ACCIDENT

Aircraft Type and Registration:	Jabiru J400, G-REAF	
No & Type of Engines:	1 Jabiru 3300A piston engine	
Year of Manufacture:	2010 (Serial no: PFA 325-14502)	
Date & Time (UTC):	23 February 2018 at 1635 hrs	
Location:	Peterborough (Conington) Airport, Cambridgeshire	
Type of Flight:	Training	
Persons on Board:	Crew - 2	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Nose leg collapsed causing distortion to firewall and cockpit floor; propeller damaged and engine shock-loaded	
Commander's Licence:	Airline Transport Pilot's Licence	
Commander's Age:	68 years	
Commander's Flying Experience:	10,560 hours (of which 5 were on type) Last 90 days - 68 hours Last 28 days - 40 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Synopsis

After purchasing this homebuilt aircraft, the owner was receiving familiarisation training from an instructor who had little previous experience on type. At approximately 50 ft aal, while making an approach to land, power was reduced and the aircraft pitched nose-down. It landed heavily on the nose landing gear, which collapsed, and the propeller struck the runway.

History of the flight

The aircraft had been acquired by a pilot who had gained a Private Pilot's Licence a few months previously and had 90 hours' flying experience, mostly in Cessna 152s. The pilot was receiving type familiarisation training from a flight instructor, and they had already flown the aircraft together for 3 hours, although for the preceding flights one of the rear seats had been occupied. Some years previously, the instructor had flown a Jabiru J430, which has a different wing design, but he had not flown a Jabiru J400 until he began giving familiarisation training to the owner and to another pilot.

After flying one circuit to the asphalt Runway 10, at Peterborough (Conington), the owner flew a normal approach and maintained 70 KIAS until, at approximately 50 ft aal, she reduced power with the aim of decelerating to 60 KIAS. The instructor suggested that

additional power was needed at this stage, but the aircraft "abruptly" pitched nose-down, causing the descent rate to increase and, before the instructor could intervene, the aircraft landed heavily in a nose-down attitude. Consequently, as the aircraft slowed to a halt on the runway, the nose leg collapsed and the propeller struck the ground. The crew members made a radio call to report their situation, switched off the fuel and electrics and vacated the aircraft without difficulty.

Commander's comments

Following the accident, the flight instructor stated that, before the owner decided which aircraft type she would purchase, he had provided her with some training in a microlight type that he was more familiar with, and which she wished to consider. When she decided instead to buy G-REAF, he agreed to provide familiarisation training to her and to another pilot. He received advice from the aircraft's builder, the previous owner, but he did not fly the aircraft until he commenced the familiarisation training. Prior to the accident flight, he had gained 5 hours experience in the aircraft, but this was with three persons on board, as one of the other two pilots occupied a rear seat for the preceding flights.

The instructor knew that 65 KIAS is the recommended approach speed for the type, but the aircraft's builder had offered verbal advice to target 70 KIAS and to keep the power above idle while landing, because with the engine idling the reduced propeller wash could reduce the elevator's authority. He also stressed that variations in the payload could significantly affect the Centre of Gravity (CG), which would move well forward with only the front seats occupied. The instructor reported that he studied the aircraft's weight and balance schedule with the new owner and they calculated that, when only the front seats were occupied, the CG was acceptable without any need for ballast to be carried.

The aircraft's builder provided written notes for operation of the aircraft and, for the approach to land, these recommended:

> '
> - *Trim full aft*
> - *Late final speed 65kts*
> - *Speed is critical – tendency to lose lift fast if speed drops*
> - *Keep a little power on during round-out to give elevator authority*'

From his past experience, the instructor believed that pilots who learn on microlights often transition easily to heavier aircraft, but pilots, such as the new owner, who learn on conventional general aviation trainers can take longer for the transition to lighter machines. He therefore anticipated that the owner could experience difficulty adjusting to the reduced momentum and quicker response of this light aircraft but, nevertheless, he was taken by surprise when the owner reduced power towards idle and the aircraft pitched nose-down "abruptly". He considered it possible that the airspeed indicator (ASI) was over-reading and the aircraft had stalled; he understood the documented stall speed in the landing configuration to be 45 KIAS.

One outcome of this accident is that it has bolstered the instructor's belief that newly qualified pilots should build experience flying the class of aircraft they have learnt on, ideally within a flying club atmosphere. The instructor also elected to join the Light Aircraft Association (LAA) in order to benefit from this organisation's knowledge and guidance.

LAA assessment

This home-built aircraft was operating on a Permit to Fly administered by the LAA, which offered several observations about this accident.

The Type Acceptance Data Sheet (TADS) for the Jabiru J400 states:

> *'Note that the handling of the aeroplane is significantly affected by the loading, especially the rear seat loading. Check weight and balance carefully before flight to ensure the aircraft is within the permitted weight and balance envelope.'*

Prior to this flight, the instructor and the owner had only flown the aircraft with three people on board. Having checked the CG, the instructor should have appreciated how far forward it moved with only the two front seats occupied, and that this would accentuate the aircraft's tendency to pitch nose-down when the power was reduced. However, it was the first time the instructor had flown the aircraft in this configuration and he was surprised when the aircraft pitched "abruptly" nose-down. The LAA does not believe it likely that the aircraft stalled, but acknowledges that the accuracy of the ASIs fitted to this class of aircraft is variable and intends to ensure the ASI in this aircraft is re-calibrated during rebuild.

The LAA encourages flight instructors to be conversant with the aircraft they provide training in and, if they are inexperienced on type, to fly with an experienced pilot before they train others. If the instructor was unable to arrange this, he could still have investigated the aircraft's handling characteristics himself prior to providing the familiarisation training. Slow speed flight and stalls in the landing configuration could have been evaluated at a safe altitude, with the ASI cross-checked against the stall warner and perhaps against GPS data.

There are 25 Jabiru J400s administered by the LAA and, because they have all been assembled from kits, their build quality, especially the wing form, can vary. As there may be slight differences in handling characteristics from one aircraft to another, pilots are advised to gain familiarity with individual machines.

Finally the LAA observed that light aircraft such as this, where the payload can account for a large percentage of the total weight, tend to have handling characteristics akin to a microlight type when lightly loaded, but they tend to handle more like conventional general aviation types when heavier. Moreover, the nose landing gear systems of aircraft in this class are unlikely to be as robust as those fitted to classical training types such as Piper PA-28s or Cessna 152s.