Network Rail

CP4 Delivery Plan 2009

Safety Delivery Plan

March 2009

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Introduction

Safety on the railway depends largely on the proper design, construction, maintenance and operation of the network. Most safety improvements will come from more effective and efficient development and management of the network, rather than from "add-on" safety initiatives. The health and safety plan for CP4 is therefore based to a large extent on the impact that our asset and route strategies will have on overall safety performance.

Our asset policies aim to deliver a safe and reliable railway through the proactive management of our assets. These asset policies specify the design and future inspection and maintenance regimes for our assets. This takes into account safety and legislative issues, including the overarching requirement to reduce health and safety risks as far as is reasonably practicable.

In developing these policies, and specific route based plans, consideration has been given to key risk areas identified through a systematic approach to risk assessment.

Periodic Review 2008 (PR08) safety targets

System safety risk encompasses all aspects of safety risk associated with the design, construction, maintenance and operation of the mainline railway network. This includes the stations and running lines, and covers risk to passengers, workforce and the public who may be affected by the operation of the railway.

Over the last ten years, the industry has developed a comprehensive model of system safety risk on Britain's mainline railway. The Safety Risk Model, maintained by the Rail Safety & Standards Board (RSSB), assesses the safety risk on the mainline network from all of the hazardous events that can give rise to fatality or injury. The risk is expressed as fatalities and weighted injuries per annum for each of the population groups at risk; passengers, workforce and public.

There are two safety targets defined in PR08, both based on output measures from the industry Safety Risk Model:

- passenger safety risk – measured as fatalities and weighted injuries normalised per million passenger kilometres - with a target to reduce this risk by three per cent between the start and finish of CP4; and
- workforce safety risk – measured as fatalities and weighted injuries normalised per million employee hours - with a target to reduce this risk by three per cent between the start and finish of CP4.

These are industry targets to be delivered by Network Rail and passenger and freight train operators working in cooperation. Both targets are based on risk rather than actual performance, measured through the industry Safety Risk Model.

These targets do not encompass all of Network Rail's health and safety responsibilities. Under the Health & Safety at Work etc. Act 1974, we have a duty to continue to reduce, so far as is reasonably practicable, health and safety risks to any person affected by our undertaking. Therefore our plans also cover risks outside the scope of the PR08 targets, including health risks and risks to the public.

Network Rail Health & Safety Plans for CP4

Details of these plans are set out later in this document.

Each year the Rail Safety & Standards Board publishes a Railway Strategic Safety Plan, based on the individual safety plans of Network Rail and train operating companies, showing collectively how they address key safety risks on the mainline railway and the projected impact on risk. The plans described here were used to support Network Rail's input to the Railway Strategic Safety Plan.

During 2007, Network Rail consulted train operators on progress with the development of Network Rail's plans and on the development by train operators of their own plans. Network Rail worked with train operator representatives and RSSB to analyse the likely impact of train operator plans on the risk projections for CP4, based largely on their submissions to the Railway Strategic Safety Plan.

These risk trajectories were further reviewed in 2008 to take account of the latest amendments to the proposed plans and changes to the weighting of minor injuries in industry risk calculations that RSSB introduced in April 2008.

Passenger safety risk

The passenger risk profile on the mainline network comprises risk from train accidents and non-train accidents.

Train accident risk is characterised by very infrequent accidents which have the potential for high casualty rates. Although this risk category accounts for only seven per cent of total risk to passengers, it represents 25 per cent of total fatality risk to passengers, due to the potential high consequence of these accidents. This aspect also gives train accident risk a high public profile. It is therefore of particular strategic importance to Network Rail and the rest of the industry.

Nevertheless, passengers are far more likely to suffer injury arising from individual accidents on stations or on board trains than in train accidents.

Passenger risk at stations represents 83 per cent of total passenger risk, with slips/trips/falls, assaults and platform/train interface accidents accounting for the greatest part of this risk. The 18 stations managed directly by Network Rail carry 21 per cent of total passenger risk, reflecting the high proportion of passenger journeys that start or finish at one of these stations.

Passenger risk on trains, excluding train accidents, represents 16 per cent of total passenger risk, the major contributors being assaults, contact with objects (including cuts from sharp edges), and slips/trips/falls.

Reducing train accident risk

Network Rail's plans to reduce train accident risk to passengers include:

- infrastructure asset strategies (particularly track and civils);
- improvements in management of weather related risks;
- improvements in irregular working; and
- improved management of level crossings.

Passenger and freight train operator plans to reduce train accident risk include:

- improvements in irregular working;
- improved T&RS maintenance; and
- improved management of SPADs.

Overall, train accident risk to passengers is projected to reduce by 3.5 per cent during CP4.

Reducing risk at Network Rail managed stations

Risk to passengers at Network Rail's 18 managed stations accounts for 21 per cent of total passenger safety risk. It is anticipated that our plans outlined below will reduce this by four per cent during CP4. This projection takes into account the significant increase in passenger numbers during CP4 and the limited degree of control over passenger behaviour, which accounts for the greatest proportion of this risk. Plans to reduce passenger risks at Network Rail managed stations include:

- implementation of slips/trips/falls reduction schemes including lighting surveys, application of consistent design standards for stairs, standard signage and improvements to cleaning arrangements;
- reduction in passenger assaults through identification of "at risk" areas with improved controls, more widespread installation of CCTV, maintaining secure stations accreditation and working closely with BTP to continually reduce these risks;
- reduction in boarding and alighting risks through initiatives drawing attention to the platform/train gap, and increased provision of

yellow lines and accompanying signage or station announcements;
- station capacity modelling and enhanced crowd management processes to allow better control during periods of high train service demand; and
- trial of improved signage warning of the hazards of crossing tracks at stations.

During CP4 significant enhancements are being planned at the following principal stations; Edinburgh Waverley, London Bridge, London Cannon Street, London Kings Cross, Leeds City, Birmingham New Street, Liverpool Lime Street and London Euston. It is expected that these enhancements will bring with them corresponding safety improvements as the latest standards and best practice will be applied within the design.

Reducing risk at stations managed by train operators

Risk to passengers at stations managed by train operators accounts for 56 per cent of total passenger safety risk. Train operator plans to reduce passenger risk at their leased stations include:

- reduction in passenger slips/trips/falls, through targeted action at stations with highest numbers of incidents; and
- reduction in passenger assaults, through better communication of information to passengers and targeted use of Police Community Support Officers and CCTV.

Network Rail retains landlord responsibilities at approximately 2,500 stations leased to train operators. This includes ongoing renewals activities. We are working with train operators to introduce improvements to these contractual relationships through the introduction of a new Stations Code.

During CP4 we will also implement a number of enhancement projects that will have a positive impact on passenger safety risk at train operator managed stations. These include:

- Thameslink – which will impact on 50 of our busiest stations;
- Reading Station Area Development;
- National Stations Improvement Programme;
- Access for All Programme; and
- train lengthening programme.

It is anticipated that the above plans will reduce risk to passengers at stations managed by train operators by five per cent over CP4. Again, the trajectory allows for the projected increase in passenger numbers and the limited degree of control over passenger behaviour.

Reducing “on-board” passenger risk

The risk to passengers on board trains accounts for 17 per cent of passenger safety risk, excluding train accident risk. It is anticipated that train operator plans will reduce this by one per cent over CP4. Again, this allows for the projected increase in passenger numbers and the limited degree of control over passenger behaviour. The main contributors to this are:

- reduction in passenger assaults, through better communication of information to passengers and use of Police Community Support Officers and on board CCTV; and
- reduction in injuries due to contact with objects on board, through improved design of rolling stock interiors during refurbishment.

The overall reduction in passenger risk during CP4 is therefore projected to be four per cent, against the PR08 passenger safety target of three per cent.

Workforce safety risk

Risk to employees of Network Rail and its contractors accounts for 49 per cent of workforce safety risk, with slips/trips/falls, contact with objects and manual handling being major contributors. Risk of track workers being struck by trains, struck by or falling from mobile plant, or electrocuted, accounts for 20 per cent of this risk. However, due to the high consequence of these incidents, they represent 85 per cent of total fatality risk to track workers.

Passenger and freight train operator workforce accounts for 51 per cent of total workforce safety risk on the network. This excludes risk to train operator employees in yards, sidings depots and other locations outside of stations and controlled infrastructure.

The major contributors to train operator workforce at stations are assaults, slips/trips/falls and boarding & alighting. On trains, the major contributors are contact with objects, assault and slips/trips/falls. Train accident risk and trackside risk when leaving the train are also significant contributors.

It is anticipated that our plans outlined below will reduce workforce safety risk for Network Rail and its contractors by seven per cent during CP4.

Based on analysis of passenger and freight train operator plans submitted in support of the industry Railway Strategic Safety Plan, it is anticipated that passenger and freight train operator workforce safety risk will reduce by approximately seven per cent during CP4, with the main contributors being:

- reduction in staff assaults, both on board and at stations, through better communication of information to passengers and enhanced training of staff; and
- reduction in staff slips/trips/falls at stations, through targeted action at stations with highest numbers of incidents.

Public safety

There is no specific PR08 target on public safety. However, Network Rail has a legal duty to continue to reduce risks to the public so far as is reasonably practicable. The biggest risks to the public arise from the behaviour of a small proportion of the public who place themselves at risk through trespass and misuse of level crossings. We will continue with our programmes to manage railway crime and level crossing misuse through our strategy of enabling, engineering, education and enforcement.

Health

There is no specific PR08 target on health, but Network Rail has management arrangements in place to comply with legislative Occupational Health requirements, such as our alcohol and drugs policy in respect of those undertaking safety critical duties. Furthermore, due to the link between good workforce health and increased productivity, Network Rail has a general policy to promote good health, which goes beyond legislative requirements.

Monitoring performance against the targets

The industry performance against the PR08 safety targets will be measured by the output of the Safety Risk Model at the start and finish of CP4. The Safety Risk Model is currently only updated every eighteen months, and it is therefore anticipated that there will be only two interim runs of the Safety Risk Model during CP4.

In addition to this RSSB will monitor passenger safety performance and workforce safety performance annually in the Annual Safety Performance Report and also in the Railway Strategic Safety Plan.

Network Rail has introduced two Key Performance Indicators (KPIs) to measure its own contribution to workforce and passenger safety risk. The workforce safety indicator measures fatalities and weighted injuries for Network Rail employees and contractors. The passenger safety indicator comprises an element of train accident risk, based on the output of the Precursor Indicator Model (PIM), and passenger non-train accident risk based on actual passenger fatalities and weighted injuries on Network Rail managed stations and station level crossings.

Managing change safely

Where, in order to deliver the improvements in capacity, performance or efficiency described in the CP4 delivery plan, Network Rail undertakes major or novel initiatives which have a potential impact on safety, we fully identify and assess the safety risks involved and develop and apply appropriate risk control measures.

Network Rail operates formal change management arrangements to control the introduction of change and to confirm that all safety risks are identified, systematically addressed and controlled. These apply to changes relating to organisational structure, management systems, operations, infrastructure engineering, traction and rolling stock route acceptance, product acceptance, timetable change, station change and any other factors which may affect the safety of the operational railway.

These arrangements are defined in our Health and Safety Management System and supporting standards and procedures. These arrangements will be applied, where appropriate, to initiatives implemented during CP4.

Organisation and process change

The “GRIP for Change” framework supports delivery of business change programmes across Network Rail. It provides a tactical solution to managing change, bringing together toolkits and documents in use across the business. The framework has been developed with the consideration of internal and external best practice (e.g. Managing Successful Programmes).

In support of GRIP for Change, we have developed toolkits for both process improvement and for managing the people aspects of change that are designed to assist managers when they are undertaking organisation, process or system changes. The process improvement tools are

available on our intranet as are the tools for managing the leadership and people aspects of change.

Network Rail has specific arrangements for validating organisation and associated Health and Safety Management System changes. Safety validation affirms that the potential risks associated with a change have been identified, assessed and appropriately controlled. Furthermore, it identifies required changes to the Health and Safety Management System.

No change is implemented until safety validation has been completed and any required revision is made to the Health and Safety Management System. Major changes are notified to the Office of Rail Regulation (ORR) in accordance with regulation 13 of the Railways & Other Guided Transport Systems (Safety) Regulations 2006 (ROGS). Where a substantial change is to be made in accordance with regulation 11(1), it is not implemented until it has been assessed and the safety authorisation appropriately amended by the ORR.

For major changes, each sponsor arranges for a post implementation review to be undertaken after the changes have taken place to confirm that the intended business benefits have been delivered and lessons learned for the future.

Network Rail standards specify the requirements for securing the safe and efficient operation of our infrastructure. They promote the application of consistent processes across all Network Rail functions and specify how we control our principal health and safety risks. Standards are produced, changed or withdrawn in accordance with formal change control arrangements which specify requirements for consultation with affected parties, assessing the risks associated with changes and appropriate briefing and other implementation arrangements.

Infrastructure and rail vehicle changes

Specific change control arrangements are applied to projects that introduce changes to the infrastructure (defined as the track, the signalling, the power supply equipment and stations) or changes to vehicles operating on the network.

This includes changes to:

- existing vehicles operating on the network;
- the way in which existing vehicles are operated;
- the infrastructure (including new infrastructure);
- the way that the infrastructure is operated, maintained and renewed as a potential consequence of a change to the infrastructure or to vehicles operating on the network;
- the way in which data is managed;
- specific products that are used on our network.

It also includes projects that:

- introduce new plant, equipment or products onto the network, and which have the potential to have an impact on the safety of the network, or the operations carried out by Transport Operators on the network;
- impact on the infrastructure of any other Infrastructure Manager with which Network Rail infrastructure interfaces.

These arrangements examine the nature of the change from a system perspective to provide assurance that the proposed change is fully compatible with:

- the existing and planned future network;
- the operation of all our commercial customers on the network and our neighbours;
- our ability to maintain the network in the future.

The change is assessed for both its immediate impact and long term consequences, which can be safety related, environmental or commercial. These change control arrangements for applicable projects are managed by the Network Rail Acceptance Panel (NRAP) and defined in relevant Network Rail standards.

Network Rail has change control processes for qualifying infrastructure projects in order to comply with the relevant requirements of the Railways (Interoperability) Regulations 2006 and/or the Railways and Other Guided Transport Systems (Safety) Regulations 2006 (ROGS).

Infrastructure projects that involve changing the network such that a significant new risk is created or an existing risk significantly increased are authorised into service under Network Rail's safety verification arrangements (in accordance with ROGS). This requires the appointment of a Competent Independent Person (CIP) to assess safety through an audit process. The assessment will normally include verification of compliance with relevant standards and legislation and will also cover rolling stock and infrastructure compatibility.

Certain projects may require to be notified to the Department for Transport (DfT) for authorisation into use under the Railways (Interoperability) Regulations 2006 (RIR), rather than under our ROGS safety verification arrangements. Network Rail takes account of the guidelines issued by the DfT in determining which projects may so qualify, and NRAP monitors the process of the notification of projects so that projects are correctly allocated to the appropriate procedure.

Where RIR has been deemed to apply, new or altered assets are designed and constructed to common European Technical Specifications for Interoperability (TSIs) and assessed by a specially designated and independent third party body, known as a Notified Body (NoBo), and subsequently authorised by the ORR (as the Safety Authority).

Safety critical plant and equipment

Network Rail has formal arrangements for the acceptance of new or modified safety critical engineering products, equipment, systems and services, (e.g. fitness for purpose of road rail vehicles / attachments and rail mounted maintenance machines, on-track machines, contractor's road plant and portable and transportable work equipment that could affect the infrastructure in respect to safety). Network Rail specialists evaluate product features against predetermined criteria to assess whether or not a product is safe and fit-for-purpose. The organisation and management systems of product suppliers are also appropriately vetted as part of Supplier Qualification and Licensing.

Timetable and station change

Network Rail has formal arrangements for identifying and assessing risks associated with changes to the timetable. All planned significant timetable changes are reviewed nationally by the Timetable Change Assessment Group (TCAG). Where a detailed assessment is considered necessary, TCAG directs the relevant Route-based Timetable Change Risk Assessment Group (TCRAG) to carry this out and identify any reasonably practicable risk mitigation controls. This includes the impact of the proposed timetable change on infrastructure maintenance requirements, including the ability to safely schedule maintenance activities within the confines of the timetable.

Alterations and property development on stations have the potential to introduce risk and are appropriately risk assessed to identify necessary control measures, taking into account such factors as crowd control and fire safety.

Our safety plans for CP4

This section describes our safety plans under the following risk headings:

1. Infrastructure – track
2. Infrastructure – civils
3. Infrastructure – signalling
4. Infrastructure – electrification and plant
5. Infrastructure – telecommunications
6. Level crossings
7. Railway crime
8. Weather and seasonal preparedness
9. Signals passed at danger
10. Irregular working
11. Stations
12. Workforce safety
13. Workforce health

Infrastructure – track

Track assets are managed by a risk-based methodology of applying an appropriate inspection, maintenance and renewals regime to each asset with the aim of providing the required level of service at minimum whole life cost. The key contributions to safety improvement are identified below:

- further reduction in broken rails through continued use of Sperry and Ultrasonic Testing Units, and the New Measurement Train's (NMT) detection of dipped joints, allowing for targeted rail grinding and renewals. Renewals are also being targeted at jointed track and pre-1976 rail on higher priority routes;
- further mitigation of risks from buckled rails, including specific work related to timber bearer vertical switches and crossings (fitting lateral resistance plates on BV/CV/DV switches at sites with line speeds of 100mph plus) and targeted renewals;
- a new standard on inspection of facing switches has been produced and a wheel/flange profile guide has been developed to assist with this. This includes checking condition of switches after grinding;
- further improvements in the management of geometry discrete faults; including improvements in competence in identifying and repairing sites; targeting of dipped joints using detection from NMT and drivers' reports. The track renewals programme will include targeted replacement of sections of jointed track; and
- improved management of gauge spread through renewal of softwood sleeper track, plus patch and spot replacement under maintenance. Development of alternative rail

support arrangements at longitudinal timbers and sharp curves.

Infrastructure – civils

Civils assets consist of structures and operational property. The structures asset portfolio covers such items as bridges, earthworks and tunnels. The operational property assets comprise a diverse range of building types, sizes and age profiles, many of which are subject to heritage constraints. These are naturally long-life assets many of which date from the original construction, although intermittent maintenance may have improved or strengthened individual assets. These assets are managed by a risk-based methodology of applying an appropriate inspection, maintenance and renewals regime to each asset with the aim of providing the required level of service at minimum whole life cost. The key contributions to safety improvement are identified below:

- the new "Examination of earthworks" policy came into operation in April 2005 which uses condition-based inspection frequency and a hazard ranking system for soil slopes and rock slopes. Better targeted inspection should reduce the frequency of landslips. Three dimensional modelling of cutting slope and outside railway boundary is currently under consideration, which should also reduce the number of landslips;
- a 10-year plan is being developed to manage the risk from subsidence due to ancient mines. The existing register of sites is being reviewed and action plans for sites improved and developed as necessary, with prioritisation of sites on the basis of risk; and
- improvements to the management processes related to bridge strikes so that the time to return to full service is reduced. There is a small safety benefit due to the reduction of degraded mode operation reducing potential for collisions. Work continues on fitting sacrificial beams at sites where the risk justifies the cost.

Infrastructure – signalling

Signalling assets are managed by a risk-based methodology of applying an appropriate inspection, maintenance and renewals regime to each asset with the aim of providing the required level of service at minimum whole life cost. The key contributions to safety improvement are identified below:

- further reduction in risk from "TPWS reset and continue" including removal of TPWS from certain Permanent Speed Restriction sites. The change to the tripping speed at TPWS at buffer stops from 10mph to 13.5mph to reduce TPWS trips and reduce on-train falls due to sudden braking; and
- improved quality of signalling maintenance through processes prescribed in the 'Red Book' (Maintenance Standard Handbook). Also the new Signalling Maintenance Testing Handbook will facilitate improved testing.

Infrastructure – electrification and plant

Electrification and plant (E&P) assets are managed by a risk-based methodology of applying an appropriate inspection, maintenance and renewals regime to each asset with the aim of providing the required level of service at minimum whole life cost. The key contributions to safety improvement are identified below:

- improved asset condition and failure reporting through better quality inspection data from the New Measurement Train - this allows for better analysis and intervention prior to failure. There are also ongoing improvements to the asset register, through the E&P Ellipse improvement programme;
- the assessment of key locations to prioritise component change, for example:
- dewirement in stations – a risk to passengers; and
- registration arms falling foul of kinematic envelope and breaking drivers windows;
- DC electrified lines instructions have been transferred from RSSB to Network Rail as single duty holder. This will allow for changes to instructions to optimise workforce safety issues;
- improvements to the process for taking DC electrified line isolations linked to the track occupancy permit work will help with improved isolation management generally, but specifically additional remote control of controlled track isolators and disconnectors will facilitate faster switch out and additional circuit breakers for the remote application of straps at strategic locations on the network;
- the upgrade of electrical control rooms (ECRs) designed to reduce isolation errors through commonality of operation amongst ECRs; and
- upgrades to traction oil filled switchgear at feeder stations to reduce risk of explosions in switchgear (the current replacement programme will continue into CP4).

Infrastructure – telecommunications

Telecommunications assets are managed by a risk-based methodology of applying an appropriate inspection, maintenance and renewals regime to each asset with the aim of providing the required level of service at minimum whole life cost. The key contributions to safety improvement are identified below:

- the introduction of GSM-R/FTN allows in-cab communication to signaller where the services currently have the national radio network only. This will have a positive effect on risk mitigation following train related incidents;
- Network Rail is considering the removal of signal post telephones once GSM-R in place and also the use of GSM-R phones for certain user worked crossings. In both cases, decisions on these will be dependent on the outcome of risk assessments;
- the telecoms engineering control will permit remote monitoring of failures, allowing better identification of location and cause; and
- a new design of level crossing phone has been developed that is intended to be simpler to use in an emergency. This will be installed as appropriate depending on the outcome of risk assessments.

Level crossings

The strategy for reduction of risk at level crossings continues to be based on: a programme of risk assessment to identify reasonably practicable measures for risk reduction; the continued reduction in the numbers of level crossings where justified; effective operation and maintenance; and education of the public on the risks of level crossing misuse. The key contributions to safety improvement are identified below:

- programme of renewals of level crossing signalling equipment. Some safety improvements will be gained from renewal to modern standards (eg. automatic open crossings replaced by barrier crossings). This also creates the opportunity for further enhancement, where reasonably practicable, on the back of the renewal;
- use of the “All Level Crossing Risk Model” to gain a greater understanding of crossing risk. This will lead to targeted investment for further risk mitigation where reasonably practicable;
- ongoing programme to close level crossings where reasonably practicable;
- development and trialling of measures to reduce the cost of level crossing closure such as ‘modular’/standard bridge designs, new construction material/techniques/processes and challenging current construction standards;
- development and trialling of new technology such as vehicle activated signs, LED miniature stop lamps, LED wig-wag lights, LED driver crossing indicators, colour CCTV cameras/monitors, obstacle detection, magnetic locks at wicket gates, electronic treadles and the simplified installation of warning lights at user worked crossings;
- adoption of new technology that proves successful in earlier trial, either through campaign change, site specific application or upgrade upon renewal;
- realising the benefits from the recent establishment of the National Level Crossing Safety Group and creation of a national specialist team for level crossings;
- continuing public awareness campaigns to educate users on how to use level crossings correctly and the dangers of misuse;
- realising the benefits from the formation of road rail partnership groups through taking measures to address level crossing safety from both a highway and railway perspective; and
- working with the DfT and ORR to review the current legislation relating to level crossings with the objective of facilitating closure and in addition with BTP to secure conviction and appropriate sentencing of those users who deliberately misuse level crossings.

Railway crime

The strategy for reduction of risk from railway crime continues to be based on; the identification and risk assessment of locations susceptible to railway crime; enhancement and control of fencing and access points to minimise unauthorised access; minimising the opportunity for crime by controlling scrap and lineside materials; educating the public; and cooperating with other stakeholders. The key contributions to safety improvement are identified below:

- maintenance and renewal of fencing and other boundary measures to deter unauthorised access;
- enhancement of fencing and other boundary measures where demonstrated, through appropriate risk assessment, to be reasonably practicable;
- the continuation and evolution of the ‘No Messin’ campaign that seeks to educate 10 to 16 year olds in the dangers of playing on the railway, placing objects on the line and throwing stones at trains. This will involve seeking advice from youth justice professionals and previous offenders to

understand some of the motivation behind route crime with a view to devising alternative deterrent methods;
- further realisation of the benefits of establishing the Community Safety Steering Group (CSSG), Community Safety Partnership Groups (CPSG) and Route Crime Working Groups (RCWG) which provide a multi-level multi-stakeholder co-ordinated approach to managing risk associated with railway crime. These groups encourage nationwide learning from local initiatives designed to tackle location specific issues at the appropriate level. Stakeholders include Network Rail, train operating companies and the British Transport Police;
- consulting criminology experts and the outputs from academic research, and interviewing offenders, to develop new strategies for tackling route crime. This includes investigation into human factor related issues such as the interpretation and use of language on signage;
- targeted use of the Network Rail helicopter, in conjunction with the British Transport Police, to monitor route crime hotspots, or follow up reported incidents, with a view to gaining increased success of securing arrest and prosecution;
- increased use of undercover surveillance cameras and other advancements in security technology at route crime hotspots to collect evidence of trespass and vandalism offences as they are committed;
- investigation of the potential use of forward facing CCTV cameras in train driving cabs to monitor and record evidence of route crime in proximity of the running line.
- continued working with the British Transport Police to generate further opportunities for co-operation in managing railway crime; and
- the inclusion of appropriate measures to provide robust protection against railway crime will be built into the design of new or enhanced railway schemes, where reasonably practicable.

Weather and seasonal preparedness

The uncertainty and variety of the British weather has always presented a challenge in being able to apply the appropriate controls at the right time in the right location. However there is growing evidence to substantiate that climate change is likely to lead to:

- increased occurrence and magnitude of high winds;
- hotter summers and wetter winters;
- more intense rainfall;
- lower snowfall; and
- less extreme cold events.

The key contributions to safety improvement are identified below:

- optimisation of the current train-based railhead treatment programme to counter the effects of railhead contamination through trialling of new technology (e.g. microwave steam cleaning), maximising fleet availability/reliability, matching fleet size to risk and continually reviewing performance with a view to making a continued improvement to railhead conditions;
- use of a new five metre flail and a continued programme of tree removal in proximity of the track, supported by the application of herbicidal treatments to deter re-growth. This is expected to significantly reduce the amount of leaves that accumulate on the rail in addition to providing improved underfoot conditions when working on the line side infrastructure and reducing the risk from trees falling on the line in high winds;
- further trial and installation of infrastructure condition monitoring equipment to measure/detect key parameters that indicate how the infrastructure is performing/ responding in relation to the weather (e.g. rail temperature monitoring) and to inform/alert those responsible for putting necessary controls in place should the limits, at which intervention is required, be reached;
- trial and utilisation of a new fleet of anti-icing units to remove any build-up of ice on the running rail and conductor rail. This will improve both wheel adhesion and current collection;
- increased use and further installation of localised weather stations to obtain more accurate data relating to the current weather conditions, with a view to being able to improve weather forecasting ability, and to enable the necessary controls to be applied in the appropriate locations in a timely manner;
- use of enhanced tools, technology and techniques to forecast the weather and improved communication of data to those parties who readily need it; e.g. relaying up-to-the-minute information to handheld data devices;
- undertaking wider and more involved discussion with European railway partners to understand any changes that they are witnessing in relation to their climate, how this is affecting the safety of their railways, and the measures they are taking or controls that they are putting in place to address. This will also

provide a forum to share good practice and lessons learnt;
- provision of a fleet of 'clip-on/clip-off' snow ploughs with the ability to be coupled to a large variety of rolling stock to clear the line in the event of a significant amount of snowfall;
- forming a greater understanding of the type of weather related risk that exists on each part of the network such that the location of the resources (e.g. vehicles, equipment, staff) can be further optimised and adjusted throughout the year;
- improved discussion with the passenger and freight train operating companies to understand at a local/route level whether current controls are proving effective and what further measures need to be put in place to deliver more effective risk mitigation. Through dialogue at this level it is expected to gain a more detailed understanding of risk at day-to-day working level; and
- responding to the need to continue adequate mitigation against weather/seasonal related risks whilst at the same time responding to the need to provide greater network capacity. This will be a key challenge in the advent of the forecasted climate change and therefore considerable thought, further initiatives and management focus will be required to satisfactorily address this.

Signals passed at danger

The strategy for reduction of risk from Cat A SPADs continues to be based on; a programme of risk assessment to identify reasonably practicable measures for risk reduction; the positioning of signals and management of lineside vegetation to maintain adequate signal sighting; implementation of recommendations from investigations and signal sighting committees; provision of information on multi-SPAD signals; and continued cooperation with train operating companies. The key contributions to safety improvement are identified below:

- continuing programme of signalling renewal schemes where opportunity is taken to bring the signalling equipment and installation up to the latest design and implementation standards to minimise SPAD risk;
- continued utilisation of new technology to optimise the visibility of signals (e.g. LED signal heads);
- trial of the European Rail Traffic Management System (ERTMS), an in-cab signalling system which removes driver reliance on observing line side signals, with a view to future evaluation for network wide implementation;
- implementation and roll-out of network wide GSM-R cab to shore radio system to improve communication between drivers and signallers and to provide the capability to communicate with all trains in the vicinity in the event of a SPAD;
- identification of possible local initiatives within area operations risk and mitigation (OPSRAM) groups to address site specific SPAD related issues through selected improvement initiatives;
- sharing of best practice through the National Operations Group and other industry forums;
- continued reporting and analysis of all SPAD incidents and follow through at the appropriate level so that any recommendations generated are considered, assigned and actioned accordingly; and
- enhancement to the current signal overrun risk assessment tool (SAT-DA) to align it with the post-TPWS residual risk profile for SPADs and to provide an assessment methodology which has a good balance between engineering and operational mitigations to further reduce risk.

Irregular working

The key contributions to safety improvement are identified below:

- continued implementation of the 'SAF6' national voice communications training programme to improve quality of communication between key operating personnel such as signallers, drivers, contractors and maintenance staff;
- further improvements to the existing safety communications monitoring process, technology and management regime, including joint monitoring of voice recordings between Network Rail and train operators;
- realise the benefits of implementing the COGNISCO competence testing programme to better understand levels of competence and understanding of the Rule Book amongst key operating staff;
- undertaking more detailed analysis of the data contained within SMIS, which has recently been modified to include more comprehensive reporting and categorisation of operating irregularities, to gain a better understanding of irregular working events such that appropriate mitigations can be developed and applied;
- trial of the Track Occupancy Permit (TOP) and Plant & Equipment Permit (PEP) regime to replace the current arrangements for protection of the workforce and trains when requiring a possession of the line;

- use of portable handheld devices amongst key operations staff to automate data collection and provide for improved consistency of data against defined input fields;
- increased focus (with industry partners) in turning data from inspections, accident investigations, incidents and assurance activity into real management information to be used to better target improvement interventions; and
- implementation and roll-out of network wide GSM-R cab to shore radio system to improve secure communications between drivers and signallers. This includes eventual decommissioning of the current national radio network and cab secure radio systems which provide alternative communication channels.

Stations

Network Rail directly operates 18 managed stations. Network Rail also leases approximately 2,500 stations to train operating companies, for which it retains landlord responsibilities. The key risks at stations relate to crowd control, trips, slips and falls, boarding and alighting, fire and security.

A key challenge in relation to stations is to maintain the existing level of safety in the face of the following trends:

- increased passenger numbers;
- increased number of trains, service frequency and network capacity;
- changes in passenger age profiles;
- extended peak periods;
- more variable weather conditions;
- increase in serious crime;
- uncertain threat from terrorism; and
- future large scale international events e.g. London 2012 Olympics.

Actions at Network Rail managed stations

The key contributions to safety improvement are identified below:

- measurement of station lighting levels to understand the relationship between poor lighting and accident hotspots, with a view to installing additional lighting where poor lighting is considered to be a contributory factor;
- application of set design standards where new stairs are erected or existing stairs are refurbished, incorporating non-slip nosings, colour contrasting steps, adequate handrails and tactile tiles in line with DDA requirements;
- introduction of a common standard for safety signage on escalators and lifts, and a review to identify if any additional signs are required highlighting the locations of lifts or alternative access;
- installation of measures to prevent trolleys and pushchairs being taken on escalators;
- letting of new cleaning contracts with emphasis on improving the response level for spillages and the quality of cleaning for the different types of floor surface;
- production of guidance documents detailing best practices for cleaning regimes and decreasing accidents on steps, staircases and escalators;
- introduction of new policies and procedures to provide station managers, at a local level, with the required tools to identify “at risk” areas and to implement effective controls;
- consideration of local measures such as working with Local Authorities to investigate the introduction of Taxi Marshalls or moving taxi ranks off station premises during the night, introduction of additional security staff at high risk times, and consideration of lighting and CCTV provision in additional locations;
- a commitment to maintain the Secure Stations Accreditation and working closely with BTP crime reduction officers to continually improve these standards;
- continued membership of the Rail Personal Security Group, a steering group run by the Rail Safety & Standards Board. This group was established to promote best practice across the industry through sharing of knowledge between Network Rail, TOCs and other affected parties. It aims to tackle the ever-present risk of staff assault through initiatives such as training to improve staff conflict management techniques, agreeing industry wide strategies and improved evidence gathering / liaison with the BTP and the Crown Prosecution Service;
- development of an improved conflict management training package for all customer facing staff, available both to new employees and as a refresher course for existing staff;
- further trial of personally worn surveillance systems issued to staff on duty that record visual and audio media and are worn at assault hotspots at high risk times;
- consulting staff as to their perception of assaults in relation to the assault data to understand whether there are differing views or emerging trends such that more focussed action plans can be developed to address these;

- increasing the number of Anti Social Behaviour Orders brought against persistent offenders;
- a proposed advertising campaign to highlight the issues surrounding violence on the railway, in particular at stations;
- a post-assault care programme that has been established to provide support to those directly affected by this risk;
- Network Rail is seeking to improve uniformity in the application of “Mind the Gap” floor markings. This includes arrangements for maintaining “Mind the Gap” floor markings in appropriate condition and that station announcements are made where necessary;
- trial of modified station announcements and Customer Information System display messages to include a caution for persons to “mind the gap”;
- provision of “mind the gap” signage at incident hotspots even where stepping distances are compliant with standards;
- investigating the maximum standard width between train and platform before “mind the gap” floor markings are required;
- further investigation of incidents to determine whether it is the height, width or diagonal distance that is the most significant hazard and implementation of mitigation where relevant;
- investigate the case to retain yellow lines at all managed stations to provide a uniform message to passengers, staff and the public regarding the safe distance to keep from the platform edge. This is particularly important not just where train speeds are high but also at times of perturbed working;
- more widespread installation of CCTV will be implemented, particularly at more northerly stations. CCTV installation has been proven to act as a deterrent against crime and also can provide vital evidence which can assist in the successful prosecution of offenders. It has the benefit of combatting a number of risks including staff/passenger assaults, vandalism, terrorism as well as providing a retrospective understanding or even early warning of other incidents that occur such as those at the platform train interface, or slips, trips and falls. Trial of screens at station entrances are planned showing CCTV images to heighten public awareness of CCTV usage on and about stations, acting as a reminder and ultimately to deter persons who may enter stations wishing to commit crime;
- increased presence and visibility of Police Community Support Officers. Although CCTV installation can positively reduce crime, it is equally important at key locations to enforce the law through increasing the number of police officers that patrol stations;
- station capacity modelling will be undertaken to determine the safe working capacity of certain station areas such that measures can be put in place to control the number of passengers entering or held within those areas during periods of high train service demand (e.g. sporting events, music festivals). It is expected that the output of this work will be used to update the current crowd management processes to mitigate potential overcrowding risks;
- the National and Station Emergency Plans have been updated with regular liaison meetings with industry partners established. The station emergency plans and contingency arrangements better enable each station to prepare for emergency situations and to quickly establish the suitable and sustainable contingency arrangements. This will improve the industry ability to respond to such situations as station evacuation in the event of fires, terrorism threats, etc. An ongoing review process has been established to make sure these continue to remain up to date; and
- reducing the incidence of persons attempting to cross the lines at stations or retrieve objects from the line through the trial of improved signage warning of the hazards of crossing tracks at stations specifically relating to the hazard of electrocution or being struck by passing high speed trains. The location initially chosen for the trial is Gatwick Airport station where it is recognised that passengers arriving into the country may be unaware of the presence of the conductor rail.

Network Rail actions at stations leased to train operating companies

Network Rail is the custodian landlord of around 2,500 stations operated by train operating companies. Our stewardship responsibilities are set out in our Network Licence, which is regulated by ORR. Station Leases and Station Access Conditions define the relationships at stations, including the split in responsibility for maintenance, repair and renewal, between the station operator and Network Rail. We are committed to working with industry partners to streamline and improve these contractual relationships through the development of a new and improved Station Code.

During CP4 we will also implement a number of enhancement projects that will have a positive impact on passenger safety risk at train operator managed stations:

- the Thameslink Programme will enhance the rail network to and through London, delivering clear and tangible benefits for millions of people, significantly increasing capacity on the over-ground railway to and through London, via King's Cross and St. Pancras in the north and Blackfriars and London Bridge in the south. In terms of station upgrades this will involve redevelopment of London Bridge, Farringdon and Blackfriars as well as upgrades at 50 other stations**;**
- the National Stations Improvement Programme (NSIP) is a programme of improvements to approximately 150 medium sized stations in England and Wales. This will include improvements to personal safety, improved access and egress and improved information provision which will have a positive impact on slips/trips/falls and assaults;
- the Access for All Programme, in addition to improving access for disabled people, will have a positive impact on the safety of all passengers through improved increased provision of lifts, and obstruction free access routes;
- Several new stations are planned for CP4 and these will be designed and built to the latest standards, with associated safety benefits;
- the train lengthening programme will reduce boarding/alighting risks through the construction of platform extensions to modern standards;
- the Reading station project will involve new lines and associated new platforms, which will reduce overcrowding and associated assault risk as well as providing an opportunity to improve surfaces, steps and escalators.

Workforce safety

Network Rail's workforce safety strategy is based upon the principle that those with line management responsibility for staff are best placed to manage actions to improve their health and safety. This approach is implemented through a rolling programme of safety improvement actions focused on risk reduction. The workforce safety strategy encompasses both directly managed staff and those working for contractor organisations.

The cross-functional integrated action plan is used to gather together and provide a cross-functional view of health and safety activities likely to positively impact on workforce safety. The plan and supporting arrangements facilitate the co-ordination of efforts on similar subjects across the company and allows functional actions to be aligned to corporate strategy in order to achieve "one way" of doing things.

The actions within the plan have recently been aligned with the six action categories agreed following recent work on system safety and the review of accident and incident data (including Lambrigg). These are:

- system design (reduction of human reliance);
- critical asset performance;
- leadership;
- competence management;
- communications (of key procedures and tasks), including employee engagement;
- assurance, including monitoring, reporting and outcomes from the "assurance mapping" process.

Within the system design element are actions relating to the provision of improved tools and equipment designed to reduce risks to health and safety for those that use them. These actions include:

- the mandating of the wearing of "all orange" personal protective equipment by all working for, or on behalf of, Network Rail on the infrastructure and the development of policy on the wearing of eye and hand protection;
- the introduction of new welding techniques that have the double benefit of reductions in manual handling and red zone working;
- continuous development of small plant and tools that reduce exposure to noise and vibration as well as reducing manual handling effort;
- further development and wider deployment of lookout operated warning systems (LOWS) to enhance trackworker safety; and
- the development and introduction of fixed lighting at junctions that require frequent night-time maintenance activity in order to reduce the risk of slip, trip and fall accidents.

Also included within system design are actions relating to planning and control of risks:

- the thorough review of the current RIMINI process, including its current use, understanding and application to identify opportunities for improvement;
- the review and revision of the rules associated with the use of detonators and possession limit boards in order to reduce the exposure of trackworkers to risk while placing those items on the infrastructure;
- the review of the current structure, roles and responsibilities of staff involved in the setting up and managing possessions with a view to reducing the risks associated with the

complicated management structure and multiple communication paths;
- continued development and testing of the track occupancy permit process with the aim of providing for efficient and safer taking of possessions for engineering works;
- improvements to the health, welfare and productivity of employees by the improved planning and provision of welfare facilities for transient work sites; and
- to use the information gathered during the health surveillance programmes for hand-arm vibration syndrome and noise induced hearing loss to in form decisions about future tools and techniques used in maintenance activities.

Leadership actions within the integrated action plan include:

- the development by each function of a programme of safety tours conducted by senior managers which will include cross-functional safety tours. The results and trends will be discussed at functional team meetings and TSG. A training programme for senior managers new to safety tours has been developed. Safety Tour Co-ordinators have been appointed in each function;
- the use of team leaders' safety days to communicate a consistent, national safety message, delivered at local level and focused on the responsibilities and accountabilities of team leaders in developing and maintaining a safe workforce; and
- improvements to the cascade of health and safety information – the Safety Brief agreed at TSG will form the basis for safety briefing of all functional teams. Safety performance headlines, included in the management cascade, will be briefed to all levels within each function. Key issues will be reported back up the briefing chain to the appropriate level. The Safety Central website will provide supporting information.

Enhanced competence is an important element within the integrated action plan. Elements in this area include:

- the development of a standard competence regime for road-rail construction plant across the industry by the standardisation of training and assessment materials and the route to competence; and
- the development of the track safety competencies to better consider the behavioural and communications elements required for each competency.

Developing and improving communications on health and safety issues forms a further element of the integrated action plan. Elements in this area include:

- the maintenance and further development of the "Safety 365" communications materials based on existing and emerging risks, trends in accident/incident data and reaction to specific occurrences;
- the continued development of "Frontline Focus" and other briefing materials to deliver a consistent and engaging health and safety message;
- the development and introduction of a competency in verbal communications for those required to undertake safety critical communications in the track safety environment; and
- the review of current Rule Book modules that relate principally to Network Rail activities with the objective of simplifying their presentation and content while maintaining their technical content.

Employee engagement in health and safety issues is also included within the communications element the integrated action plan. Elements within this area include:

- establishment of a revised national trade union health and safety representative structure and fostering of a closer working relationship with those representatives at all levels within the company;
- continued development and enhancement of the health and safety elements of the apprentice programme to provide the next generation of skilled technicians with the correct attitudes to health and safety; and
- continuing the work exploring safety behaviours of managers, supervisors and employees in order that system and process can be amended, based on the research findings, to increase the safety of trackworkers.

The final area covered by the integrated action plan is assurance, including monitoring and reporting. Elements within this area include:

- the encouragement of near miss reporting with the reports collected and risk ranked to provide information that can be used for learning;
- the development and deployment of an electronic measurement and tracking process

for site activity reports in order to provide improved action recording and tracking; and
- the further development of the safety league table system to focus on proactive health and safety improvement actions at local level.

Workforce health

The central tenet of the Network Rail occupational health and wellbeing strategy is the enhancement of employee health and wellbeing in order to maintain and improve the efficiency of the workforce. This aligns with the "people" element of the Network Rail "efficient infrastructure delivery" objective. It also aligns with the UK Government's Health, Work and Wellbeing strategy, which focuses on improving the health and wellbeing of working age people and is reflected in the ORR' s CP4 Delivery Plan.

Following analysis of data collected at periodic medicals and line management medical referrals to BUPA the key health issues for Network Rail have been identified as musculoskeletal problems, obesity, diabetes and heart and circulatory problems. These key health issues are being addresses by the following work streams:

- health screening and surveillance;
- risk reduction;
- mental illness and stress reduction;
- health promotion and education;
- rehabilitation;
- information and metrics.

Within the health screening and surveillance area the following actions are being taken:

- rationalisation of competence related medical fitness requirements and the review of those requirements to include consideration of medical progress in areas such as digital hearing aids and laser eye technology;
- continued routine screening of at risk employees for Hand Arm Vibration Syndrome (HAVS) and Noise Induced Hearing Loss (NIHL); and
- the design, pilot and possible deployment of mobile health screening facilities that can be deployed to delivery units.

The risk reduction area of the strategy includes the deployment of training and risk assessment in the use of display screen equipment (DSE) to all at risk staff.

Work on mental illness and stress reduction includes:

- revised guidance for line managers and the 're-launch' of the Care First counselling service with the emphasis of the programme is primarily on 'self help' and developing 'self resilience";
- collaborative work with trades unions on the development, implementation and analysis of results from an online "work life balance" questionnaire. The results of the survey will be analysed and the data used to inform a stress management campaign and other HR-led stress management initiatives.

Health promotion and education elements of the strategy include:

- the continued use of monthly health "fact sheets" to target the key risk areas (musculoskeletal, mental illness, obesity, diabetes, heart and circulatory problems);
- piloting the use of a "Positive Health Programme". This is an on-line, individual, confidential health service offering an interactive health assessment in the four key areas of nutrition, fitness, sleep and stress;
- work with Strategic Sourcing to develop a policy on the provision of health options within all Network Rail catering facilities and vending machines;
- work with HR Employee Benefits to examine the feasibility of providing subsidised membership to health and fitness clubs for all Network Rail staff throughout the country;
- development with our healthcare providers of a voluntary, coordinated "weight management" programme for employees; and
- formation of a Strategic Health and Wellbeing Group with senior level membership from all Delivery Functions, Employee Relations, Compensation and Benefits and Safety & Compliance. The purpose of this group will be to provide cross-functional coordination of occupational health and wellbeing initiatives and supporting programmes.

Rehabilitation forms a key part of the strategy. Work in this area includes:

- further development of the drug and alcohol rehabilitation programme; and
- pilot and possible deployment of an off-site physiotherapy service, ultimately funded by the functions, for staff who sustain acute musculoskeletal injuries at work.

The continued collection of information and metrics to inform further development of the strategy will continue. This area of work includes:

- the use of occupational health data within the “Employee Health and Safety Index” element of the Company KPI programme; and
- further development by HR of the Human Resources Management System (HRMS) to allow the collection and the further analysis of causes of sickness absence at a national level.