Maule MX-7-180A, G-LOFM

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Aircraft Type and Registration:	Maule MX-7-180A, G-LOFM	
No & Type of Engines:	1 Lycoming O-360-C4F piston engine	
Year of Manufacture:	1995	
Date & Time (UTC):	27 December 2000 at 1420 hrs	
Location:	Manston Airport, Kent	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Damage to right wingtip and aileron and right mainwheel	
Commander's Licence:	Private Pilots Licence	
Commander's Age:	21 years	
Commander's Flying Experience:	138 hours (of which 21 were on type)	
	Last 90 days - 35 hours	
	Last 28 days - 19 hours	
Information Source:	Field Investigation	

History of flight

After a flight from Coventry Airport, the pilot made a visual approach to Runway 10 at Manston Airport. At a range of approximately 4.5 nm from the runway, he was cleared to land with a reported wind strength of 8 kt. Full flap (40°) had been selected for landing and the airspeed over the threshold was about 60 MPH. The pilot had full into-wind aileron applied during the flare and he maintained this as he achieved a three-point landing. After touchdown, he kept full into-wind aileron and also used full right rudder and full nose-up elevator to prevent the aircraft from swinging left. However, even with the application of right wheel brake, the pilot could not prevent the aircraft yawing to the left. He was aware of the right wheel skidding and released the brake. The

aircraft then swung violently into wind and the right wingtip struck the ground. After the pilot cleared the runway, he requested a wind check which was given as 010°/ 10 kt.

Engineering information

The aircraft has a steerable tailwheel which improves the aircraft performance during crosswind operations. However, it also has a disconnect feature which allows the tailwheel to castor thereby improving low speed ground manoeuvring. With weight on the tailwheel, movement of the rudder pedals rotates a bellcrank to transmit movement to the tailwheel assembly; the movement of the tailwheel is limited by the range of movement of the rudder. However, with full rudder applied, additional steering can be achieved by differential braking but in that situation the tailwheel castors. This occurs when a locking pin moves outwards along a ramp plate and withdraws its associated lug from the steering mechanism. When the tailwheel returns to the rudder steering range, the lug re-engages and tailwheel steering is restored.

Following the accident to G-LOFM, part of the locking pin could not be found indicating that it had sheared off in the accident or had been missing before the accident. However, two pins, which retain the bellcrank to a pivot assembly, were found but were sheared. Inquiries with the operating company revealed that these retaining pins had been replaced at least four times over the last three years. The company considered that the aircraft might have flown for some indeterminate time prior to the accident with the locking pin sheared.

The manufacturer confirmed that instances of broken retaining pins had been recorded but stated that this generally occurred in tailwheel assemblies that needed maintenance. The MX-7-160/180A Maintenance Manual advises operators to lubricate and adjust the tailwheel if 'shimmy of the tailwheel becomes a problem'. Other indications that the assembly needs attention are when the tailwheel fails to lock or unlock during ground movements.

The locking pin remnant was subject to structural analysis. This indicated that the locking pin had been subjected to stress corrosion, which could have been caused by pressure of the pin against the ramp plate induced by the return spring load. The general corrosion of the fracture surface indicated that the final fracture had occurred some time before the accident.

Additional information

The operating company stated that their pilots are briefed to confirm that the tailwheel operates correctly during the pre-flight external inspection; this is done by inducing a disconnect and subsequent reconnection of the steering system. Following the accident to G-LOFM, this procedure has been re-emphasised. Additionally, crews have been rebriefed on the expected ground handling characteristics with a correctly operating tailwheel steering mechanism.

Following the accident, the company has instigated an inspection of the tailwheel assembly during the Light Aircraft Maintenance Schedule (LAMS) 50 hour check.

Discussion

During the investigation, it became apparent that there was a history of the retaining lugs being replaced but no record of the locking pin being replaced. Subsequent examination of the fractured locking pin indicated that failure had occurred some time prior to the accident. With an inoperative

locking pin, tailwheel steering would only have disconnected when the two retaining pins sheared through overload. That is the most likely scenario during the accident to G-LOFM.

The measures already taken by the operating company should raise the awareness of this particular problem among flight crew and engineers.