



LAA TYPE ACCEPTANCE DATA SHEET
TADS 947
DH82A TIGER MOTH

Issue 1	Initial issue	Dated 01/05/14	FD
Revision A	Addition of LAA/AWA/17/02 in section 3.3	Dated 10/02/17	JV

These TADS are intended as a summary of available information about the type and should be used during the overhaul, operation and permit revalidation phases to help owners and inspectors. Although it is hoped that this document is as complete as possible, other sources may contain more up to date information, e.g. the de Havilland Support (DHSL) website.

Section 1 contains general information about the type.

Section 2 contains information about the type that is **MANDATORY** and must be complied with. The annual Permit to Fly renewal (revalidation) process requires a Declaration by the inspector and owner that the Requirements of Section 2 have been complied with.

Section 3 contains advisory information that owners and inspectors should review to help them maintain the aircraft in an airworthy condition. If due consideration and circumstances suggest that compliance with the requirements in this section can safely be deferred, is not required or not applicable, then this is a permitted judgement call. This section also provides a useful repository for advisory information gathered through defect reports and experience.

Section 1 - Introduction

1.1 UK contact

de Havilland Support Ltd, Building 213, Duxford Airfield, Cambridge CB22 4QR
Tel: 01223 830090
Email: info@dhsupport.com
Website: www.dhsupport.com

1.2 Description

The DH82A Tiger Moth is a two seat, open cockpit, tandem biplane of fabric covered wood and metal construction. It was intended for use as a military and civil trainer, which was manufactured in the 1930s and early 1940s initially by de Havilland and Morris Motors in the UK, and later by DH Australia. A later closed cockpit variant, the DH82C was also built by DH Canada. This TADS deals only with the models built in the UK and in Australia.

The aircraft is generally fitted with a DH Gipsy Major 1 series engine but some have subsequently been converted to accept the later, more powerful DH Gipsy Major 10 series, including either tapered crankshaft 10-1 or later splined crankshaft 10-2, and including civil conversions of the military Mk 7 and 8.

de Havilland Support Ltd rescinded the Tiger Moth's type certificate in April 2012 and subsequently the CAA approved LAA's application to take over the airworthiness administration of those Tiger Moths whose owners choose to transfer from a CofA to a Permit to Fly.

de Havilland Support provide the drawings and manuals for the type, a compilation of all Technical News Sheets to-date applicable to the type, titled TNS CT (MOTH), a technical support function and a Continued Airworthiness Service (CAS) option which



LAA TYPE ACCEPTANCE DATA SHEET
TADS 947
DH82A TIGER MOTH

provides subscribing individuals or groups with an update service for all technical and regulatory issues and copies of any new or amended TNSs.

Section 2 – Mandatory information for owners, operators and inspectors

At all times, responsibility for the maintenance and airworthiness of an aircraft rests with the owner. Condition No 3 of a Permit to Fly requires that: *“the aircraft shall be maintained in an airworthy condition”*.

The Permit to Fly Operating Limitations document requires that: *“the aircraft must be maintained in accordance with the requirements of LAA Type Acceptance Data Sheet 947”* (this document). Specifically, Section 2 of this TADS describes those requirements. Declaration of compliance with this TADS means also that the relevant TADS concerning the engine, propeller and equipment fitted have also been consulted and the mandatory requirements described therein have been satisfied. The TADS number, along with the latest issue number, must be quoted on applications to revalidate the Permit to Fly, as must those for the engine, propeller and equipment.

2.1 Lified Items

DH TNS No 29/3 and 33/2 specify retirement lives of certain airframe structural components. These TNSs are made 'legally' mandatory by AD 006-10-97 and 007-03-99. For the avoidance of doubt, operation on an LAA Permit to Fly affords no alleviation with respect to retirement lives. The particular components affected are:

- TNS 29/3 Fuselage lateral tie rods.
- TNS 33/2 Cockpit harness.

The above components whose life is specified by mandatory Airworthiness Directives must be changed when due. Lified items specified only by TNSs or by the manufacturer but not mandated by ADs are advisory in strictly legal terms. The owner is responsible for deciding whether to implement these advisory life limits.

2.2 Maintenance Schedule

The aircraft must be maintained in accordance with one of the following maintenance schedules: either:

1. The CAA's Light Aircraft Maintenance Schedule, [CAP 411](#)

Or

2. Technical Leaflet [TL2.19](#) and associated Generic LAA Maintenance Schedules (tri-annual, annual and 50 hr checks) as downloaded from the '[maintenance](#)' page of the LAA website.

Notes:

- a. If maintained to the CAA Light Aircraft Maintenance Schedule, the alleviations specified in [TL 2.25](#) 'Alleviation to LAMS schedule available to aircraft operating on an LAA Permit to Fly' are acceptable.



**LAA TYPE ACCEPTANCE DATA SHEET
TADS 947
DH82A TIGER MOTH**

- b. An Annual Check must be carried out coincident with renewal (revalidation) of the Permit to Fly.
- c. Whether maintained to the LAMS Schedule or the LAA Generic Maintenance Schedule, the schedule should be customized to include any relevant special requirements provided in the Tiger Moth Maintenance and Repair Manual, reference DHTM1.
- d. Whether maintained to the LAMS Schedule or the LAA Generic Maintenance Schedule, in order to satisfy the requirements of the de Havilland TNS's, which are a mandatory part of the aircraft's dataset, the schedule must be customized to include the actions called for by the TNS's from DHSL's TNS CT (MOTH) as listed below.

Those marked ** are legally mandatory.

<i>TNS no.</i>	<i>Description</i>	<i>Periodicity</i>
TNS 5/2	Recurring inspection checks of aileron control system **	Annually
TNS 6/2	Recurring inspection checks for fabric deterioration	Annually
TNS 10/2	Main undercarriage wear limits	Annually
TNS 14/1	Check for cracking in fuselage upright	Annually
TNS 17/2	Check for cracking in front fuselage angle fitting	50 hr
TNS 21/1	Check for cracking in upper mainplane root end fittings	50 hr
TNS 23/4	Rigging, treatment/inspection streamline wires	Check A & 50 hr
TNS 29/3	Fuselage lateral tie rods – life **	Annually
TNS 32/3	Inspection of wooden structure	Annually
TNS 33/2	Cockpit harness integrity and Lifting **	Annually
TNS 42/1	Wear in/at elevator control cable clevis pins	250 hrs
TNS 43/1	Deterioration/replacement of flexible fuel hose	Annually

2.3 ADs - Per CAP 747 Mandatory Requirements for Airworthiness

Airworthiness Directives (ADs) must be complied with. Tiger Moth ADs are published by the CAA in Section 2 of [CAP 747](#), Mandatory Requirements for Airworthiness.

See also [CAA website](#) for details of any new ADs awaiting incorporation into CAP 747.

<i>CAA AD No</i>	<i>Mod and TNS No</i>	<i>Description</i>	<i>Applicability/ Requirement</i>
2731 PRE 80	Mod 125 TNS 5	Introduction of aileron sprocket chain guides and reduction in floor stop slot length	Before issue or renewal of CofA (or Permit to Fly)
2732 PRE 80	Mod 134 TNS 5	To seal the aileron gearbox and improve inspection facilities	Before issue or renewal of CofA (or Permit to Fly)
2733 PRE 80	Mod 138 TNS 5	To prevent splitting of aileron control box side members	Before issue or renewal of CofA (or Permit to Fly)

LAA TYPE ACCEPTANCE DATA SHEET
TADS 947
DH82A TIGER MOTH

CAA AD No	Mod and TNS No	Description	Applicability/ Requirement
2734 PRE 80	TNS 19	Inspection of pins attaching universal joint to undercarriage compression leg	Before issue or renewal of CofA (or Permit to Fly) - should have been complied with by 15.4.62
002-04-83 Rev 1		Addition of anti-spinning strakes if aircraft is to be cleared for aerobatics and spinning, unless a special flight test is carried out by CAA Flight Dept	Effective from 12.4.01 More limiting aft cg range without strakes
002-10-97	TNS 28	Datum bolts	One-off check that correct bolts are fitted at fuselage joint 'E'.
006-10-97	TNS 29	Fuselage, lateral tie rods, fracture at wing joint fittings	Introduces a mandatory maximum life of 2000 flying hours or 18 years, whichever soonest, for the fuselage tie-rods and also mandatory special annual checks and mandatory post heavy-landing checks on airframe, undercarriage and attachments
007-03-99	TNS 33	Cockpit safety harness installation – integrity and lifing. Note: A variety of seat harness may be encountered: eg, mod 152 (Z-Type), mod 158 (Schroth), mod 160 (Anglia Sailplanes Sutton-type)	Introduces mandatory annual inspection /integrity checks on the harnesses and their attachments, and a mandatory life of not exceeding 9 years for front and rear Sutton-type harnesses
008-03-99	TNS 34	Introduction of locking device for fuel on/off cock operating lever	One-off mandatory modification. Embodiment of Tiger Moth mod 155 or approved equivalent.
002-10-2000	TNS 37	Introduction of increased strength seat harness transverse cable	One-off replacement by uprated cable assembly
EAD G- 2014- 0001-E		Lateral tie rods - provenance	One-off provenance check and removal from service of any lateral tie rods not of UK approved type



LAA TYPE ACCEPTANCE DATA SHEET
TADS 947
DH82A TIGER MOTH

2.4 Mandatory Permit Directives (CAP 661)

MPD 1995-01	Compliance with ADs	Continued compliance with all ADs and other mandatory requirements applicable when aircraft was on C of A.
MPD 1998-019	Flexible fuel tubing	Replacement of suspect tubing especially PVC See MPD for full details.
MPD 2001-012	Sutton Harnesses	Introduces mandatory 9 year replacement life on Sutton type harnesses after old examples broke in accidents having lost much of their strength

MPD 1995-001 is issued to make ADs mandatory for aircraft formerly eligible for a CofA but now issued with a Permit to Fly. There are currently no other MPDs published which apply specifically to the Tiger Moth aircraft, however, there are two MPDs which apply to equipment which may be installed on Tiger Moth aircraft. These are MPD 1998-019 Flexible Fuel Tubing, and MPD 2001-012 Sutton Harnesses – Integrity and Lifting. These can be found in CAA [CAP 661](#).

Also check the LAA website for MPDs that are non-type specific ([TL2.22](#)).

2.5 Generic Requirements (GR) CAP 747 and Civil Aircraft Airworthiness Information and Procedures (CAAIP) CAP 562

<i>Item</i>	<i>Description</i>	<i>Requirement</i>
GR 8 (Was AN 20)	Fabric covering	See GR for guidance
GR13 (Was AN 61)	Fire resistant furnishings	See GR for guidance
CAP 562	Deterioration of wooden structures	See CAP 562 leaflets 51-10 and 51-20 for guidance (Replaces AN 50)
CAP 562	Metal structures and corrosion/protection	See CAP 562 Leaflets 51-50 and 51-60 for guidance (Replaces AN 73)

2.6 Flight Manual

There is no formal flight manual for the Tiger Moth. Copies of the original RAF operating notes are widely available and provide some useful guidance but these have no formal role and may contain an incorrect VNE. For LAA Permit examples, the applicable operating limitations are contained with the Operating Limitations document associated with the Permit to Fly.

2.7 Maintenance Manual

A copy of the appropriate Maintenance Manual must be available to the owner. This is the DH Tiger Moth Maintenance and Repair Manual, reference DHTM1.



**LAA TYPE ACCEPTANCE DATA SHEET
TADS 947
DH82A TIGER MOTH**

For engine, propeller and equipment refer to manufacturer's maintenance instructions.

2.8 Additional Placards

The Permit to Fly Operating Limitations document requires placards or instrument markings to be installed in accordance with the information shown thereon. The ANO also requires that an Occupant Warning placard be installed in full view of all occupants, so for all two-seat Tiger Moths, two occupant warning placards will be required. Suitable placards are available from LAA HQ. The wording for the occupant warning placard is as follows:

"Occupant Warning - This Aircraft has not been Certificated to an International Requirement"

In addition, placards must be fitted restricting the aircraft to flight by day and under VFR only.

A fireproof identification plate must be fitted to the fuselage, engraved or stamped with the aircraft's registration letters.

Section 3 – Advice to owners, operators and inspectors

3.1 General

The annual check needed at transfer to an LAA Permit to Fly and at each subsequent permit renewal is essentially the same as would be required under the LAMS scheme, including any special recurring inspections for the type as specified on the Airworthiness Directives and TNSs, such as the checking the aileron control system annually as called for by TNS 5 and checking the seat harnesses per TNS29.

Any spare parts fitted must be in accordance with the parts manual and fit for purpose. While there is no requirement for a 'form one' to accompany a spare part for a Permit aircraft, the inspector must be satisfied that it is the correct part and in good order, i.e. within manufacturer's limits and not worn out, time expired or bogus.

Unlike many other vintage aircraft types operating on Permits to Fly, the Tiger Moth is a fully documented type and de Havilland Support Ltd can provide full drawing back-up, manuals, etc. On the plus side, this means that everything about the design is fully defined down to the last split pin and washer, including such things as the fabric covering details and inspection rings. Maintaining the aircraft to this standard should as near as possible guarantee that the aircraft continues to perform exactly as it should. It would also facilitate return to CofA status if this should ever be desired. On the down side, for those with a yen to 'do their own thing' with their own custom tweaks and improvements, with a fully defined type like a Tiger Moth any changes to the design standard, however small, have to be requested as modifications and only embodied if approved by LAA HQ. This is a different situation from most other LAA types where the design drawings are no longer available, or only in a very basic form. With those ill-defined types, owners and their LAA inspectors are left partly to their own devices to keep their machines airworthy by following 'standard aviation practice' rather than conforming to drawings and manuals.



LAA TYPE ACCEPTANCE DATA SHEET TADS 947 DH82A TIGER MOTH

As an example of the LAA mod requirements, in some cases LAA could accept imperial AN equivalent hardware being substituted for the original AGS parts, but this would require a modification being applied for from LAA Engineering and the alternative parts only fitted if the modification has been approved for use on this individual aircraft by LAA HQ. The same would go for the use of a different type of wing fabric, different locations of access panels or drain holes – these latter being fully specified in TNS 32. Just because one Tiger Moth might be seen with a particular ‘mod’ in place doesn’t mean that others can automatically assume this is an approved alternative and follow suit. For full details of the LAA procedures for mods and repairs, mod application forms etc, refer to ‘mods and repairs’ section of the LAA website - or call LAA HQ.

While the Tiger Moth can be inspected by any suitably rated LAA inspector, due to the particular complexities associated with the Tiger Moth, the LAA’s Chief Inspector has compiled a list of those inspectors who have a long history of experience with the type who may be a first choice for inspecting this type or as a source of advice.

3.2 Standard Options

The standard engine is a DH Gipsy Major 1 with fixed pitch wood propeller. Alternative propellers are as listed in [CAP 562](#) leaflet 61-10

The fitment of leading edge slats to the top wing, and the associated cable-operated slat locking system is considered optional.

The fitment of anti-spin strakes to the rear fuselage is considered optional. Having said that, non-fitment of the anti-spin strakes introduces a more restricted aft cg limit which often results in difficulty in keeping within the permitted loaded cg range, especially when carrying two heavy crew, baggage and minimum fuel. Those considering removing the strakes should consider that this may not result in acceptable weight and balance results. See also flight test section 3.6 below.

Various modifications have been accepted in the past to fit wheel brakes, which are seen on some examples. On some braked examples the main wheels are repositioned further forward to increase the static weight on the tailskid and so reduce the likelihood of nosing over when brakes are applied.

Some Tiger Moths are fitted with additional fuel tanks in the front cockpit area. The contents are pumped by hand up to the main gravity tank using a stirrup pump mounted on the starboard side of the rear cockpit. Fuel transfer to the main tank may alternatively be effected instead by engine driven or electric pumps.

In the past, Tiger Moths were regularly used for glider towing, but this is a rarity nowadays, other than at vintage glider events. A few Tiger Moths still sport glider tow hooks but may require fitment of a fine pitch propeller if towing is intended.

3.3 Manufacturer’s Information (including Service Bulletins, Service Letters, etc)

Manufacturer’s information takes the form of Dh Technical News Sheets, (TNSs, originally published by de H, subsequently by Hawker Siddeley Aviation, BAe and latterly by DHSL). In the absence of any over-riding LAA classification, inspections and modifications published in the TNSs should be satisfied according to the recommendations therein. It is the owner’s responsibility to be aware of and supply such information to their Inspector.



LAA TYPE ACCEPTANCE DATA SHEET
TADS 947
DH82A TIGER MOTH

The indicated compliance level shown below is as recommended by DHSL.

The LAA consider it mandatory that owners and maintainers have access to, and review Tiger Moth TNSs. Regarding compliance, TNSs not mandated by ADs are advisory in strictly legal terms, however, owners, who are ultimately responsible for deciding whether to implement a TNS should note that their duty of care might well be tested if they elected to ignore such advice and this were to result in an accident or injury.

TNSs are listed below as a quick reference guide / checklist but the ultimate source is the information provided by DHSL via the DHSL Continued Airworthiness Service.

DHSL Technical News Sheets from CT(Moth) Series not Mandated by AD

<i>TNS CT (Moth) No</i>	<i>Issue</i>	<i>Description</i>	<i>Applicability/Requirement</i>
2	7	Future arrangements for type support	Information only
3	3	List of Tiger Moth modifications	Information only
6	2	Fabric covering	Instructions regarding fabric strength testing, when fabric strength is in doubt, and approved methods of re-fabricing
7	1	Adhesives for repair schemes	Information only - defines acceptable types of glue when carrying out repairs to wood structure
8	1	Fuel tank patch repair	Information only - approval of change to material thickness of steel repair patch used when repairing fuel tanks.
9	1	Rudder bar pivot pin	One-off check that pivot pin has been drilled too deep.
10	2	Undercarriage wear limits	Information only
11	2	Interplane struts	Information only – identifying correctly the front and rear interplane struts when aircraft being assembled, as struts are of very slightly different lengths and significantly different cross section
13	2	Fuselage coaming	Instructions for optional radiussing of corners of cockpit coaming to reduce risk of injury
14	1	Fuselage – port vertical member front joint 'C'	Recurring annual check for any signs of cracking of vertical member through the bolt hole for oil tank attachment.

LAA TYPE ACCEPTANCE DATA SHEET
TADS 947
DH82A TIGER MOTH

<i>TNS CT (Moth) No</i>	<i>Issue</i>	<i>Description</i>	<i>Applicability/Requirement</i>
15	1	Bottom main plane – front spar	One-off check for cracking of wooden wing spars within a certain main plane serial number range, from woodscrew holes of woodscrews securing reinforcing spar cap doubler
17	2	Front fuselage – angle fitting	Check for cracking in fittings H35140 (port) and H35141 (starboard) at the 83 degree bend line, at each 50 hour check
18	1	Propellers	Information only – choice of propeller pitch with special reference to glider tugging
20	1	Weighing of Tiger Moth aircraft	Information only unless undertaking aircraft weighing
21	1	Upper main plane – rear spar root end fittings	Recommended dye-pen checks at each 50 hr check of fittings 60603 and 60604 for signs of cracking
22	2	Undercarriage compression leg lower fittings	Information only – improved steel fork fittings p/n 63063 introduced in 1942 to replace original aluminium alloy fittings p/n 45491 which were found prone to fail in heavy landings. (NB especially important if wheel brakes installed)
23	4	Streamlined wires and swaged tie rods	Advice about maintenance and recurring inspection of streamlined steel bracing wires and tie rods, including historical background to different types of wire in service, wire tensions and rigging.
24	2	Pilot's seat – safety belt	One-off check of correct length of cords attaching the safety pin to the webbing strap, to prevent excessively long cords from snagging and possibly leading to control restrictions.
30	3	Gipsy engine continued airworthiness	Information only
32	3	Inspection of wooden structure	Advice on the method and scope of structural inspection of wooden aircraft during restoration, return to service after extended storage, during normal service at annual checks, and following incidents likely to have caused structural damage. Details of standard modifications embodied and details of inspection panels and drain eyelets required.
36	1	Cover for control box in front cockpit	One-off check



LAA TYPE ACCEPTANCE DATA SHEET
TADS 947
DH82A TIGER MOTH

<i>TNS CT (Moth) No</i>	<i>Issue</i>	<i>Description</i>	<i>Applicability/Requirement</i>
41	1	Centre section bracing wire lug attachment	One-off check on bolts for condition and correct orientation
42	1	Elevator control cable clevis pins	Recurring check for of clevis pins for wear, replace if worn. 250 hr interval.
43	1	Flexible fuel hoses	Annual inspection of flexible fuel hoses, replacement life and condition testing by pressure testing at specified intervals
44	1	Tiger Moth Fuel System	One off review / check of system configuration. One off mod Mod 167 required to be embodied to prevent fuel cock pivot migrating down cabane strut, unless alternative already embodied
45	1	Schroth Seat harness	Lifing policy

| [LAA/AWA/17/02](#) Schroth harness SIL SSP-007

3.4 Special Inspection Points

See section 3.3. The Tiger Moth TNSs provide details of many special inspection points applicable to the type, derived from many years of experience with it in service. It is strongly recommended that all owners obtain copies of the set of TNS's from DHSL and subscribe to the DHSL continuing airworthiness service to keep abreast of new developments.

In February 2014 following an accident in Australia, LAA Engineering wrote to owners of Tiger Moths on LAA Permits to request that they inform LAA Engineering immediately if their aircraft are fitted with lateral tie-rods (i.e. those linking the two sets of lower wing root fittings together, across the width of the fuselage) other than those supplied by de Havilland or DHSL. An Airworthiness Directive about the tie-rods is expected to be issued in the spring of 2014.

3.5 Weight and Balance

Many Tiger Moths, especially those without ant-spin strakes, have been found to suffer from an aft cg problem when the weighing results have been studied, which means that pilot and baggage weight must be severely restricted especially when fuel state is near empty, or if any baggage is carried in the rear baggage space. Factors that have encouraged a rearwards migration of the cg on Tiger Moths over the years include the substitution of aluminium alloy cylinder heads where originally bronze heads were used, and the addition of (now optional) rudder mass balance weights, glider towing hooks and home-made additions of heavy lumps steel to the tail skid.



**LAA TYPE ACCEPTANCE DATA SHEET
TADS 947
DH82A TIGER MOTH**

For cg reasons, it is essential to rig the centre section as far forward as possible. Failure to do this sometimes reveals itself by the passenger cockpit doors contacting the cabane struts when the doors are opened.

In many cases however, the problem has been found, on deeper investigation, to be due to, or compounded by erroneous weighing results. Errors in weighing may occur due to weighing the aircraft incorrectly without a full oil tank, or in the incorrect weighing attitude – unusually, the Tiger Moth must be weighed 4 degrees tail up, not level. One degree on weighing attitude makes a significant difference.

The ideal empty cg position for a Tiger Moth is between 7.5 and 8.5 inches aft of datum. If the empty cg is more than 12.0 inches aft of datum with strakes, or 10.0 inches aft of datum without strakes, something needs to be done about it and owners must double check the weighing figures and weighing method.

3.6 Special Test Flying Issues

When not fitted with anti-spin strakes, Tiger Moths must be subject to a spin test evaluation under an LAA flight test authorisation before they can be cleared for aerobatics and intentional spinning. This test must be repeated whenever the aircraft is recovered or otherwise re-rigged or altered in a manner that might affect its spin recovery characteristics.

Prior to the addition of anti-spin strakes to the Tiger Moth in 1941-42, problems were experienced with spin recovery on particular rogue aircraft. At the time, Tiger Moths were fitted with aileron mass balances, and sometimes bomb racks which increased the rolling and yawing moments of inertia, and may have contributed to the problem. Pilots reported that failure to accurately centre the ailerons during recovery had a significant effect on recovery time, and that there was a tendency for the ailerons to trail in-spin and needed to be forcibly held centred.

----- END -----

Please report any errors or omissions to LAA Engineering: engineering@laa.uk.com