4 Seasonal Management

4.1 Introduction

Seasonal ambient temperature variations and weather can adversely affect the performance of traction and rolling stock and rail head conditions, if it is not recognised and planned for. It is likely that different types of rolling stock may be affected in different ways, so it is important to gain a thorough understanding of seasonal effects on your particular rolling stock, and have processes in place to minimise these effects.

Plans need to take into account the time of year, so a 'Weather Calendar' or 'Seasonal Preparation Plan' may be developed which should be visible at all levels within the company. Progress against target should be monitored and KPIs developed which can allow for future analysis. It should be recognised that any plans and processes which are in place to manage seasonal changes must be controlled through a constant review cycle, the plans in place for seasons management should also recognise that seasons will start at different times of the year, plans must be flexible enough to accommodate such variances.

The guidelines below are intended to promote a structured approach to seasonal planning and operations. Individual TOCs and Maintainers should review with key stakeholders the guidelines in the context of their own operations and take measures they feel appropriate to meet their business needs.

To maximise the level and consistency of fleet performance during seasonal variances both operations and engineering need to work together to produce robust and effective management plans.

Seasons management should be viewed as a normal part of your processes, change management, maintenance cycle and normal performance improvement. Seasons management should be treated as the norm and not as an additional function / process which is added to the exam cycle.

Some examples of common processes irrespective of the seasonal variances which may need to be considered are given below, though this is by no means exhaustive.

4.2 Common Seasons Processes:

4.2.1 Analysis of previous data

Review changes from previous years	Design specification changes
Think about design changes	
Modifications	Process changes
People competencies	Maintenance actions / cycles
Trains	Depot Infrastructure
Performance	MPC (Miles Per Casualty)
MTIN (Miler per Technical Incident)	PPM (Public Performance measure)
DPI (Delays Per Incident)	Delay Minutes
Cancellations	Material usage
Seasonal variances in stock levels	Supplier performance

Kill frost (did it perform at the desired temperatures?)	Product development with suppliers
New replacement products available	Safety review
Doors open in traffic	Station over runs
SPADS and location	Poor braking and location
NIRs	Passenger and Train Crew
Environment condition	Air conditioning / heating when a train is in a failed state
Lighting conditions	Frozen footsteps
Slips Trips and falls	

4.2.2 Preparing for a common seasons approach

Staff	Briefings
Competence	Strategic deployment
Staffing levels (up or down)	Equipment
Materials	Cradles
Lifting gear	Depot Equipment
PPE (warm clothing etc)	Telephones
Staff equipment	Correct tools and kit for the season

Ensure adequate seasonal items are available and planned for:

Wheelsets (Autumn)	Gritting of walking routes in winter
Maintenance plans to reflect seasonal changes and not undertaking special tasks.	Ensure depot infrastructure is fit for the season
Documentation	Killfrost (Winter)
HVAC (Summer)	Utilities protection (water, electrical cabling etc)
Depot maintenance tasks do not hamper seasons management *Example:* Wheel lathe being maintained during height of leaf fall	Station footpaths and platforms
Communication	Seasonal preparation as a day to day item (not special checks)
Staff briefings	Daily conference updates (war room plans)
Technical Bulletins	Intranet
Infrastructure	

4.2.3 Implementing common seasons management

People	Seasons maintenance to be treated as just another type of exam
Processes	Radiator cleaning (Summer)

Ensure maintenance documentation / balanced exam sheets reflects the correct season	WSP Check (Autumn)
Killfrost application (Winter)	Communications
Common season issues discuss and reviewed at daily management meetings	Exceptional seasons management war room
Seasonal KPIs	Feedback from maintenance staff and train crew
Daily briefing update to all staff	Materials
Purchasing plan must be in line with seasons maintenance plan to ensure	Materials available on time
Materials available at the correct location	Sufficient quantity of material is available
Consider contingency material when weather forecasting indicates the need	Storage facility for material is available
Wheelsets (increased usage in autumn)	HVAC Units (increased usage in Summer)
Budgets may need to be amended to ensure levels of material usage can be maintained at the desired level to ensure a reliable service can continue to be delivered	

4.3 Planning for Winter

The following section addresses planning issues for winter and has been extended in scope to consider prolonged periods of extreme weather conditions.

To ensure good service reliability and availability going into the winter period, efforts should be made to ensure that fleet condition and service continuity can be sustained given inevitable degradation of fleet condition and deferral of maintenance arising from extreme winter weather, as such efforts should be made to reduce demand / outstanding work prior to winter operation.

This section comprises six sub- sections:

- Standard Winter Preparedness: tasks within this section have a focus on preparing fleets for standard winter operation. Standard winter operation tasks are additional to standard exam tasks and should be in place prior to winter operation.
- Extreme winter preparedness: tasks within this section focus on prolonged periods of extreme weather conditions. The elements within this section should be planned for and implemented when certain trigger levels are reached. Trigger levels should be defined in the plan and offer a co-ordinated approach in partnership with operations and frontline staff and other key stakeholders.
- Response: tasks within this section focus on the implementation of plans and activities which are designed to respond to extreme conditions and ensure that service levels are maintained during actual operation of the fleet. The critical element of response is continued feedback of information to ensure that measures which have been planned and implemented are effective.

- Extreme Winter Recovery: previous winters have shown that extreme conditions can have a damaging effect on fleet condition and that full recovery post winter operation can take some considerable time. Plans should be in place to allow continued flexibility for fleet repairs to take place and deferred work situations to be recovered.
- Post winter review: this section concentrates on reviewing information which has been captured during winter operations. It is critical to have a complete review of all information and data gathered to ensure continuous improvement can be maintained and effective plans for future operations developed.
- Other Considerations: this section looks at areas of winter operation which could be considered outside of the day to day running of fleet. In undertaking these assessments, it is critical that consideration is given to extreme scenarios where trains may become stranded for a prolonged period of time whilst passengers are on board. Contingency plans must be in place with all stakeholders.

4.2.1 **Standard Winter Preparedness**

Initial winter preparedness is largely based around enhancing the Vehicle Maintenance plans to ensure that an acceptable level of winter operation can be maintained. This should only be used as an initiator for winter planning. Vehicle maintenance plans may not cover all areas which are critical to maintaining service during winter. The guidance within this section of winter planning should be used to enhance winter operations of fleet.

As part of preparing for winter operation key risk areas must be considered to ensure effectiveness of any plans which have been developed and are in place. This list is not exhaustive and should be adapted to meet your specific business needs.

Vehicle Maintenance undertake an annual review and look ahead process. This should consider how effective the standard winterisation tasks have been and what needs to be incorporated into exams going forward to minimise performance risks. Examples of the areas which may need consideration are pip equipment, lagging, horn trace heating, air system pre-treatment, pre-filtration of electrical machines etc.

Differentiate between what should be classified as winterisation and what should be included in standard maintenance tasks - ensure that winterisation is aimed at specific winter preparedness and not used as an opportunity to catch up on previously deferred work, for example to get heating systems working again post summer operations.

Development of specific winter exams (ensure that these tasks are not ‘lost’ within general exams).

Stock holdings

A key material stock holding review should be conducted well in advance of the winter period – deployment of critical spares to strategic locations should be planned and implemented to support the operational requirements of the fleet

Understand train availability drivers to develop stock holdings of critical materials and consumables such as traction motor brushes, fuel, pan heads etc to ensure a service can be maintained during material usage peaks

Safety Risks and Performance Risks

Winter ‘survival kits’ – i.e. phone chargers, appropriate clothing, tools, local support networks need to be defined and allocated within the winter plan

Depot & Infrastructure

Winterisation checks on key plant and equipment such as wash plants, fuel, CET, etc should be conducted. Gritting rosters etc

Ensuring a supply chain is in place to support the availability, potentially at short notice-, of critical plant, i.e. space heaters etc

Ensure that materials planning is conducted thoroughly, paying particular attention to critical stock holdings of kilfrost and thaw granules etc

Contingency plans – alternative suppliers should be identified to support where possible your existing supply base

Review depot based risk assessments to ensure the adequacy of mitigation arrangements which are specified

Ensure availability and preparedness of road vehicles etc (snow chains, availability of 4x4’s)

Ensure availability of equipment for local deployment, i.e. shovels, rock salt etc

Operations Planning

Review of Business Continuity Management plans

Consider depot & infrastructure facilities – is access to the depot clear?

Operational restrictions and trigger events – clarify what triggers will move the business to the next level of winter management and how these instructions will be communicated within the business

Consider a cut and run policy review to ensure disruption is minimised

Consider staff deployment at local stations and other key locations to allow the service to be maintained

Winter competence development – ensure that clear roles and responsibilities are defined. Where appropriate develop a training plan to reflect the requirements of the organisation

Weather forecasting management

Ensure that 28 day, 7 day and 24 hour planning horizons are being considered

Extreme Weather Advisory Team (EWAT)

Key decision makers defined – contact list circulated to required parties

Fleet management responsibilities defined

Trigger events for fleet condition change (i.e. when extreme weather forecast is predicted)

Is everyone using the same forecasting tool – ensure consistency of communication media for all stakeholders www.nrws.co.uk – Network Rail weather forecasting facility

Delay attribution

Consider negotiating with the Infrastructure Manager temporary measures that allow for recovery of delay re-attribution (allow time to investigate thorough attribution of delays whilst 7 day rule is in place)

4.2.2 Extreme Winter Preparedness

Tasks contained within this section are looking at periods of sustained extreme conditions, trigger levels and co-ordination of response. Extreme winter measures may be short term and may require increased flexibility from all stakeholders to allow positive reaction to changing plans and emerging trends.

Trigger events should be clearly defined so that a clear plan can be produced when extreme prolonged weather conditions are forecast. Different fleets and route diagrams will be subject to different trigger levels so it is critical to understand the different levels of activity for trains and the environments in which they will be operating. Plans should be in place to ramp up or down trigger events due to the restrictions which can be placed upon or removed which will affect the level of service being offered. Co-ordinated fleet / operations management plans will need to be developed to manage trigger events.

What are the trigger events for initiation of extreme winter operation?

Trigger events will take many forms, but will be based around changing conditions for operation such as:

Changing weather conditions (snow, snow and wind etc)

Moving to different diagrams / operations

Decision criteria for operational restrictions (reducing line running speeds etc)

Step up of Vehicle Maintenance/Fleet Management activities

Clear definition of extreme winter maintenance measures for respective fleets

Identification of critical operating parameters – go/no go criteria for trains

Passenger information systems, heating, lighting (step up maintenance)

Consideration of revised maintenance plans – deferral of non key elements to create capacity for additional key system checks (ballast damage, broken seals, de-icing etc) Development of catch back plans for deferred / outstanding work

Contingency roster cover (more staff on nights – less work on days?)

Development of a key competency matrix for specific extreme weather tasks supported by risk assessment

Management of vehicle dispersal.

This is critical to manage maintenance schedules and to reduce the amount of deferred work which will hinder any recovery programme post winter operations

Stabling plans for dispersed units maintenance and start up

Cleaning and servicing strategy

Consideration of winter response teams which may be dispersed to units in service to address key systems (couplers and doors etc)

Deployment of winter kits – key supplies for keeping the trains running (de-icers etc) for use by nominated winter response team

Failure Review and forward planning meetings.

These should be held at regular intervals to ensure clear instructions are in place to manage the fleet and personnel.

At least every 24 hours – what issues are emerging, what containment plans are required (short and medium term mitigations)?

Data downloads to be collated and reviewed from relevant data sources (OTMR, defect analysis tool and other sources of relevant data)

Ensure capture of issues for future continuous improvement

Depot & Infrastructure maintenance.

Absolutely critical to keeping the fleet running.

Ensure contingency plans are in place to ensure critical routes are clear to gain access into and around depots and key service points (access for fuel trucks, staff, emergency vehicles or temporary conversion of depot facilities (mess rooms or offices))

Review staff welfare provisions in the event that they are stranded at work or away from home (block reservations at local hotels/inns etc)

Maintenance planning for extreme weather on depots – continuity of utilities etc

Depot yard maintenance (points, conductor rail, walkways, car parks etc)

Ensure that extreme weather risk assessments for depot management are up to date, conduct staff briefings to promote awareness of the arrangements that are to be employed

Operations Planning

Train preparation contingency planning

Support for drivers at dispersed locations, earlier start up for drivers

Train disposal and mobilisation techniques – in severe weather leave train live/powered up/engines running

Communications strategy.

This is a key element to managing extreme conditions and ensuring a service level can be maintained. A clear communication strategy will ensure clear paths of communication are maintained and understood Definition of key roles and decision makers

Delegated authorities

Media management

Passenger communications (CIS) and Internet

Standard Ops review agenda (identification of key staff numbers etc)

Definition of review and governance structure

What reviews take place & how often?

4.2.3 Response

Whilst plans have been put in place to allow for extreme winter operation actual implementation of plans and contingency measures must be monitored and reacted to. To ensure an effective response to potentially dynamic conditions response monitoring arrangements should be in place.

Extreme Winter Operation

It is critical to ensure a service can be maintained and clear plans are in place which allow flexibility to react to changing conditions during operation of fleet. Clear lines of communication must be in place which allows feedback from frontline staff. This will allow for analysis of emerging trends, which in turn will assist effective planning. Timetable flexibility to allow for proactive response to extreme weather

Co-ordinated response from engineering and operations

TRUST updated to reflect timetable changes

Public awareness of timetable changes

Poster at stations to show timetable changes

Website updated at regular intervals

Pre-printed schedule cards for operational staff

Pre-printed messages for on board train crew

PIS updates

Service Running

High level monitoring and review team to co-ordinate feedback from critical sources of information (train crew, fleet managers, station managers, control staff etc) for stock availability / reliability, train crew availability, local weather conditions, passenger levels etc

Preserving the service during operation

De-icing and removal of snow from critical systems / components at pre-determined locations which have been supplied with sufficient resource to carry out critical tasks. Some examples are listed below, but this is not a definitive list: Tail Light visibility

Horn functionality

Door operation and removal of grit from door tracks

De-icing door tracks and door gear

Greasing of door gear and rubber seals (silicone grease)

Coupler de-icing and bagging

Wiper check (frozen to the screen)

Get information from the driver (meet and greet)

De-ice both passenger and driver tread plates

Horn covers / bags

Consider utilising non-frontline staff for preservation tasks

Recovering / Preparing the service for operation during extreme weather (overnight)

To ensure availability of stock is maintained for service extensive recovery plans should be in place which allow for overnight maintenance of key systems. This may require the deferral of non safety critical maintenance tasks

Consideration should be given to dispersing available resource to the train at pre-determined locations which allow access to critical systems

Risk assessments, reflecting the requirements of the winter contingency arrangements should be developed

Removal of packed ice on the under frame of the stock can be very difficult and consideration should be given to special tools which allow access to restricted locations for its safe removal

Where possible keep the stock in a warm condition and consider keeping units powered up continuously

For Diesel units and to preserve resource (fuel etc), as an example; implementation of a 1 in 4 rule (run for one hour in every four) should be considered

Consider battery management on diesel stock where infrastructure allows for safe access and charging Pre-service start up conference call

Joint review between, engineering, operations and control to determine the level of stock availability which can realistically be achieved to deliver a reliable service. This conference call will determine the level of flexibility of your timetable

Levels of degradation of rolling stock should be considered, i.e. reduced traction power in extreme circumstances in multiple only operation. These decisions should be agreed by all parties after giving due consideration to the associated risk to service.

Lessons learned and feedback from previous service should be considered and plans adapted where appropriate

4.2.4 Extreme Winter Recovery

Fleets can suffer from extensive damage during extremes of weather. The guidance within this section of winter planning should be used to plan for winter operation recovery. Flexible recovery plans should be in place to allow for continued operation of service while fleet repairs and recovery activities are carried out.

Recovery Planning

Review of fleet position and dispersal vs. maintenance plans and diagrams

Maintenance recovery plans should allow the fleet to enter back into its cycle of maintenance at the earliest opportunity

Deferred work recovery plans should be put in place to manage the most critical deferred maintenance and defects first

Post extreme winter checks should be considered for all vehicle systems potentially affected by extreme weather i.e. door set up, electrical connectors, tilt systems, axle damaged from impact of ice balls containing ballast etc

Repair recovery plans may be longer term as material and spares may be at a reduced availability, such as traction motors, wheel sets etc. This may then lead to the development of maintenance containment plans to be put in place to increase inspection of key known degraded components, this may allow an extension to operational life until sufficient spares become available

Business Needs

To enable the delivery of a service a full understanding of the business needs and the actual availability of fleet should be planned. This will enable priority to be set which are realistic and achievable

An example of this process is AGA chose to minimise impact in service of the Class 317 fleet by prioritising traction motor changes so that at least 50 of the available 60 units were operating on full

tractive power. At this point the units on degraded power did not influence or degrade the operation of the service

To reduce the recovery time of the fleet, consideration should be given to temporarily increasing the resource available or sub contracting to approved suppliers to carry out recovery tasks

An example of this is Southern, who utilised Bombardier technical staff to remove and temporarily repair defective ACM modules which previously allowed snow ingress due to poor sealing arrangements. This allowed the fleet to resume service until a permanent solution could be developed

Maintenance facilities

Depot facilities (fuel station, CET plant, wash stations etc) are susceptible to extreme winter conditions and plans should be put in place which will allow for recovery from winter operations.

Deferred work recovery plans should be in place to manage the most critical deferred maintenance and defects first

4.2.5 Post Winter Review

As part of the winter review process using the above guidelines, a period should be allowed for formal reflection on, and documentation of, successes and failures. This is an opportunity to learn lessons and implement changes to plans for future events of extreme weather. Some areas for consideration are shown below, but this is not an exhaustive list.

Consideration of vehicle sustainability in changing climate.

Maintenance strategy review (post winter checks (drying out water ingress etc, winterisation exam improvement))

Overhaul strategy (either improve upon or return to original build condition)

Modification strategy (horn relocation, horn heating, improved IP rating)

Revised materials and logistics plans with key suppliers (incl. ROSCO's)

Be imaginative with respect to emerging climate trends when developing cost benefit argument for winter modifications

Challenge the established norms

Do not 'accept' known winter failure modes. This is not sustainable for future operational performance

Traction motors can draw in moisture from snow and cause earth faults and flash over. Long term solutions should be developed where possible such as ducting systems

3rd rail icing/de-icing is a common issue during winter operations but with co-ordinated planning with Network Rail mitigations to minimise disruption should be available to put into effect should the situation warrant it

Horn failures can be reduced by appropriate and timely dosing of the horn sock with anti-freeze.

Availability of key materials.

Particularly those associated with higher attrition of key systems

(e.g. DC traction motors)

Review potential for quick repairs as opposed to full overhaul when returned for snow damage

Review ROSCO and/or Maintainer stock holdings

Staff occupational and operational health and safety

Planning of extreme winter operations and maintenance should be an overarching principle of fleet operation and management. Risk assessments should be carried out for all non-routine activities which are expected to be carried out

A post winter operation review of maintenance facilities should be conducted

Delay attribution

Segregation of winter failure modes (within BUGLE?) to enable post winter review and planning for subsequent years.

4.2.6 Other Considerations

Although outside of the day to day running of fleet, consideration should be given to areas which may become of concern in the future. This is not an exhaustive list.

Train procurement specification

Lessons learned from extreme winter operation should be captured and used when procuring new trains. This is particularly critical due to the levels of climate change and the extremes of conditions in which rolling stock is required to operate

At- risk passengers

Consideration should be given to passengers who are at risk of the elements during times of extreme winter weather. Blankets

Refreshments

Priority passenger alighting

4.3 Planning for Summer

High temperatures can also affect the comfort of passengers and traincrew and also the functionality and performance of the rolling stock.

Air conditioning, including cab air conditioning and any driver cooling fans fitted, must be fully serviced and functional prior to the onset of high temperatures. It should be remembered that the temperature variance within the summer months can be quite dramatic and this can affect the functionality of many systems within the rolling stock.

Air Conditioning

Train crew briefed when air conditioning fails

Incorrect usage of the system can cause further damage (having windows open whilst the air conditioning system in operational)

Filters cleaned / serviced

Re-gassed

Electronic racks, traction motors

Filters cleaned / serviced

Air flow paths for cooling are clear of debris

Radiators

Clear of debris to ensure air flow is smooth

Ensure radiators are fully topped up with coolant

Washer bottles

Ensure all washer bottles are operational and topped up for the removal of green fly etc

Windscreen washing

Ensure windscreens are cleaned regularly

Door system

Check bearings and rubber joints for degradation leading to poor open and closing

Summer adjustments to avoid binding of the door system

Toilets

CET Tanks to be emptied on a regular basis to ensure odours and potential germination is minimised

Infrastructure can also become a major issue during times of extreme heat with instances of rail buckling. Close work must be carried out with Network Rail to identify 'Critical Rail Temperature (CRTs)' sites and the management of speed restrictions and the potential impact of the train plan.

Depot infrastructure also needs to be considered during extreme temperatures. This includes identifying any potential risks to the depot's ability to deliver the service.

Critical point work

Increased maintenance during extreme conditions

Management of the environment to ensure depot safety

Infestations

Insects

Vermin

Birds (nests etc)

Waste management

4.4 Autumn

The leaf fall in autumn often causes poor rail head conditions and can affect performance in a number of ways:

Low adhesion extends running times by increasing acceleration time (due to possible wheelspin), and by increasing deceleration times (defensive driving to prevent wheelslide). Many TOCs have developed 'autumn timetables', which allow extra time on those routes which are most likely to be affected during this period each year.

Low adhesion significantly increases the likelihood of wheel flats, despite defensive driving. Knowing that all Wheelslide Prevention equipment (WSP) is in good working order prior to the commencement of the leaf fall season is important.

Low adhesion significantly increases the likelihood that wheels will also slip when taking traction resulting in units failing to run to time. It is therefore essential that maintainers are on top of traction system performance. Prior to and during autumn. A particular risk surrounds DC motors where there are supply chain issues.

Low adhesion sites should be reviewed with NR, historic sites in the sectional appendix can change, the reasons for declaring them as exceptional should be clear (freight, traction adhesion, stopping for a platform etc).

Wheel flats require attention, so wheel lathe slots will be required. To reduce the effect on unit availability, it is desirable to keep within the planned number of units for tyre turning, so getting 'ahead of plan' with pre-planned tyre turning based on mileage or tread condition prior to the leaf fall season can free up space.

With some fleets, tyre turning may not be possible on all vehicles if the tread thickness is already below a certain size, so wheelsets will have to be renewed. This will require pre-planning and ordering of wheelsets so they are available on site prior to the leaf fall season. It may also mean getting 'ahead of plan' with other routine lifting work, to free up space on the lifting facilities, and create fleet availability headroom during this period.

Particularly bad leaf fall conditions can affect a large proportion of the fleet at the same time, despite all the carefully planned arrangements. A contingency plan should be pre-agreed with all concerned within the TOC to cope with reduced fleet availability, should this be necessary.

Rolling stock

Communication to train crew

Driver briefings on defensive driving

Reporting of poor traction hot spots

Autumn surgeries

Opportunity for feedback between drivers, management and Network Rail

Whiteboards within train crew depots to leave feedback on performance related issues

Operations

Network Rail

WSP Systems

Analysis of rogue units

Lathe records

WSP health checks

Dump valves firing in the correct sequence

Blocked valves can vent

Spares availability

WSP system under the most effort during leaf fall

Sanders and sand storage

Health checks

Blocked delivery units

Blocked pipes

Use dry sand only

Ensure sand is stored in a dry place

Use correct grade of sand

Increased use of sand during leaf fall

Sander top ups may be more frequent

Scrubber Blocks

What trains are appropriate to fit with scrubber blocks

What percentage of the wheelsets should be fitted with scrubber blocks

Leaf mulch build up under units

Ensure filters are clear of leafs to ensure proper air flow is maintained

Door pockets

Ensure guides and runners are clear of leafs to ensure smooth operation of door system Depot

Wheel lathe

Increased usage of wheel lathe during leaf fall

Ensure availability plan is in place

Maintenance of wheel lathe is carried out prior to leaf fall

Wheelset availability

Increased usage of wheelsets during Autumn

Fleet Wheelset condition check prior to Autumn

At risk units

Units with low wheel life expectancy to be deployed within local geographic location of wheel lathe

Minimises the risk of units running with restriction to wheel lathe

Infrastructure

During the period leading up to and during leaf fall infrastructure management is critical to ensuring the delivery of a reliable service. This should be done in partnership with Network rail to ensure the effective use of all tools available. Examples are given below but this list is not exhaustive.

Effective vegetation management

Programme of vegetation clearance

Station cleaning

Do not sweep leaves onto the line (sweep it and bag it)

Identification of vegetation hot spots (high risk sights)

Rail head treatment

Traction gel applications

Location specific

Joint management and deployment of Rail Head Treatment Train

Contingency for start and finish dates for the Rail Head Treatment Train

Northern Rail have employed the policy of riding with drivers to identify areas within its geographic network of extreme areas at risk of poor performance or safety due to leaf fall conditions. This is done in conjunction with Network Rail to ensure such areas are kept to a minimum. This work stream also includes the identification of areas of high priority for remedial work. This in turn reduces the number of station overruns, wheel flats and wrong side track circuit failures.

In summary

Large fleets take a long time to rectify, so it may be necessary to be planning for the summer hot weather whilst still in the depths of winter, and planning for the winter weather before the effects of the leaf fall have been felt. The use of a 'weather calendar' or 'Seasonal Preparation Plan' to monitor progress against target at Performance Meetings and/or Exec meetings helps to ensure that the next season's requirements are not overlooked, whilst still busy dealing with this season's problems.

It should also be noted that instances of cross seasonal issues may be seen during times of extreme weather. An example of this is when leaf fall conditions have been experienced and this is then followed by heavy snow fall. This can lead to the leaf sap to become frozen and when the snow and ice has cleared poor rail head conditions can return.