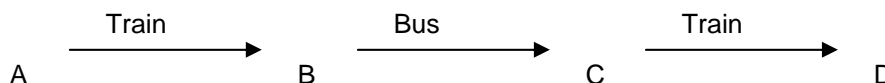
OPSU do not appear to have any current formal procedure which sets out what data is required. They were also not aware of how the data was processed once supplied to the 7-Day Railway team.

Data is drawn straight from Trainplan using a standard query. This is done by day set. Trainplan holds a timetable for each day which includes all the relevant data for both long term and short term train schedules (including buses).

The data provided by OPSU gives the total number of schedules broken down by type. This will show if they are long term schedules (LT) or short term schedules. This is processed by a macro by the 7 Day Programme team to produce the KPI. The assessors have not verified the macro. There was some initial confusion over what data was supplied which was resolved following a second meeting with Tony Roberts.

As the data is sourced directly from the timetable data it can be regarded as highly reliable. Any issues with the data source would manifest themselves as a timetable compliance issue and be a source of major disputes with TOCs. The instances of such events, given the size of the dataset, are very rare.

The data is used to provide a calculation of the percentage proportion of schedules provided by buses over the weekend (long term planned bus links are counted as trains for this KPI). There are some inconsistencies arising from the way the KPI is calculated. For example, a train that is planned to normally operate through as one schedule but has a portion provided by bus for part of its journey (a common practice) will be split into several new schedules as below:-

In this example, A to B would become an STA schedule, B to C would be a bus and C to D would be an ST (New) schedule. In other words the bus element would become a third of the schedules.

If the work were between C and D the bus would become 50% of the schedule and therefore show a greater level of non compliance. This means the results will vary by weekend dependent on factors such as the location of work so that two identical possession types will lead to different results. However, we understand that the measure is intended as a guide to, and means of reducing, the extent of bus substitution. This is reflected by its description as providing a trend line rather than an absolute result, in recognition of its limitations.

Trainplan is currently in the process of being replaced by a new planning system called ITPS (Integrated Train Planning System). Full implementation will coincide with the May 2010 timetable. We understand that it is not currently possible to produce the data required for this KPI from ITPS, but that the ITPS team is investigating a range of options for doing so.

Alongside this the OPSU team will be relocating to Milton Keynes and whilst some of the team look likely to relocate there may be transitional risks which will require close management.

4.1.2   Rail Replacement Bus Hours (weekend)

The data is provided from the Trainplan day set by OPSU in Leeds by the same team that provide the WTT Compliance Data.

The KPI is defined as:-

Number of weekend rail replacement bus service hours operated due to possessions obtained by calculating scheduled arrival time – scheduled departure time using the Train Service Data Base code 'BR' summed over all TOCs.

No current document setting out how data should be collated is available to instruct the OPSU team on what to produce although regular dialogue is apparent with the 7-Day Railway Team.

The data supplied is broken down by TOC and gives the total number of buses bid for and the departure and arrival times of trains at destination. Total bus hours would appear to be a simple multiplication of these two factors.

The OPSU Team described a basic problem with the data collected. The rules for TOCs bidding for buses are not as stringent as those for trains. NR does not validate bus timings and at best these are regarded as notional and may not fully reflect actual journey times. More significantly TOCs differ in how they bid for multiple buses. If a service requires more than one bus, standard on most busy routes, some will bid for all of them. Others however will only bid for one bus to ensure there is a compliant schedule in the Train Service Data Base (TSDB).

This will have a significant impact on the number of bus hours calculated by weekend and fluctuations may simply reflect the bidding policy of the TOCs affected by the relevant weekend.

Other factors not reflected by the KPI include the provision of standby buses to cope with higher than expected levels of passengers which most TOCs will provide.

4.1.3   Possession Planning – Possession Notification Discount Factor

The KPI base data is supplied by the Schedule 4 team, led by the NDS Business Manager (Compensation) based in Milton Keynes. This post is part of a new team that is not yet fully staffed with work being transferred from the previous territory teams to the new office. The transition process is expected to be completed by the end of 2009.

The data is taken directly from the Schedule 4 Compensation System (S4CS) which is the system used to manage Schedule 4 payments to TOCs. This is based on the prevailing rates and the correct levels of discount based on when the possession was notified to the TOC.

The KPI is defined as:-

Percentage of possessions that were requested in each of the 3 possession notification bands:

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- *Possessions notified by First Working Timetable (%) : number of disruptive possessions incorporated in the first working timetable (for which is received the biggest discount)*

- *Possession notified by T-12 timetable (%) : number of disruptive possessions entered into the national timetable database at least 12 weeks before the date of the possession*

- *Possessions notified Post T-12 timetable (%): number of disruptive possessions entered into the National Timetable database within 12 weeks before the date of the possession (for which is received the smallest discount, if any).*

The data for this KPI is produced from an Excel spreadsheet which checks the planned dates from S4CS. The dates that possessions are notified are recorded in PPS (Possession Planning System) which is the central repository of all possession plans. Any changes which are disruptive to TOC timetables will be recorded in PPS with the later date overruling any earlier ones.

S4CS extracts the data from PPS and holds the applicable discount rules for comparison purposes. The spreadsheet compares the latest notification date and allocates it to the appropriate category. It is important to note that if a possession affects more than one TOC but a subsequent change is made that only affects one of them it will be recorded as a later category only for that TOC. It is recording the actual number of notifications by category not possessions. (A more detailed description of the S4CS process is provided in the PDI-P section.)

There is no formal procedure currently in existence setting out how the data shall be collated.

No formal targets are currently in place but the Schedule 4 team has a general rule of expecting 85% of possessions to be fully discounted, 10% notified by T-12 with 5% notified after T-12. Any possessions notified after 2200 hrs on the previous night are subject to Schedule 8 payment and are completely excluded from this KPI.

If changes are not captured in PPS these could be missed by the S4CS team since they have no other source of base data. However, if changes were missed these would lead to claims by the relevant TOC into the underpayment. These are subject to regular review and no major levels of dispute are currently reported as being experienced, but the auditors have not verified this.

Internal verification currently includes checking all possessions where the maximum discount factor does not apply but no routine base data checks take place where the possession is at maximum discount but a later notification has been missed. As already stated these rely on TOC challenge. The Business Manager (Compensation) is currently considering what base checks could be undertaken and this approach is endorsed.

4.1.4   Late Possession Changes and Very Late Possession Changes

The information for both these KPIs is supplied to the 7-Day Railway Team by the Business Improvement Specialist of the NDS team, currently based in York (the post will shortly be moving to Milton Keynes).

The late possession changes KPI is defined as:-

The number of possession changes that cause the disruptive element of the possession to be increased or reduced (i.e. a new, cancelled, curtailed or extended possession) between CPPP [Confirmed Period Possession Plan] and the issue of WON.

The very late possession changes KPI is defined as:-

The number of possession changes that cause the disruptive element of the possession to be increased or reduced (i.e. a new, cancelled, curtailed or extended possessions) after the issue of the WON.

Data for both KPIs is collected in entirely the same way so they are dealt with together for the purposes of this report.

The data is generated by the 15 Lead Planning Managers (Delivery) based in each of the areas. These are all NDS staff reporting to four geographically split Business Planning Managers. It is all collected manually by the local planning managers. Most appear to keep their own spreadsheets on which they record late changes. This is done against the number of Access and Resource Planning Change Request (ARPC) forms that are signed off. The ARPC forms are a requirement of a new NDS procedure – NR/L2/NDS 202 – to authorise late changes to possessions. Any that are disruptive to TOCs must be signed off by the Head of the NAU within Operations and Customer Services. Each keeps a tally of the forms that are signed off against the appropriate time threshold.

There is no formal written procedure setting out how the data should be collated but a briefing was undertaken to ensure it was collected consistently.

There are no verification checks currently in place to check that the reports supplied by the Lead Planning Managers (Delivery) are correct although the process for agreeing late and very late changes is formalised in an NDS procedure - NR/L2/NDS 202.

It was noted by the 7-Day Railway Programme Team that there are apparent differences between the data supplied by NDS and that held by the NAU.

In discussion it was ascertained that the two organisations are using different definitions of disruptive possessions and that this is the likeliest cause of the difference. NDS staff includes possessions that affect the contractual rights of TOCs, whilst the NAU figures only deem them to be disruptive if the timetable requires amending. For example, if a possession starts at 2200 hrs, and the TOC has contractual rights to operate trains until 2300 hrs, but its last booked service is at 2155 hrs, NDS would deal with it as disruptive, whilst NAU would not. A clear definition is required within a formal procedure to ensure complete clarity on what is collected.

Other differences are the way that PPS records changes. If a possession is changed more than once PPS will only record the latest change but NDS would report the multiple changes. Also any week day night possessions that are all changed in the same way would also be recorded as one change whereas NDS would count each individual example.

It would appear from the data samples supplied that the submission of figures is not 100%, with one of the 15 Lead Planning Managers failing to supply any data for two of the periods sampled. This appears to be reported as zero in both KPIs and clearly potentially underestimates the number of late and very late changes reported.

4.1.5   Possessions Involving Single Line Working

The data is collated by the Possession Systems Support Specialist in the NAU team in Leeds from PPS by week.

The KPI is defined as:-

The number of possessions planned for engineering work with the adjacent line open. The measure includes the number of planned possessions that leave an adjacent line that is signalled for bi-directional operation or SIMBIDS [a simplified system of bi-directional signalling] open, and the number of planned possessions where single line working was implemented.

The data is collected by the use of a query within PPS to pick up key words inserted into a free form text field within PPS. The query looks for phrases such as single line working,

SLW, reversible working, bi-directional and SIMBIDS. There is no mandated terminology which must be used, nor is there a field in PPS which will identify the use of single line working, bi-directional signalling or SIMBIDS simply.

The raw data from the query is supplied to the 7-Day Railway Programme Team to process the resulting graphs to identify if the possessions have been correctly identified. This is usually around 200 items per week.

There is no independent verification or sample checking done to identify if any examples are missed. In terms of single line working, the Possession Systems Support Specialist felt confident that in excess of 95% were identified as it is a rule book requirement to publish this data. Similarly, he felt that SIMBIDS was of the same level of accuracy since again this was required to be published within the weekly operating notice. However, he felt that the use of bi-directional facilities was less accurately recorded. This is partly down to definitions of when it is required to be recorded and that since the facility does not require prior notification to drivers it is not always routinely input in to PPS.

It was noted by the auditors that there has been a significant increase in the number of reported instances of single line working and a fourfold increase in the levels of SIMBIDS and bi-directional working. A review of the reported data is required but has not been possible within the timescales of this audit. Firm rules setting out how to record, extract and interpret the data are required as parts of a set of formal procedures.

4.1.6   Possession Incidents – Delay Minutes due to Possession Overrun
Data is collated by the National Performance Team in Milton Keynes.

The KPI is defined as:-

   Total delay minutes attributed to possession overrun per 100 train kilometres.

The data is supplied from PSS, the performance database, via a Business Objects query. The process of delay minute collation has been subject to a recent quarterly audit which concluded that the information was of good quality. This review did not focus on this measure as a result.

4.1.7   Possession Incidents – Cancellation Minutes due to Possession Overruns
Data is supplied by the National Performance Team who calculate the deemed minutes from cancellations data held centrally.

The KPI is defined as:-

   Total cancellation minutes ("deemed minutes") attributed to possession overruns, divided by scheduled train km. Cancellation minutes are, for a cancelled stop, the number of minutes specified for the service group that includes the affected train.

Again as the supplied performance data was subject to a recent audit this measure has not been a specific focus of this review.

4.1.8   Possession Incidents – TSRs: Delay Minutes and Numbers
The information is supplied from two sources. The delay minute data is provided by the national performance team in Milton Keynes, whilst the TSR data is provided by Project Manager, National TSR Avoidance within the National HQ Maintenance Improvement Team.

The KPI is loosely defined as:-

   The numbers of TSRs in place and the minutes delay due to those TSRs.

The delay minute data is supplied directly from PPS. This records all delays attributed to TSRs across the network. As this data was the subject of a recent audit, detailed checks have not been undertaken as part of this review.

TSR data was originally supplied by the NAU team in Leeds but is now provided by a new post within the National Maintenance Improvement Team.

The current format of the information provided is about to change following a recent agreement between NR and ORR and over the wider reporting of TSRs. The Project Manager, National TSR Avoidance will supply TSR data split by planned and unplanned. The basic criterion will be whether or not TOCs have been informed that the TSR was due to happen.

The figures will be produced in line with the standards taking the position at 0600 on the last Saturday of the period (weekly figures will follow the same format). There will be some historical re-working of the TSR figures but it is not clear what level of changes will be made to the KPI as currently presented.

The 7-Day Railway Programme Team should review the revised data format and look at how the existing KPI report should be amended and what re-working of any historical data is necessary to measure ongoing progress.

4.2   Main Indicators

4.2.1   Possession Disruption Index – Passenger

This is a new measure implemented at the start of CP4 to measure the impact of engineering work on passengers. A separate report by the Part A Reporter Team has reviewed the calculation used in the model by the 7-Day Railway Programme Team.

In contrast this report focussed on examining the data supplied for input into the model.

The main data source is taken from S4CS, the national Schedule 4 management system, and supplied by the Business Manager (Compensation) and her team, currently transferring to Milton Keynes. Train km data are provided by the National Performance Team.

The KPI is summarised as:-

PDI-P – Excess passenger journey time and weighted cancellation minutes (EPJ) weighted by busyness, passenger journeys and user value of time (wVT) normalised by the MAA for 2007/08.

The S4CS data is supplied on a periodic basis to the 7-Day Railway Programme team on a spreadsheet known as the Part 3 report.

The creation of the data is a fairly manual process which is primarily undertaken to calculate the payment levels for TOCs. S4CS will undertake a daily comparison between actual train mileages and extended journey times against plan.

This is actually done twice. The system compares the perfect timetable for any given day to the "first working timetable". This will pick up where planned engineering periods have led to WTT amendments that affect the passenger service. The Schedule 4 team must agree the 'perfect' timetable with each TOC at every timetable change. For most TOCs this usually consists of selecting an unaffected day set from previous years. However in some cases, for instance Arriva CrossCountry this may mean constructing the timetable for Sundays.

The second comparison is between the first working timetable and the service that operates on the day. S4CS uses Trainplan data to undertake this check. The accuracy of this process has not been checked. The Schedule 4 team, which is split by TOCs, will then investigate all differences. To do this they will look at possession data from PPS. All disruptive possessions are placed in a holding area within S4CS to aid this process. This relies on the NAU marking the possession as disruptive.

The team will also check TRUST to eliminate any differences caused by incidents which will be subject to Schedule 8 payments. If necessary the team will also check other possession

data directly within PPS to identify any that are not marked as disruptive but that have caused delays for mileage differences.

The S4CS system is maintained by Atos who currently make any changes to the tables used for calculation purposes. These are normally carried out at timetable change under instruction from the Business Manager (Compensation).

Little of the process described is currently written down, and the team undertaking this work is currently being assembled. In the meantime some of the work is still being undertaken by outbased staff due either to move to Milton Keynes, take up new posts, or leave the business. This would appear to be a well-managed transition, but many of the new team are inexperienced and the Business Manager (Compensation) is looking to train and improve the skill set of the new team members.

The move to implement a process manual is supported and should be put in place as quickly as possible alongside the training.

There is little done currently in terms of internal verification of the data. Most errors that deny payments to TOCs are likely to be picked up by the affected TOC. Currently this is a rare occurrence, although no data was made available on the actual levels. The process requires all possessions which do not get the maximum discount factor to be fully investigated. However, there is no sampling of possessions receiving full discounts. The process review should consider what internal checks can sensibly be implemented to verify the regime.

Train km data are derived from PALADIN, part of the current national performance suite of systems. This takes the base data from TRUST which records the actual operation of services. An Access database is used to process the PALADIN data by simply totalling the mileage by TOC. The process is entirely automatic apart from an adjustment to Eurostar data to ensure that only the four trains a day that traverse the NR conventional network at Ashford are counted (the system records all Eurostar data currently right through to Paris and Brussels). In processing the data NR apply the same rules as for delay data. This for example excludes the following:

- ECS moves

- Light locomotives

- Non-revenue services

This data is used widely across NR reports, and recent checks carried out by NR have shown it to be accurate. No changes are felt necessary at present to the collection process.

4.2.2   Passenger Disruption Index – Freight (PDI-F)
Like the PDI-P section, this review has concentrated on the data supply, not the calculations within the model.

The data is supplied by the NAU in Leeds.

The KPI is summarised as:-

Track-km availability weighted by freight traffic level (TWF), normalised by the MAA for 2007/08.

A file of data is extracted from PPS which proves the following data:-

- Location of possession – from and to

- Lines affected

- Duration of possession

- Whether or not it is disruptive

A second file is supplied which provides data on each possession by work type, i.e. whether it is for maintenance, enhancements or renewals.

The data is taken straight from PPS and does not involve any processing by the NAU team. Because the file is taken from PPS this does not include any very late possessions, since these are not contained in PPS, which means PDI-F is inconsistent with PDI-P, which does include them.

At the review in the NAU, some concerns were expressed about how the data supplied is interpreted. Two specifics raised were how possessions on four track sections were interpreted and how the model dealt with location data within the ELR model. Either of these factors could overstate or understate the impact of engineering work. In the first instance a route will be available if only two lines are blocked and the model needs to interpret this correctly. In the second case location data at junctions does not precisely describe which routes are affected and others that are available. This could lead to the model showing unaffected routes as not available. It is recommended that a future review of the model explores these issues in detail, to confirm the basic robustness or otherwise of the PDI-F model.

No formal procedures/processes setting out the data collection arrangements are currently in place and these should be provided.

The NAU team will shortly move to Milton Keynes and it is not clear currently which staff will transfer. This issue must be recognised and the production of procedures will help mitigate any risk of personnel changes.

5   Observations

The reporting pack is still relatively new and is not yet supported by formal procedures setting out how data is to be captured.

The fact that data are provided from such disparate sources reinforces the need for more formality.

The accuracy of the KPIs is very mixed. It was stated that many of the supporting KPIs are designed to give high level trends rather than absolute values. This is not made clear to users of the pack who may put more reliance on the data than should be the case.

There are several areas where definitions are unclear and lead to potential differences in the collection of data. These sometimes actually lie within the process which provides the data, a good example being different definitions of a disruptive possession.

Many of the teams providing this data are currently in transition. This adds risk to the creation of the underpinning data. Whilst each team is seeking to manage its own risks, it is important the 7-Day Railway Team ensure that its processes will not be interrupted during these changes.

Many of the procedures rely on a great deal of manual intervention, and any opportunity for further automation should be explored.

The transfer of all train planning activity to the new ITPS system means that the current data provided by Trainplan for WTT compliance will no longer be available. A revised method of collating the data must be in place by May 2010.

There are few verification checks currently built into the collation process. A review of how this could be undertaken to offer better assurance should be carried out. In some cases, such as S4CS data, the responsible manager is sorting out the data.

Many people in the business are still struggling with PDI-P and PDI-F as measures, particularly in terms of understanding how this affects their planning role. It will be a major challenge to ensure that those involved in longer term engineering planning can plan effectively against the constraints imposed by the new measures. However, the teams involved in the planning of possessions are very aware of the requirement to reduce disruption to the network, and are actively seeking to do so.

6   Conclusions

The collation of data currently lacks any homogenised set of procedures to ensure consistent collection.

Variation of interpretation is possible and means any data collected is unlikely to reach 100% reliability, particularly given the manual nature of much of the process.

There is evidence that some of the manual processes do not result in all data being collected, for example late and very late possession changes.

The data collected does not necessarily reflect the intent of the KPI. A review of each KPI data source, as well as the definitions and criteria to be used, should be undertaken to ensure its appropriateness now that the KPIs have been in use for some time.

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7 Assessment of Confidence Rating

7.1 Confidence Grading System

The confidence grading system used in this report is based on the approach taken by previous Reporter in their reports, whereby a two-character alphanumeric rating (e.g. 'A2') is used to provide a combined assessment of reliability and accuracy, with the letter used as a reliability rating, and the number as a confidence rating. The rating system used is summarised in Table 7.1 which again is adopted from the previous Reporter's final report.

Table 7.1: Confidence Grading System

Reliability Band	Description
A	Sound textual records, procedures, investigations or analysis properly documented and recognised as the best method of assessment.
B	As A, but with minor shortcomings. Examples include old assessment, some missing documentation, some reliance on unconfirmed reports, some use of extrapolation.
C	Extrapolation from limited sample for which Grade A or B data is available.
D	Unconfirmed verbal reports, cursory inspections or analysis.

Accuracy Band	Accuracy to or within +/-	But outside +/-
1	1%	-
2	5%	1%
3	10%	5%
4	25%	10%
5	50%	25%
6	100%	50%
X	accuracy outside +/- 100 %, small numbers or otherwise incompatible (see Table 8.2)	

Again, as in the previous Reporter's reports, some reliability/accuracy combinations are considered to be incompatible, as shown as 'N/A' in Table 8.2.

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Table 8.2: Confidence Grading Compatibilities

Compatible Confidence Grades				
Accuracy Band	**Reliability Band**			
	A	B	C	D
1	A1	**N/A**	**N/A**	**N/A**
2	A2	B2	C2	**N/A**
3	A3	B3	C3	D3
4	A4	B4	C4	D4
5	**N/A**	**N/A**	C5	D5
6	**N/A**	**N/A**	**N/A**	D6
X	AX	BX	CX	DX

This grading system is subject to review, and our graphical interpretation of the gradings we have awarded is included in the following section.
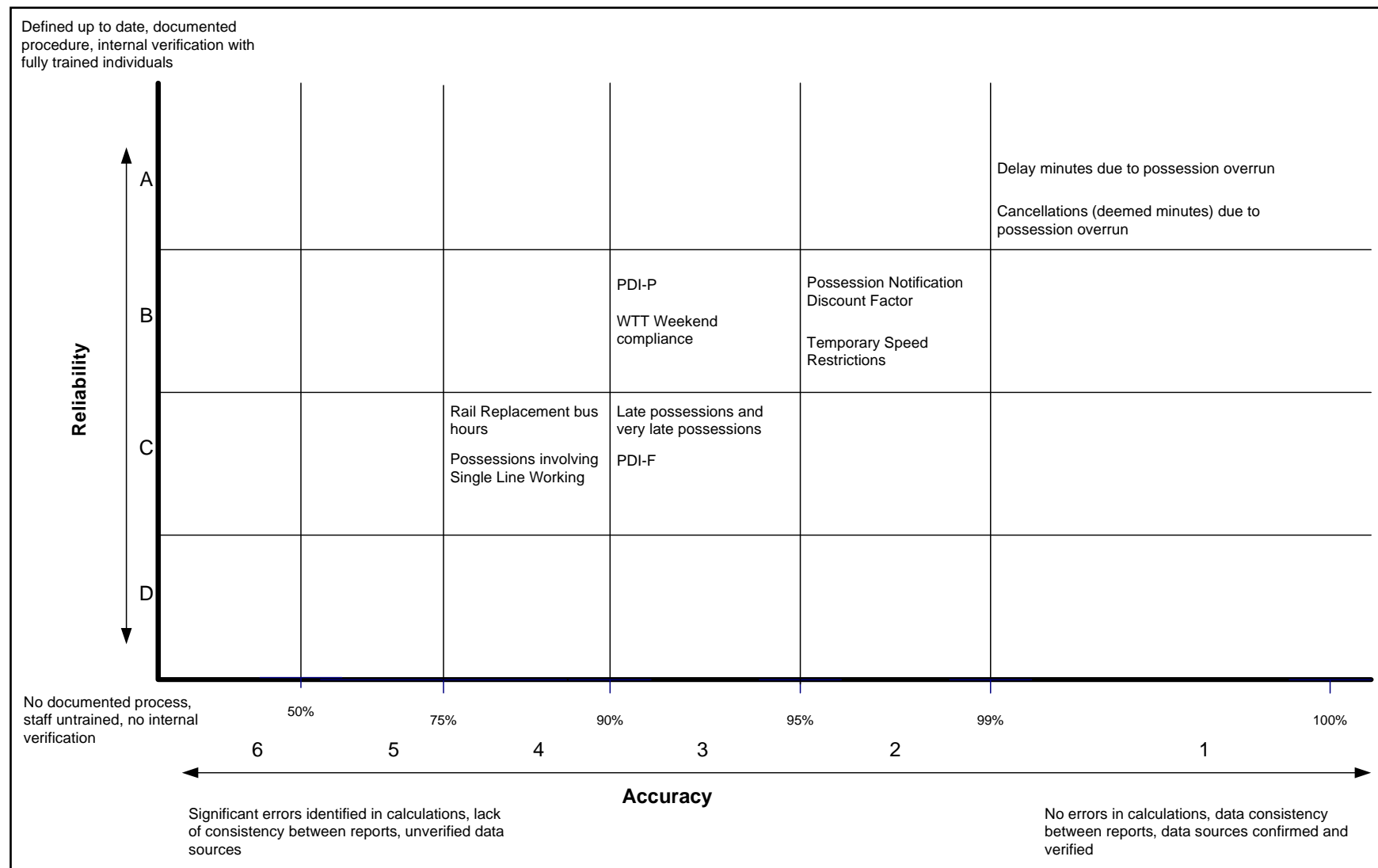
7.2   Confidence Ratings Achieved

The confidence ratings for the network availability KPIs are summarised below, and explained further in Figure 7.1. The accuracy scores reflect the view of the assessors of the potential levels of error based on the data seen, rather than statistical sampling:

- WTT Weekend Compliance – the audited data has a rating of B for Reliability and 3 for Accuracy. This reflects the fact that the KPI as currently set out will only give a trend line, and any absolute interpretation of the results must take this into account. No formal procedure is in place.

- Rail Replacement bus hours – the audited data has a rating of C for reliability and 4 for Accuracy. This KPI gives a trend line, but because of differences in TOC procedures for bidding for buses, will not give an absolute reflection of the bus operation on any given weekend. No formal procedure is in place.

- Possession Notification Discount Factor – the audited data has a rating of B for Reliability and 2 for Accuracy. The schedule 4 process is well established, but the procedures are not formalised, and much of the process is still manual. There are unlikely to be major data discrepancies given TOC challenge because of the payment regime.

- Late possessions and very late possessions – the audited data has a rating of C for Reliability and 3 for Accuracy. The process is very manual, it isn't formalised with issues around definitions, and previous data collections have not been complete.

- Possessions involving Single Line Working – the audited data has a rating of C for Reliability and 4 for Accuracy. The process would appear not to capture all instances of bi-directional working and there is some concern that the increase in actual Single Line Working shown in the data may be down to interpretation issues.

- Delay minutes due to possession overrun – the audited data has a rating of A for reliability and 1 for Accuracy. The score reflects the recent audit of performance data.

- Cancellations (deemed minutes) due to possession overrun – the audited data has a rating of A for Reliability and 1 for Accuracy. The score again reflects the recent audit of performance data.

- Temporary Speed Restrictions – the audited data has a rating of B for Reliability and 2 for Accuracy (as the process is currently changing, the score reflects the transitional status).

- Possessions Disruption Index – Passenger (PDI-P) – the audited data has a rating of B for Reliability and 3 for Accuracy. This reflects the fact that the Schedule 4 data process is still largely manual and doesn't have a formal set of procedures. This rating also reflects the findings of our earlier, companion report on the Computational Checks and Documentation Review conducted on the Possession Disruption Indices, which found that the complexity and poor documentation of some of the processes used in the PDI calculations are such that we cannot be fully confident of their accuracy without additional, detailed checks.

- Possessions Disruption Index – Freight (PDI-F) – the audited data has a rating of C for Reliability and 3 for Accuracy. This again reflects the lack of processes given to those collecting the data to feed in, and the uncertainties in the processing of key data taken from PPS such as the blockage of four-track sections. Again, the rating reflects the findings of our earlier, companion report on the PDI computation checks and documentation review.

Figure 7.1: Confidence Ratings Matrix

Defined up to date, documented procedure, internal verification with fully trained individuals

A					Delay minutes due to possession overrun Cancellations (deemed minutes) due to possession overrun
B			PDI-P WTT Weekend compliance	Possession Notification Discount Factor Temporary Speed Restrictions	
C		Rail Replacement bus hours Possessions involving Single Line Working	Late possessions and very late possessions PDI-F		
D					

Reliability

No documented process, staff untrained, no internal verification

50%	75%	90%	95%	99%	100%
6	5	4	3	2	1

Accuracy

Significant errors identified in calculations, lack of consistency between reports, unverified data sources

No errors in calculations, data consistency between reports, data sources confirmed and verified

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8   Recommendations

Table 8.1 contains a set of draft recommendations for ORR. The recommendations were discussed in principle with Tony Roberts on 12th November 2009, and provide the basis for a work plan and schedule to be agreed with NR. The recommendations are numbered 2010.4.1, 2010.4.2, etc. to reflect the (end of the) current year and the Network Availability KPI number.

Table 8.1: Recommendations

No.	Recommendation to NR	NR Data Champions	Due Date
2010.4.1	Put in place a procedure for each KPI detailing what data is to be collected and where it should be sourced from. At a minimum each should contain: • Definitions • Data source • Verification and check arrangements	Tony Roberts	March 2010
2010.4.2	Review each of the supporting KPIs and specify if they are for measuring high-level trends or used to provide accurate assessments. This should be done with data providers to confirm that the data represents: • The most appropriate measurement • Best source of base data • What the target accuracy level is for each KPI	Tony Roberts	March 2010
2010.4.3	Review transitional risks posed to the KPI production process and develop mitigation plans: • Managing staffing changes both in teams supplying data and in the 7 Day Railway Programme team • Addressing system changes, such as to ITPS from Trainplan. A new data source for measuring WTT Weekend Compliance based on ITPS data will need to be implemented	Neil Henry	January 2010
2010.4.4	Implement system for monitoring WTT Weekend Compliance from ITPS	Neil Henry	May 2010
2010.4.5	Put in place a plan to automate data collection. This should identify opportunities and set out a path to achievement.	Neil Henry	March 2010

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Appendix A

**Data Assurance
Meeting Remit**

Part A Reporter Data Assurance Meeting Remit

Network Availability

The purpose of each meeting is for the Reporter team to understand the arrangements for populating and reporting the various **Network Availability** KPIs, in order that the team can provide assurance that the performance data reported by NR for **Network Availability** is reliable, accurate, consistent and complete.

The following KPIs & measures will be covered within these meetings:

- WTT Weekend Compliance & Rail Replacement Bus Hours
- Possession Disruption Index – Passenger (PDI-P - National & Sample TOCs)
- Possession Disruption Index – Freight (PDI-F - National & Sample FOCs)
- Possession Planning – Possession Notification Discount Factor
- Late Possession Changes & Very Late Possession Changes
- Possessions Involving Single Line Working
- Possession Incidents – Delay Minutes due to Possession Overrun
- Possession Incidents – Cancellations (Deemed Minutes) due to Possession Overrun
- Possession Incidents – Temporary Speed Restrictions

Standard Questions

1. Is there a formal procedure for the collation of the KPI?
   a. Where is it contained?
   b. Does it contain a clear definition?
   c. How is it issued?
   d. Is it up to date?
2. Who is involved in the production of the KPI?
   a. Is there a responsible manager for KPI?
   b. What is the linkage between HQ and NDS/NAU teams
   c. What training has been given to relevant personnel
3. What data sources are used to compile the KPI?
   a. Internal
   b. Any external sources?
4. How is the KPI produced?
   a. Straight from a mainframe data system or not?
   b. What manual input or intervention is needed, if any
   c. Any spreadsheets used?
   d. Amalgamated from lower level data?
5. What targets exist for this KPI?
   a. Where are the targets to be found?
   b. How are the targets established?
   c. How are the targets, KPIs, and variance reported?
6. How is the KPI used?
   a. What reports are produced?
   b. Who gets the reports?
   c. How does this link to action plans?
7. What verification procedures exist?
   a. Routine checks?

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b.   Regular internal audit?

Data Requirements

We will require to understand the working routines and data management arrangements from which KPI information is produced, and have access to the range of standard NR reports which result. We may request access to or provision of some data, for the purpose of verification.

Keith Winder

Phil Dargue   **29 October 2009**

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