

No. 14

Kuwait Airways Corporation, Trident 1E, 9K-ACG, accident 2½ miles south of Kuwait International Airport, Kuwait on 30 June 1966. Report undated, released by the Directorate General of Civil Aviation, Kuwait

1. - Investigation1.1 History of the flight

Flight KU 32 was a scheduled international flight from Beirut, Lebanon to Kuwait. It departed Beirut at 1855 hours GMT and apart from a tendency for the autopilot pitch lock to disconnect the flight to the descent point was uneventful. The aircraft was cleared to commence descent at 2028 hours GMT from flight level 300 to flight level 95 by the DY NDB - the pilot-in-command decided to carry out a visual approach and advised the co-pilot accordingly. The aircraft reached flight level 95 some three minutes before reaching the DY NDB and it maintained this level until passing the beacon at about 2039 hours GMT at which time it was cleared to descend to 3 000 ft it being agreed the aircraft would report on left base for runway 33R. By visual navigation and ADF indications from the MG NDB the aircraft was positioned on a left hand base leg for runway 33R passing abeam the MG NDB 1 - 2 miles to the south. The rate of descent was 1 500 ft/min with the outboard engines at idle and 10 400 rpm on the centre engine. At about this time and when at flight level 50 the flight reported the field in sight - the pilot-in-command and flight engineer having sighted the airport rotating beacon and the co-pilot the rotating beacon and some airport lights - and the aircraft was cleared for final. A left turn on to final was commenced at about 4 000 ft and the flight reported its position as 6 miles from the airport when at 2 300 ft. Rate of descent was 1 500 ft/min and airspeed was 178 kt. During all these manoeuvres the aircraft was being flown on the autopilot and the co-pilot had been requested to set 1 500 ft in the "acquire height" box of the autopilot. The ADF was tuned to the KWS locator which is 2 224 m from the runway threshold, and the co-pilot was occupied with the landing checks.

At this stage of the flight the aircraft was at 1 830 ft almost abeam of the MG NDB inbound and 80 seconds from impact with the ground. Desired approach speed was 154 kt with a descent rate of 700 ft/min and a threshold speed of 134 kt.

80 seconds	Altitude	1 830 ft
	Rate of descent	1 500 ft/min
	Airspeed	176 kt
	Pitch attitude	0.1°
	Course	009° (Aircraft turning left to align with runway)
	G	1.04
74 seconds	Altitude	1 685 ft
	Rate of descent	1 500 ft/min
	Airspeed	177 kt
	Pitch attitude	0.1°
	Course	001°
	G	1.05

73 seconds	Pilot-in-command engaged the rate of descent lock on the autopilot which had been set for 500 ft/min. This rate of descent was acquired without any change in power.	
66 seconds	Calculated time when the aircraft was abeam the MG NDB.	
63 seconds	The rate of descent had decreased to 500 - 600 ft/min; indicated airspeed was 168 kt and decreasing; pitch attitude was +6°.	
59 seconds	Altitude	1 400 ft
	Rate of descent	500 to 600 ft/min
	Airspeed	163 kt
	Pitch attitude	+6°
	Course	344°
	G	1.02
50 seconds	Altitude	1 300 ft
	Rate of descent	500 to 600 ft/min
	Airspeed	154 kt
	Pitch attitude	+6°
	Course	334°
	G	1.04
47 seconds	Altitude	1 265 ft
	Rate of descent	500 to 600 ft/min
	Airspeed	150 kt
	Pitch attitude	+7°
	Course	334°
	G	1.035
	The pilot-in-command decided to abandon the autopilot approach and disconnected the autopilot. He called for 10 500 rpm on all three engines and this was set up by the co-pilot.	
46 seconds	The nose of the aircraft was lowered, the pitch attitude changing from 6.8° to 0.6° in 2 seconds and the G value changed in the same time from 1.03 to 0.8. The rate of descent increased.	
	The pilot-in-command, who was now flying the aircraft manually cancelled the flight director, azimuth master and descent locks on the FCS panel.	
44 seconds	Altitude	1 200 ft
	Rate of descent	1 800 ft/min
	Airspeed	149 kt
	Pitch attitude	-0.6°
	Course	333°
	G	0.80

42 seconds	Altitude	1 140 ft
	Rate of descent	2 600 ft/min
	Airspeed	151 kt
	Pitch attitude	-0.9°
	Course	333°
	G	0.97

27 seconds	Altitude	640 ft
	Rate of descent	1 500 ft/min
	Airspeed	158 kt
	Pitch attitude	1.5°
	Course	333°
	G	1.0

During this period of 44 - 27 seconds the pilot-in-command observed and was concerned that the airspeed was below 150 kt and that the altimeter was passing through 700 ft on QNH. He was also concerned that the ADF was indicating he was to the left of the runway centreline. His attention was centred on the airspeed indicator, attitude director and the ADF indications. He did not monitor the vertical speed indicator and at no time was he aware that the aircraft had a high descent rate.

19 seconds	The pilot-in-command called for 11 500 rpm on all engines and this was set up by the co-pilot. A turn to the right was initiated at about this time to align with the anticipated position of the runway. The co-pilot, who was still performing his pre-landing checks, glanced through the side window and observed that the aircraft was close to the ground. He glanced ahead expecting to see the runway lights but none were visible. He checked his instruments and observed 350 ft on his altimeter (QNH), a rate of descent of about 1 500 ft/min, and an indicated airspeed of 148 kt. He immediately warned the pilot-in-command and applied full engine power - the pilot-in-command at this time called for 12 000 rpm.
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11 seconds	By this time full power had been applied and flight recorder readings were -
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	Altitude	250 ft
	Rate of descent	1 350 ft/min
	Airspeed	153 kt
	Pitch attitude	3.0°
	Course	334°
	G	1.02

3 seconds	Altitude	85 ft
	Rate of descent	1 200 ft/min
	Airspeed	157 kt
	Pitch attitude	2.6°
	Course	341°
	G	0.98

0 seconds The aircraft struck the ground and crashed approximately 4 km short of the runway threshold, slightly to the left of the centreline at an elevation of approximately 185 ft. (Latitude 29°13'25"N, Longitude 47°58'05"E). The accident occurred at approximately 2046 hours GMT at night.

1.2 Injuries to persons

Injuries	Crew	Passengers	Others
Fatal			
Non-fatal	3	8	
None	8	64	

1.3 Damage to aircraft

The aircraft was destroyed.

1.4 Other damage

There was no other damage.

1.5 Crew information

The pilot-in-command, aged 42, held an airline transport pilot's licence endorsed in Group 1 for DC-6 and Trident aircraft. He had completed an instrument rating test on 26 April 1966. His last medical examination had been on 28 February 1966 and was valid. He had flown a total of 95:50 hours on Trident aircraft, all within the 90 days preceding the accident.

The co-pilot, aged 28, held an airline transport pilot's licence endorsed in Group 1 for Viscount aircraft and in Group 2 for Comet and Trident aircraft. He had completed an instrument rating test on 9 May 1966. His last medical examination had been on 22 March 1966 and was valid. He had flown a total of 107:40 hours on Trident aircraft, all within the 88 days preceding the accident.

The flight engineer, aged 40 years, held a flight engineer's licence with ratings for Comet 4 and Trident aircraft. His last medical examination had been on 10 June 1966 and was valid. He had flown a total of 197:05 hours on Comet 4 aircraft, all within the 95 days preceding the accident but he had no flying experience on Trident aircraft.

A check flight engineer who held a flight engineer's licence with ratings for DC-6 and Trident aircraft was present in the cockpit. His last medical examination had been on 5 October 1965 and was valid. He had flown a total of 147 hours on Trident aircraft, all of which had been within the 65 days preceding the accident.

Also on board the aircraft were 7 supernumerary crew members. (Their location in the aircraft is not stated in the report.)

1.6 Aircraft information

The certificate of airworthiness of the aircraft was valid until 24 May 1967.

A certificate of maintenance had been issued for the aircraft on 26 June 1966, and it was valid for two months or 300 hours.

The aircraft had been properly maintained in accordance with the approved maintenance schedule and all mandatory modifications, technical news bulletin and special instructions had been complied with. However, the aircraft was flown on the last two flights with seven "B snags" which did not affect the airworthiness of the aircraft. Following the previous flight (under the command of a different pilot) a defect was recorded stating that the autopilot pitch channel had disconnected twice. No rectification action was recorded.

The aircraft had flown a total of 361 hours at the time of the accident including 14 hours since the last Period 1 inspection on 26 June 1966.

The take-off weight at Beirut and the calculated landing weight of the aircraft at Kuwait were within limits.

The type of fuel being used was not stated in the report.

1.7 Meteorological information

The weather conditions at Kuwait at the time of the accident were: nil cloud; visibility: 5 km; wind direction and speed: 300°/5 kt.

1.8 Aids to navigation

The navigational aids available to this flight during the approach at Kuwait were:

- i) locator beacons; MG, KWS, KWI
- ii) non-directional beacons; KW, AH
- iii) VOR; KW
- iv) VDF

The aircraft carried dual ILS/VOR marker equipment, dual ADF, and a single Decca Doppler 62. For the approach, which was made under visual conditions, the MG and KWS locator beacons were utilized - these aids were operating normally.

1.9 Communications

There were no communication difficulties.

1.10 Aerodrome and ground facilities

The aerodrome was equipped with a rotating beacon. No ILS or VASIS were installed at the time of the accident. Due to work in progress no approach lighting was available for the runway in use. No information on the runway lighting was contained in the report.

1.11 Flight recorder

The aircraft was fitted with a Plessey-Daval flight data recorder which was recovered after the accident. From the readout of the recording and the statements of the flight crew, it was possible to make a reconstruction of the last part of the flight prior to the accident. This reconstruction is presented in paragraph 1.1.

1.12 Wreckage

The aircraft struck the ground approximately 4 km short of the runway threshold, slightly to the left of the extended centreline, in an area of soft and level sand, first with the starboard wheels and 10 m farther with the port wheels. Three metres farther on the starboard wheels left the ground making contact again 21 m distant; they created a deep trench 6 m long at the end of which the first traces of collapse of the undercarriage were found. Twelve metres after this another trench indicated where the port undercarriage collapsed. The aircraft then slid on its belly leaving various components along its track and came to a stop approximately 450 m from the first contact point and on a heading of 109°.

Examination of the cockpit revealed that the pilot-in-command's altimeter was at a setting of 1000 mb corresponding to the QNH and was indicating an altitude of 300 ft while the co-pilot's altimeter was at a setting of 997 mb indicating an altitude of 190 ft. Flaps were down at 23°.

1.13 Fire

Although external damage to the aircraft was extensive, there was only minor rupturing of fuel tanks and no fire broke out.

1.14 Survival aspects

The fuselage and mainplanes remained essentially intact, the impact and deceleration being consistent with a heavy landing on soft level sand. Only 11 occupants received injuries and these were minor.

The last message received from the aircraft was when it reported as being about 6 miles from the airport on final approach. When nothing further was heard from the aircraft and it did not arrive at the airport, search and rescue operations were initiated immediately. The aircraft was located approximately 1-½ hours after the accident occurred.

1.15 Tests and research

None mentioned in the report.

2. - Analysis and Conclusions

2.1 Analysis

On 27 June 1966, three days prior to the accident, a special procedure had been published instructing pilots to be at 1 300 ft on QFE when passing abeam of the MG NDB and not to descend below 500 ft unless the runway was in sight. The rate of descent was not to exceed 1 000 fpm and special instructions for undershoot conditions were given.

The QFE setting which should have been used below the transition level was not requested by the pilot-in-command and his altimeter was found on the QNH setting.

The procedures specified in the operations manual for the approach and landing of Trident aircraft were not followed by the pilot-in-command and this resulted in a rate of descent in excess of that desired. Though it was considered that the indicated airspeeds throughout the approach were completely safe it would appear the pilot-in-command became unduly concerned about them and he directed his attention to the airspeed indicator to the exclusion of any other instruments.

The cockpit check which should have been completed before passing the MG NDB was still being carried out when the aircraft struck the ground. Consequently the co-pilot, who should have been monitoring the approach and looking for the runway, was not able to do so.

2.2 Conclusions

(a) Findings

The crew were properly certificated.

The aircraft had valid certificates of airworthiness and of maintenance. Although it had been properly maintained and was airworthy at the time of the accident, it was flown with seven "B snags".

The aircraft was loaded within the specified limits.

Visibility was reduced to 5 km, however, it was considered that weather was not a factor in the accident.

The pilot-in-command did not follow the procedures laid down in the operations manual for approach and landing of the aircraft type.

The cockpit check for the approach and landing was still being carried out when the aircraft hit the ground and the pilot-in-command's altimeter was set on the QNH instead of the QFE.

(b) Cause or Probable cause(s)

High rate of descent and non-observance of Company's regulations. Corrective action carried out in calling for 10 500 rpm was not sufficient to re-establish level flight. A further demand for additional power was too late to be of any use.

3. - Recommendations

The following recommendations were contained in the report submitted by the Operator's Committee of Enquiry and which was forwarded as an attachment to the State's report:

It was recommended that -

1. The airline take immediate steps to introduce the following operating techniques and procedures for Trident operations -
 - (a) During the approach to landing all cockpit checks (with the exception of the final check) to be completed before the aircraft turns on to final and, in any case, at a height never less than 1 500 ft above ground level.
 - (b) During the final stages of the approach from 1 500 ft the rate of descent is to be maintained at 5 - 700 ft/min and never allowed to exceed 1 000 ft/min.
 - (c) The co-pilot should monitor the aircraft's speed, altitude and rate of descent calling the readings to the pilot-in-command at 1 500 ft and thereafter at 500 ft intervals or at any intermediate holding altitude. Should the rate of descent at any time exceed 1 000 ft/min he is to warn immediately the pilot-in-command.
 - (d) Unless the autopilot is serviceable and a coupled ILS approach is being carried out the autopilot is to be disconnected at 1 500 ft above ground level.
 - (e) When landing on R 33 R at Kuwait the final approach is to be from the KWS beacon using the approved instrument let down pattern or is to be initiated from the Alpha Hotel beacon at a height of not more than 4 000 ft nor less than 2 500 ft.
2. The airline should make urgent and strong representations to the Airport Authorities in an effort to get more adequate radio and visual aids installed on the 33/15 runway.

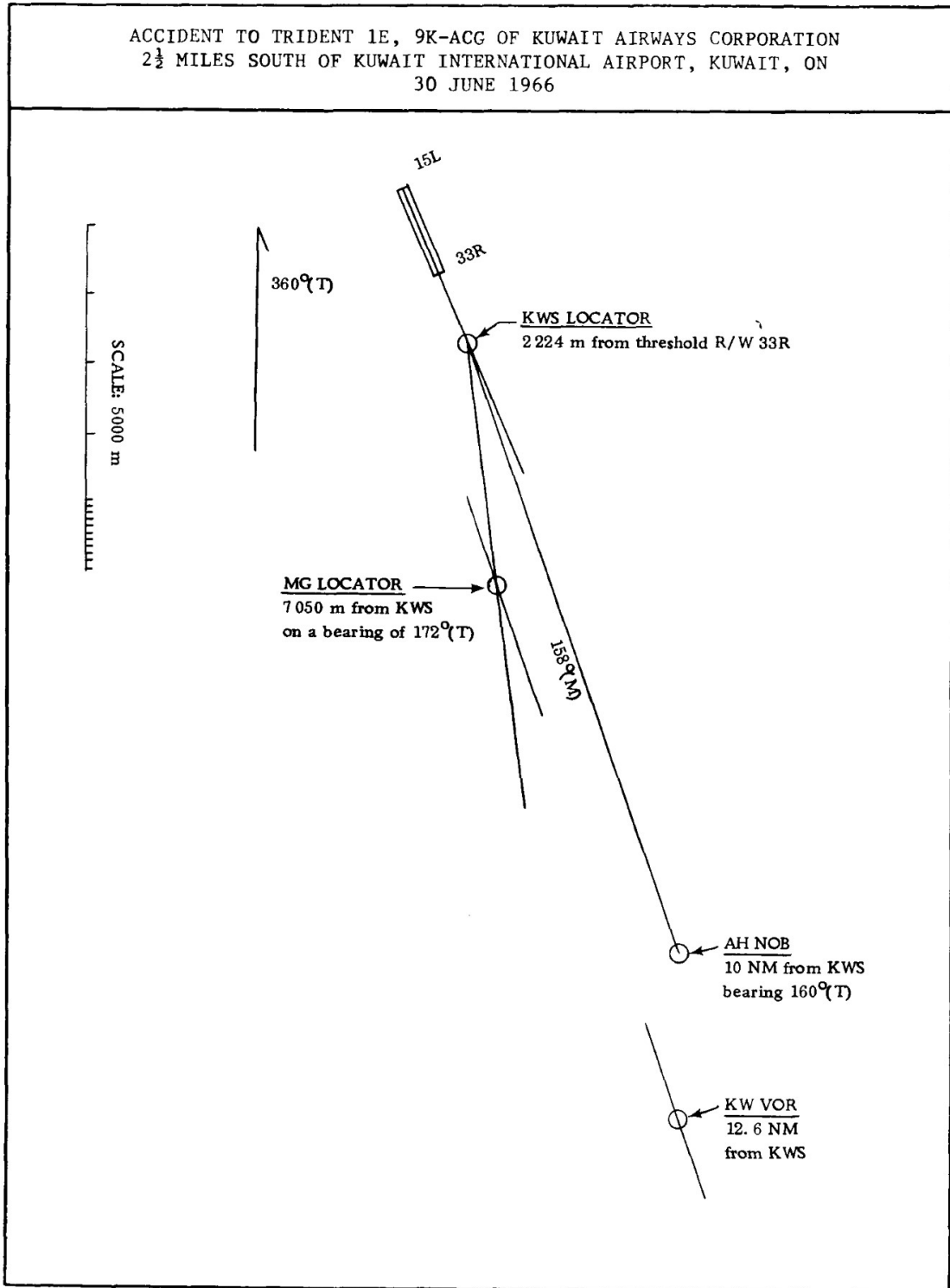


Fig. 14-1.-SKETCH MAP OF THE RADIO FACILITIES AVAILABLE ON 30 JUNE 1966
 FOR LET-DOWN TO 33R AT KUWAIT