Exceptional weather events

Type of event: Storm

Date:

January 2nd, 1976

DEPARTMENT OF TRANSPORT AND POWER

METEOROLOGICAL SERVICE

INTERNAL MEMORANDUM IM82/76

THE STORM OF JANUARY 2, 1976

BY

Th. KEANE B.Sc.

U.D.C.

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Introduction:

Although Ireland is a rather windy country, and experiences gales every year, particularly in the winter period, those causing widespread damage happen only a few times per century.
One of the more recent memorable storms was perhaps "Hurricane Debbie" which occurred on September 16, 1961.
The worst storm this century was probably that of February 26/27th, 1903.
Another of importance was on January 11/12th, 1974 (Meteorological Service Internal Memorandum Doi 79/74).
Another notable storm, although less severe, occurred on January 2, 1976.
Unlike the January 1974 storm, which was heralded by several days of an almost continuous series of gales, the latest storm took the general public, and to some extent the weather forecast office, a little by surprise.

During the previous month the weather in Ireland had been dominated by an unusually strong anticyclone centred in the North Atlantic to the west of Europe. Later this anticyclone had declined and frontal wave depressions, originating further west in the North Atlantic affected the northwest of Europe. A minor depression passed over Ireland on January 1, 1976, giving some gale gusts in places. This was followed however, by another depression which intensified considerably, particularly when it was off the north coast of Ireland, during the afternoon of January 2, 1976 giving storm force winds in many areas throughout the country.

For a preliminary analysis of the extreme wind distribution during the storm the maximum wind averaged over ten minutes and the highest gust for each station is shown in Figure 1, In this figure the arrow points with the wind direction and the strength of the ten-minute mean wind, expressed in the Beaufort wind force scale (see Figure 2), is plotted at the tail of the arrow, The maximum gust in knots and the spatial progress, depicted by isochrones, of the
occurrence of maximum gust is also given. It seems that for the northern and central parts of the country the strongest ten-minute mean winds of the storm blew from the west-northwest or northwest direction but for
the southern and southwestern regions maximum winds were mainly from
the southwest or west-southwest. The maximum mean winds reached violent storm force 11 at Roche's Point and storm force 10 in the Shannon and the Mid-West regions and at Malin Head, Maximum gusts in excess of

80 kts were encountered in the same areas except in the case of the station at Malin Head where a gust of 73 knots only was recorded, Surprisingly enough the highest gust for the country (85 kts) occurred at Bi=.

In Figure 1 a time cross-section of the times of occurrence of maximum gusts has been entered at half hourly intervals, The isochrones are seen to converge closer to each other in the Shannon region which might suggest a localised delay in the spatial progress of the oocurrence of the maximum gust or alternatively that maximum winds may have been sustained for longer in the region, The delay was caused by a post cold frontal trough well marked over the northeast half of the country, The anemogram from Birr shows a fairly sharp peak of strong winds, perhaps more typical of a squall, in contra.st to the more gradual build up of wind force recorded at Shannon Airport. On the other hand the wind trace at Shannon Airport dosen't suggest that the strongest winds were sustained for an unduly longer period than at most other stations, No firm conclusions could be drawn therefore, about the character of the wind during the somewhat slower spatial progress of storm force mean winds
and maximum gusts in th·e region between Shannon Airport and Birr, Newspaper accounts refer to the unusual intensity of the storm in the area particularly along the upper Shannon from Limerick to Portumna or Athlone.

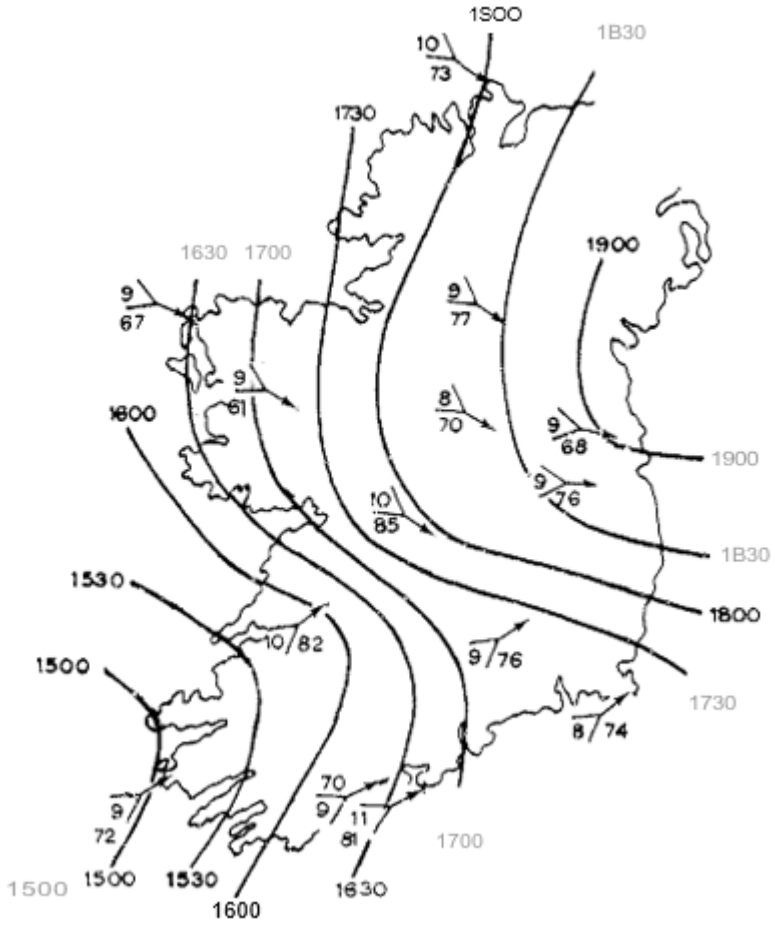


Figure 1. The direction (indicated by an arrow)and the strength of the maximun, 10- minute wind',n the Beaufort wind scale (shown within the arrow tail) are plotted for each synoptic station, the maximum gust (knots) and isochrones showing the time of occurrence(GMT) of maximum wind gusts are also included.

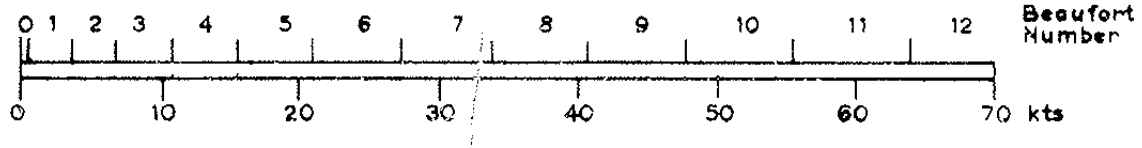


Fig. 2 Beaufort scale number and equivalent wind velocity in knots.

Table 1, attached, gives the direction, speed and time of the maximum gust at each station for the storm of January 2nd. The highest ten-minute and sixty-minute mean wind speed recorded at each station is also shown. The number of hours with gusts of 48 knots or greater and the times, in hours GMT, preceding and succeeding the first and last gusts respectively, is also shown in the table to give some indication of the duration of storm condition at the various stations. These latter columns of the table show that generally the storm lasted longest in northwest, west and southwest regions while the minimum duration was inland mainly east of the Shannon. It is worth noting that, of the stations examined, Claremorris experienced the lowest maximum gust and had the lowest number of hours with gusts reaching or exceeding 48 kts but on the other hand the number of hours with gale gusts reported at Claremorris was comparable to most other stations (gale gusts have not been included in Table 1), It is also interesting that although Birr reported the highest gust for the country the duration of storm winds there was relatively short.

Table 2 compares the January 1976 storm with the storm on January 11/12th, 1974 and also with another somewhat less severe storm which occurred in the same month in 1974. It appears from the table that the January 1976 storm was of shorter duration than the fi.rst January 1974 storm and much shorter in the north and west of the country. The highest ten-minute mean winds were lower except in some mid-west regions.

Comparing the storm with the second storm of January 1974 it proved to be about equal in duration except on the north coast and in some north-western areas where it did not last as long. The maximum mean speed over ten minutes was greater in many inland and eastern regions during the latest storm, particularly at Birr and Dublin Airport. Claremorris however, experienced a much stronger wind force in January 1974.

TABLE 1

Highest Gusts and their times of occurrence. Highest mean speed over ten-minute and sixty-minute intervals, the number of hours with gusts >=48 kts and time (in whole hours GMT) preceding and succeeding first and last gusts respectively. January 2nd 1976

Station	Highest Gust Direction °	Highest Gust Speed (kts)	Highest Gust Time (GMT)	Highest Mean Speed Recorded over 10-minutes (kts)	Highest Mean Speed Recorded over 60-minutes (kts)	Gusts ≥48 kts Hour at start GMT	Gusts ≥48 kts Hour ended GMT	Gusts ≥48 kts Actual No. of hours
Valentia Observatory	240	72	1508	46	44	0800	1900	10
Roche's Point	250	81	1645	56	50	1000	2200	11
Cork Airport	250	70	1629	45	41	1000	2000	9
Rosslare	230	74	1725	40	39	1100	2100	9
Shannon Airport	240	82	16o7	54	52	1200	2100	8
Birr	300	85	1756	51	38	1500	2000	5
Kilkenny	240	76	1723	43	41	1600	2100	4
Casement Airport	280	76	1845	44	40	1200	2200	7
Dublin Airport	290	68	1905	46	43	1300	2200	6
Mullingar	300	70	1823	39	35	1500	2000	5
Clones	310	77	1830	43	42	1400	2300	8
Claremorris	320	61	1727	43	39	1500	1800	3
Belmullet	320	67	1630	43	40	0800	2100	12
Malin Head*	320	73	1810	53	49	0900	0700 (Jan. 3rd)	17(14)**
Valentia Observatory	240	72	1508	46	44	0800	1900	10
Roche's Point	250	81	1645	56	50	1000	2200	11

* Effective height of anemometer 18 metres (10 metres approx. for all other stations)
** Essentially two periods with gusts; in southeast to south winds from 0900 to 1300 GMT and in northwest winds from 1700 to 0700 GMT

TABLE 2

Highest mean speeds over a 10-minute interval and the number of hours with gusts >=48 kts for the two storms in January 1974 and the storm on January 2nd, 1976.

Station	11-12/1/1974 Direction	11-12/1/1974 Mean Speed (kts) (A)	11-12/1/1974 hours with gusts (C)
Valentia Observatory	190	54	16
Roche's- Point	210	62	13
Cork Airport	210	58	12
Rosslare	200	46	12
Shannon Airport	220	55	11
Birr	220	47	8
Kilkenny	200	44	9
Casement Airport	190	53	13
Dublin Airport	230	47	12
Mullingar	220	45	10
Clones	220	43	10
Claremorris	26o	40	10
Belmullet	26o	50	25
Malin Head	240	54	27

Station	27-28/1/1974 Direction	27-28/1/1974 Mean Speed (kts) (B)	27-28/1/1974 hours with gusts (D)
Valentia Observatory	200	54	11
Roche's- Point	220	53	13
Cork Airport	220	48	8
Rosslare	16o	42	12
Shannon Airport	220	53	6
Birr	210	39	7
Kilkenny	200	36	5
Casement Airport	190	45	9
Dublin Airport	200	35	8
Mullingar	200	38	5
Clones	230	44	8
Claremorris	220	59	9
Belmullet	240	49	12
Malin Head	190	61	23

Station	2/1/1976 Direction	2/1/1976 Mean Speed (kts) (E)	2/1/1976 hours with gusts (F)
Valentia Observatory	240	46	10
Roche's- Point	250	56	11
Cork Airport	250	45	9
Rosslare	230	40	9
Shannon Airport	240	54	8
Birr	300	51	5
Kilkenny	240	43	4
Casement Airport	280	44	7
Dublin Airport	290	46	6
Mullingar	300	39	5
Clones	310	43	8
Claremorris	320	43	3
Belmullet	320	43	12
Malin Head	320	53	17

Station	Difference between (A) – (E)	Difference between (C) – (F)	Difference between (B) – (E)	Difference between (D) – (F)
Valentia Observatory	8	6	8	1
Roche's- Point	6	2	-3	2
Cork Airport	13	3	3	-1
Rosslare	6	3	2	3
Shannon Airport	1	3	-1	-2
Birr	-4	3	-12	2
Kilkenny	1	5	-7	1
Casement Airport	9	6	1	2
Dublin Airport	1	6	-11	2
Mullingar	6	5	-1	0
Clones	0	2	1	0
Claremorris	-3	7	16	6
Belmullet	7	13	6	0
Malin Head	1	10	8	6

Reports of the Storm of January 1976, received from other Sources

From newspaper reports it seems that, from a local point of view, peak storm conditions lasted some two hours in many places. The Westmeath/Offaly Independent wrote that most damage was done in the Midlands area between 1730 and 1930 local time when the storm was "fierce in intensity".
It appears that the most widely disruptive aspect of the storm was the number of trees which fell blocking a considerable number of major and minor roads, cutting electricity and telephone cables in several places and directly causing most of the traffic accidents at the time,
The Electricity Supply Board (ESB) estimated that some 90,000 homes, or one tenth of the total number of homes supplied, had their electricity disrupted for a prolonged period at a cost to the Board of about £250,000 for repairs. Cable damage was particularly bad in the West Limerick and Kerry regions and extra repair crews were drafted into the area. Widespread disruption of electric supply was also caused in the extreme south of the country, in counties Cork and Kerry. There were many lucky escapes reported throughout the country. Flying slates

and collapsing walls were reported from Limerick city, Dunlaoire and Cork city. Five people were killed however during the height of the storm - three deaths in the Midlands, one in Co. Wicklow and one in Belfast.
During the storm the river Shannon overflowed its banks in Limerick.
The tide level at Limerick Harbour was only three inches short of its record level of twenty seven feet. The Shannon south of Athlone also burst its banks and low lying areas were heavily flooded. Counties Louth and Meath were also badly hit - the Drogheda fire service answered some 58 calls. Some flooding of houses was also reported from Ballina, Co. Mayo and from Cos. Cavan and Monaghan.

The Connaught Tribune reported that the storm hit south Co. Galway with unusual ferocity and that it was generally assumed in the area that had the blast continued for another half hour the effects would have been "disastrous". At Kinvara the sea cascaded across the quays and for a time the town was threatened with being cut off from the outside by the tides which swept over the road in two places. Fortunately, the storm abated just when calamity appeared imminent. The Clare Champion described the trail of destruction in Co, Clare with particular reference to the West and Southeast where the gales caused much havoc, It was said to be one of the worst storms ever in Killaloe and it caused widespread, though not serious, damage.

Air, sea and rail movements were widely disrupted. Some 400 passengers, many of them returning with their families after Christmas to their EEC duties in Brussels, were delayed at Rosslare because the Ferry, St. Patrick, was ten hours late arriving from Le Havre. Many islands off the west coast were isolated, cut off by the heaviest seas of the winter. A number of aircraft were grounded for some hours at the airports and an inflatable cargo hanger at Shannon Airport was blown away.
This storm does not appear to have had the same widespread severity as other storms in recent years. Cn the other hand its severity in the mid-west region of the country, along the upper river Shannon, is not too often experienced there. Averaged over the country as a whole storm force winds were sustained for some three-fifths and three-quarters respectively of the equivalent periods for the two previous January 1974 storms. On
average, the duration of storm force winds for "Hurricane Debbie" was about
the same as for the January 1976 storm.

Judging the storm by the number of homes with major disruption in the ESB supply this storm would seem to have been about one third as disruptive as the first storm in January 1974, and about equal to the second storm of that month. The number of deaths by accidents attributed to the storm was double each of the previous two storms but the numbers of deaths in all cases were relatively few.
The storm reached maximum vigour as it passed into Great Britain and it moved on from there to the Baltic States through the North Sea and Denmark. Some 47 deaths and widespread damage were reported from Great Britain and northern Europe.

METEOROLOGICAL SERVICE

Highest Winds* Recorded at various stations on 2nd January, 1976

County and Station	Highest Gust kts.	Highest Gust ms^{-1}	Highest Gust Direction	Highest Gust Time	Highest mean speed recorded over 10 mins. Kts	Highest mean speed recorded over 10 mins. ms^{-1}	Highest mean speed recorded over 60 mins. Kts	Highest mean speed recorded over 60 mins. ms^{-1}
Co. Clare Shannon Airport	82	42	240	1607	54	28	52	27
Co. Cork Cork Airport	70	36	250	1629	45	23	41	21
Roche's Point								
Co. Donegal Malin Head	81	42	250	1645	56	29	50	26
Casement Aerodrome	76	39	280	1845	44	23	40	21
Dublin Airport	68	35	290	1905	46	24	43	22
Valentia Observatory	72	37	240	1508	46	24	44	23
Kilkenny	76	39	240	1723	43	22	41	21
Belmullet	67	34	320	1630	43	22	40	21
Claremorris	61	31	320	1727	43	22	39	20
Clones	77	40	310	1830	43	22	42	22

County and Station	Highest Gust kts.	Highest Gust ms^{-1}	Highest Gust Direction	Highest Gust Time	Highest mean speed recorded over 10 mins. Kts	Highest mean speed recorded over 10 mins. ms^{-1}	Highest mean speed recorded over 60 mins. Kts	Highest mean speed recorded over 60 mins. ms^{-1}
Co. Offaly Birr	85	44	300	1756	51	26	38	20
Co. Westmeath Mullingar	70	36	300	1823	39	20	35	18
Co. Wexford Rosslare	74	38	230	1725	40	21	39	20

* All values are as recorded by Dines Pressure tube Anemographs and refer to an effective height of approximately 10 metres except at Malin Head (effective height 18 metres).

Mean direction (in degrees from North. e.g., E=90˚, N=360˚) at the time of the highest gust. Values in metres per second (ms^{-1}) are conversions (to nearest whole number) from values measured in knots.