

# Pegasus Sport Aviation Ltd.

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CAA approval ref: DAI/9970/19

BCAR A8-1 & A8-9 (F1)

ref: SB158 slack pull-back cable

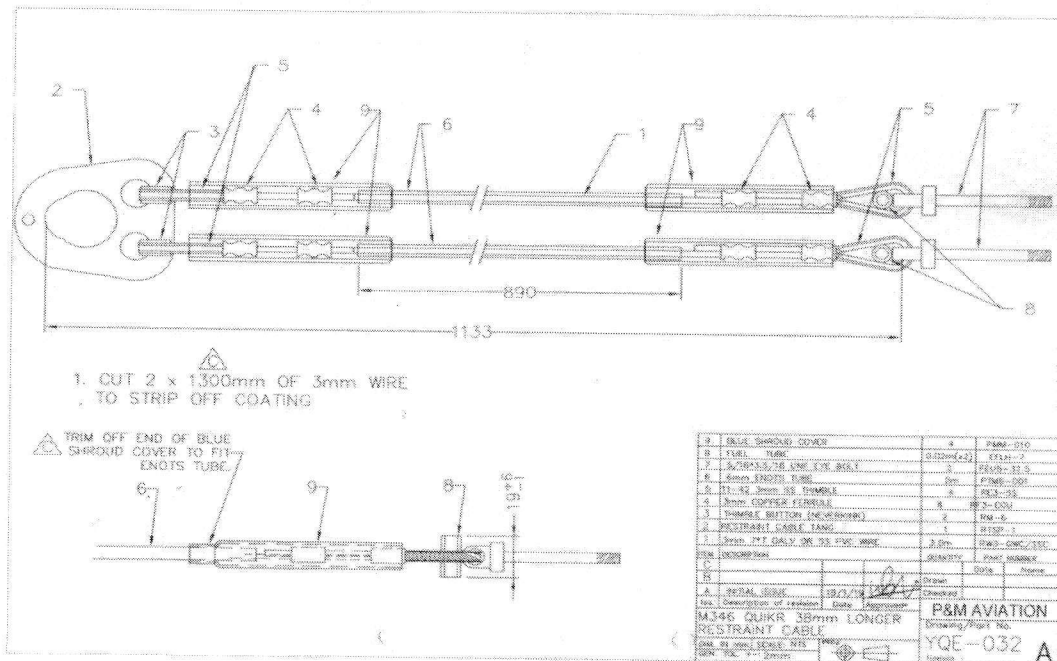
## SERVICE BULLETIN NUMBER 158

Issue 1.

- TITLE** Cross boom pull-back cable length and roll stability.
- CLASSIFICATION** PSA ltd have classified this bulletin as compulsory.
- COMPLIANCE** For wings fitted with the slack cross boom restraint cable modification 315 or 346 which are more than 2 years old or more than 100 hours flight time ( whichever comes first), a flight test as detailed below must be performed within the next 5 hours.
- APPLICABILITY** QuikR,(TADS BM77), Quik GTR(TADS BM80), PulsR(TADS BM81), Hyper GTR(TADS BM87) when fitted with the slack cross boom restraint cable modification M315 or 346.

### 1 INTRODUCTION

A slacker crossboom pull-back cable part YQE-032 is available for the QuikR and is 1133mm long. A slacker crossboom pull-back cable part YQF-032 is available for the GTR and is 1060 mm long. These slacker cables are approved P&M modifications no's 346 (QuikR) and 315 (GTR). They were introduced to improve roll response especially at low speeds.



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A QuikR wing, fitted with the slacker pull-back cable and no winglets showed an unacceptable reduction in directional stability with associated out of trim rolling at high speed on a Permit to Fly revalidation check flight. This particular wing is several years old with 400 hours airtime. It had been kept rigged under tension for most of its life and so the sail had stretched from new. It was found that on pulling in the control bar above 90mph under power, a right yaw and associated left roll would develop. At speeds above 95mph it became difficult to correct by weight shift in roll alone. However, as soon as the angle of attack was increased by pushing out a little on the bar, control was restored.

The yaw is caused by P factor with the 912/912S engine, which causes a roll in the opposite direction when the slackened sail undersurface inflates more on one wing than the other. Because the directional stability of a swept wing reduces at low angle of attack, the effect is much worse at high speed.

Another QuikR with a new sail was tested, also fitted with the slack cable and no winglets. Under identical conditions, the directional stability was found satisfactory with no out of trim rolling.

Both these wings are fitted with undersurface vents which reduce the yaw/roll tendency, however not sufficiently when coupled with a stretched sail, high speed and a slack pull-back cable. Some tendency to yaw right and turn left under power at the top of the speed range is common with the Rotax 912S engine especially, due to the greater power and torque. It should be possible to tune this out using not more than 20mm of reflex on the LEFT wing tip 4 battens as described in the operator's manual.

It is also possible to compensate for some yaw and to trim the aircraft using the nosewheel; full left steering generates some left yaw. In smooth conditions with a well tuned wing it should be possible to turn slowly left or right by using the yaw effect of the nosewheel steering. Note this works in the "three axis" control sense in the air, push right = steer left = yaw left = roll right.

## 2 CHECK FLIGHT

The following should be carried out by a suitably qualified and experienced flexwing pilot ( 25+ hours on any of the Quik range) in appropriate weather conditions. Flight limitations with respect to loading, attitudes and speeds must be adhered to. Do not exceed Vne 120mph. Ensure helmets are secure and that visors are locked. The check flight should be carried out solo initially then within 20kg of maximum all up weight.

Firstly, the wing must be checked to be flying as straight as possible hands-off using the methods published in the operator's manual (which can be downloaded from the P&M Aviation website). Check the fast ( trimmer slack ) hands-off trim speed does not exceed the handbook limits.

If the hands-off trim speed with the trimmer set fast is above the limits, the wing must be slowed down by increasing washout (rotating tips up ) or by reducing tip batten camber as per the operator's handbook. Where fitted, the wing root trailing edge cables can also increase trim speed by pulling the trailing edge down.

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In level flight, progressively increase airspeed by pulling the control bar in to 105mph (QuikR) or 100mph (GTR). Bar pressure must increase as it is pulled even with the trimmer fully slack – if not, the washout and/or batten profiles are not correct. It should be possible to fly with the bar fully into the chest without an unacceptable yaw or roll developing.

Should a bad roll develop, reducing airspeed below 80mph by pushing out slightly will enable roll control to be regained.

## 2.1 Pass/fail criterion

If the roll at high speed is uncomfortable or cannot be corrected by weight shift in the roll axis alone, then the wing will need to be made more directionally stable before flying again.

## 3 ACTION

Any or all the following measures can be used to improve directional stability at speed:

- 1) Fit the approved winglets with the slack pull-back cable (this has been found to be a very pleasant combination to fly).
- 2) Install the original length shorter pull-back cable.
- 3) If the above 2 measures are insufficient, where fitted, remove the root trailing edge cables, as these reduce roll stability by differential tension applied to the trailing edge in rolling manoeuvres. If they are too tight, they can also increase trim speed by pulling the trailing edge down. For check flying only, they can be disconnected from the sail and securely taped to the lower rear cables. If removal is found beneficial, these cables must be removed permanently. A duplicate inspection of the rear cable rocker assembly will be required on reassembly. Spacer washers will be required to take the place of the removed cables – contact PSA Ltd. All 3 rocker bolts should be tightened to 8-10NM and new nyloc nuts used.

If all 3 are done together, there will be increased stability at high speed but heavier roll control at low speed. It is recommended to make one change at a time and keep notes.

The aircraft must be check flown after these changes. It must be possible to fly with no significant roll with the trimmer fully fast and the bar to the chest.

### 3.1 Fitting a new pull-back cable

If it is necessary to change the pull-back cable then it must be exchanged with a genuine PSA Ltd part, the length checked and then installed. It is possible to do this with the trike folded so that the wing rests level on the control frame; once the pull-back cables are released it is possible to change them in situ.

As a primary structural part, the wing must NOT be flown until the new cable assembly has been inspected and signed off in the logbook by a qualified person. It should not be twisted and the castle nuts must be locked with split pins.

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## 4 Documentation


An entry must be made in the aircraft logbook "check flown in accordance with SB 158" and a note as to whether it was satisfactory or not and a note of tuning adjustments and modifications made. Adjustments to the battens must be marked on the batten plan, dated and kept as part of the aircraft records.  
Replacement of pull-back cables must be signed off in the aircraft logbook by a qualified person.

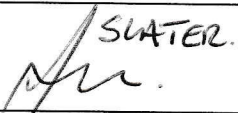
## 5 Continued Airworthiness

The aircraft should be check flown annually at each Permit revalidation including a check on high speed yaw/roll tendencies as described above.

**ISSUED BY**      **W.G.Brooks**

**DATE**

Approved		Date 26/05/21
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