



GOVERNMENT OF AUSTRALIA

DEPARTMENT OF TRANSPORT

AIRCRAFT ACCIDENT INVESTIGATION SUMMARY REPORT

Publication of this report is authorised by the Secretary under the provisions of Air Navigation Regulations 283 (1)

Reference No.

AS/722/1011

1. LOCATION OF OCCURRENCE

5 kilometres south of Goulburn, New South Wales	Height a.m.s.l. 2,100 feet	Date 3.2.72	Time (Local) 1700 hours	Loss ESuT
---	-------------------------------	----------------	----------------------------	--------------

2. THE AIRCRAFT

Make and Model Beech E33A "Bonanza"	Registration VH-TYJ
--	------------------------

3. CONCLUSIONS

3.1 At 1700 hours Eastern Summer Time on 3 February, 1972 a Beech E33A "Bonanza" aircraft registered VH-TYJ, struck the ground 5 kilometres south of Goulburn, New South Wales. The aircraft was destroyed by impact forces and subsequent fire and the two occupants were killed.

3.2 The operator and holder of the certificate of registration for the aircraft was Hawker De Havilland (Aust.) Pty. Ltd. of Birnie Avenue, Lidcombe, New South Wales.

3.3 The aircraft was operating under a certificate of airworthiness which was valid from 25 June, 1968 until 24 June, 1977 and there is no evidence that it was in other than an airworthy condition.

The pilot, who occupied the left hand control seat, was Colin Monk, aged 27 years. Mr. Monk held a valid senior commercial pilot licence endorsed for the aircraft type and was employed by the operator as a pilot. His total flying experience amounted to 5229 hours of which 40 hours had been flown on this aircraft type.

3.5 The occupant of the right hand control seat was Nicholas John O'Keefe, aged 38 years. He was a qualified aeronautical engineer and held a valid private licence endorsed for the aircraft type. His total flying experience was 430 hours. As a technical sales manager employed by the operator, Mr. O'Keefe was responsible for the preparation of the aircraft for a series of acrobatic sales demonstration flights.

3.6 When the requirement to conduct the demonstration flights became known, the operator made enquiries as to the availability of an E33C series aircraft which is a Bonanza variant approved for the intended acrobatic manoeuvres. These enquiries were unproductive and approval was then sought from the Department of Civil Aviation to use E33A aircraft, VH-TYJ for the proposed flights. Although registered in the normal category and not normally approved for acrobatics, VH-TYJ was aerodynamically virtually identical with an E33C aircraft. Upon application by the operator, the Department issued a Permit to Fly for VH-TYJ which permitted acrobatic test and demonstration flights not exceeding a total of 10 hours duration. The permit specified that Mr. Monk was to be the pilot-in-command and imposed a number of limitations on the flight in respect of the loading of the aircraft and the manoeuvres to be performed. The approved manoeuvres included spins with entry from level flight. The structural justification submitted by the operator, and accepted by the Department, specified the centre of gravity limits (77 to 86.7 inches aft of the datum) applicable to the utility category, and these limits were then specified in the Permit to Fly whereas the limits appropriate to the acrobatic category are 78.5 to 81 inches aft of datum. Nevertheless there is good evidence that the occupants of the aircraft were aware of the correct limits and intended to load the aircraft within those limits.

3.7 Mr. Monk was an experienced acrobatic pilot but had not carried out acrobatic manoeuvres in a Beech E33 aircraft prior to making two solo practice flights in VH-TYJ near Bankstown on the day of the accident. On his return to Bankstown he discussed the flights with Mr. O'Keefe and other company personnel, expressing general satisfaction with the performance of the aircraft but stating that he had been unable to enter a spin to the right and that the attitude of the aircraft had been excessively nose low with increasing airspeed in spins to the left.

3.8 Following the discussions, Mr. O'Keefe calculated the position of the centre of gravity of the aircraft as loaded during the practice flights and found that it had been near the forward acrobatic limit. It was then decided to add ballast to the aircraft to reduce the nose down attitude during spins and it was estimated that 20 lb. placed in the aft cabin would bring the centre of gravity to the aft acrobatic limit with both front seats occupied and with the fuel tanks filled to capacity. Ballast in the form of two sealed containers of gravel totalling 125 lb. was then secured in the rear cabin area.

3.9 Immediately after the ballast had been installed, the aircraft departed for Canberra where the demonstration flights were scheduled to commence next day. The aircraft was fitted with full dual controls and Mr. O'Keefe was the nominated pilot-in-command on this flight, occupying the left hand control seat. En route

3. CONCLUSIONS (Cont'd)

to Canberra a change of plan was notified by radio and the aircraft landed at Goulburn, where baggage and loose equipment was off-loaded and left in the care of a bystander. Mr. Monk, closely followed by Mr. O'Keefe, re-boarded the aircraft which then took off and climbed quickly in clear weather conditions to a height estimated to have been about 6000 feet above the accident site. On reaching this height the aircraft entered a spin to the left and this spin continued until the aircraft struck the ground. Fire broke out almost immediately. There is no record of any radio communication having been received from the aircraft immediately prior to or during the last flight.

3.10 Examination of the wreckage disclosed no evidence of any pre-impact structural failure, malfunction or defect which might have contributed to the accident. The ballast was found to be intact and fastened in position. The impact damage indicated that the aircraft had struck the ground in a nose-down attitude of approximately 20 degrees whilst rotating rapidly to the left.

3.11 It was ascertained that a flight manual amendment sheet issued by the Department to a previous owner of the aircraft had not been correctly inserted in the manual nor had a superseded sheet containing obsolete loading data been removed. As a result, the loading calculations made by Mr. O'Keefe were based on an aircraft empty weight 40 lb. less than the amended weight and an empty centre of gravity position 0.78 inches forward of the amended position.

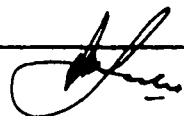
The approved acrobatic centre of gravity range for the aircraft type was from 78.5 to 81 inches aft of datum and the maximum gross weight was 2,800 lb. It has been calculated that the centre of gravity of VH-TYJ at the time of the accident was 81.93 inches aft of datum, i.e. 0.93 inches behind the aft limit, and the gross weight was 2779 lb. The effect of this centre of gravity position on the mode of spin and the capability of the aircraft to recover from a spin has not been established.

3.13 Subsequent to the accident, flight testing of a Beech model E33C aircraft was carried out in the United States. It was established that with a gross weight similar to that of VH-TYJ at the time of the accident and with the centre of gravity at the aft acrobatic limit, the aircraft entered and recovered from spins up to six turns in a normal manner. The pitch attitude of the test aircraft in the spins was 70/75 degrees nose-down and the rate of rotation was of the order of 180 degrees per second.

4. OPINION AS TO CAUSE

The cause of the accident was that the aircraft did not recover from an intentional spin but there is insufficient evidence available to determine why recovery could not be achieved.

Approved for
publication



(I. M. Leslie)
Delegate of the Secretary

Date

1.10.1975