ACCIDENT

Aircraft Type and Registration:	Titan T-51 Mustang, G-DHYS	
No & Type of Engines:	1 Suzuki V6 Mini Merlin piston engine	
Year of Manufacture:	2015 (Serial no: LAA 355-15190)	
Date & Time (UTC):	31 May 2017 at 1433 hrs	
Location:	Gloucestershire Airport, Gloucestershire	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Main landing gear, propeller and right wing damaged	
Commander's Licence:	Commercial Pilot's Licence	
Commander's Age:	60 years	
Commander's Flying Experience:	2,462 hours (of which 51 were on type) Last 90 days - 95 hours Last 28 days - 24 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Synopsis

The aircraft's right main landing gear collapsed during the latter stages of a normal landing rollout, whilst the aircraft was travelling at low speed. The cause of the landing gear collapse was not positively identified.

History of the flight

Following a local flight in good weather conditions, with light winds, the pilot landed the aircraft normally on Runway 27. As the aircraft slowed to approximately 10-15 mph at the end of the landing roll the pilot gently applied the brakes, but as he did so the aircraft yawed to the left which he could not control using right rudder and right brake. The pilot reported that the wings remained level as the aircraft yawed to the left. The weight transferred to the right main landing gear leg, which collapsed inwards, causing the propeller and right wingtip to contact the runway as the aircraft came to a stop, Figure 1.

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Figure 1

G-DHYS following the collapse of the right main landing gear

Aircraft information

The Titan T-51 Mustang is a three-quarter scale replica of the North American P-51 Mustang. It is a homebuilt kit aircraft of steel frame and aluminium skin construction, with a retractable main landing gear. The aircraft was first flown in 2015 and had accumulated 41 hours at the time the accident occurred. The main landing gear (MLG) is of the oleo-pneumatic type with an upper outer cylinder and a lower piston assembly that is attached to the main wheel. The lower piston and main wheel is restrained in rotation by a torque link assembly, Figure 2.

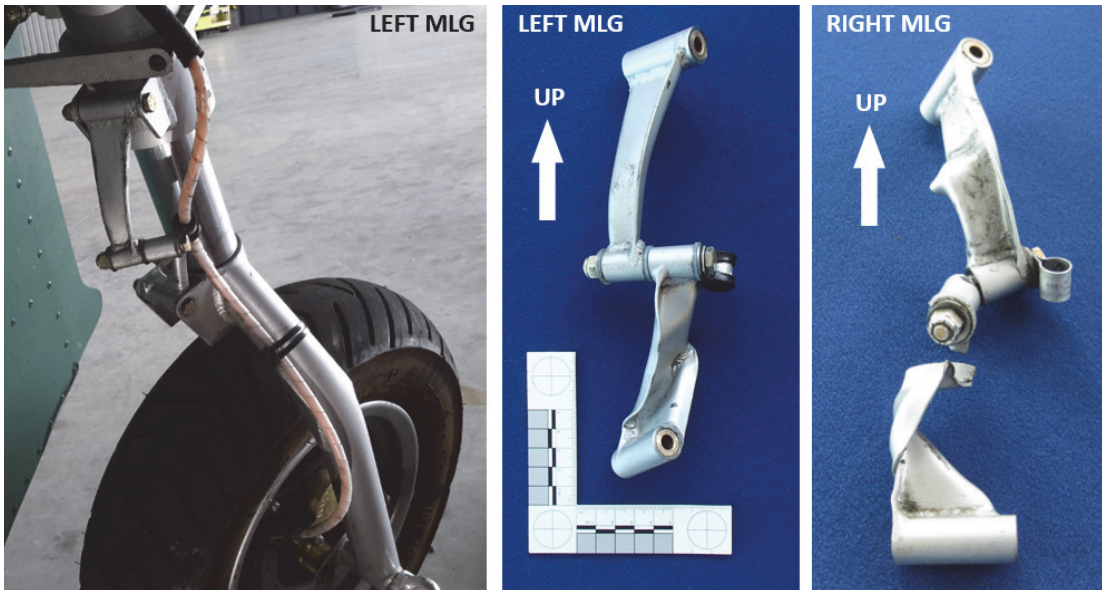

Figure 2

G-DHYS left MLG leg (left), left MLG torque link (centre) and right MLG torque link (right)

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Each MLG leg is deployed by a hydraulic actuator via a bellcrank and an adjustable-body link. Instructions provided to kit constructors describe how to adjust the adjustable-body link to ensure that the MLG bellcrank becomes sufficiently over-centre when the landing gear is down. The owner confirmed that he had followed these instructions and that he had not experienced any problems with the MLG deployment during his operation of the aircraft prior to the accident flight.

Aircraft examination

Examination of the aircraft revealed that the right MLG torque links had buckled, allowing the right mainwheel to rotate inwards. This would have caused an inboard side-loading on the MLG leg. The right MLG adjustable-body link was damaged due to excessive bending, caused by the right MLG collapsing inwards whilst the landing gear hydraulic actuator remained in the 'down' position, Figure 3.

The left MLG adjustable-body link was undamaged, consistent with the left MLG remaining locked down during the event. The left MLG torque links were buckled due to excessive side loading, as a consequence of the collapse of the right MLG leg.

Figure 3

G-DHYS left MLG adjustable-body link (top), and overload-damaged right MLG adjustable-body link (bottom)

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Other information

The aircraft kit manufacturer stated that they were aware of four cases of T-51 Mustang MLGs collapsing; in their opinion each case was caused by improper adjustment of the adjustable-body link.

The LAA has approved a set of modified torque links, Figure 4, for installation on G-FION, another T-51 Mustang aircraft that is currently under construction. The modified stronger torque links were developed as an LAA modification as a result of concerns raised by the accident with G-DHYS. If this modification is successful, the LAA will require that T-51 Mustang aircraft, powered by the Suzuki V6 engine and operating on an LAA Permit to Fly, are modified in this manner.

Figure 4

Strengthened MLG torque links installed on G-FION

Analysis

It was not possible to determine, based on the damage to G-DHYS's main landing gear components, whether the right MLG torque links failed before or after the right MLG leg collapsed. If the right MLG torque links had failed first, this would have allowed the right wheel to rotate inwards relative to the leg, thereby imposing an inwards side-load on the leg, causing its subsequent collapse. This possibility is supported by the pilot's recollection that the aircraft's wings remained level as the initial left yaw developed during the landing roll.

It is also possible that the right MLG leg could have collapsed due to a lack of sufficient over-centre of the bellcrank. In this scenario the right wheel would have been subject to high side-loading as the leg collapsed, resulting in the observed damage to the right MLG torque links.

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Conclusion

The aircraft's right MLG leg collapsed during the latter stages of a normal landing rollout, whilst the aircraft was travelling at low speed. Inspection of the damaged MLG components did not positively identify the cause of the right MLG leg collapse. The LAA have approved a modification for strengthened MLG torque links for the T-51 Mustang aircraft and pending flight trails, may mandate this modification for certain T-51 Mustang aircraft[1] operating on an LAA Permit to Fly.

Footnote

[1] The modified torque links may not be required for T51 Mustang aircraft powered by Rotax engines, as these variants have a significantly lower maximum operating mass.

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