Grob G115E Tutor, G-BYWV

AAIB Bulletin No: 10/2004	Ref: EW/G2004/05/10	Category: 1.3
Aircraft Type and Registration:	Grob G115E Tutor, G-BYWV	
No & Type of Engines:	1 Lycoming AEIO-360-B1F piston engine	
Year of Manufacture:	2001	
Date & Time (UTC):	18 May 2004 at 1301 hrs	
Location:	RAF Church Fenton, Yorkshire	
Type of Flight:	Training	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Nose landing gear collapsed, propeller bent and engine shock-loaded	
Commander's Licence:	Military student pilot	
Commander's Age:	20 years	
Commander's Flying Experience:	13 hours (all on type)	
	Last 90 days - 13 hours	
	Last 28 days - 8 hours	
Information Source:	Aircraft Accident Report Form submitted by the president of the RAF Unit Inquiry	

Background

The aircraft operator manages a large fleet of civilian registered Grob Tutor aircraft used by the Royal Air Force (RAF) to provide elementary flying training. In essence the operator provides the aircraft plus engineering and logistic support whilst the conduct of flying training is managed by the RAF.

The pilot was a young, inexperienced overseas Air Force student undergoing training at RAF Church Fenton with a University Air Squadron. This flight was the student's third solo sortie and he was briefed to practice normal powered and glide approaches to Runway 24. The weather conditions were fine with high pressure prevailing and the surface wind was 260°/13 kt.

The glide circuit at Church Fenton is flown at 1,300 feet on the QFE, 500 feet higher than a normal circuit and the downwind leg is normally flown a little wider. An Initial Aiming Point (IAP) is selected some distance into the runway and, when abeam that point downwind, the throttle is closed and, in the Tutor, the RPM lever is selected to 'LOW' which minimises drag from the propeller. The final turn is flown with take-off flap at 75 KIAS with about 20° angle of bank although that is adjusted in order to maintain a 'constant sight line angle' towards the IAP.

History of the flight

Following a dual check with a Qualified Flying Instructor the student was cleared solo to practice normal and glide circuits to roll (touch and go), overshoot (go around) or land. On his first circuit after a powered approach he carried out a touch and go followed by a series of three glide approaches, 'rolling' from the first, going around from the second and landing heavily 260 metres short of the threshold on the third.

On the third glide circuit, the final turn was initiated slightly earlier than before and was closer to the runway. Despite this shorter ground track, the student, at about 200 feet agl, realised that he was too low to glide to the runway and he attempted to go around. When he advanced the throttle, the engine failed to respond and the aircraft continued to descend, but at a reduced rate, before appearing to stall at about 75 feet agl. The aircraft came to rest having bounced and then slid for some 50 metres. The Airfield Fire and Rescue Service arrived at the scene about two minutes after the accident and the student pilot was able to vacate the cockpit unaided.

Analysis

Stored data within the aircraft's GPS was recovered, analysed and compared with precision approach radar data. For a glide approach in the Tutor, the rate of descent around the finals turn is normally about 800 to 900 feet/min. This rate of descent was typical of the first two glide circuits but on the third glide circuit, the rate of descent was about 1,200 feet/min. This higher rate of descent is typical of the Tutor's glide performance if the propeller RPM lever is left at HIGH. The Unit Inquiry suggested that the reasons for the higher rate of descent and the failure of the engine to respond when the throttle was opened were probably due to the student's inadvertent movement of the mixture lever instead of the propeller lever. If, as suspected, he moved the mixture lever to LEAN instead of the propeller lever to LOW, this would have effectively starved the engine of fuel and yet allowed it to windmill at a rate consistent with a glide approach and with no obvious symptoms of engine shutdown. When the abnormally high rate of descent prevented the aircraft reaching the runway, the student's attempt to go around was doomed but had he maintained flying speed, it is possible that he could have completed a forced landing instead of the subsequent heavy, uncontrolled landing.

The Unit Inquiry suggested the following causal factors may have influenced the accident:

a. The pilot's lack of flying experience.

b. The pilot's handling of the aircraft during the attempted go around.

c. The lack of a gate or warning device either to prevent inadvertent complete rearward movement of the mixture lever or to warn of such movement when the LEAN position is selected.

d. The practice of moving the RPM lever to LOW to simulate the best gliding performance following engine failure.

e. The late recognition of a poor approach by the pilot.

Safety Recommendations

The Unit Inquiry made the following safety recommendations:

1. Tutor pilots should be reminded of the importance of positively identifying individual engine control levers before moving them.

2. Consideration be given to the fitting of a gate or short term audio warning device to either prevent inadvertent selection of Mixture to 'Lean' or to warn of such movement as 'Lean' is selected

3. Consideration should be given to practising glide approaches with the RPM selected to high.

Safety action

The selection of propeller RPM to LOW has been removed from the unit's emergency 'Immediate' and 'Subsequent' actions and is now merely a note in the emergency handling drills. RPM LOW is to be selected only if glide range is critical.