

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 18½ 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 anemometer is of a modern type and underwent a routine maintenance check in October 1985.

MANSTON - AERODROME LAYOUT

