1. Purpose

1.1 To provide board members for information, with a copy of the passenger risk paper that went to the System Safety Risk Group (SSRG) on 17 December 2014.

2. Background

2.1 SSRG received the Passenger Risk paper at its meeting on 17 December 2014 and a final copy is attached as Annex A.

2.2 At the SSRG meeting, and at the preceding SSRG workshop that was held on 17th October, it was recognised that there was a need to review the nature of risk papers for SSRG. The papers need to be developed to include more targeted information and learning to support productive SSRG discussion. A different approach and document format is to be developed for the next annual cycle of papers, which begins in March with a paper to the People on Trains and Stations Risk Group (PTSRG).

3. Recommendation

3.1 The board is asked to NOTE the passenger risk paper and SSRG discussion.
1. Purpose

1.1 The purpose of this paper is to provide SSRG members with a review of passenger risk and safety performance up to the end of the 2013/14 financial year, and present emerging trends for 2014/15. The paper presents a number of key safety performance measures for passenger risk and specific areas of risk currently being tackled by industry groups.

2. Key points

- The level of harm to passengers was lower in 2013/14 than in 2012/13. The level was similar in the first half of 2014/15 to that seen in the first half of 2013/14.
- There have been two passenger fatalities so far in 2014/15.
- The majority (94%) of risk to passengers is covered by one industry group, the People on Trains and Stations Risk Group. The remainder of passenger risk is covered by the Train Operations Risk Group and the Level Crossing Strategy Group.
- An industry-wide strategy has been developed by the Platform-Train Interface Strategy Group to tackle existing and emerging risk at the PTI.
- At the latest update, in November 2014, train accident risk to passengers, as measured by the Precursor Indicator Model (PIM), stood at 3.14 fatalities and weighted injuries (FWI) per year.

3. Passenger risk profile

3.1 Safety Risk Model version 8.1 (SRMv8.1) estimates the risk to passengers as being 58.4 FWI per year, which is 44% of the total mainline system risk of 132.0 FWI (excluding suicides). A detailed breakdown of the risk profile is shown in Chart 1 in the Appendix.

Passenger risk from train accidents

3.2 According to SRM v8.1, train accidents account for 7.8 FWI per year. Of this, 2.8 FWI is to passengers, which is 4.8% of the total risk to passengers (58.4 FWI per year).

3.3 The PIM measures the underlying risk from train accidents by tracking changes in the occurrence of accident precursors. At the latest update, on 8 November 2014, the train accident risk to passengers stood at 3.14 FWI compared with 3.31 FWI at the end of 2013/14. The overall PIM stood at 6.99 FWI, compared with 7.53 FWI at the end of 2013/14. Further analysis can be found in the Appendix.
4. **Overview of trends in 2013/14**

4.1 There were 1.59 billion passenger journeys in 2013/14, a 6% increase from 2012/13. There has been a 53% increase in passenger journeys, a 44% increase in passenger kilometres, and a 10% increase in train kilometres over the past ten years.

4.2 There have now been more than seven-and-a-half years without a passenger fatality in a train accident.

4.3 There were four passenger fatalities, 270 major injuries, 6,307 minor injuries and 235 cases of shock/trauma reported in 2013/14. There were two fatalities in the first half of 2014/15 compared with one in the first half of 2013/14. All six fatalities occurring since 2013/14 occurred in separate incidents at stations.

4.4 The total level of passenger harm recorded in 2013/14 was 43.6 FWI, which was a 9% decrease on 2012/13, a year with an above average level of harm. When normalised by passenger journeys, the rate of FWI per passenger journey in 2013/14 showed a 14% decrease from the rate for 2012/13. The level of harm in the first half of 2014/15 was similar to the first half of 2013/14. Further details of safety performance can be found in Chart 4 and Chart 5 in the Appendix.

4.5 The number of assaults recorded by British Transport Police in 2013/14 increased slightly compared with the previous year. When normalised, the rate of assault has continued to reduce, and stands at around one per 450,000 journeys.

5. **Current industry groups that review risk to passengers**

5.1 Chart 3 in the Appendix presents passenger risk broken down by its SSRG sub-group.

5.2 The People on Trains and Stations Risk Group (PTSRG) covers 94.2% (55.0 FWI) of risk to passengers. The purpose of the group is to understand and review risks to the workforce, passengers and public in stations and on-board trains on Network Rail controlled infrastructure and interfaces with other rail systems. It covers risks such as slips, trips and falls, trespass, assault and abuse, platform-train interface (PTI) and on-board injuries.

5.3 The Train Operations Risk Group (TORG) covers 4.4% (2.6 FWI) of risk to passengers. The group’s terms of reference (TOR) include understanding and reviewing the proportion of total system risk relevant to its scope, which includes train accidents on the national rail network (except at level crossings) due to any cause. The TOR also include monitoring the effectiveness of current control arrangements, identifying improvement opportunities; learning from and promoting good practice; and considering future developments that may impact risk.

5.4 The Level Crossing Strategy Group (LCSG) covers 1.4% (0.8 FWI) of risk to passengers. The group’s TOR include reviewing the risk to users of level crossings and train occupants. Some of the group’s objectives include; reviewing current control arrangements and risk mitigations in place, to sponsor and govern research, learning and promotion of good practice/co-operation and responding to SSRG.

6. **Other relevant initiatives and information**

   **Platform-train interface strategy**

6.1 The Platform-Train Interface Strategy Group (PTISG) was established in December 2013. It has cross-industry representation, which is also reflected across the programme team and technical work stream leads.
6.2 An industry-wide strategy has been developed by the PTISG to tackle existing and emerging risk at the PTI. The core aim of the strategy has been for the industry to work together to reduce safety risk and optimise operational performance and availability of access in a manner that promotes the long-term best interests of the mainline railway system. The strategy identifies the immediate, short-, medium-, and long-term deliverables for the mainline railway system as a whole for new railway developments and major renewals, and for existing stations and rolling stock.

6.3 The PTI strategy will:

- Focus on safety, performance, capacity and access issues that impact on the PTI.
- Address the issues relating to the continued compatibility of freight vehicles with the routes and platforms on the network.
- Give due consideration to the accessibility requirements of the ‘Persons with reduced mobility’ Technical Specification for Interoperability.
- Consider the potential for multi-fatality incidents at the PTI resulting from crowding.
- Consider the expected increase in passenger numbers and required platform modifications.

Accidents at the PTI involving contact with a train

6.4 The severity of a passenger injury at the PTI is heavily influenced by whether or not the accident involves a train and if so, whether the train is stationary or moving. The following analysis is based on all passenger injuries occurring at the PTI between 2014/15. For those involving trains, the type of train movement is highlighted.

<table>
<thead>
<tr>
<th>Chart 1. PTI harm 2004/05 to 2013/14</th>
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<tr>
<td><strong>Injuries per year:</strong> (1,245.6) 1%</td>
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<tr>
<td><strong>Harm per year:</strong> (9.9 FWI) 56%</td>
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<tr>
<td><strong>Fatalities per year:</strong> (3.2) 44%</td>
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6.5 While they have accounted for just 1% of the events, accidents involving moving trains represented nearly 30% of all PTI passenger FWI harm and over 75% of fatalities of the past ten years.

6.6 Around half of the harm and most of the fatalities caused by moving trains at the PTI have involved a through train, with departing and arriving trains making up the remainder. In viewing the above chart, it is important to note that while incidents involving departing trains occurred around the time of dispatch, it is not necessarily the case that the dispatch process was the cause of the incident.
Train dispatch

6.7 A research and development business case has been made for project T1059 *Evaluating the use of on-train driver only operation (passengers) monitors during station departures*. The case is outlined below:

6.8 Driver Only Operation for Passenger Trains (DOO (P)) is used for 25% of all dispatches. The On Train Camera Monitor system consists of dedicated cameras mounted on each vehicle body-side used in conjunction with monitors fitted inside the active driving cab.

6.9 Current practice is to turn off the monitors when the doors are closed/locked, whereas on recent builds for London Underground (LUL) the DOO(P) monitors stay active during station departure. This research will inform choices around operational options for the use of the monitors, such as leaving monitors on until the driver releases brakes / takes power, or until a train moves for a specified time, distance, given speed or until the train has fully departed the platform.

PTI dashboard

6.10 An initiative carried out under the strategy is the development of a PTI dashboard by Network Rail. The dashboard presents information on PTI events broken down by route and by influencing factor (such as passenger behaviour, substandard surfaces). The data behind the dashboard is derived from the Safety Management Information System, with post-processing to identify the influencing factors carried out from the narrative. The dashboard data is in the process of being handed over to RSSB, who will continue with the on-going analysis. In the future, it is planned that the extra information *requirements identified from this work* will be incorporated into the programme of work to redevelop SMIS as a more complete risk information system.

Other contributors to passenger risk

6.11 The PTSRG will focus their work on four priority risk areas: Slips, trips and falls; trespass; assaults and abuse; and on-board injuries. Work is required to identify and confirm causes of accidents in these areas, as well as current mitigations in place across the industry, which will be collated in a matrix.

6.12 A detailed analysis is underway on the causes of on-board injuries that are captured in SMIS. Extra information identified from this work could then be incorporated into the programme of work to redevelop SMIS.

7. Recommendation

7.1 SSRG are invited to:

a) **CONSIDER** and **DISCUSS** the key points identified in this paper.

b) **CONFIRM** that they are content that they have reviewed and considered the significant items of passenger safety risk that impact on the industry and are satisfied with the overall arrangements to control the risk.
The pie chart in Chart 2 shows the proportion of risk to passengers as being 58.4 FWI per year, which is 44% of the total system risk of 132.0 FWI (excludes suicides).

The chart on the right then presents the accident type and shows that slips, trips and falls account for the largest proportion of the risk to passengers (47%).

Passenger accidents at the PTI account for the largest proportion of passenger fatality risk, at 48%. This category includes injuries during boarding and alighting, but also injuries when no train is present, such as falls from the platform edge.

Train accidents account for 5% of passenger FWI risk and 23% of passenger fatality risk, and are the next highest contributor to passenger fatality risk after accidents at the PTI.

Assault on passengers is estimated to contribute 9.6 FWI per year, which is 16% of the passenger FWI risk.

The category other passenger accidents includes events such as those arising from falls from height, exposure to hazardous substances, manual handling injuries and station fires.
Chart 3 presents passenger risk broken down by its SSRG sub-group. The chart shows that the vast majority of risk to passengers (94%) falls within the scope of the PTSRG.
Recent trends in passenger harm

The average level of harm to passengers over the past ten years has been 42.3 FWI per year, of which 6.6 FWI relates to fatalities.

- The level of passenger harm due to major injuries decreased in 2013/14, after a marked increase in the previous year.

- Comparison between the first half of 2013/14 and the same period in the previous year does not show a notable change in the overall level of passenger harm. However, there were two fatalities reported, in comparison to one in the same period in the previous year.

- There was a reduction in the number of weighted injuries occurring at PTI in the 2014/15 half-year when compared with the same period in the previous year. This has led to an overall reduction in weighted injuries.

- There were two fatalities in the 2014/15 half-year compared with one in the same period in the previous year. There have now been more than seven-and-a-half years without a passenger fatality in a train accident.
Precursor indicator model

Chart 6 shows trends in the overall PIM indicator (the topmost line), and trends in the contribution of the six PIM groups to passenger risk.

- The train accident risk to passengers stood at 3.14 FWI compared with 3.31 FWI at the end of 2013/14. The overall PIM stood at 6.99 FWI, compared with 7.53 FWI at the end of 2013/14. The train accident risk to members of the public and the workforce stood at 3.07 FWI and 0.78 FWI respectively (compared with 3.39 FWI and 0.83 FWI at the end of 2013/14).