



4. Seasonal Management

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. This section is intended to promote a structured approach to seasonal planning and operations.



4 Seasonal Management

4.1 Introduction

Seasonal ambient temperature variations and weather can adversely affect the performance of traction, rolling stock and rail head conditions if they are not recognised and planned for. Different types of rolling stock may be affected in different ways so a thorough understanding of seasonal effects on a particular rolling stock and processes in place to minimise them are essential.

Plans need to take into account the time of year, so a weather calendar or seasonal preparation plan should be visible at all levels. Progress against targets should be monitored and KPIs developed to allow for future analysis. Any plans and processes in place to manage seasonal changes must be controlled through a constant review cycle and the plans for seasons management should recognise that seasons start at different times of the year and plans must be flexible enough to accommodate this.

The guidelines below are intended to promote a structured approach to seasonal planning and operations. Individual TOCs and maintainers should review them with key stakeholders 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, operations and engineering need to work together to produce robust and effective management plans.

Seasons management should be viewed as an integral part of processes, change management, maintenance cycle and normal performance improvement and treated as the norm, not as an additional function/process.

4.2 Common seasons processes

4.2.1 Analysis of previous data

Review changes from previous years	Design specification changes
Think about design changes	Slips, trips and falls
Modifications	Process changes
People competencies	Maintenance actions/cycles
Trains	Depot infrastructure
Performance	Station overruns
MTIN (Miles per Technical Incident)	PPM (Public Performance Measure)
DPI (Delays Per Incident)	Delay minutes
Cancellations	Material usage
Seasonal variances in stock levels	Supplier performance
Killfrost (did it perform at the desired temperatures?)	Product development with suppliers
New replacement products available	Safety review
SPADS and location	Poor braking and location
NIRs	Passenger and traincrew
Environment condition	Air conditioning/heating when a train is in a failed state
Lighting conditions	Frozen footsteps

4.3 Planning for winter

The following section addresses planning issues for winter and has been extended 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 the inevitable degradation of fleet condition and deferral of maintenance arising from extreme winter weather. Efforts should be made to reduce demand/outstanding work prior to winter operation.

The industry guidance on preparation for and operation during winter ([GEGN8628](#)) was developed to capture all lessons learned and good practices.

This section comprises six sub-sections:

4.3.1 Standard winter preparedness

Initial winter preparedness is largely around enhancing 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 critical to maintaining service during winter. This section should be used to enhance fleet winter operations.

Key risk areas must be considered to ensure the effectiveness of any plans. The list is not exhaustive and should be adapted to meet your specific needs:

- Vehicle maintenance should undertake an annual review and look-ahead process to consider how effective standard winterisation tasks have been and what needs to be incorporated into exams going forward, e.g. pipe equipment, lagging, horn trace heating, air system pre-treatment, pre-filtration of electrical machines, etc.
- It is helpful to differentiate between what should be classified as winterisation and what should be included in standard maintenance tasks. Winterisation should be 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 (that 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.

Safety risks and performance risks

- Winter 'survival kits', i.e. appropriate clothing, tools, local support networks 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.

- Gritting rosters.
- Supply chain in place to support the availability, potentially at short notice, of critical plant, i.e. space heaters, etc.
- Thorough materials planning paying particular attention to critical stock holdings of killfrost and thaw granules, etc.
- Contingency plans: alternative suppliers should be identified to support existing supply base
- Review depot-based risk assessments to ensure the adequacy of mitigation arrangements
- Ensure availability and preparedness of road vehicles, etc. (snow chains, availability of 4x4s)
- Ensure availability of equipment for local deployment, i.e. shovels, rock salt, etc.

Operations planning

- Review of business continuity management plans
- Consider depot and infrastructure facilities: clear access to the depot
- Operational restrictions and trigger events: clarify the triggers to move to the next level of winter management and how these instructions will be communicated
- 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: define clear roles and responsibilities, 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)
- Define key decision-makers; contact list circulated to relevant parties

www.nrws.co.uk – Network Rail weather forecasting facility

Delay attribution

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

4.3.2 Extreme winter preparedness

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

Trigger events should be clearly defined to produce a detailed plan 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 their environments. Plans should allow trigger events to ramp up or down based on restrictions which will affect the level of service being offered. Co-ordinated fleet/operations management plans will be needed to manage trigger events.

Trigger events take many forms but are based on 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.)
- Stepping up vehicle maintenance/fleet management activities
- Identification of critical operating parameters; go/no-go criteria for trains
- Passenger information systems, heating, lighting
- 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 up plans for deferred/outstanding work
- Contingency roster cover (more staff on nights, less work on days)
- Developing a key competency matrix for specific extreme weather tasks supported by risk assessment

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 will determine the flexibility of the timetable
- Levels of degradation of rolling stock, i.e. reduced traction power in extreme circumstances in multiple-units only operation, to be agreed by all parties after giving due consideration to the associated risk to service
- Lessons learned and feedback from previous service and plans adapted where appropriate

Cleaning and servicing strategy

- Consideration of winter response teams to disperse to units in service to address key systems (couplers and doors, etc.)
- Deployment of winter kits: key supplies for keeping trains running (de-icers, etc.) for use by nominated winter response team

Failure review and forward planning meetings

- Held at regular intervals to ensure clear instructions 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)
- Capture of issues for future continuous improvement

Depot and infrastructure maintenance

- Contingency plans in place to guarantee critical routes are clear for access to 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, taxi etc.)
- Maintenance planning for extreme weather: 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, staff briefings to promote awareness of the arrangements to be employed
- 3rd rail icing/de-icing is a common issue during winter operations; co-ordinated planning with Network Rail to mitigate and minimise disruption should the situation warrant it
- Staff occupational and operational health and safety

Operations planning

- Train preparation contingency planning
- Support for drivers at dispersed locations, earlier start for drivers
- Train disposal and mobilisation techniques: in severe weather, leave train live/powered up/engines running

Communications strategy

- Key to managing extreme conditions as well as ensuring a certain service level and clear channels of communication
- Definition of key roles and decision-makers
- Delegated authorities
- Media management
- Passenger communications (CIS) and Internet
- Standard operations review agenda (identification of key staff numbers, etc.)
- Definition of review and governance structure
- What reviews take place & how often?

4.3.3 Response

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

Extreme winter operation

It is critical to ensure a service can be maintained and plans are in place to allow flexible reactions to changing conditions during fleet operation. Clear lines of communication must be established to allow feedback from frontline staff. This will facilitate the analysis of emerging trends, which in turn will assist effective planning.

Timetable flexibility

- 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
- Posters at stations to show timetable changes
- Website updated at regular intervals
- Pre-printed schedule cards for operational staff
- Pre-printed messages for on-board traincrew
- PIS updates

Service running

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

At-risk passengers

- Consideration should be given to passengers who are vulnerable to the elements during extreme winter weather
- Blankets
- Refreshments
- Priority passenger alighting

Preserving the service during operation

De-icing and removal of snow from critical systems/components at pre-determined locations supplied with sufficient resources 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)
- Information from driver (meet and greet)
- De-ice both passenger and driver tread plates
- Consider utilising non-frontline staff for preservation tasks
- Recovering/preparing the service for operation during extreme weather (overnight)
- To maintain availability of stock for service, extensive recovery plans should allow for overnight maintenance of key systems, which may require the deferral of non-safety-critical maintenance tasks
- Where possible, keeping the stock in a warm condition or keeping units powered up continuously
- For diesel units and to preserve resources (fuel, etc.), implementation of a 1 in 4 rules (run for one hour in every four)

- Consider battery management on diesel stock where infrastructure allows for charging

4.3.4 Extreme winter recovery

Fleets can suffer from extensive damage during extreme weather. This guidance should be used to plan for winter operation recovery. Flexible recovery plans should allow for continued operation of service while fleet repairs and recovery are carried out.

Recovery planning

- Review of fleet position and dispersal vs. maintenance plans and diagrams
- Maintenance recovery plans should allow the fleet to re-enter its cycle of maintenance at the earliest opportunity
- Deferred work recovery plans should 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 subject to reduced availability, e.g. traction motors, wheel sets, etc. This may then lead to maintenance containment plans to increase inspection of key known degraded components, extending operational life until sufficient spares become available

Business needs

- Delivery of a service requires a full understanding of the business needs and the planning of fleet availability to enable realistic and achievable priorities to be set

An example of this is AGA, who chose to minimise the 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

- The recovery time of the fleet could be reduced by temporarily increasing the resources available or sub-contracting recovery to approved suppliers

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

4.3.5 Post winter review

- The winter review process should allow for a period of formal reflection on and documentation of successes and failures. This is an opportunity to learn lessons and implement changes to plans for future extreme weather events. 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])
- Modification strategy (horn relocation, horn heating, horn baffle plates)
- Revised materials and logistics plans with key suppliers (incl. ROSCOs)
- Imaginative approach to emerging climate trends when developing cost-benefit argument for winter modifications

- Challenge established norms
- Not 'accepting' known winter failure modes as 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
- Review potential for quick repairs as opposed to full overhaul when returned for snow damage
- Review ROSCO and/or maintainer stock holdings
- 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 anticipated non-routine activities

Delay attribution

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

4.3.6 Other considerations

Although outside the day-to-day running of fleet, consideration should be given to areas which may be of concern in the future.

Train procurement specification

- Lessons learned from extreme winter operation should be captured and considered for inclusion in a future version of the Key Train Requirements ([KTRs](#)) to improve new train performance and reliability. This is particularly critical due to the levels of climate change and the extremes of conditions in which rolling stock is required to operate.

4.4 Planning for summer

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

Cab and saloon 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 flow 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

Windscreen washing

- Ensure windscreens are cleaned regularly and washer bottles topped up

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 minimise odours and the spread of germs

Infrastructure

- Tracks can also become a major issue during times of extreme heat with instances of rail buckling. Work closely with Network Rail to identify Critical Rail Temperature (CRTs) sites and manage speed restrictions and the potential impact of the train plan
- Depot infrastructure also needs to be considered during extreme temperatures, including identifying any potential risks to the depot's ability to deliver the service

Management of the environment to ensure depot safety

- Infestations
- Insects
- Vermin
- Birds (nests, etc.)
- Waste management

4.5 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 decreasing acceleration (due to possible wheelspin) and deceleration (defensive driving to prevent wheelslide). Many TOCs have developed autumn timetables, which allow extra time on those routes 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 also significantly increases the likelihood that wheels will 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 exceptional should be clear (freight, traction adhesion, stopping for a platform, etc.).

Wheel flats require attention in the form of wheel lathe slots. To reduce the effect on unit availability, it is desirable to keep within the planned number of units for tyre turning. Getting ahead of schedule 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; pre-ordering wheelsets so they are available on site prior to the leaf fall season. It may also mean getting ahead of schedule 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 careful planning. A contingency plan should be pre-agreed with all concerned within the TOC to cope with reduced fleet availability.

Rolling stock

- Communication to traincrew
- Driver briefings on defensive driving
- Reporting of poor traction hot spots

Autumn surgeries

- Opportunity for feedback between drivers, management and Network Rail
- Whiteboards within traincrew depots to leave feedback on performance-related issues

Operations

- Network Rail
- Analysis of rogue units
- Lathe records
- WSP health checks
- Dump valves firing in the correct sequence
- Blocked valves can vent
- Spares availability
- Sanders and sand storage
- Blocked delivery units
- Use correct grade of sand
- Increased use of sand during leaf fall
- Sander top ups may be more frequent

Scrubber blocks

- Which trains can be fitted 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 leaves to maintain proper air flow

Door pockets

- Ensure guides and runners are clear of leaves to guarantee smooth operation of door system

Depot

- Ensure availability plan is in place
- Maintenance of wheel lathe is carried out prior to leaf fall
- Wheelset availability
- 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

In the period leading up to and during leaf fall, infrastructure management is critical to ensuring the delivery of a reliable service. This should be 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 and bag)
- Identification of vegetation hot spots (high-risk sites)

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. This is in conjunction with Network Rail to keep such areas to a minimum. This work stream also includes the identification of areas of high priority for remedial work, which in turn reduces the number of station overruns, wheel flats and wrong side track circuit failures.