Tropical Cyclone Kerry 19/01/1973– 24/01/1973

(i) General

"Kerry" was the third tropical cyclone of the season and was the second to develop off the northwest coast of Western Australia. This cyclone was the most noteworthy of the season as it was the only one to cross the northwestern Australian coast and move inland. Although "Kerry" was a severe storm it did not pass directly over any densely populated areas. Effects however were felt over a large part of the Northwest Shelf, the Pilbara, and the east Gascoyne.

The estimated structural damage caused by cyclone "Kerry" was close to $2 million and the loss of production and man-hours over $5 million.

(ii) Development

Cyclone "Kerry" developed from a disturbance in the ITCZ which, in the longitudes 100°E to 120°E, was evident as a discontinuous band of convective cloud between latitude5 5°S and 15°S. No organisation was apparent on 17th January. By 19th January the cloud in the ITCZ had developed considerably in the Western Australian region with large areas of cumulonimbus activity apparent from satellite photographs. At the same time convective banding features indicated the possibility of tropical cyclone seedling development in the vicinity of 15°S 120°E. Further indications that a circulation was developing were the strong east to northeast winds at the 700 mb level recorded at Broome and Port Hedland during 17th – 19th January. A tropical advisory was issued at 190500 GMT. Deepening did continue with winds reported by ships near the low pressure system reaching gale force by 200600 GMT. Using this data the first cyclone warning issued at 200800 GMT. Progressive deepening occurred during the next 36 hours and the cyclone apparently reached maximum intensity on the night of 21st January with an estimated central pressure of 960 mb. About this time it was close to the offshore oil drilling rig "Big John" and its tender "Smit Lloyd" located about 130 km north of Dampier.

The minimum pressure reported was from Cape Lambert where barograph trace recorded a station level pressure of 975 mb at approximately 0530 WST 22nd January.

Shortly after passing Cape Lambert the cyclone crossed the coast and moved inland. After landfall "Kerry" filled slowly, winds in excess of 56 km/h being reported from Near its centre until 240400 GMT.

The value of the first anticyclonically curved isobar of the nature cyclone was 1004 mb on 21st January.

(iii) Features of the Track (fig. 3.1)

In the five days that "Kerry" was active it travelled about 1800 km, half of this being over land. The track displays rather classical features in its early movement to the southsouthwest followed by recurvature to the southsoutheast. In following this course the cyclone crossed the coast on the morning of 21st January.

The track of “Kerry” is well documented; satellite surveillance was regular; ships reported from the vicinity; weather conditions at the oil rigs on the Northwest Shelf were monitored; Port Hedland weather radar maintained a continuous watch on the cyclone, the centre being visible from 210945 GMT until 221320, and, after “Kerry” crossed the coast, land station reports were invaluable.

For most of its life “Kerry” seems to have travelled at a fairly constant speed of about 15 km/h. The cyclone began its life in an area some 480 km northnorthwest of Broome on 19th January. For the next 60 hours “Kerry” moved in a generally southsouthwesterly Direction reaching a point approximately 150 km north of Dampier at 211200 GMT. In this location it was about 20 km east of the oil drilling rig “Big John” which was severely buffeted. At about this position and time the cyclone began moving to the southsoutheast being tracked constantly by Port Hedland weather radar for over 24 hours. As an intense depression “Kerry” travelled inland to the vicinity of Mundiwindi after which its track became more southerly and ended near Wiluna.

The southsouthwestward movement of the cyclone in its early stages occurred while there was a general low level easterly flow over the continent. This was the result of a high pressure ridge persisting in the Great Australian Bight. Late on 21st January a moderate cold front associated with a depression with central pressure below 1000 mb in the western Bight approached the lower west coast. This coincided with the cyclone’s recurvature and subsequent movement in a southsoutheasterly direction across the coast. After the front had passed to the east and a new ridge was established in the Bight on 24th January the cyclone’s movement towards higher latitudes ceased.

(iv) Rainfall

“Kerry” brought heavy rain to the De Frey, East Gascoyne, Northeast Division and Goldfields. Total falls to between 50 and 100 mm were common (Fig 3.2) with a few recordings of between 150 and 300 mm. The greatest totals tended to occur on the eastern side of the cyclone’s track. The highest cumulative totals for the period 19th to 25th January were Windidda 310 mm, Warrambie 254+ mm, Lorna Glen 276 mm, Millrose 241 mm, Bandya 221 mm, Hooley 207 mm, Wittenoon 218 mm, Rhodes Ridge 215 mm, Prenti Downs 209 mm. The highest daily totals in the 24 hours to 0000 GMT are shown in Table 3.1. In conjunction with Fig 3.1. This table indicates that most rain at a particular station occurred when the disturbance centre was close to the station. The locations of stations mentioned in this paragraph are shown in Fig. 3.3.

During the time that “Kerry” was over the sea rain was reported from various ships and oil rigs. However no estimate of the amount which fell is available. Qualitative statements from selected ships are included in Table 3.2 and from “Big John” oil rig in Table 3.3.

The intensity of rain over the land was such that run-off was substantial and lead to flooding in many low lying areas. The effects of this were noticeable in the coastal towns of Port Hedland and Roebourne. Flooding occurred in most rivers and streams from the De Grey to the Fortescue. Many travellers were stranded, including 60 people at Whim Creek for about a fortnight. After the floods had subsided further delays were experienced as a result of erosion damage to road surfaces. Serious washaways on the

Mt Newman to Port Hedland railway resulted in a stoppage of the railway traffic for 16 days and a repair cost of over $900,000.

In the central parts of the State flooding was widespread. The area between Wiluna and Lake Carnegie was described as a “huge lake”.

(v) Winds

Cyclone “Kerry” was a severe storm and hurricane force winds were experienced near the centre during its mature stages.

While “Kerry” was over the ocean ship reports from its vicinity were received. The first ship to report gale force winds was the “Okadamaru” at 200001 GMT. At that time the ship was about 230 km south of the centre. Six hours later the “Shinznimaru” located about 130 km southsoutheast of the centre reported an easterly wind of 80 km/h. Thereafter reports of gale force winds were common from both ships and oil rigs. A selection of reports from ships is given in Table 3.2 and from the “Big John” in Table 3.3. For almost 24 hours from 202200 GMT the oil rig “Big John” experienced winds in excess of 130 km/h. Between 211045 and 211330 GMT all reports indicated winds of 130 km/h. Between 211045 and 211330 GMT all reports indicated winds of 185 km/h. At 211200 GMT the ship “Smit Lloyd” standing by the “Big John” reported southerly winds of 150/185 km/h. The centre of the cyclone was very close to “Big John” at 211200 GMT as the hurricane force wind veered in one hour from the southeasterly to southsouthwesterly. After this the winds gradually became more westerly and slowly decreased.

At the approach of “Kerry” to the coast winds at land stations gradually increased. By 210100 GMT Cape Lambert was experiencing a constant wind of 65 km/h or more. At 210700 GMT 65 km/h winds were reported from Roebourne. By 212200 GMT, shortly after landfall, the wind at Roebourne was southsouthwesterly at 110 km/h. Cape Lambert reported gusts to 160 km/h at 220100 GMT. Port Hedland Meterological Office experienced gusts to 128 km/h with the wind not falling below gale force from 211600 GMT to 220001 GMT. Nearer the coast hourly records from the Port Hedland Port Authority control tower indicate a maximum gust of 153 km/h with an average wind speed from 211600 GMT to 221600 GMT of 98 KM/h.

As it moved inland cyclone “Kerry” did not fill as rapidly as is usually expected. Winds exceeding 65 km/h were reported from stations near the centre at most synoptic hours until 231900 GMT.

(vi) Seas, Swells and Storm Surges

Very rough seas and very heavy swells were associated with cyclone “Kerry”. Sea and swell data from selected ships are included in Table 3.2, and data from the oil rig “Big John” is in Table 3.3.

On 21st January at 1330 GMT the “Big John” reported seas of 21.5-24.5 m from the southwest and a swell of 12-14 m also from the southwest. At the time the rig was probably very close to the zone of maximum winds. Very rough seas and very heavy

swells extended at least 200 km from the centre on 21st and 22nsd January. Reports from the "Smit Lloyd" at 210001 GMT and 220001 GMT and from the "Iron Cavalier" at 210400 GMT confirm this (Table 3.2).

A storm surge put water 15 cm deep over the Athol Street causeway in Port Hedland. Erosion damage was minimal.

Analysis of a water level gauge record taken at Dampier Service Jetty shows that water level increased above predicted levels on 20th[st], 21st and 22nd January.

Table 3.4 displays the predicted and recorded heights of high and low waters fro these days together with their differences. A high water increase of 0.3 m was recorded on several occasions.

(vii) Damage

Cyclone "Kerry" was important because it passed close to a number of oil drilling rigs, crossed the coast and then retained its intensity for a further 2 days while travelling well inland. Winds, seas and flooding all caused damage to various installations.

Hurricane force winds and very heavy seas buffeted the oil rigs causing three of them to lose some of there mooring anchors. Seas broke into the power room on the "Big John" rendering most of its generators inoperable. Other machinery was also damaged or lost by the sea action. On the whole, however, damage sustained by the rigs was not as costly as the operating time lost. In the drilling company estimates cyclone "Maud" is linked with "Kerry" for in the case of two of the rigs the lost time periods merged. For the two cyclones the cost to the company was over $1.5 million of which more than 90 per cent was unproductive-time cost.

Near Port Hedland a youth was drowned in the heavy seas while surfing. Part of the roof of the South Hedland primary school was ripped off, and the roof of the High School was lifted. Another school which suffered damage was St Ceclia's Convent School where two walls of a classroom were levelled.
Extensive sand damage to ocean front houses was reported. Paintwork to most buildings suffered in the blast and tons of sand were dumped on front lawns and against fences. At least two cars were buried. Small craft were flung out of the water and one tug was beached further south at Mistaken Island. A local plant nursery suffered damage estimated at more than $5000 resulting from the wind damaging stock and uprooted trees destroying shade houses. Power lines were brought down and some of the steel pylons were twisted. The State Public Works Department estimated the cost of repairs to items under its control at $16,000 and repairs to local council concerns were costed at $10,000. Leslie Salt Co. estimated repairs to its earthworks to cost about $40,000.

Near Roebourne the coaxial cable repeater station was flooded causing telecommunication difficulties throughout the Northwest for some hours. At Wickham more than 30 houses were partly unroofed while some experienced major damage.

Washaways on the Mt Newman to Port Hedland railway cost the Mt Newman Mining Company $900,000 to repair. The mine ceased working for only seven hours but because of delivery delays the estimated production loss was $4 million.

At Mundiwindi roofing to several houses was loosened. One surveyor's caravan was written off after being washed into a creek near Wiluna.

The estimated damage caused by Cyclone "Kerry" was close to $2 million and the loss of production and man-hours over $5 million.

(viii) Radar

Cyclone "Kerry" was within range of Port Hedland weather radar and was tracked from 210945 GMT to 221330 GMT.

Although the track of the centre located buy the radar showed an erratic path, the mean track was closely correlated to that shown by the data.

(ix) Satellite Analysis

Photographs from the satellite ESSA 8 and NOAA 2 were received regular during the period that cyclone "Kerry" operated. Data from these satellites complemented that deduced from conventional ship and land station reports and from radar information while "Kerry" was within range. Data deduced from the photographs is displayed in Table 3.5.

On photographs dated 18th January a broad band of cumulonimbus activity was evident centred on a line from 11°S 100°E to 15°S 125°E. This zone was still present on 19th January with some indications of curvature in convective cloud bands toward 15°S 120°E near the edge of a dense overcast area. Seedling development appeared possible in this area. By 20th January more organisation of the cloud mass was apparent with the system becoming a separate entity. On 21st January the photographs of the low near 18°S 117°E showed a small central dense overcast (CDO) and an almost complete coil of one degree banding. The system appeared to be still maturing. By the next morning in the satellite photograph (ESSA 8, 220101 GMT) a ragged eye embedded in a small CDO was visible. The final T number according to Dvorak's classification was T5. About three hours prior tot hat photograph "Kerry" had crossed the coast; however the characteristics of the mature cyclone were still very clear. A marked circulation in the cloud pattern was still present in the satellite photographs taken on the next two days.

The central pressure of the cyclone estimated using all data is shown in Table 3.5 in brackets. It is generally lower than that obtained using Dvorak's method alone.

Table 3.1 Highest Daily Rainfall Totals to 0100 GMT from selected Stations (mm)

Station	22nd	23rd	24th	25th
Port Hedland	128			
Warrambie		254+		
Rhodes Ridge		188		
Marrillana		185		
Lorna Glen			236	
Millrose			222	
Wongawol			154	
Cosmonewbery				101

Table 3.2 Selected Ship Reports

Ship	Position °S °E	Date/ Time (GMT)	Bearing/ Distance From centre (km)	Wind (km/h)	Sea (m)	Swell (m)	Weather	Pressure (mb)
Irenes-grace	12.5 118.5	190400	330/270	270/46	46 Very Rough		Rain	1005
Iron Cavalier	13.9 120.8	191200	060/210	340/28	1	Nw2	Heavy Cont. rain	1010.6
Okadamaru	17.9 118.7	200001	170/235	070/67	5	NE6		1005.9
Okadamaru	16.7 119.3	200900	080/135	040/65	3	N8	Slight intemitt rain	1001.5
Oden-clipper	17.6 116.9	201200	240/120	200/65	1	ESE2		1000.5
Smit Lloyd	19.9 116.3	210000	210/210	110/83	Very Rough	E8	Showers	1004
Iron Cavalier	19.7 118.5	210400	130/200	040/102	3	NE 10	Heavy Cont. rain	1001.4
Iron Cavalier	19.5 118.6	211200	100/195	360/93	3	N5	Heavy Cont. rain	997.6
Smit Lloyd	19.5 116.4	211200	270/ 35	180/148 /185	5	S13/ 16	Very Heavy rain	990
Smit Lloyd	19.5 116.4	211600	310/ 80	200/111	4	SSW 13	Moderate rain	992
Smit Lloyd	19.5 116.4	220000	320/210	220/74	3	SSW 11	Overcast	999
Iron Cavalier	18.1 118.0	220400	360/385	320/56	2	Sw3 WNW6	Squally	1006.3

Table 3.3 Reports from “Big John” (19.5°S 116.4°E)

Date/ Time (GMT)	Wind (km/h)	Sea (m)	Swell (m)	Weather	Pressure (mb)
210045	SE 130	SE 3	E 6-9		1000
210400	SSE 157	SSE 6-8	SSE 8-9		998
210700	SE 37/ 56	E 5	E 5-6	Squall	996
211000	SE 157	SE 5	SE 11	Rain	994
211200	S 185	Confused	SE 14-15	Heavy intermit rain	992
211300	SSW 185	Very Rough	SSW 14-15	Heavy intermit rain	993.5
211330	SSW 185	SW 22-25	SW 12-14	Heavy rain	994.5
211600	SW 93	SW 12	SSW 9-12	Moderate rain	995
212200	WSW 74		WSW 11		998.5

Table 3.4 Tide level data for Dampier Service Jetty at selected dates

Date	Time (WST)	Predicted Hts of High & Low Water P (metres)	Measured Hts of High & Low Water M (metres)	Variation M-P (metres)
20	0602	0.1	0.2	+0.1
	1200	3.8	3.9	+0.1
	1809	0.7	1.0	+0.3
21	0003	4.3	4.5	+0.3
	0638	0.0	0.3	+0.3
	1234	4.1	4.3	+0.2
	1849	0.6	1.0	+0.4
22	0400	4.3	4.3	0
	0712	0.0	0.3	+0.3
	1305	4.2	4.1	-0.1
	1926	0.5	0.5	0

Table 3.5 Data from Satellite Photographs.

Satellite Name	Orbit Number	Date/Time (GMT)	Estimated posn. of centre °S	Estimated posn. of centre °E	Final T No.	Min. Sea Level Pressure (mb)
ESSA 8	18773	190217	15.0	118.5	1.5	1004 (1004)
NOAA 2	1199	191222	15.0	119.0	2	1001 (1001)
ESSA 8	18785	200113	15.8	117.5	2	1001 (999)
NOAA 2	1212	201316	16.5	117.2	2.5	997 (992)
ESSA 8	18798	210204	18.1	116.8	3.5	987 (982)
NOAA 2	1225	211412	19.0	117.0	4	982 (965)
ESSA 8	18810	220101	21.7	118.7	5	964 (965)
NOAA 2	1237	221312	22.0	119.0	3	992 (975)
ESSA 8	18824	230347	23.7	119.5	2	992 (985)
ESSA 8	18836	240048	26.5	121.2		

(The central pressure of the cyclone estimated using all data is shown in brackets. It is generally lower than obtained using Dvorak's method alone.)