1 Purpose of paper

1.1 This paper is part of the Strategic Board Agenda considering the modelled safety risk for the industry. The paper provides a review of public risk and safety trends, an overview of some of the key activities the industry is undertaking to address the risk and a snapshot view of some of the ways in which the sources of public risk are being tackled.

2 Key trends and issues in public risk

2.1 The number of suicides and suspected suicides has increased in the last quarter to the end of June with 66 being recorded, such that the annual moving total at the end of the quarter was 249, 5% higher than it was at the end of March 2013.

2.2 Suicide remains a key focus of attention with increasing levels of pre-suicide interventions being made and managed. The average time it takes to return the railway to operation after a suicide or trespass fatality has been reduced.

2.3 The amount of recorded vandalism continues to drop. Five years ago, the annual moving total of incidents was 9,191, now it is 5,160, a drop of 44%. There has also been a marked reduction in cable theft despite the continued high value of copper.

2.4 The numbers of level crossing fatalities and collisions between trains and road vehicles in the last quarter were broadly consistent with previous quarters

2.5 The number of trespass fatalities in the last quarter was lower than usual at five. The annual moving total currently stands at 36 compared to 51 last year.

3 Public risk in context

3.1 Version 7.5 of the Safety Risk Model (SRM) indicates that, on average, public risk accounts for 57.7 FWI/year (42% of the accidental risk). Additionally, on average, suicides account for 224.3 FWI/year. The majority of risk to the public is made up of fatalities (either suicides, trespass or using level crossings). Risk from the public to the workforce or passengers, manifests itself in the form of misuse at level crossings (though most of this risk is to the public), by placing objects on the line or by throwing objects at trains, or in the form of accidental road vehicle incursions (via fences, bridges and occasionally via level crossings).

3.2 The major influence of public risk on train accidents occurs at level crossings, with the last level crossing accident resulting in train fatalities occurring at Ufton in 2004 killing the train driver and five passengers. The driver of the car that had been parked on the level crossing, who was intending to commit suicide, also died.

3.3 The most recent train accident at a level crossing resulting in a fatality occurred on 9 April 2013 at Great Coates level crossing (London North Eastern) and resulted in the death of two vehicle occupants.
3.4 Details of the recent safety performance and risk relating to public risk are presented in the Annual Safety Performance Report and a ‘snapshot view’ of some of the ways in which sources of public risk are being tackled is presented in Annex B.

Overview of key activities the industry is undertaking to address the risk

4 Suicides

4.1 Despite the recent increase in the rate of suicides and suspected suicides, noted in 2.1 above, the rate over the last two years has remained the same at 238 per year. In contrast there have been increases in all railway suicides (including London Underground and other railways), as well as the national suicide rate. In addition to the fatalities a further 90 per year attempted suicides across all rail networks resulted in injury (and about half of these result in major injuries). These 330 incidents are a small proportion of the total number of people who show suicidal intentions.

4.2 According to data collected by the BTP for 2012/13, there were some 2,353 pre-suicidal incidents. This number includes 313 determined attempts which did not result in injury, and are in addition to the numbers mentioned in 4.1 above. Most of these incidents would have involved some preventative intervention which foiled the attempt. Every incident is risk assessed and those ranked medium or high risk (about 800 per year) are made the subject of a suicide prevention plan. This ensures they are given a medical assessment and that the individual is referred to the right medical service, so that proper care can be provided. These plans are also logged in the Police National Computer so that if individuals are checked by local police they are aware of their status and can take more informed action.

4.3 Since February 2013, the London North area of BTP has been working closely with mental health professionals on a daily basis to provide a review of BTP suicide prevention plans, fast access to information and social care skills in understanding and tackling particular social and economic issues.

4.4 Network Rail and the Samaritans have completed the third year of their long-term programme to reduce the number of suicides. To date, about 3,000 frontline railway staff have attended a training course on how to manage suicidal contacts and there have been outreach working meetings taking place between priority locations and Samaritans branches across the country. Since the programme was launched in 2010, there have been more than 30 occasions where members of workforce have put their training into practice and have been successful in dissuading an individual perceived to be at-risk from taking their life.

4.5 RSSB is undertaking research (T845: Improving suicide prevention measures on the rail network in Great Britain) alongside the programme, to support the development of these interventions and to evaluate their effectiveness as they are rolled out. As a result of this work changes have been made to SMIS with the aim of formally capturing these interventions so that we can analyse them and hence objectively review how successful this particular initiative is. Interventions are now being recorded in SMIS but the data are not yet considered sufficient to draw any conclusions.

4.6 BTP data on this issue is currently more comprehensive, but the majority of their interventions are not being entered into SMIS. Their data show that 62 life-saving interventions were made in periods 1 and 2, and since then about 1.5 life-saving interventions are made every day.
4.7 Based on the suite of suicide data (from pre-suicide incidents right through to suicides), a weighted measure has been developed by the BTP and Network Rail, leading to the identification of 27 priority locations. In the next 12 months each of these locations will be visited by a joint industry team to evaluate the current measures and local factors and to identify local preventive measures that can be put in place.

4.8 Network Rail has been working with station operators to arrange the installation of physical barriers (particularly at platforms where fast trains pass and never stop), hatched areas, improved Samaritan information and lighting and other anti-suicide measures.

4.9 A significant proportion of suicide attempts and interventions are made at bridges, which is a challenge for the rail industry as often these bridges are managed by local councils and unlike some stations are unstaffed.

4.10 In early 2012, BTP working with Network Rail and other industry partners changed its process for how they respond and categorise railway fatalities, shifting the emphasis to a more risk based approach. This has led to improved investigations, and the ability to return the railway to normal running quicker as less fatalities are deemed to be unexplained. There is an emphasis on returning the railway as soon as practicable (taking into account dignity, thorough investigations and identification of any criminal activity), so that additional risks to passengers are not created (ie being stuck in tunnels, or forced evacuations). Ways of enabling partial train running are also being explored. This has led to a reduction in train delays related to suicide of around 22%.

5 Vandalism

5.1 The number of recorded incidents in SMIS is currently 40% lower than ten years ago, with just over one incident per day currently being recorded.

5.2 The theft of lineside cable causes significant operational delay, creates reinstatement cost and necessitates criminal investigation. Where the cables that are cut or damaged are either live, or near to other live sources of electricity there is serious potential for injury or death. In June 2012, a man was electrocuted while apparently engaged in the act of cable theft on the line between Benfleet and Leigh-on-Sea.

5.3 New legislation has been introduced following cross-industry lobbying to explain the need for changes to the law regarding scrap metal dealers. The Scrap Metal Dealers Act 2013 received Royal Assent on 28 February 2013; this comprised an update of the 1064 legislation.

5.4 Up to the end of 2011/12, the incidence of cable theft showed a general correlation to the trend in copper price over the same period. Since then, although copper prices have stabilised, there has been a decreasing trend in the recorded incidence of thefts, which is suggestive of initiatives taking effect. About eighteen months ago recorded incidents of cable theft started to fall. In the last quarter there were 225 incidents. The annual moving total is 1,029, 12% lower than at the end of March 2013, and 47% lower than a year ago. This is shown in the chart below.
5.5 The general reduction in railway vandalism is in line with falls in vandalism seen in wider society. According to the Crime Survey of England and Wales, since 2007, there has been a 37% reduction in vandalism incidents. There has been a similar reduction in Scotland. The reasons for this reduction is unclear, but suggestions include: stuff is harder to vandalise, anti-social behaviour crackdowns are working, vandalism prevention is more sophisticated, social media is the new graffiti, and young people drink less alcohol. Some of these have correlations with work on the railway: for example new rolling stock that is more arson proof, and the recruitment of more security personnel.

6 Level crossings

6.1 Excluding suicides, during 2012/13 there were nine fatalities at level crossings. In the three months since, there have been a further three fatalities.

6.2 Network Rail has developed a new model called the Level Crossing Risk Indicator Model (LCRIM) to track risk at level crossings and regularly monitor progress towards the target of reducing risk by 25% over the duration of Control Period 4 (CP4). Details of the model are provided in Annex A.

6.3 The achieved reduction in FWI at the end of 2012/13 was 22.8% (77.2 index points). The target was a 20% reduction (to 80 index points).

6.4 Improving level crossing safety is currently a major focus for the industry. Network Rail has put a level crossing risk reduction programme in place, and given that the LCRIM showing a 26.2% reduction at the end of Period 5, is currently on track to meet the targeted reduction in level crossing risk of 25% over the course of CP4. A further 8% risk reduction is planned for Control Period 5 (CP5), which will runs from April 2014 to March 2019.

6.5 An overview of some of the current Network Rail level crossing initiatives are presented in Annex A.

7 Recommendations

7.1 The board is invited to:

- CONSIDER and DISCUSS the key points identified in this paper.

- CONFIRM that they are content that they have reviewed and considered the significant items of public safety risk that impact on the industry and are satisfied with the overall arrangements.
Annex A. Overview of current Network Rail level crossing initiatives

Level Crossing Risk Indicator Model (LCRIM)

Network Rail have developed a new model called the Level Crossing Risk Indicator Model (LCRIM) to track risk at level crossings and regularly monitor progress towards the target of reducing risk by 25% over the duration of CP4.

Results from the SRM and ALCRM inform the LCRIM. While the SRM is only updated periodically, the development of the LCRIM enables Network Rail to track progress on a more regular basis.

The chart below shows the LCRIM and the progress made in CP4 thus far. The black dashed line shows the projected risk reduction target and the red line is the actual risk reduction score which is in line to reach the 25% risk reduction date of April 2014, if the rate of progress continues.

- The LCRIM uses data from the ALCRM and is updated every four weeks. It is calibrated against risk estimates from the SRM.
- The risk score is expressed as an index, with a baseline score of 100 at the start of CP4. This allows the percentage reduction in risk from the start of the control period to be monitored easily.
- The achieved reduction in FWI at the end of 2012/13 was 22.8% (77.2 index points). The target was a 20% reduction (to 80 index points).

<table>
<thead>
<tr>
<th>Level Crossing Risk Indicator Model – overall score</th>
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<tbody>
<tr>
<td><img src="chart.png" alt="Graph showing LCRIM and progress" /></td>
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</table>

Other Network Rail safety related projects currently underway are:
- Recruitment has been completed for the 100+ dedicated Level Crossing Managers and Route Level Crossing Managers. This initiative is to support the continued improvement of asset inspections as well as data collection for risk
assessments and modelling. Their role includes building relationships with authorised users and in the wider local community to understand local risks. All new Route teams have gone operationally live. A new comprehensive training course has been developed and introduced for the level crossing teams. Over 2,000 days of training were provided to support the delivery of the new operating regime.

- The programme of level crossing closures has continued through 2012/13. A further 117 crossings were closed during the year, bringing the total closed since 2009 up to 700.

- High risk footpath crossings are being replaced by footbridges, in line with a policy decision to remove the need for pedestrians to cross high speed main lines unprotected by barriers. Two new modular footbridges were erected to close crossings and detailed plans have been developed to complete 33 more similar schemes in 2013/14. The new modular approach reduces unit costs by 40%.

- Sighting and warning times are being improved at passive level crossings, which has resulted in enhancements to more than 1,100 crossings since 2010.

- Work has continued for the development of red light safety cameras with number plate recognition technology. Three systems are currently undergoing Home Office Type Approval, with a view to roll them out at 150 AHB or AOCL crossings during 2013/14.

- Thirteen new mobile safety vehicles have been deployed during 2012/13 covering every route on the network. The vehicles are staffed by British Transport Police and they have detected and prosecuted more than 1,000 motorists responsible for red light violations since 2012.

- Audible warning devices have been developed, which provide a spoken warning which advise pedestrians; “Warning: another train is approaching”. These are now being introduced with the aim to roll them out at around 150 level crossings at stations. This is to ensure that pedestrians understand that it is not safe to cross when the crossing sequence continues after a first train has entered, or passed through, the station.

- Network Rail is introducing a range of technologies to locate trains in long signal sections, including GPS and sound wave based solutions. A system that provided precise information to the signaller was demonstrated on the Sudbury Line in December 2011; this was introduced under a trial certificate in January 2012. The next phase aims to provide this information directly to crossing users, removing responsibility from the signaller.

- Power operated gate openings are being developed for circa 300 user-worked crossings to improve user behaviour and to avoid the need for users to get out of the vehicle and make multiple trips over a crossing on foot.

- The trial installation of overlaid barriers at AOCL crossings (making them AOCL-B crossings) has now been completed. These can be installed at a fraction of the cost of a full crossing upgrade and the roll out programme to over 70 locations will continue during 2013/14.
AGENDA ITEM: 02

- A form of approach locking (barrier inhibition) is being installed at more than 70 high risk manual crossings to remove the risk of the crossing being opened to road traffic with a train approaching (but the signals set to danger behind it).

- Network Rail are continuing with two major initiatives to educate level crossing users:
  - During October 2012 on national television, radio and online. See Track / Think Train delivered the message – Distractions can cost you your life, take care at crossings. The campaign ran again in May 2013 to coincide with spring/summer peak usage and International Level Crossing Awareness Day (ILCAD). Over 100 awareness events were held at level crossings during ILCAD.
  - Rail Life, a primary and secondary school initiative for young people launched in May 2012, continues to support railway safety awareness within schools. A digital campaign on Spotify, YouTube and Twitter with rapper Professor Green in September 2012 highlighted the dangers of distractions such as headphone with the key message being: Lose your headphones, not your life.
### Annex B. ‘Snapshot view’ of some of the ways in which sources of public risk are being tackled

<table>
<thead>
<tr>
<th>Risk from</th>
<th>Main types of event</th>
<th>Fatal</th>
<th>FWI</th>
<th>RSSB actions to support industry</th>
<th>Industry co-operative actions</th>
<th>Actions by individual organisations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public behaviour</td>
<td>Trespasser struck by train or electrocuted.</td>
<td>42.13</td>
<td>45.25</td>
<td>A large portfolio of previously published research on trespass issues is available from the RSSB website. More recently published: T704: The contribution of alcohol to personal safety and security risk on the railways (including Good Practice Guide); T723: Making the most of data associated with railway crime; T943: Addressing crime and disorder through planning and design; T954: Evaluating measures to improve personal security and the value of their benefits.</td>
<td>Crime topics reviewed nationally by the System Safety Risk Group and regionally by Community Safety Partnership Groups, which enable industry organisations to consider local measures and work in partnership with local authorities.</td>
<td>General improvements made to CCTV systems across a number of stations; general management and maintenance of systems also upgraded.</td>
</tr>
<tr>
<td></td>
<td>Assaults, threats and verbal abuse</td>
<td></td>
<td></td>
<td>The Trackoff website supplies educational materials to teachers to enable them to warn their students of the dangers of inappropriate behaviour on the railway network. During 2009 a DVD was sent to more than 30,000 schools throughout the country.</td>
<td>Operation Tornado is a BTP scheme involving scrap metal recyclers that is designed to crack down on metal theft. Following a successful pilot in the North East of England Operation Tornado is being rolled out across the UK.</td>
<td>Rail enforcement officers given direct access to the BTP radio network, enabling them to contact BTP immediately when necessary. TOCs, Network Rail and BTP use a variety of staffing measures including security guards, rail enforcement officers, special constables and police community support officers.</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>Pedestrian struck by train at (footpath) level crossing</td>
<td>5.71</td>
<td>6.11</td>
<td>RSSB manages the annual Community Safety Forum, Newsletter and Resource Centre website to inform industry and share good practice.</td>
<td>Network Rail has developed a new communications package to address the issue of pedestrian safety at crossings and a specific campaign targeting schoolchildren has been launched.</td>
<td>Network Rail and Network Rail’s Partnership Awards recognize work by groups to encourage the public to act responsibly when using the railway.</td>
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<tr>
<td></td>
<td>Train collision with road vehicle at level crossing; road vehicle incursion not at level crossing and bridge strikes</td>
<td>2.81</td>
<td>3.15</td>
<td>Published: T335, Improving road user and pedestrian behaviour at level crossings, T650 Improving safety and accessibility at level crossings T653, Safer European level crossing assessment and technology (SELCAT); and T730 Understanding human factors and developing risk reduction solutions for pedestrian crossings at railway stations. In progress T984 Research into the causes of pedestrian accidents at level crossings and potential solutions. In 2011, a new level crossing teaching package was added to the Trackoff website.</td>
<td>Published: T729: Further work on obstacle detection at level crossings; T737: Documenting the All Level Crossing Risk Model; T863: Updating the Level Crossing Risk Management Toolkit; T738: Trialling the national roll out of the level crossing cost model; and T854: Reducing the number and impact of road vehicle strikes on railway underline bridges. In progress: T756: Research into traffic signs at level crossings (second stage) and T983: Research into signs at private level crossings. RSSB chairs the European Level Crossing Forum, to share good practice and</td>
<td>Network Rail has a series of initiatives running to tackle railway crime, including trespass. Some examples are: Rail Life, a website aimed at teaching young people about the dangers of misusing the railway; media campaign with 400m hunder Dai Greene – this showed that if an athlete at the peak of fitness cannot outrun a train, an average person will not stand a chance; Partnership with Streetgames – offering local kids the chance to engage in sport and not mess around on the tracks; Rail Reps – a mentoring relationship between school and BTP volunteers.</td>
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<table>
<thead>
<tr>
<th>Risk from</th>
<th>Main types of event</th>
<th>Fatal</th>
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<th>Actions by individual organisations</th>
</tr>
</thead>
<tbody>
<tr>
<td>General</td>
<td>Non-trespass related slips, trips and falls at stations</td>
<td>0.64</td>
<td>1.28</td>
<td>Published research projects: T157a: The best flooring materials for stations; T157b: Safer surfaces to walk on - reducing the risk of slipping; T166: The use of tactile surfaces at rail stations; T332: An evaluation of frost, ice and snow precautions at stations; T829: Safer surfaces to walk on: an updated guide. T834 Reducing accidents through inclusive design; steps, stairs and ramps T749, Guidance on protecting people from the aerodynamic effects of passing trains in progress. In progress: T992 Safer stairs and escalators in public places.</td>
<td>Industry groups looking a similar risk to passengers, eg Operations Focus Group (OFG), will also address same risks to members of the public.</td>
<td>Covered by individual duty holder actions aimed at reducing passenger risk at stations.</td>
</tr>
<tr>
<td>Level crossing</td>
<td>LX equipment malfunctions</td>
<td>0.10</td>
<td>0.22</td>
<td>No research specifically addressing public risk.</td>
<td>The work of systems interface committees and standards committees related to engineering issues.</td>
<td></td>
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<tr>
<td>Rolling stock</td>
<td>Third party injury from train accidents</td>
<td>0.21</td>
<td>0.25</td>
<td>Engineering research predominantly focused on rolling stock itself and passengers.</td>
<td></td>
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<tr>
<td>Infrastructure</td>
<td>Third party injury from train accidents</td>
<td>0.28</td>
<td>0.35</td>
<td>T359: Management of stressed continuously welded track, T569: Development of risk based examination intervals for Network Rail bridges, T696: Appraisal of Eurocodes for Railway Loading, T683: Research to investigate and advise on optimisation of close- and long-range viewing of signals, T804: Automatic Warning System (AWS) infrastructure Characterisation all completed; and T808, AWS Testing - the way forward in progress.</td>
<td>RSSB has worked closely with Network Rail and appropriate European committees (CEN/UIC) to establish requirements that are relevant to the GB railway industry in the Structural Eurocodes.</td>
<td>In addition to internal studies and the development of standards and management processes, Network Rail have actively participated as a stakeholder representative on research project steering groups and the review of project outputs. Following the publication of T569, Network Rail has used the guidance provided to establish examination intervals for their bridge assets on the basis of risk. Work is also targeted at reducing the frequency and consequences of bridge strikes.</td>
</tr>
<tr>
<td>Station staff</td>
<td>Non-trespass related slips, trips and falls at stations</td>
<td>0.03</td>
<td>0.42</td>
<td>Published: T743, Improving the arrangements for train dispatch from stations. T749, Guidance on protecting people from the aerodynamic effects of passing trains in progress.</td>
<td></td>
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<tr>
<td>Workforce behaviour(^1)</td>
<td>Train crew</td>
<td>0.13</td>
<td>0.16</td>
<td>No research specifically addressing public risk</td>
<td>Initiatives such as ATOC Driver Managers group.</td>
<td>Duty holder responsibilities and initiatives related to competence management and development that address the prevention of train accidents will be relevant here.</td>
</tr>
<tr>
<td></td>
<td>Track worker</td>
<td>0.01</td>
<td>0.01</td>
<td>No research specifically addressing public risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Signaller</td>
<td>0.25</td>
<td>0.27</td>
<td>No research specifically addressing public risk</td>
<td></td>
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<tr>
<td>Total</td>
<td></td>
<td>52.4</td>
<td>57.7</td>
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<tr>
<td>Public</td>
<td>Suicide</td>
<td></td>
<td></td>
<td>Project T845 Improving suicide prevention measures on the rail network in Great Britain, in progress</td>
<td>Working with Samaritans to train rail staff to recognise behaviour that might lead to suicide. Two courses are available: managing suicidal contacts and trauma support. Network Rail's cross-industry National Suicide Prevention Steering Group and Working Group</td>
<td>Closure of access to unused platforms. Placing of Samaritans posters around stations and additional staff training to identify potentially suicidal people. Network Rail are working as part of the European RESTRail project to tackle trespass and suicide prevention.</td>
</tr>
</tbody>
</table>

\(^1\) Third party risk also has the potential to arise from workforce activity away from the mainline railway, for example road traffic accidents whilst driving between sites. This is not covered by the SRM.
<table>
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<tr>
<td></td>
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<td></td>
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<td>addresses suicide prevention...</td>
<td></td>
<td>Network Rail has produced a Drivers Guidance document outlining the behavioural impacts and strategies for recovery should a driver be involved in a suicide event. In addition they have also produce Memorials Guidance on how to deal with requests for memorials.</td>
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<td>Emotional Support Outside the Branch (ESOB) – All Network Rail priority locations are covered by local Samaritans branches.</td>
<td></td>
<td>BTP have launched a new fatality guidance document that has already had a positive impact on the delay impact of events.</td>
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<td></td>
<td>The Samaritans/Network Rail suicide reduction campaign was refreshed and re-launched in September 2012.</td>
<td></td>
<td>British Transport Police Referral Scheme – this is being piloted in the London North area but will be rolled out this year to all areas.</td>
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<td></td>
<td>BTP officers are able to refer individuals to the service through the Central London Samaritans branch.</td>
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</tbody>
</table>