

Nomad N24A, OY-JRW

AAIB Bulletin No: 10/2002	Ref: EW/G2002/04/07	Category: 1.2
Aircraft Type and Registration:	Nomad N24A, OY-JRW	
No & Type of Engines:	2 Allison 250-B17 turboprop engines	
Year of Manufacture:	1981	
Date & Time (UTC):	13 April 2002 at 0830 hrs	
Location:	RAF Weston-on-the-Green	
Type of Flight:	Aerial Work (Parachuting)	
Persons on Board:	Crew - 2	Passengers - 13
Injuries:	Crew - None	Passengers - 3 (Minor)
Nature of Damage:	Aircraft damaged beyond economic repair	
Commander's Licence:	Commercial Pilots Licence with Instrument Rating	
Commander's Age:	24 years	
Commander's Flying Experience:	581 hours (of which 51 were on type)	
	Last 90 days - 26 hours	
	Last 28 days - 7 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot and further enquiries by the AAIB	

History of the flight

A series of parachute flights had been planned from Weston-on-the-Green. The forecast conditions were good, predicting a surface wind of 360°/10 kt, visibility 30 km, with no significant weather and some strato-cumulus cloud with a base of 3,000 feet. The first flight, which consumed 144 lb of fuel, was completed successfully with 12 parachutists jumping from 12,000 feet.

Thirteen parachutists boarded for the second flight and the aircraft was cleared to take off from the dry surface of grass Runway 01 (take off run available 3,194 feet). The surface wind at the time was 360°/15 kt with no significant weather and the temperature was 15°C. The pilot subsequently reported that he checked the condition levers were set to 100% N2, the flaps were set to 10° and that the trim was set in the take off range. He also reported that the company recommended power

of 738°C turbine outlet temperature (TOT), and 89 pounds per square inch (psi) manifold pressure were set and achieved during the take off run. This power setting was equivalent to the 'Max Cruise Rating' as specified in the 'Operating Limits' section of the aircraft manual and no take off performance charts or data concerning 'take off distance required' (TODR) and 'accelerate stop distance required' (ASDR) information was available. The maximum take off power available (5 minute limit) was 810°C TOT and 102 psi.

At approximately 80 to 83 kt (scheduled rotation speed 71 kt) the pilot pulled back on the control column. He reported that, 'the aircraft felt more nose heavy', 'the aircraft nose did not rise and he perceived that the aircraft was no longer accelerating'. He decided to abort the take off, commenced braking and set the condition levers to the full reverse position. As the aircraft decelerated he turned it to the right in order to avoid trees and bushes ahead. The aircraft struck a small earth mound, whilst still travelling at about 15-20 kt, and came to an abrupt halt. The pilot shut down both engines and selected the fuel and the battery to OFF. The crew and passengers evacuated the aircraft unaided.

Subsequent examination of the aircraft by the aircraft maintenance facility noted that the damage to the aircraft was consistent with the impact and that there were no obvious signs of pre-impact damage to the flight controls.

Mass and centre of gravity

Calculations made prior to the flight indicated that the aircraft mass at take off was 176.2 kg below its maximum mass of 4,264 kg and with a centre of gravity (CG) at the forward limit. Since these calculations used a notional weight of 80 kg per parachutist, and their exact seating position could not be determined, it is not possible to establish accurately the mass and CG of the aircraft as loaded for this flight.

Data from the aircraft manufacturer indicates that for the stated mass and CG the control column force required to rotate the aircraft at the scheduled rotation speed would not exceed 75 lbf. This force would be reduced by about 10 - 20 lbf for a take off at a mid CG position

Analysis

The pilot had successfully completed a similar flight in the same aircraft, in benign meteorological conditions and the available evidence suggests that the aircraft was serviceable.

He reported that during the second take off run 'the company recommended take off power of 738°C TOT and 89 psi was set and achieved'. The take off was therefore attempted with only 89 - 90% of the maximum power available. This would have had the effect of not only increasing the take off distance but also the 'ASDR' to achieve a successful rejected take off from a speed at or beyond normal rotate speed.

With the flap position and trim set correctly for take off the pilot attempted to rotate the aircraft between 80 to 83 kt, at least 9 kt above the scheduled rotation speed of 71 kt. If the aircraft loading had been within the limits of mass and CG prompt rotation of the aircraft should have occurred. This however did not happen and instead the pilot felt the aircraft to be 'more nose heavy than normal'. The exact mass and CG for this flight are uncertain. If the CG position was at the forward limit for the calculated mass, control column forces would have been high but not sufficiently high

to prevent a successful takeoff. Extreme forces would only have been encountered if the aircraft CG position was significantly in error.

It is therefore considered that for the second takeoff of the day the aircraft CG was significantly forward of the forward CG limit.