# 超輕型載具檢驗實務

民用航空局 飛航標準組 108年11月24日

## 簡報大綱

- 超輕法規說明
- 申請文件說明
- ■常見檢查缺失
- 載具未具備完整手冊之處理原則

# 超輕法規說明



# 民航法「超輕型載具」定義

指具動力可載人,並符合下列條件之固定翼載具、動力滑翔機、陀螺機、動力飛行傘及動力三角翼等航空器:

- (一)單一往復式發動機。
- (二)最大起飛重量不逾六百公斤。(1320 lbs)
- (三)含操作人之總座位數不逾二個。
- (四)海平面高度、標準大氣及最大持續動力之條件下, 最大平飛速度每小時不逾二百二十二公里。 (V<sub>H</sub>-120 knots)
- (五)最大起飛重量下,不使用高升力裝置之最大失速速 度每小時不逾八十三公里。(45 knots)

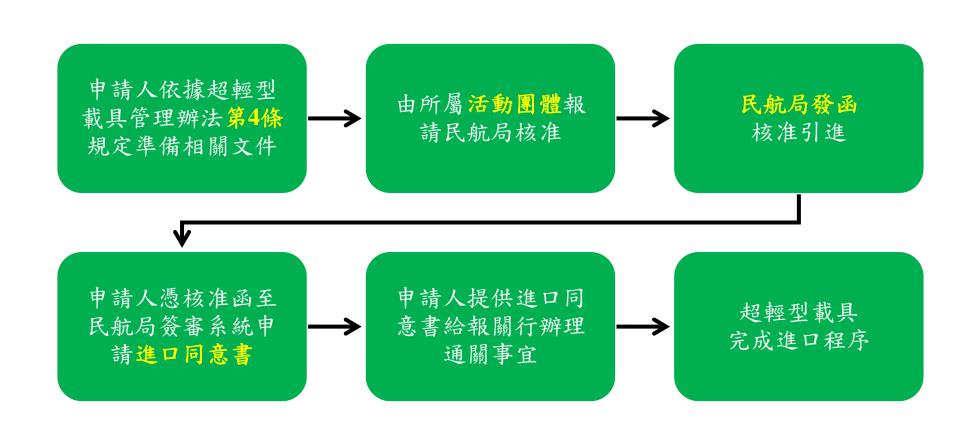
## **Vs = Stall Speed (without flap)**

	Airspeed	km/h IAS *	Warning
Vne	Never exceed speed	270	Do not exceed this speed in any circumstance!
Vnc	Maximum cruising speed	240	This speed can be exceeded only in smooth air, use max. 1/3 of full deflections of the controls.
Vb	Maximum speed in turbulence	216	Maximum speed for the flights in turbulence and wind gusts
Va	Maximum maneuvering speed	156	Do not use full deflections of flight controls, the airplane could be overstressed.
Vfe	Maximum flap extended speed	120	Do not exceed this speed with the flaps extended
Vs	Stall speed / clean	78	Minimum speed with the flaps retracted
Vsc	Stall speed / landing configuration	65	Minimum speed with the flaps full extended

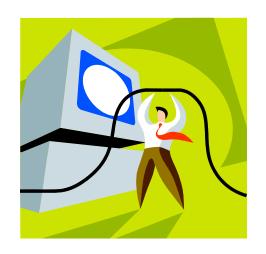
## 超輕型載具定義

- (六)螺旋槳之槳距應為固定式或僅能於地面調整。 但動力滑翔機之螺旋槳之槳距應為固定式或自動 順槳式。
- (七)陀螺機之旋翼系統應為雙葉、固定漿距、半關 節及撬式。
- (八)設有機艙者,機艙應為不可加壓式。
- (九)設有起落架者,起落架應為固定裝置。但動力 滑翔機,不在此限。

## 超輕型載具進口申辦作業流程



# 申請文件說明



## TABLE OF CONTENTS

		P	ΑG	ìΕ
REVISION FORM			ii	
INTRODUCTION			,	,
SECTION 1	SPECIFICATIONS / LIMITAT	IO	<u>vs</u>	
SPECIFICATIONS:				
Powerplant		1	_	2
Propeller -		1	-	2
General		1	-	2
Performance		1	-	3
Koch chart		1	_	4
3 - views -		1	_	5

### LIMITATIONS:

Type of operations			
Load factors	1	-	6
Fuel	1	-	6
Engine	1	_	6
Weight	1	_	6
Airspeeds	1	-	7
Center of gravity	1	_	7
Instruments required	1		8
Documents required	1		8
PLACARDS	1	-	в
INSTRUMENT MARKINGS	įı	-	11
SECTION 2 WEIGHT AND BALANCE			
DEFINITIONS	2	_	2
EMPTY WEIGHT AND E.W.C.G	2	-	4
LOADED C.G	2	-	5
LOADING GRAPHS AND C.G. ENVELOPE	2	-	6
SAMPLE PROBLEM	2	_	10

SECTION 4 FIELD ASSEMBLY / PREFLIC	НТ		
FIELD ASSY	4		2
PREFLIGHT CHECKLIST	4	_	13
STARTING PROCEDURE	4	_	20
SECTION 5 MAINTENANCE			
General  General  Maintenance schedule	5		
AIRFRAME:  General  General  Maintenance schedule	5 5	<u>-</u>	5 8

## 維護計畫

### MAINTENANCE

### AIRFRAME SCHEDULE

2 yrs or 25hr. | 50hr. | 75hr. | 100hr. | 125hr | 150hr | 175hr | 200hr | 225hr | 250hr | 275hr | 300hr | 325hr | 350hr | 375hr | 400 hrs Component Root Tube All Spars Compression Struts 2 Diagonal Struts \*Tri Bar Down Tubes 3 \*Trl Bar Cross Tube 'Seat Mount ·Seat \*Seat Support Tube 2 \*King Post \*King Post Fittings

### Legend:

- Oil lube service
- Remove (if necessary for inspection), inspect & replace if necessary
- Recommended replacement or overhau!
- Check bolt or nut tension.
- \*Should be inspected closely after any hard landing.
- \*Check shaft for smooth free spinning of bearings.
- ‡ Punch test every 2 months with fabric tester (Kit #60100)

### Note:

When maintenance is performed, check appropriate square and make log book entry.

## 彈射傘(Ballistic Recovery System, BRS)

MTOW including BRS ..... 472,5 kg

Empty weight

265 kg in basic configuration with engine Rotax 912 without BRS.

286 kg in basic configuration with engine Rotax 912 with BRS.





## RESCUE BALLISTIC PARACHUTE



使用期限6年

### BRS™-6 System Parameters

All BRS-6 models are designed to produce an approximate sea-level descent rate of 21 ft/sec (6.4 m/sec) and an approximate 5,000 ft (1,500 m) density altitude descent rate of 25 ft/sec (7.6 m/sec), at maximum gross takeoff weight.

SYSTEM	600	800	1050 ASTM	1050 DAeC	1350	1350HS	1600	1800
Maximum aircraft	600 lbs	800 lbs	1050 lbs	1050 lbs	1350 lbs	1350 lbs	1600 lbs	1800 lbs
weight	272 kg	363 kg	475 kg	475 kg	612 kg	612 kg	726 kg	816 kg
Maximum deployment speed	138 mph	138 mph	138 mph	172 mph	138 mph	184 mph	138 mph	175 mph
	222 km/h	222 km/h	222 km/h	276 km/h	222 km/h	296 km/h	222 km/h	282 km/h
Canister Weight (1)	22 lbs 10.0 kg	23 lbs 10.4 kg	28 lbs 12.7 kg	28 lbs 12.7 kg	N/A	N/A	N/A	N/A

## Max Aircraft Weight 最大可負荷載具重量 Max Deployment Speed 最大可開傘速度

## FAA 51% 套裝元件(Kit)

- 美國聯邦航空總署:業餘自製載具清單 (Amateur-Built Aircraft Kits)
- http://www.faa.gov/aircraft/gen\_av/ultralig hts/amateur\_built/kits/

ICP North American LLC

410 E. Chestnut Archer City, TX 76351 SAVANNAH "S"

Builder Manual, Version I/R, 10/11/11 Parts List, Version I/R, 10/11/11 06/12/12

Imported from I.C.P. srl, S.P.16 km 15.15, 14022 Castelnuovo Don Bosco (AT), Italia. Previously listed under "Skykits"

Quic	ksi	lver	Inc.
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42214 Sarah Way Temecula, CA 92590 Quicksilver MX II

Parts List dated 03/04/82

Quicksilver MX Super

Parts List dated 01/05/84

Quicksilver MXL II

Parts List dated 06/28/84

Quicksilver - Sport 2S

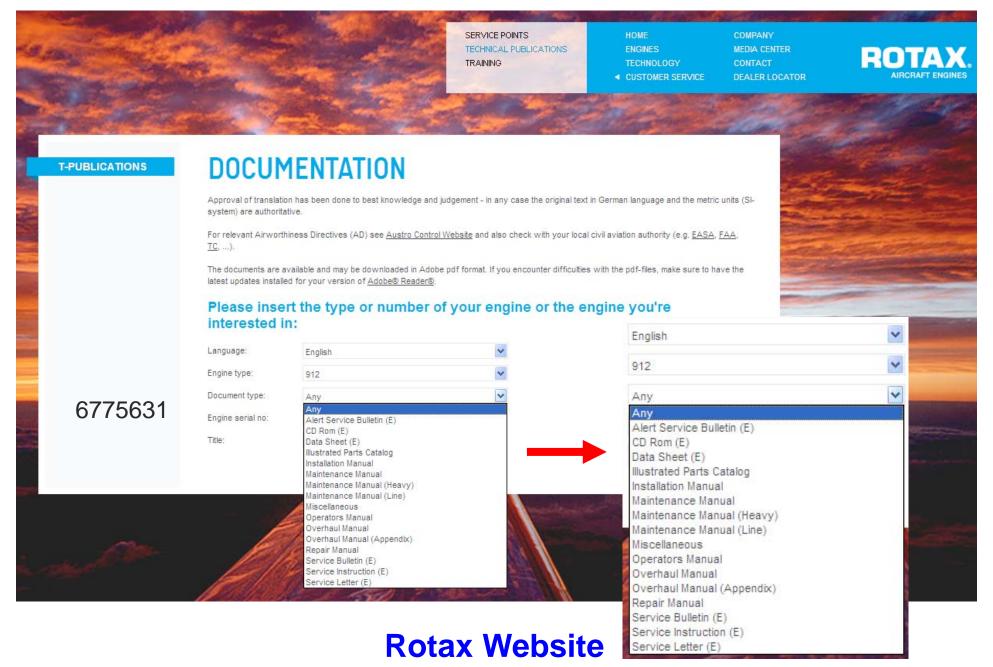
Packing Lists:

99350, Rev "-" Airframe Kit 98025, Rev "C" Engine Kit 05/19/82

01/30/85

01/30/85

09/30/2012



http://www.flyrotax.com/customer-serviceImpressum/technical-publications.aspx

## Rotax 912引擎 - 緊急技術通報



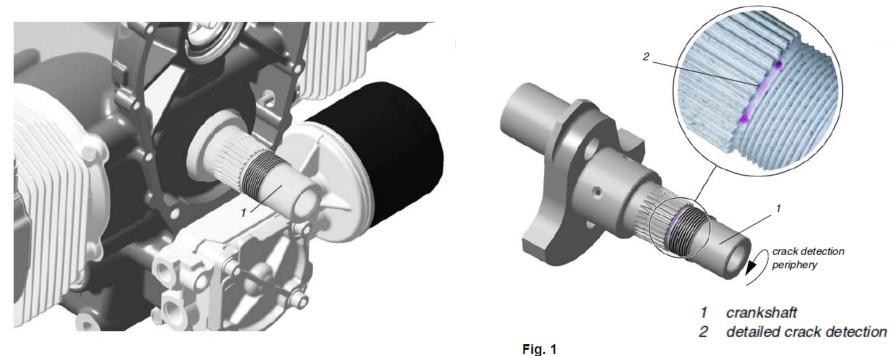
### ALERT SERVICE BULLETIN

CHECKING OF THE CRANKSHAFT JOURNAL (POWER TAKE OFF SIDE)
FOR ROTAX® ENGINE TYPE 912 AND 914 (SERIES)

ASB-912-059UL ASB-914-042UL

**MANDATORY** 

## Rotax 912引擎 - 緊急技術通報(續)



### 1.3) Reason

crankshaft journal

Due to a deviation in the manufacturing process some <u>crankshafts</u> may have a <u>crack</u> formation occur on the power take off side. These cracks can cause a breakage of the crankshaft support bearing and may lead to engine stoppage.

### 1.4) Subject

Check of the crankshaft journal (power take off side) for ROTAX® engine type 912 and 914 (Series).

## Rotax 912引擎 - 緊急技術通報(續)

#### 1.1) Engines affected

All versions of the engine type:

- 912 UL

- 912 ULS

from S/N 6,770.159 up to S/N 6,770.176 inclusive/6,770.184

from S/N 6,777.492 up to S/N 6,777.505 inclusive/6,777.526/6,777.528 up to

6,777.542 inclusive/6,777.544 up to 6,777.547 inclusive/6,777.563 up to 6,777.569/

6,777.576 up to 6,777.594 inclusive/6,777.596/6,777.609/6,777.610/6,777.624 up to

6,777.628 inclusive/6,777.630/6,777.631/6,777.634 up to 6,777.642 inclusive/

6,777.667/6,777.668/6,777.686/6,777.688 up to 6,777.690 inclusive

- 912 ULSFR

- 914 UL

S/N 6,777.514/6,777.527

from S/N 6,774.151 up to S/N 6,774.160 inclusive/6,774.165/6,774.166/6,774.168 up

to 6,774.171 inclusive/6,774.176 up to 6,774.193 inclusive/6,774.199 up to 6,774.213

inclusive/6,774.220

♦ NOTE:

Crankshafts with the following serial number (S/N) that were installed in the above-mentioned engines are also affected, if removed:

S/N 40233 up to 40235 inclusive/40237/40239/40240/40243/40244/40246/40247/40249 up to 40255 inclusive/40258/40260 up to 40263 inclusive/40266/40293 up to 40299 inclusive/40301/40304 up to 40309 inclusice/40311 up to 40328 inclusive/40330 up to 40336 inclusive/40338 up to 40348 inclusive/40350 up to 40357 inclusive/40360/40362 up to 40372 inclusive/40374/40408 up to 40421inclusive/40425/40427/40431/40433/40437/40448/40449/40451/40452/40454/40457 up to 40460 inclusive/40465/40467/40468/40470 up to 40476 inclusive/40481 up to 40485 inclusive/40487/40489 up to 40506 inclusive

## Rotax 912引擎 - 緊急技術通報(續)

#### 1.1) Engines affected

All versions of the engine type:

- 912 A
- 912 F
- 912 S
- 914 F

from S/N 4,410.884 up to S/N 4,410.887 inclusive from S/N 4,412.984 up to S/N 4,412.985 inclusive

from S/N 4,924.044 up to S/N 4,924.054 inclusive/4,924.056/4,924.058/4,924.064 up to 4,924.077 inclusive/4,924.081 up to 4,924.084 inclusive/4,924.086

from S/N 4,420.965 up to S/N 4,420.970 inclusive/4,420.972 up to 4,420.978 inclusive

(不適用超輕)



This Service Bulletin is valid until SB-912-067UL/SB-914-048UL (latest issue) has been complied with.

### **SERVICE BULLETIN**

# Periodic inspection of the float buoyancy for ROTAX<sub>®</sub> Engine Type 912 and 914 (Series)

ATA System: 73-00-00 Fuel system

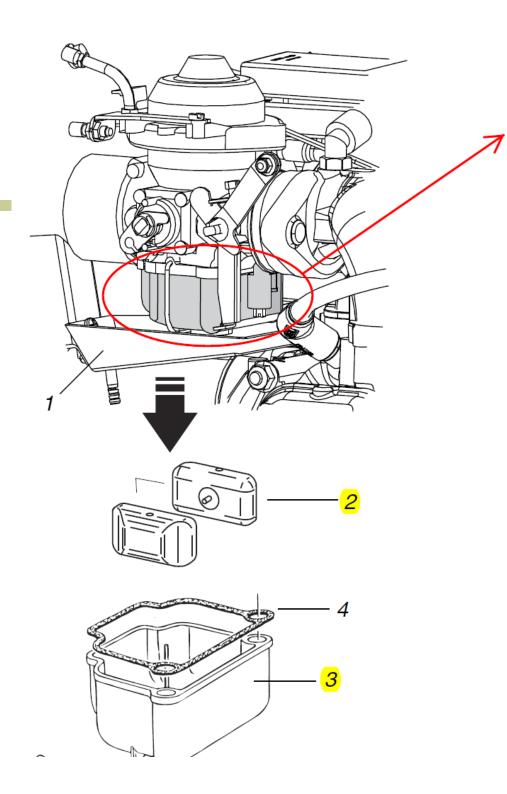
### **MANDATORY**

### 1.1) Applicability

All engines of Series 912 UL, 912 ULS and 914 UL are affected, if at least one of following criteria applies:

### Criterion A) Engine Serial number:

Engine type	Serial number
912 UL	from S/N 6 770 733 up to S/N 6 771 484 inclusive
912 ULS	from S/N 6 780 228 up to S/N 6 783 917 inclusive
914 UL	from S/N 7 682 154 up to S/N 7 683 662 inclusive



- 1 Drip tray
- 2 Floats
- 3 Float chamber
- 4 Gasket
- 5 Spring clip
- 6 Attachment screw
- 7 O-ring

#### 1.3) Reason

Due to a deviation in the manufacturing process some floats could absorb more fuel thus having more weight. This leads to a loss of float buoyancy and wrong regulation of the fuel in the float chamber. Possible effects may be a rough engine running, especially at low speeds and under circumstances loss of performance and/or fuel leakage in the area of the carburetor.

### 1.5) Compliance

NOTE: The installation of new floats as per SB-912-067/SB-914-048

"Exchange of floats" (latest issue) supersedes and cancels the requirement to comply with SB-912-065/SB-914-046 (latest issue).

Before the first installation in the aircraft and/or the initial start-up.

Carry out this inspection of float buoyancy of the engines listed in section 1.1., according to the instructions in section 3 at the next BRP maintenance event or within the next 25 hours of operation, but at the latest after 60 days (from the date of the initial issue of this Service Bulletin).

- Carry out this inspection of float buoyancy of the engines listed in section 1.1., according to the instructions in section 3 periodically after each 25 hours of operation, but at the latest after 60 days.
- At rough engine running, especially at low engine speeds (crankshaft speed to 4000 rpm), fuel odor or fuel leakage carry out this inspection before the next flight. The cause (may also be independent of the float) has to be fixed before the next flight.

## EASA適航指令

### **EASA**

### **EMERGENCY AIRWORTHINESS DIRECTIVE**



AD No.: 2011-0224-E

Date: 24 November 2011

Note: This Emergency Airworthiness Directive (AD) is issued by EASA, acting in accordance with Regulation (EC) No 216/2008 on behalf of the European Community, its Member States and of the European third countries that participate in the activities of EASA under Article 66 of that Regulation.

This AD is issued in accordance with EC 1702/2003, Part 21A.3B. In accordance with EC 2042/2003 Annex I, Part M.A.301, the continuing airworthiness of an aircraft shall be ensured by accomplishing any applicable ADs. Consequently, no person may operate an aircraft to which an AD applies, except in accordance with the requirements of that AD, unless otherwise specified by the Agency [EC 2042/2003 Annex I, Part M.A.303] or agreed with the Authority of the State of Registry [EC 216/2008, Article 14(4) exemption].

### Type Approval Holder's Name:

BRP-Powertrain GmbH & Co. KG

### Type/Model designation(s):

Rotax 912 and 914 series engines

TCDS Numbers: EASA.E.121, EASA.E.122

Foreign AD: Not applicable

Supersedure: This AD supersedes EASA Emergency AD 2011-0222-E dated 15 November 2011.

## EASA適航指令(續)

ATA 72	Engine – Crankshaft – Inspection		
Manufacturer(s):	BRP-Powertrain GmbH & Co. KG, BRP-Rotax GmbH & Co. KG; Bombardier- Rotax GmbH & Co. KG; Bombardier-Rotax GmbH		
Applicability:	Rotax 912 A1, 912 A2, 912 A3 and 912 A4 engines, all serial numbers (s/n).  Rotax 912 F2, 912 F3 and 912 F4 engines, all s/n.  Rotax 912 S2, 912 S3 and 912 S4 engines, all s/n.  Rotax 914 F2, 914 F3 and 914 F4 engines, all s/n.		

issue dated 15 November 2011.
The use of later approved revisions of this document is acceptable for compliance with the requirements of this AD.

## 製造廠安全通告

# Zenair Europe

## Airworthiness Directive



This Directive is issued by Zenair SARL (Europe) on behalf of Zenair Ltd, owner of CH type certificates

A.D. Number:	ZE-2008-01
Date of issue:	October 28, 2008
Subject:	Verification and adjustment of control cables for adequate tension.
Affected Models:	All Zenair Zodiac CH 601XL (ULM and Homebuilt Models)
Serial Number(s)	All
Manufactured by:	Czech Aircraft Works (CZAW) and others.
Purpose:	Under certain conditions, loose control cables can lead to flutter of control surfaces in some types of aircraft; Flutter has been experienced in the Zodiac CH 601 XL aircraft as reported by two pilots. The actions outlined in this directive are to eliminate the possibility of flutter in this aircraft design when the aircraft is flown within its design parameters.

## 製造廠安全通告(續)

	a) Inspect all control cables and adjust as necessary so that they are within the following parameters:
	Rudder cable tension should be 22 lbs +/- 5 lbs Aileron cable tension should be 30 lbs +/- 5 lbs Elevator cable tension should be 40 lbs +/- 5 lbs
Directed Action(s):	b) Inspect both ailerons for any type of deformation of the skins at the piano hinge and root rib area. Contact Zenair immediately if anything unusual is found.
	c) Inspect the rear spar attachment area at the wing root. Look for deformation, loose rivets, etc. and contact Zenair immediately if anything unusual is found.
Effective date:	Immediately.
Compliance:	Mandatory. Before the next flight and every 50 hours thereafter.
References:	<ul> <li>Designer's letter of summer 2008 posted on <u>Zenair News</u>;</li> <li>AMD Service Letter for Zodiac XL S-LSA – <u>August 11, 2008</u></li> </ul>

## 國外民航局適航指令



### Civil Aviation Authority Netherlands Emergency Airworthiness Directive

#### Caution

This Airworthiness Directive is issued by the Minister of Transport, Public Works and Water Management in accordance with the Aviation Act 2001 (Wet Luchtvaart), Article 3.22. Airworthiness Directives affect aviation safety. These are regulations which require immediate attention. No person may operate an aircraft to which an Airworthiness Directive applies, except in accordance with the requirements thereof, unless otherwise agreed with the Authority of the State of Registry (EC2042/2003, M.A.201 & M.A.303).

Nr. NL-2008-003

Date: 24 October 2008

Type Certificate Holder: Zenair Ltd.

#### THIS AIRWORTHINESS DIRECTIVE IS PUBLISHED BY THE CAA-NL:

· acting as Airworthiness Authority (ICAO Annex 8) as the State of Registry for the affected product(s)

## 國外民航局適航指令(續)

Supersedure:	Not applicable
Subject:	ZODIAC CH 601 XL (MICROLIGHTS OR HOMEBUILT AIRCRAFT) - GROUNDING
Applicability:	All Zodiac CH 601 XL (Micro Light or Homebuilt Aircraft)
Reason:	On the 14th of September 2008 a fatal accident occurred with a Micro Light Aircraft, Type Zodiac CH 601 XL. There are indications that break-up of the wing structure was the cause of the accident. Based on the preliminary findings of the accident investigation of the Dutch Safety Board, the Civil Aviation Authority of the Netherlands declares the aircraft not airworthy until further notice.
Effective date:	24 October 2008
Mandatory Actions and Compliance Times:	From the effective date of this AD, the aircraft is grounded and shall not be flown until appropriate action has been agreed in order to return the aircraft to airworthiness.
Reference Publication(s):	None

# 常見檢查缺失



### **6.2 WEIGHING CONDITIONS**

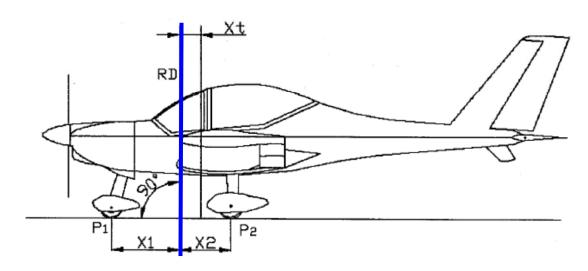
For the weighing of the aircraft, the followings conditions apply:

- The equipment installed must be approved by the factory for the aircraft in question.
- Must be included the brake fluid, engine oil, water coolant and the non-usable fuel.
- Must use three independent scales for each tire horizontal plan and of a thread to lead.
- To determinate the empty weight and the position of the Center of Gravity, the aircraft must be positioned on three autonomous scales, one for each wheel. It is fundamental that the longitudinal and lateral axes of the aircraft are both in the same horizontal plane. You can verify the horizontal datum position when the fuselage side





Using a plum bob mark a line on the ground directly beneath the leading edge of the wing. This point is your reference datum RD. Measurements are to be taken from this point.



X1 is the distance from nose wheel axle centerline to projection of RD. X2 is the distance from main wheel axle centerline to projection of RD. The standard distance is:

 $X1 = 925mm (\pm 0.5\%)$ 

 $X2 = 655mm (\pm 0.5\%).$ 

The formula for CG calculation is as follows:

Xt = ML / PT . [CofG position in mm on the wing chord]

Where:

**PT=P1+P2** 

ML = (P2DX + P2SX) x X2 - P1 x X1

Xt% = (Xt / MAC) x 100 [CG position in percentage to the wing chord]

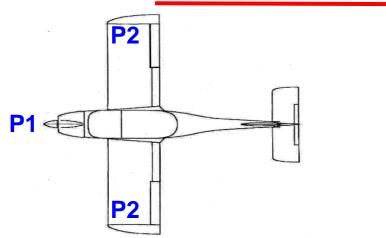
ML = Empty weight moment

P2DX, P2SX = Weight measured on main wheel

P1 = Weight measured on nose wheel

**NOTE:** DX = RHS SX = LHS

For greater W&B detail refer to the maintenance manual.



#### **4.3 CENTER OF GRAVITY LIMITATIONS**

Forward Limit: 377 mm behind the reference datum (27% MAC)

Aft Limit: 504 mm behind the reference datum (36% MAC)

The longitudinal location of the Centre of Gravity (CG) is measured as the distance behind a reference datum (RD).

The reference datum is defined as the vertical plane of the leading edge of the wing, when the airplane is level.

The mean Aerodynamic Chord (MAC) is the average chord of a wing, for this airplane it is 1400 mm.

The 0% of the MAC is the reference datum (RD).

The location of the CG can be defined by reference to the % MAC.

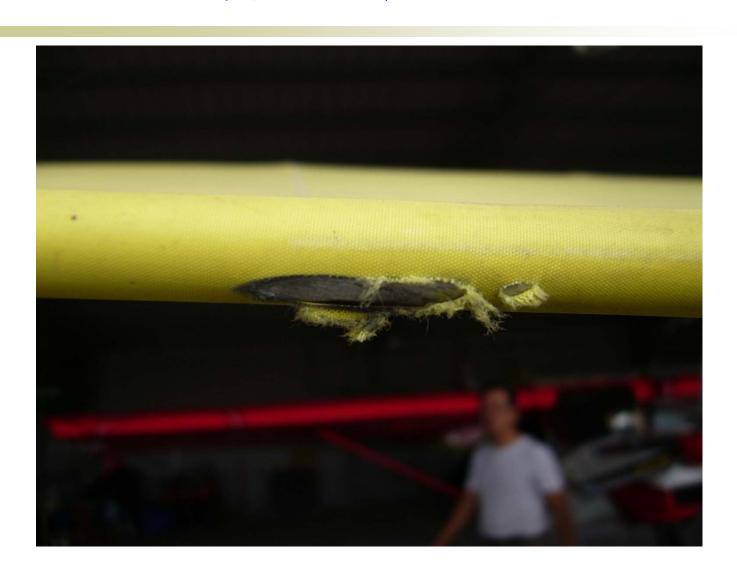
## 鋼繩脫毛



## 接合螺栓銹蝕



## 翼面帆布破損



### 機翼固定螺絲安裝反向



## 未用原材質修補翼面帆布



### 未有燃油種類標示



### 搭接螺栓未施塗Torque Seal

改正後情形



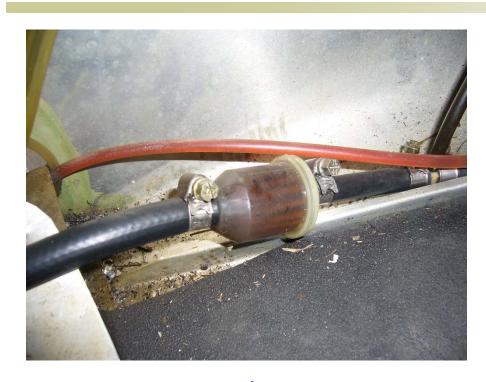




## 搭接螺栓出牙不足



# 油濾不良



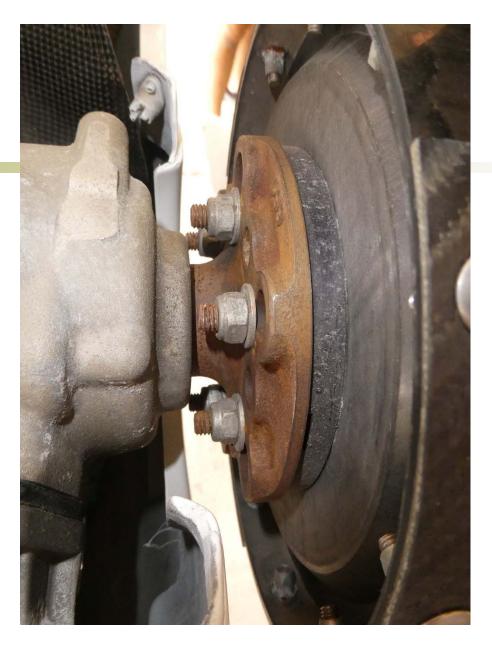
不良

### OK





機翼快拆插銷銹蝕



螺旋槳傳動軸盤銹蝕

### 儀表板未有操作限制標示



未標示

#### OK



#### AIRSPEED INDICATOR

#### MARKING

#### SIGNIFICANCE

Green Area

Normal operating range.

Lower limit: Vs (stall)

Upper limit: Vno (max structural cruising)

Speeds: 33-64

Yellow Area

Caution range.

Lower limit: Vno (max structural cruising)

Upper limit: Vne (never exceed)

Speeds: 64-75

Operations must be conducted with

caution and only in smooth air.

Red Line

Maximum speed.

Vne (never exceed)

Speed: 75

Do not exceed this speed

under any circumstances.

# 未有符合載具構型之手冊

- 若載具之原廠超輕型載具規範、組裝或 維護手冊,未有符合載具構型之手冊。
- 未具備適用之飛航手冊及組裝或維護手冊,後續應持續向原廠洽詢取得,或可依07-03A第八條規定,按照「民航通告AC90-001A超輕型載具飛行測試程序」編製飛航手冊。

## 超輕管理辦法 第十六條

所有人或操作人應依其超輕型載具之組裝或維護手冊,執行及簽署各項檢查與維護紀錄;年度或飛航時間一百小時以上之定期維護檢查,應由活動團體之授權檢驗人員執行及簽署並記錄,以符合安全飛航條件。