Serious Incident

Aircraft Type and Registration:	Piper PA-34-220T, G-ZZOT	
No & Type of Engines:	2 Teledyne Continental TSIO-360-RB1B piston engines	
Year of Manufacture:	1998 (Serial no: 3449108)	
Date & Time (UTC):	15 August 2023 at 1045 hrs	
Location:	Liverpool Airport	
Type of Flight:	Training	
Persons on Board:	Crew – 2	Passengers – None
Injuries:	Crew – None	Passengers – N/A
Nature of Damage:	Impact damage to both propellers and shock loading to both engines and propeller drivetrains. Minor damage to under surface of fuselage.	
Commander's Licence:	Commercial Pilot's Licence	
Commander's Age:	64 years	
Commander's Flying Experience:	2,695 hours (of which 842 were on type) Last 90 days – 62 hours Last 28 days – 25 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Synopsis

The aircraft's propellers struck the runway during a go-around from a simulated one engine inoperative (OEI) approach at Liverpool Airport that was inadvertently flown with the landing gear up.

While the aircraft was fitted with an unsafe landing gear position warning system, the instructor had disabled it by pulling its circuit breaker (CB) due to nuisance warnings after a previous approach and go-around. His intention was to re-enable the warning system when downwind to land but cited distraction as a contributory factor for him omitting to reset the CB and not positively confirming the gear was down for the landing.

The operator intended issuing formal guidance to its pilots that CBs should only be pulled if specifically required when following an approved abnormal procedure checklist.

History of the flight

The serious incident occurred on a training flight being undertaken as part of a multi-engine instrument rating course. After successfully completing a simulated OEI ILS approach and go-around to Runway 27 at Liverpool the aircraft was turned downwind to join the

visual circuit for a simulated OEI landing. The instructor reported that, during the go-around, the aircraft's unsafe landing gear warning alarm was sounding "well above" the normal engine manifold pressure (MAP) alert level. The alarm sound was significantly interfering with communication between him and his student, so he elected to pull the "landing [CB] to silence the alarm." He initially left his finger on the CB as a reminder to reset it when downwind to land.

On the downwind leg the pilots were asked by ATC to orbit before turning finals due to an ahead aircraft on the ILS for Runway 27. As a result of the orbit, when it intercepted the centreline, G-ZZOT was further from the runway than would be normal for a visual circuit and it was decided to delay lowering the landing gear until assured of reaching the runway. The student's workload was high during the approach, thereby increasing the monitoring workload for the instructor. As a result, neither pilot completed their prescribed pre-landing checks, the landing gear remained up and the associated warning system remained inhibited due to the pulled CB.

When in the pre-touchdown flare the instructor "became aware of abnormal [propeller] contact with the runway" and "reacted instinctively" by selecting full power and attempting a go-around, which was successful. When the landing gear was selected down during the subsequent visual circuit it travelled normally and after "three greens" had been confirmed, the aircraft was landed safely from a normal approach.

Aircraft information

As described in the Pilot's Operating Handbook, the PA34's throttle levers are mounted in a control quadrant on the lower centre of the instrument panel. They are used to control the engines' MAP. On some PA34 aircraft, including G-ZZOT, the throttle quadrant also houses microswitches linked to a '*gear up warning'* system. The microswitches are designed to be activated by either or both throttle levers during the *'lower portion of throttle lever travel, (approximately 14 in Hg* [inches of mercury] *MAP and below).*' When the microswitches are activated the warning horn will sound if the landing gear is not down and locked. The PA34 Maintenance Manual gives a '*normal'* microswitch activation MAP tolerance range of 14 ± 2 in Hg.

The operator reported that G-ZZOT had undergone maintenance action approximately eight months prior to this incident due to a fault with the MAP trigger level, but that the warning system had been operating at the expected power settings thereafter. The instructor on the incident flight reported the warning horn sounding when power was reduced to approximately 16 in Hg.

Organisational information

While not explicitly stated in their operations manual, the operator reported its expectation was that pilots would only pull CBs when specifically required as part of an approved abnormal procedure checklist.

Analysis

The aircraft's landing gear warning system appeared to have been operating normally during the go-around from the ILS approach, albeit triggering at the top end of its tolerance range. To the instructor this was at a higher MAP setting than he expected and it made effective communication with the student pilot challenging. He pulled the CB because he considered the risk from communication difficulties outweighed the immediate risk from silencing the alert. He initially kept his finger on the CB as a tactile reminder, but at some stage unconsciously removed it. He considered that the distraction caused by the orbit and change from normal sequencing for lowering the landing gear "most likely diverted [him] from resetting the CB." He further considered that workload and distraction were factors in the student not completing the pre-landing checklists and procedures and him not detecting that the action had been missed.

The company operations manual (OM) did not contain a policy for the pulling of CBs outwith published abnormal procedure checklists. Following this incident, the operator declared an intention to amend the OM to include guidance on the issue.

Conclusion

The aircraft's propellers struck the runway after an inadvertent landing gear-up approach.

While the aircraft was fitted with an unsafe landing gear warning system, the instructor had disabled it by pulling its CB during a go-around because the warning horn was causing intra-cockpit communication difficulties. His intention was to re-enable the warning system when downwind to land, but he cited distraction as a contributory cause for him omitting to reset the CB and not positively confirming the gear was down for the landing. Had the warning system not been inhibited, it would have been more likely that the unintentional gear-up approach would have been detected and prevented by one or both of the pilots.

The operator intended issuing formal guidance to its pilots that CBs should only be pulled if specifically required when following an approved abnormal procedure checklist.