

Well managed Highway Liability Risk- Winter Service Delivery

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Today's presentation

- Risk Based approach
- NWSRG guidance
- Ensemble forecasting
- Severe weather and resilience



The role of the highway authority

- Highways Act 1980 Section 41(1A) provides that a highway authority is under a **duty** to ensure, so far as is reasonably practicable, that safe passage along a highway is not endangered by snow or ice.
- Section 150 of the 1980 Act imposes a duty upon highway authorities to remove any obstruction of the highway resulting from “accumulation of snow or from the falling down of banks on the side of the highway, or from any other cause”.



Section 41 duty to maintain

- (1) the authority who are for the time being the highway authority maintainable at the public expense are under a duty, subject to subsections (2) and (4) below to maintain a highway
- (1A) In particular, a highway authority are under a duty to ensure, as far as is reasonably practicable, that safe passage along a highway is not endangered by snow or ice

Inserted by the Railway and Transport Safety Act 2002 following the judgement of *Goodes v. East Sussex County Council* (2000) 1 WLR 1356



Well-maintained Highway Infrastructure

part 2 –Highways Section 7 Winter Services

- Compliance by October 2018
- Risk based approach throughout
- Fewer if any prescribed standards
- Appendix H removed and to be replaced by NWSRG Practical Guide due during 2017



Recent County Court Decision

- Brenda White v Nottinghamshire County Council
(Nottingham County Court HHJ Owen QC 19 April 2017)
- Claimant slipped on ice on pavement
- Section 41 (1)(A) breach claimed
- Defence relied on Winter Services Operational Plan
- Claimed dismissed as WSOP had appropriate method to it and was applied
- Only County Court Decision



Well Managed Highway Infrastructure

Key issues to be examined

- Is the WM policy reasonable?
- Is it compliant with Best practice e.g. WMHI ?
- Good Record keeping essential in establishing a Section 58 defence



Risk or Evidence based approach

- Are you able to justify through sound evidence of network, likelihood, impact and affordability that the Winter Services Policy in your authority satisfies the requirements of Section 41(1)(A) of the Highway Act 1980



NWSRG Guidance

- As one of the benefits of NWSRG membership, members can book the training at the IHE members rate



NWSRG Guidance

- Appendix H remains as current guidance
- Revised documents due in early 2018
- New advice will follow WMHI format



Ensemble Forecasting

- Ensemble forecasts quantify uncertainties in weather prediction and estimate risks of particular weather events.



Ensemble Forecasting

- Ensemble forecasting system samples the uncertainty inherent in weather prediction to provide more information about possible future weather conditions. Rather than producing a single forecast, multiple forecasts are produced by making small alterations either to the starting conditions or to the forecast model itself, or both.
- Ensemble forecast systems are designed so that each member should be equally likely, so that the ensemble can be used to forecast the probabilities of different possible outcomes. Where all the forecasts in an ensemble are similar we can be more confident in the forecast; where they differ we must take more account of uncertainty.
- Two ensemble forecasting systems are used at the Met Office: the Met Office Global and Regional Ensemble Prediction Systems ([MOGREPS](#)) is used for short-range prediction, while the [ECMWF](#) ensemble prediction system is used for the medium range (up to 15 days ahead).



Ensemble Forecasting

- **Key aims**
- To develop ensemble prediction systems, improving the representation of uncertainties in both the initial conditions and the forecast models.
- To continue to develop a range of probabilistic forecast products, particularly to improve forecasts of the risk of high-impact weather events.
- To support customers in using uncertainty information to manage weather-related risks effectively.



Ensemble Forecasting

- ensemble prediction allows the uncertainty in forecasts to be assessed quantitatively, and attaching numbers to the confidence or uncertainty can allow the user to assess the risks more accurately.
- Ensemble forecasts contain a huge amount of information. Using the 12 forecast members shown on the right, at over a day ahead we can be confident that there will be showers and bands of heavy rain around the UK, but there is considerable uncertainty about the location and extent of the heavy rain (shown in the yellow and orange colours).



Ensemble Forecasting

- **How we use the ensembles to help decision-making**

Forecasters often like to see the individual forecasts, but for other users we need to find efficient ways to summarise the information.

One way is using probability forecasts.

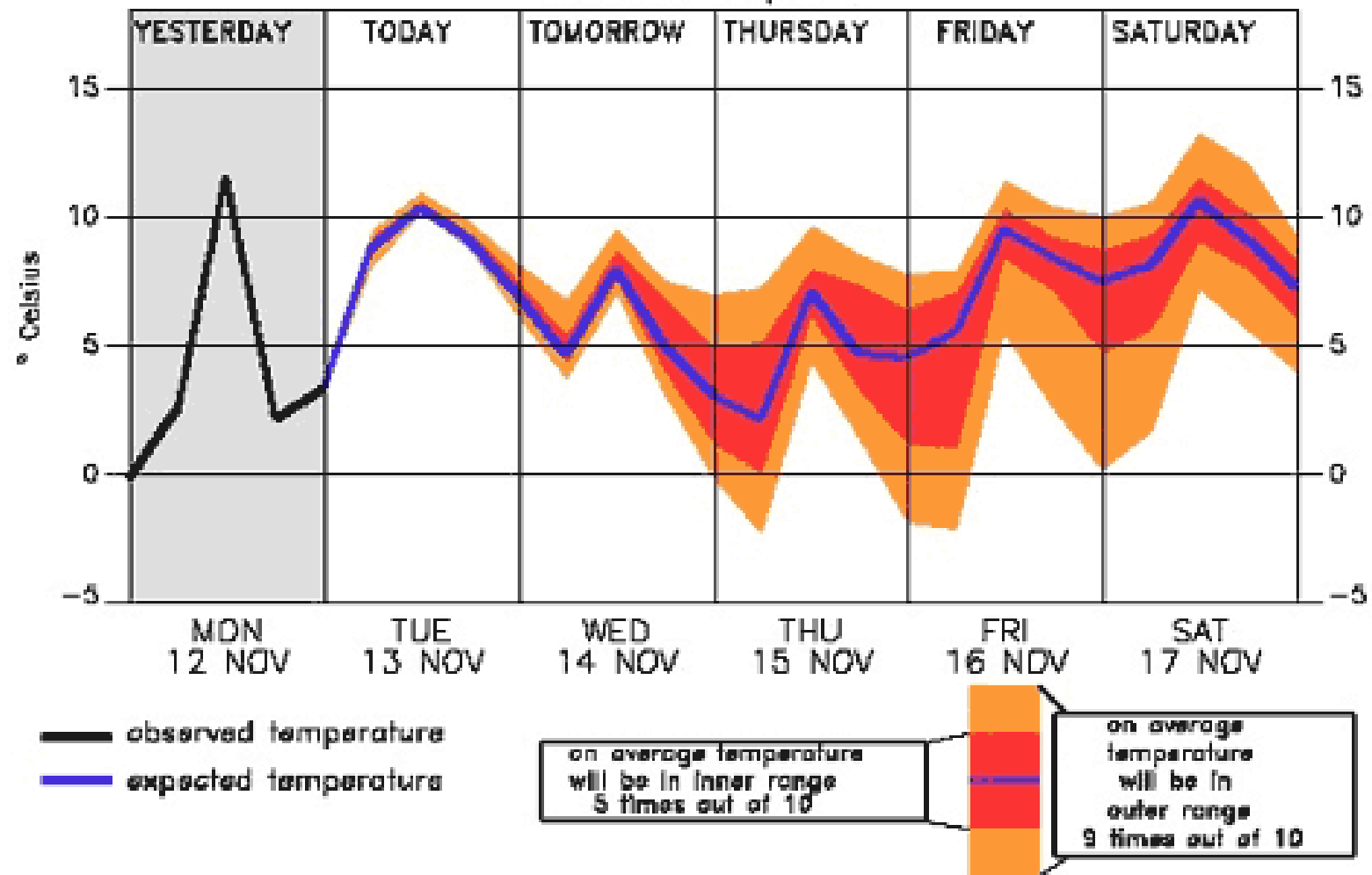
- To make best use of a probability forecasts, users must choose a probability threshold which gives the correct balance of alerts and false alarms for their particular application.
- **Probability forecasts**
- Probability forecasts can be used in two main ways:
- [Using a range of values](#)
- [Using percentages](#)



Ensemble forecasting

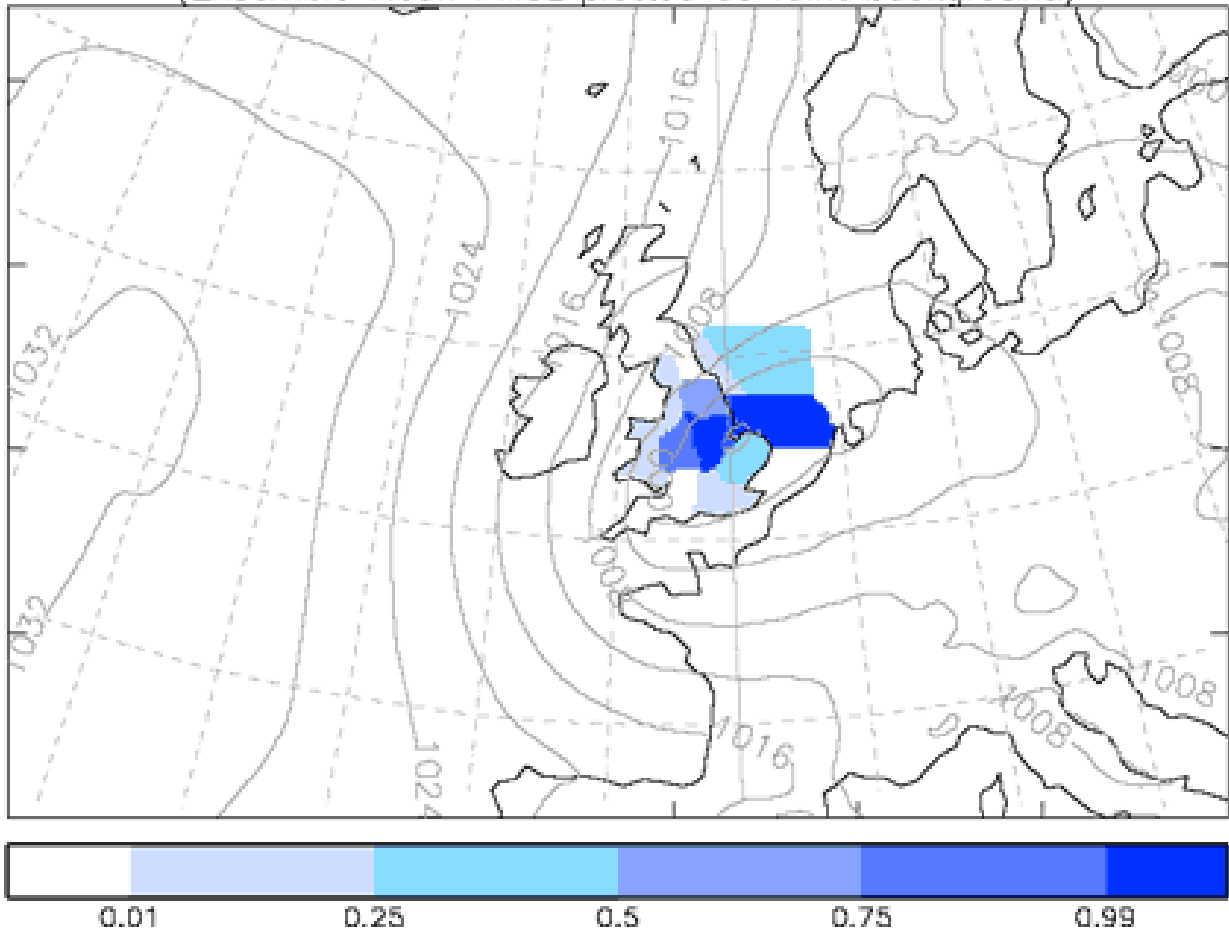
- **Range of values**
- For a specific weather element, such as temperature or wind speed, a range of values can be provided, along with a measure of how confident we are that the actual value will fall within that range.
- Diagram shows the range of uncertainty in temperature at a specific location, plus some indication of the most probable values. At each forecast time a range of possible values are plotted, along with an estimate of the probability that the temperature will fall within that range

EXETER HQ SITE





MOGREPS (Regional) Probability map for 6HourPrecipB > 20.0mm
DT 18Z on Sun 24/06/2007 VT 12Z on Mon 25/06/2007 lead time 18h
(Ensemble Mean PMSL plotted as faint background)





Ensemble Forecasting

- Percentages
- A probability forecast can give a percentage of how likely a defined event is to occur, which can help users to assess the risks associated with particular weather events to which they are sensitive.
- Ensembles are designed to estimate these probabilities by sampling the range of possible forecast outcomes. The probability of a particular event occurring is estimated by counting the proportion of ensemble members which forecast that event to occur. So if six out of the 24 members predict more than 5 mm of rain at a specified location in a defined period, we would estimate there to be a 1-in-4, or 25%, chance of the event happening.
- Diagram is an illustration of a probability forecast. The darker the blue becomes, the greater the probability of the rainfall exceeding 5 mm in six hours. For additional information, the contour lines show the pressure at mean sea level predicted by averaging all the ensemble members. This gives an indication of the weather system producing the risk.



Severe Weather and Resilience

- SECTION ONE - THE CODE OF PRACTICE

Section 7 recommendations

- Winter resilience standard
- Part of organisation's resilience planning
- Planned escalation procedure

- Minimum highway networks
- Subset of normal treated network
- Key infrastructure
- Interface with other authorities

- Contingency planning
- What if scenarios



MINIMUM HIGHWAY NETWORK

- What is the key infrastructure access which should be maintained? To this end the authority's emergency planning department should be consulted. Consideration should be given to a wide range of services including consideration for private infrastructure. For example, water treatment works may require chemical deliveries to ensure continuity of water supply but are unlikely to be on the primary treated road network.



MINIMUM HIGHWAY NETWORK

- How will carriageways, cycle ways and footways be prioritised across the authority's network? Issues to be considered include treatment methods, resource requirements, type of network as a whole and alternative routes or modes of transport.
- How will the minimum winter network interface with other authorities? There is little point expending effort to keep a route open if it is snowbound in a neighbouring authority.



WINTER RESILIENCE STANDARD

- Consider number of days continuous service delivery
- Recommendations in Quarmby Report and UKRLG report
www.ukroadsliaisongroup.org/en/utilities/document-summary
- 48 runs suggested- based on number of days continuous service plus replenishment time
- Relies heavily on available resources-shortage of one element can put strain on service
- Risk assess delivery of the service



Well Managed Highway Liability Risk

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