Data and statistics

A significant problem in many construction contracts is the inherent subjectivity in judging to what extent a weather event is exceptionally adverse. Disruption from adverse weather conditions may affect working conditions, lead to lost time, and compromise worker safety.

The New Engineering Contract (NEC) uses weather data and meteorological expertise to give a more precise definition of when an exceptional weather event has occurred.

With solid statistical evidence derived from Met Office observations both parties can agree on whether a particular month contains a compensation event.

GATHERING WEATHER DATA

We have over 160 years’ experience in observing and recording weather, in both the UK and the rest of the world. We run a network of more than 100 designated NEC report-producing weather stations, as well as around 200 other observing stations, across the UK. In addition, we maintain and operate the UK’s radar network, and are party to international agreements to operate meteorological satellites. We are thus ideally placed to deliver, and make comparisons between, historical and current weather data.

There are rigorous global standards for all weather observations and we are diligent in checking measurements and calibrating the instruments. For instance, the cup anemometers that measure wind speed are calibrated in wind tunnels at least every five years, and rain gauges are routinely cleaned and checked by our network managers.

LONG TERM AVERAGES

Most of our extensive UK network of land surface weather observation stations are long-established and provide automatic, frequent and accurate readings for weather elements, such as rainfall, and temperature. When we build up a long record of observations from a location we are able to analyse them and generate what we call Long Term Averages (LTAs). These LTAs are the best measure of what the average or normal climate looks like, and are generated using observations for a 30 year period spanning 1981 to 2010.

For example, by looking at 30 Januarys we will be able to calculate the average (mean) January and give ourselves a good understanding of what normal looks like for comparison.

For the NEC we calculate LTAs on a monthly basis for temperature, rainfall and snow. Crucially, this baseline is periodically updated to ensure that the averages that are generated from it are representative of the changing climate. We can quickly see if conditions were above, below or as expected by comparing the recorded monthly observations against the LTA.

1-IN-10 YEAR VALUES

In association with NEC, we have devised a system of 1-in-10 year values to determine the rarity or exceptionality of particular weather events, especially rain, snow, air temperature and wind speed. These values are calculated on the basis of 30 years of monthly data for all the main weather stations. The totals for a particular month, for every year from 1981 to 2010, are laid out in order from most extreme to lowest. The third most extreme value is then used as the 1-in-10 year value. Although the value is really the third most extreme in thirty years, it is simpler to consider it the highest in ten years.
This article is part of a series of Met Office /NEC articles designed to highlight weather impacts on the construction industry and how contractors can take the impacts into account during projects.

**COMPENSATION EVENTS**

Should the readings for a particular weather element in one month be more exceptional than the highest value in a ten-year period, then the contractor will have a case for compensation should the weather event impinge on the contractor’s ability to carry out the work. In this way a clear-cut standard for compensation claims related to weather events can be agreed to by both the client and contractor. This removes the uncertainty surrounding terms such as ‘exceptionally adverse’ or ‘exceptionally inclement’ in contract clauses concerning the weather that are common in other contracts.

Contracts will include reference to a suitable weather station to be used for current observations and as a data source for LTAs and 1-in-10s. If this station closes, or becomes inoperative for some reason, both parties would need to agree on the next nearest suitable station.

LTAs and 1-in-10 values are vital tools for creating successful contracts. Knowledge of Met Office LTAs as a basis for predicting the weather should help both parties plan and agree contract terms. The occurrence of monthly observations in excess of the 1-in-10 year value, for any of the standard weather elements, will help settle whether a contractor can make a compensation claim.

**Terminology:**

Observation – a measured reading of what the weather is doing. We make observations every minute of every day. In data reports the standard frequencies are hourly or daily.

LTA – Long Term Average, an average for the whole month calculated using 30 years of data

1-in-10 year values – these values provide a measurement of significantly adverse weather

Cup anemometers measure wind speed

Example of 1-in-10 year values calculation