No: 7/86 Ref: 1a

Aircraft type

and registration: Canadair CL44-D N122AE

No & Type of engines: 4 Rolls Royce Tyne RTy 12 Mk 515 Turboprops 10

Year of Manufacture: 1963

Date and time (GMT): 10 April 1986 at 1004 hrs

Location: RAF Manston, Kent

Type of flight: Commercial — Freight

Persons on board: Crew -3 Passengers - None

Injuries: Crew — None Passengers — N/A

Nature of damage: Substantial — to right outer propeller, right main gear, skin

penetration

Commander's Licence: Airline Transport Pilot's Licence (USA)

Commander's Age: 43 years

Commander's Total

Flying Experience: 6,200 hours (of which 3,016 were on type)

Information Source: AIB Field Investigation.

History of the Flight

The aircraft was on a flight from New York (John F Kennedy) to Manston, Kent, carrying 40,410 lbs of freight and three flight crew.

The crew were aware of the possibility of strong crosswinds at Manston (an RAF run airfield) with its single asphalt runway 11/29, 2752 metres long and 61 metres wide. At approximately 0730 hrs the current Manston weather was obtained from an RAF HF (high frequency) Volmet broadcast, and this included a wind velocity of 010°M at 24 knots (kt) gusting to 37 kt. When in the vicinity of Stansted, the nominated alternate, the weather was obtained for this airfield and the current wind was 020°M at 19 kt. RTF contact was then made with Manston Tower and the 0900 hrs meteorological observation was received — 010°M at 24 kt gusting 39 kt, varying between 360°M and 030°M at 20 kt gusting to 40 kt; visibility 10 km; cloud 2 oktas at 900 feet, 8 oktas at 1000 feet.

At 0954 hrs the crew made contact with Manston approach and after receiving onward clearance was again given the 0900 hrs weather but with the wind reported as 020°M at 25 kt gusting 39 kt.

At 1000 hrs the flight was handed over to the talk-down controller for a precision approach radar (PAR) approach. At a range of 3 miles from touchdown the wind was reported as 010°M at 20 kt, and at 1004 hrs at their declared decision height of 200 feet agl, the crew reported that the runway was in sight and requested the wind which was given as 020°M 20 kt. At a range of 1 mile to touchdown, the wind was 020°M 25 kt and at the touchdown zone the controller reported "twenty, zero three zero".

The last two radar headings passed to the aircraft by the controller were 088° and 091°M. The

radar headings throughout the approach bracketed an average heading of 090°M by approximately 3° either side. The runway QDM is 105.5°M and the reported indicated airspeed (IAS) of the aircraft over the threshold was 150 kt. The commander kept open his option of landing with 30° of flap, but called for 45° flap (landing position) at between 50 and 100 feet agl. The raw data heading trace from the flight data recorder indicates that the average heading of the aircraft during the 20 seconds prior to touchdown as 095°M.

After touchdown the left wing and nose lifted and the aircraft started to yaw to the left but continued to track, partially broadside on, along the runway heading and crabbed to the left. All four right main gear tyres were destroyed, and control was regained by the application of forward thrust on the left engines. The aircraft then temporarily left the runway to the right but had regained the runway before coming to stop just after the arrester gear at the runway 29 threshold end. After assessment of the damage, which included a severely damaged right outer propeller, a normal shutdown was carried out. The crew were unhurt and there was no fire. The emergency services were on hand promptly, and had responded before the aircraft had come to a stop.

Investigation

Examination of the tyre marks left by the aircraft on the runway showed that it had touched down first on the left mainwheels just over 2000 feet beyond the threshold, with the right main wheels touching down some 250 feet later. The main events of the landing roll are annotated on the runway plot at the end of this bulletin. Flight Data Recorder (FDR) information indicated that the aircraft touched down whilst yawed about 8° left of runway heading, which is consistent with the heavy but even definition of the wheel tracks during the early part of the ground roll. The striking of the starboard outer propeller on the runway indicates a roll angle of about 8° and the reduction of the main gear track separation from 31 feet (the nominal track of the aircraft) to $18\frac{1}{2}$ feet suggests a yaw angle of about 50° to the left developed. (This was not apparent on the FDR trace.)

An extract from the Airplane Flight Manual states that:

"The CL-44D has been demonstrated to be satisfactorily controllable during take-off and landing with a crosswind velocity component of 25 kt, measured at a tower height of 50 feet.

This crosswind velocity is the maximum encountered during certification tests, but is not considered to be the limiting crosswind velocity for the airplane."

The Operating Manual, however, offers further advice on crosswind landing techniques, and specifies a maximum crosswind component of 25 knots. The following is an extract from the Operating Manual.

"Inasmuch as the "44" is slip-limited because of a lack of dihedral and prop clearance, a crabbing approach is preferable during cross-wind landings. With steady wind conditions this is fairly easy. However, with heavy gusts, a more difficult situation prevails. Directional control centres around the use of *coarse rudder* inputs and asymmetrical reverse power as necessary, with nosewheel steering utilized after rudder control effectiveness has been lost.

The maximum crosswind component for landing is 25 knots, which is acceptable when no adverse conditions exist. If there are any adverse conditions present such as lack of crosswind landing practice, short runway, wet or slippery runway, aircraft empty or lightly laden, Captains should consider reducing their acceptable crosswind accordingly. When landing an empty or lightly laden aircraft in cross-wind conditions, Pilots should be prepared for the upwind wing to lift after the aircraft has landed, and some aileron should be applied in the 'correct' sense to counteract this tendency. The upgoing spoiler may tend to aggravate any swing into wind, but this may be corrected by the use of asymmetric reverse power (i.e. more reverse on the downwind side).

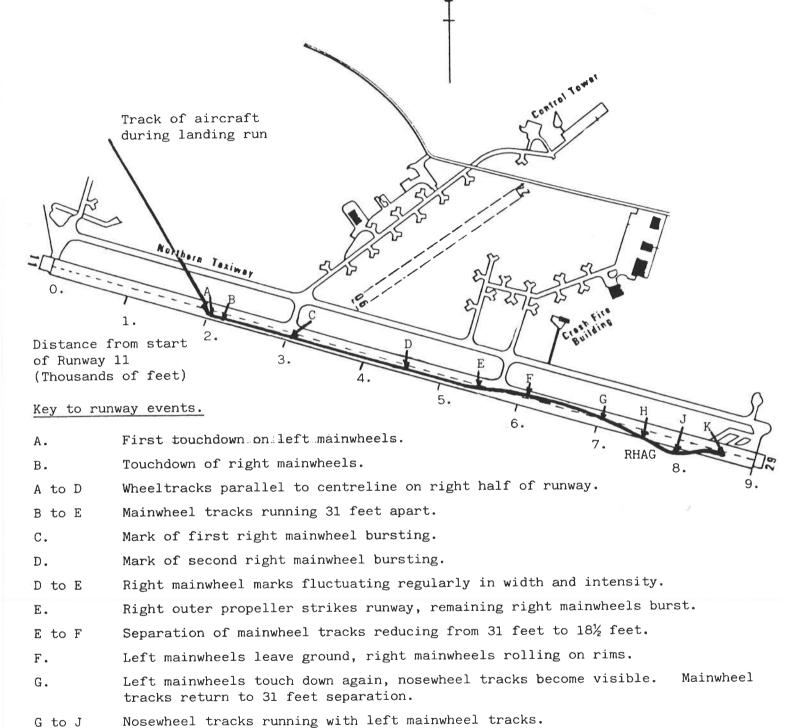
NOTE: To prevent the tendency for a wing to lift, adherence to the correct threshold speed is important.

If a landing is to be made in gusty conditions, the full value of the gust, not to exceed 15 knots will be added to the charted approach speed, and the threshold speed adjusted accordingly at Pilot's discretion."

The crew states that 15 kt were added to the approach speed of 135 kt; which accords with the "150 knots" call from the co-pilot prior to touchdown and with the FDR data. The pilots also state that full into wind (left) aileron was applied throughout the landing run.

The aerodrome anenometer is of a modern type and underwent a routine maintenance check in October 1985.

MANSTON - AERODROME LAYOUT



Nosewheel tracks begin to run to centre, between mainwheel tracks.

Aircraft comes to rest aligned with runway to right of centreline.

Nosewheel tracks running to left of left mainwheel tracks.

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J.

Κ.