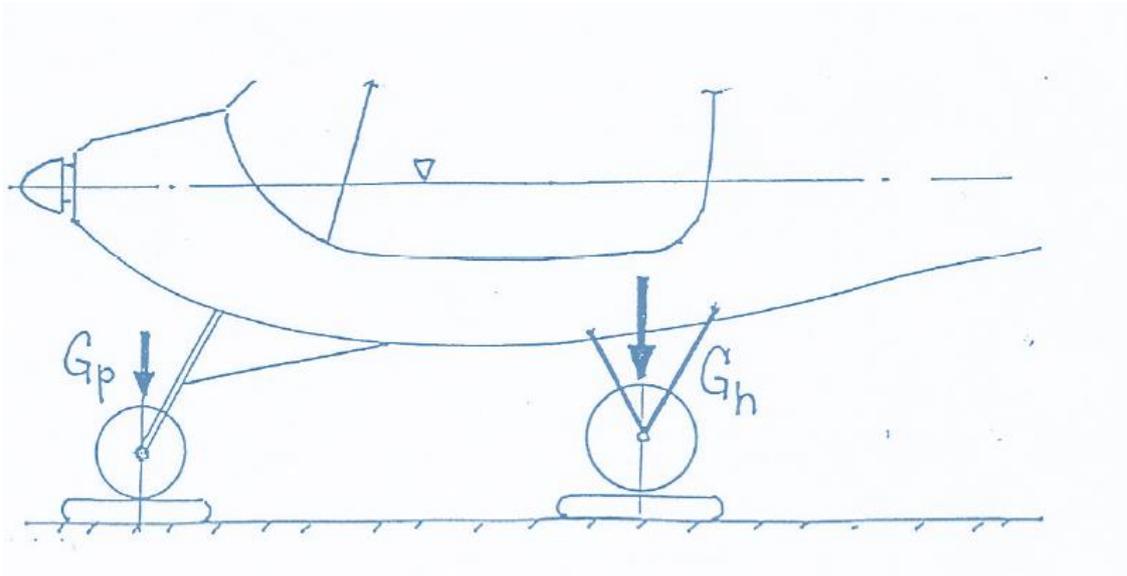# Weight and balance

JORA Build Number: _____ Aircraft registration number: _____   Date: ___/___ - _____

Content:

Procedure for weighing and calculating the centre of gravity on the Jora ULA

- Set the aircraft on three scales, each able to measure minimum 130 kg, each for one wheel.
- In order to get correct weights for points **Gp** and **Gh**:
    - Ensure the aircraft to be in absolute horizontal level using a spirit level on the floor.
    - A correct sideways level between the rear main wheels is also necessary.
    - Adjust by adding height under each scale if necessary.
- The two weights measured on each scale under the rear wheels is added as one sum **Gh**.

Weight and balance sheet:

- Arm - the horizontal distance from the reference datum of the Jora (prop mount).
- Centre of Gravity - the point the Jora would balance if suspended from that point.
- Moment - the product of the weight of an item multiplied by its arm.

Weight position	Weight	Arm in cm	Moment
Nose wheel		25	
Main wheels		166	
Pilot		161	
Co-pilot		161	
Fuel		120	
Baggage		210	
Total			
		CG:	

Weights measures for the wheels must be done with empty aircraft with little fuel.

CG: total moment divided by total weight.

Petrol weight is 0.73722 kg per litre.

According to JAA regulations the pilot and co-pilot is per definition 150 kg.

Max CG front: 140 cm

Max CG aft: 152 cm

Example of a Jora ULA with a Rotax 582, belly radiator max loaded:

Weight position	Weight	Arm in cm	Moment
Nose wheel	36	25	900
Main wheels	209	166	34694
Pilot	75	161	12075
Co-pilot	75	161	12075
Fuel	29	120	3480
Baggage	26	210	5460
Total	450		68264
		CG: 68264 / 450	151,7

Example of a Jora ULA with a Rotax 582, belly radiator empty:

Weight position	Weight	Arm in cm	Moment
Nose wheel	36	25	900
Main wheels	209	166	34694
Pilot		161	
Co-pilot		161	
Fuel		120	
Baggage		210	
Total	245		35594
		CG: 35594 / 245	145,2

Calculating the centre of gravity
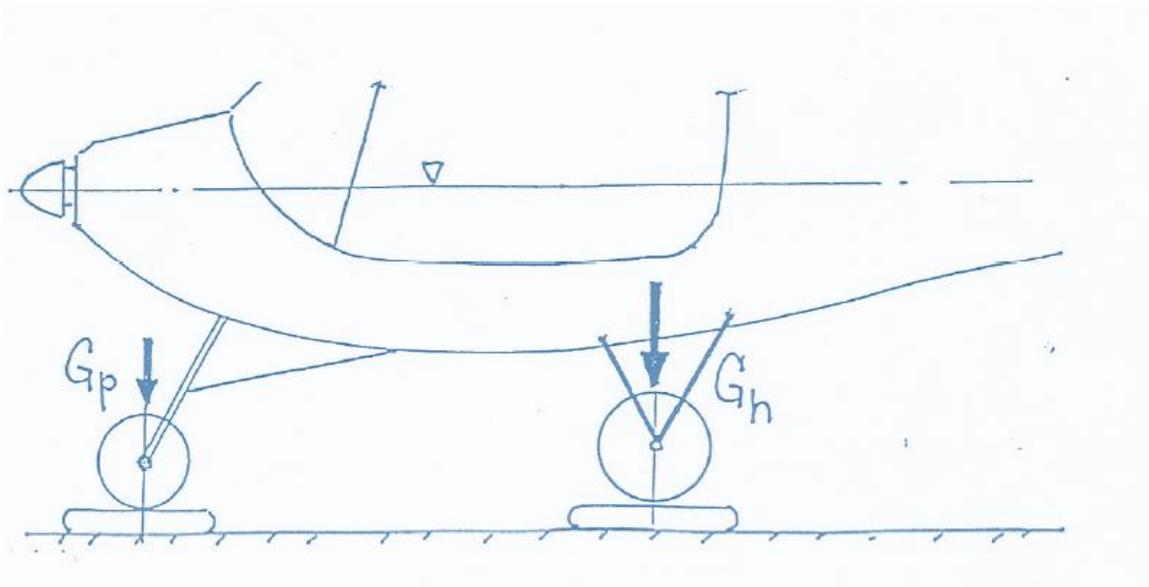
- Set the aircraft on three scales, each able to measure minimum 130 kg, each for one wheel.
- In order to get correct weights for points **Gp** and **Gh**:
  - Ensure the aircraft to be in absolute horizontal level using a spirit level on the floor.
  - A correct sideways level between the rear main wheels is also necessary.
  - Adjust by adding height under each scale if necessary.
- The two weights measured on each scale under the rear wheels is added as one sum **Gh**.
- Measure the distance between the **axle** of the main gear and the front wheel axle in millimetre as measure **Lp**.
- Measure with the help of a plumb-bob the distance from the wing leading edge to the **axle** of the main undercarriage in millimetre as measure **La**.

Lt = $\dfrac{\textbf{Gp x Lp}}{\textbf{G}}$ Distance from the CG of the aircraft to the main undercarriage axle in millimetre.

Xt = La - Lt   This distance is expressed in percentage by **MAC**, (mean aerodynamic chord), and is

$$\textbf{xt} = \textbf{Xt} / \textbf{bsat} * 100 = \textbf{Xt} / 12$$

Measure values	Max and minimums
MAC = mm Gp = kg Gh = kg G = kg Lp = mm Lt = mm Xt = mm X% = %	The centre of gravity according to the documentation can be between 30% and 40% from MAC. Max and minimum span for the centre of gravity from the wing leading edge: - Front max: 360 mm. - Aft max: 520 mm.