

***MODEL AERONAUTICAL ASSOCIATION  
of AUSTRALIA Inc.***



**AUSTRALIAN OFFICIAL RULES**

**Section 4 - RC Australian Pylon Rules**

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5.1. **AUSTRALIAN PYLON RULES:**

5.1.1. **SAFETY & GENERAL PYLON RULES:**

**1. Safety Headgear:**

All officials on the racecourse and all competitors must wear a crash helmet with a chinstrap.

**2. Model Aircraft Airworthiness:**

The Contest Director has the right to request any competitor to make a flight to demonstrate the airworthiness of his model aircraft and/or ability to fly the aeroplane around the course. If during the race, the Contest Director considers any model aircraft to be flying erratically, dangerously, or so low as to endanger Course Officials, he may disqualify the competitor from that heat or from all heats and requires the model aircraft to be landed as soon as practicable. Persistent flying below the top of the pylons may be considered dangerous.

**3. Racecourse Safety:**

The racecourse specification may be modified in the interest of safety or to suit field conditions if safety is not compromised.

**4. Builder of the Model Aircraft**

This is not applicable to Australian Pylon Classes.

**5. Ballast**

If used to balance the Model Aircraft - it must be permanently and safely affixed.

**6. Fuel**

The organisers will supply fuel to a standard formula for glow plug and spark ignition motors. Its composition shall be 80% methanol, 20% castor oil – unless it is specified otherwise, in the Pylon Class Rules.

**7. Jettisoning**

The loss of any part of the model aircraft after the starting signal (flag drop or light signal) and before the engine stops disqualifies the model aircraft for that flight, except as a result of a collision - if a re-run condition applies.

**8. Engine Shutdown:**

The engine must be able to be stopped within 5 seconds of a starter's instruction to do so. (In Half A the requirement is within 20 seconds). If this is not done that heat score of the competitor is recorded as 200 points.

**9. Aircraft Collisions:**

After the starting signal (flag drop or light signal) is given, any contact between model aircraft shall be considered a collision and the model aircraft involved must land as soon as it is safe to do so. The Contest Director is required to give such competitors a second opportunity to record a score in that round. Provided that in his opinion the aircraft is still airworthy or the competitor has an airworthy reserve model aircraft. The Competitor will not be awarded a re-run if the collision occurred after the 10 laps have been completed and the competitor has received an official score.

### **10. Timing Malfunction**

In the event of an official's error, or a malfunction of the timing, lap counting, signalling or other such equipment which is the responsibility of the organisers, the competitor(s) affected by such malfunction shall be granted a re-run of that round.

### **11. Model Aircraft Identification**

The pilot's FAI number must be permanently displayed in a prominent place on the outside of the aircraft. The lettering must be a minimum of 25mm high.

### **12. Landing Gear**

A positive means of steering on the ground shall be provided - Rudder is acceptable. Steering on the ground is not required for Half A class.

The landing gear must be attached in a permanent manner to the Model Aircraft so as to permit normal take off and landings.

### **13. Pylon Construction**

Pylons must be brightly coloured and should have a Minimum Height of 4m and not exceed 5m in Height.

## **5.2. RACE ORGANIZATION: 5.2.1. OPERATION OF THE RACE**

### **1. Flight timers and lap counters:**

Each competitor shall be assigned a timer for each heat. This official will time the competitor's aircraft for the required ten laps. In doing so he will count the laps flown, and signal the completion of the race. He will keep the recorded time on his electronic stopwatch until the time has been entered on the score sheet.

### **2 Caller's Responsibilities:**

The caller is required to launch the Pilot's model aircraft – then direct the Pilot throughout the race – and advise the Pilot when his race is finished

### **3. No. 1 Signallers:**

The number 1 pylon shall have one pylon judge and an official signaller for each competitor in the heat. Each signaller will operate a light of a distinctive colour that is located at #1 pylon.

The signallers will have their lights off as the aircraft reach mid-course between #3 and #1 pylons, or earlier. At the instant the model aircraft draws level with the #1 pylon the signaller will switch his light on.

If a Model Aircraft turns short before reaching the pylon – the No1 signaller will not switch on his light.

The No1 Signallers will award a side line cut to any person who flies behind the No1 Signalling cage. However they will switch on the light only when they are sure that the contestant has completed the full distance to the No1 Pylon.

### **4. Side Line Judge:**

The Side Line Judge will record as an infringement, any over flight of the sideline during or after the race.

The judges for #2 and #3 pylons will record any cut pylon infringements during the race. At the end of each race the Sideline and Pylon Judges will inform the timing official of any infringement by any competitor.

## **5. Race Starter Responsibilities:**

The Race Starter is in charge of each heat; the starter will ensure that all competitors and Race Officials are ready to commence. The starter will arrange for each model aircraft to be identified by one signaler before the start of any heat. A radio operation check from each competitor will be made prior to starting motor(s)/engine(s).

The race starter will notify all competitors when the one minute countdown has commenced, and ensure no engines/motors are started prior to this advice

### **5.2.2 CONDUCT OF THE RACE:**

#### **1. Model Aircraft per Heat:**

A maximum of 4 model aircraft per heat will be allowed.

#### **2. Starting Positions:**

Starting positions in all races will be allocated by the starter - with the #1 position being closest to #2 pylon. Model aircraft will be released from the starting line on the starting signal (flag drop or light signal) at a minimum of one-second intervals with timing commencing at the starting signal for that particular model aircraft.

Starting positions will change after each round –with the pilot moving to the next position on the start line.

#### **3. Heat Format:**

Heats shall be arranged in accordance with the radio frequencies in use to permit simultaneous flights.

#### **4. Starting Rules:**

The race starts at the start-finish line. All take-offs will be ROG, no mechanical device will be used to assist the aircraft, but hand pushing is permitted. (Hand Launch is allowed in Half A).

#### **5. Race Direction:**

All laps are to be flown counter-clockwise with turns to the left.

#### **6. Starting Time Duration:**

After the starter has announced that the one minute count down has commenced, the competitors may start and tune their engines.

After that minute the racing will commence – at flag fall or light signal.

A competitor whose engine is not running at the end of the 1-minute period will be disqualified from the heat. No competitor shall be permitted to take off once the first model aircraft has passed the start/finish line heading from #1 to #2 pylon on the first lap, and no time shall be given him for that heat

#### **7. Duration of Race:**

The race is terminated at the start-finish line after ten 10 laps have been completed. Those who have not completed the ten laps will get a 200 points score – except if they have been granted a re-run.

At the completion of the 10 laps the pilot must immediately remove his aircraft from the course. The pilot shall land his aircraft promptly if instructed by the Starter.

#### **8. Early Release of Model Aircraft:**

A penalty will be incurred if the competitor releases the model aircraft before the drop of the starter's flag or starting signal.

**9. Model Aircraft Obstructing Normal Take Off:**

If another competitor impedes the normal take off of a Model Aircraft. The caller who is about to launch a Model Aircraft can abort his take off if he considers that there is a danger of hitting the Model Aircraft that caused the obstruction. He then must inform the Starter what happened. If the starter agrees that the aborted take off was valid, he will grant that competitor a re-run of that round.

**10. Pilots' Helpers (Callers):**

Each competitor must have one helper (For Safety Reasons) in each race and the helper may release the model aircraft at the start and give the pilot verbal information regarding the flying course of his model aircraft and official signals.

No more than one helper (Caller) is allowed per pilot – with the exception of physically disabled Pilots as Detailed in these rules.

The pilot or caller of one team may act as the caller in other teams. However, more than one team may not use the same aircraft, nor roles be interchanged in a team using the same aircraft.

Any award will be made jointly to team members. (A team entry is only applicable to the "AI" class).

**11. Physically Disabled Pilots:**

An extra helper is permitted to assist where the competitor is physically disabled, for example, paraplegic. This helper is not eligible for a team award nor is he required to pay an entry fee (If Applicable) but is required to be a member of a MAAA affiliated club.

**12. Electronic Pilot Assistance:**

Electronic communication with the pilot is prohibited.

5.2.3. **SCORING**

**1. Timing of Model Aircraft:**

The flight of each model aircraft shall be timed by a lap counter/timekeeper with a timing device measuring to at least 1/100th of a second. Timing shall start when the starting signal is given to the individual competitor. The lap counter/timekeeper stops his timing device after the competitor has completed ten laps.

At the completion of each heat, the elapsed time from the timing devices is recorded on the Competitors Score Sheet.

The pylon and sideline judges will notify the Scorer the aircraft that have infringed. The Scorer will then record the total number of infringements for each competitor on his score sheet.

The score sheets are then processed by a Scorer who will:

- a) If one infringement was incurred, add 1/10th of the flyer's time for ten laps to give the corrected time;
- b) If two or more infringements were incurred, cancel the flight thereby resulting in a 200 point score;
- c) Round the competitor's corrected time to the nearest 1/10th of a second.

**2. Allocation of Points Score:**

Points shall be awarded after each race as follows: The competitor's score is his corrected time in seconds to the first decimal place. If the competitor fails to complete his flight or is disqualified the score shall be 200.

**3. Determination of Event Winner:**

The winner of the event is the competitor who has accumulated the lowest score after the conclusion of all heats. If four or more rounds are flown, each competitor's worst score shall be discarded. If nine or more rounds are flown, each competitor's worst (highest) two scores shall be discarded.

**4. Procedure relating to Event Ties:**

If the time permits and there is no frequency conflict, ties shall be broken by a fly off race. Otherwise, the best single race score shall be considered in resolving a tie.

5.3. **AUSTRALIAN PYLON CLASSES:**

5.3.1. **AUSTRALIA ONE (A1) PYLON RULES (Modified F3D):**

**1. Definition of Australia One (A1) Model aircraft:**

This is a Model Aircraft, which the propulsion energy is provided by a piston type engine. Lift is obtained by aerodynamic forces acting on the supporting surfaces, which except for the control areas must remain, fixed in flight.

The model aircraft must be of conventional design with forward wing and an aft empennage with the general lines of a full size aircraft. Unusual or unconventional features must be justified with three view drawings or photographs of similar features used on full size aircraft.

**2. Motor:**

Motor(s) must be of the reciprocating piston type, with a maximum total swept volume of 6,6 cc. The maximum venturi size is 114 sq mm (equivalent to 12mm diameter).

a) **Shut-off:**

The engine shall be equipped with a positive radio controlled engine shut-off. The pilot must be able to shut off his engine by radio control, on the ground, or in the air.

b) **Silencer:**

The motor(s) shall be fitted with a silencer. Within its length there shall be an expansion chamber of not less than 30 mm diameter and 100 mm length; the exhaust outlet's total area shall not be more than 80 mm<sup>2</sup>. Muffled pipes, as per the FAI noise rules, 5.2.3, are to be used in all selection events for the Australian team for International Championships

c) **Propeller:**

Only fixed propellers may be used. Two-bladed wooden or two or more blade composite resin continuous fibre construction propellers may be used.

d) **Propeller Spinner:**

A rounded nose metal spinner of at least 25 mm diameter must be fitted.

**3. Fuselage**

a) **Cross-section:**

The fuselage shall have a minimum height of 175 mm and a minimum width of 85 mm, the measurements to be of the fuselage body and are to exclude any fins, attachments or spacers. Both minimum dimensions must occur at the same cross-section location. The fuselage at this point will have a minimum cross sectional area of 100 cm<sup>2</sup> excluding fillets and competitors will be required to provide templates to prove this. Fillets are not considered part of the fuselage or lifting surfaces.

b) **Cowls:**

The engine or engines must be enclosed, with the exception of the silencer, cylinder head and controls that must be manipulated during operation of the motor. The cylinder head for this purpose is defined as the top (or outer) 1 centimetre of the motor, excluding ignition plug or compression screw.

c) **Pilot Cockpit:**



A cockpit or canopy profile must be evident and capable of enclosing a pilot's head 50 mm from the chin to the top of the head. The canopy need not be transparent and a pilot need not be fitted.

#### **4. Lifting Surfaces:**

a) **Area of Surfaces:**

Total projected area of the lifting surfaces (wing and horizontal tail combined) shall be a minimum of 34 dm<sup>2</sup>. With a biplane, the smaller of the two wings shall have at least 2/3 of the area of the larger wing. No delta or flying wing type aircraft are allowed

b) **Wing Span:**

Minimum wingspan shall be 1150 mm for a monoplane and 750 mm for the largest wing of a biplane.

c) **Wing Thickness:**

Wing thickness of the root shall be at least 22 mm for a monoplane, and 18 mm for a biplane. On a biplane with different size wings, the smaller wing must be at least 13 mm thick at the root. Wing thickness may decrease in a straight line taper from root to tip as viewed from the leading or trailing edge.

**Note:** Root shall be defined as the innermost wing section, not counting fillets that may be measured without removing wing from fuselage.

On a completely exposed wing, such as on a parasol monoplane or the top wing of most biplanes, the root is that section of the wing that is intersected by a projection of the outline of the fuselage as seen in the top view, ie. the root section would be 50 mm from the centre-line of an exposed wing on a model aircraft with a 100 mm wide fuselage.

#### **5. Weight:**

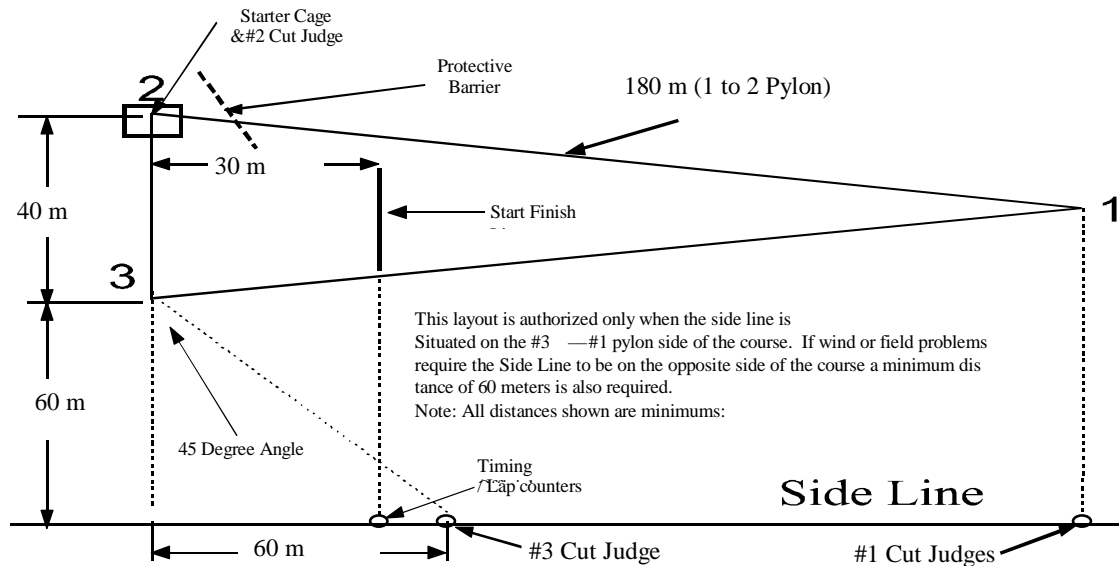
Weight less fuel, but including all equipment necessary for flight shall be at least 2250 g and not more than 3000 g. If ballast is used it must be permanently and safely affixed.

#### **6. Landing Gear:**

The landing gear may have two or three wheel design with the main wheels having a minimum track of 150 mm. The minimum diameter of the main wheels shall be 57 mm and the minimum width of the wheel or wheel spat or wheel pant shall be 12 mm for at least 1/3 of the diameter. A tailskid may be used in lieu of a tail wheel.

## 7. AUSTRALIA ONE (A1) - COURSE LAYOUT:

The triangular course will be laid out as follows. The course is 10 laps with individual length of 400 m. Total distance travelled are 4 km.



The following Australian General Pylon Racing Rules shall apply (Including all Paragraphs contained therein). 5.1 Safety & General Rules and 5.2 Race Organisation unless otherwise stated in the Australia One (A1) Rules above.

## 8. NUMBER OF TRIALS

Each competitor shall have the option of qualifying in up to 3 selection events, (with a minimum of 2 events required).

The 3 selection events should normally be;

- The AMPRA championships
- The Nationals Special trial event to be held first weekend in October to coincided with Queensland Queens birthday weekend
- The State championships in the competitors home state.

If required, alternate event(s) may be nominated by the AMPRA committee.

If a competitor does not attend the state championships in their resident state or such event is not run, they may nominate an alternate state championship event. If doing so, they must notify the AMPRA committee in writing at least 1 week prior to the running of their home state champs if these State Champs are to be conducted and at least one week prior to an alternative State Champs.

5.3.2. **FORMULA 400 PYLON RULES (F400)**

**1. Definition of Radio Control Pylon Racing Model Aircraft:**

A Radio controlled pylon racing Model Aircraft is an aircraft in which the propulsion energy is provided by a piston type engine - the lift is obtained by aerodynamic forces acting on the supporting surfaces which, except for control areas, must remain fixed in flight. The Model Aircraft must be of a semi-scale type and their general lines must be in accordance with those of full-size aircraft. Competitors may be required to justify any unusual or unconventional features of their Model Aircraft design, with documentary evidence of similar full size aircraft.

**2. Engine:**

The engine must be of the reciprocating type, be commercially available and have a maximum swept volume of 6.6 cc. The engine must of front induction – side exhaust configuration.

**3. Shut – Off:**

The engine must be equipped with a positive radio-controlled shut off. The pilot shall be able to shut off his engine by radio control on the ground or in the air.

**4. Tanks:**

Pressurised fuel tanks are permitted. (Viz. Crankcase or muffler pressure)

**5. Silencer:**

The engine shall be fitted with a silencer; within the general length there shall be an expansion chamber not less than 19mm diameter, with a minimum length of 32mm. The silencer shall have a single orifice with a maximum outlet diameter of 10mm. Alternatively, such other muffler as is produced by the manufacturer of the engine used and specified by the manufacturer for that Engine may be used, even though it does not meet the above specifications.

Full length tuned pipes are not permitted – Magic Muffler types are allowed.

**6. Propeller:**

Only fixed propellers shall be used. Two bladed wooden or two or more blade composite resin continuous fiber construction propellers may be used.

**7. Spinner:**

A rounded nose spinner is required.

**8. Fuselage:**

**Cross Section** – The fuselage shall have a minimum height of 127 mm and a minimum width of 75 mm, the measurements to be of the fuselage body and are to exclude any fins, attachments or spacers. Both minimum dimensions must occur at the same cross-section location. The fuselage will have a minimum cross-sectional area of 80.6 cm<sup>2</sup>, excluding fillets. Competitors will be required to provide templates to prove this. Fillets are not considered part of the fuselage or lifting surfaces.

**9. Landing Gear:**

At least two wheels shall be used. The two main wheels must be a minimum lateral distance of 15cm, when the Model Aircraft is at rest on the ground. A retracting undercarriage is permissible.

**10. Lifting Surfaces:**

**Area:** The total area of the wing shall be a minimum of 2550cm<sup>2</sup>. On biplanes with different wings, the smaller wing shall be at least two thirds of the larger wing. Flying wings and deltas will not be allowed in this event.

**11. Wing Thickness:**

The depth of the wing must be a minimum of 22mm at the root of the root cord of a monoplane, and 17 mm if a biplane. On a biplane with wings of a different size, the smaller wing must be at least 15mm thick at the root. If the wing is not uniform in thickness, then the thickness must decrease in a straight line from root to tip as viewed from the leading or trailing edge.

**Note:** “Root” is defined as the innermost wing section, excluding fillets that may be measured without removing the wing from the fuselage. On a completely exposed wing, much as that of a parasol monoplane or the top wing of most biplanes, the root is that section of the wing that is intersected by a projection of the outline of the fuselage as seen in the top view, ie. The root section would be 50mm from the centre line of an exposed wing on a Model Aircraft with a 100mm wide fuselage.

**12. Weight:**

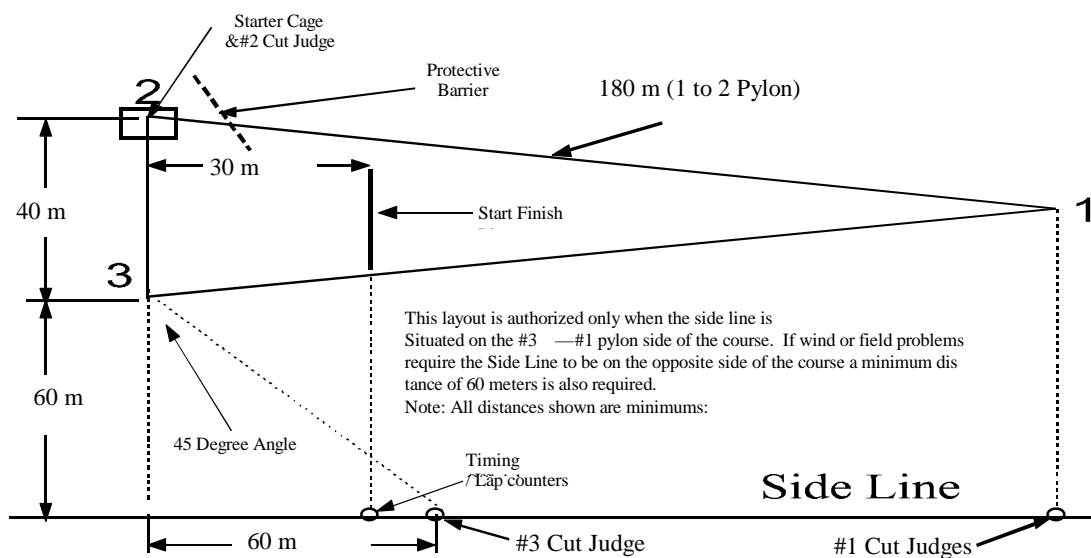
The minimum weight of an assembled aircraft, ready for flight, but less fuel shall be 1.8kg.

**13. Fuel:**

The organisers shall supply fuel to a standard formula for glow plug motors. Its composition shall be 80% methanol, 20% castor oil.

**14. F400 Course Layout:**

The triangular course will be laid out as follows.



The following Australian **General Pylon Racing Rules** shall apply (Including all Paragraphs contained therein). Unless otherwise stated in the F400 Rules above.

**5.1 Safety & General Rules:**

**5.2 Race Organisation:**

### 5.3.3. **QUARTER MIDGET PYLON RULES (QM):**

#### **1. Definition of a Quarter Midget Model Aircraft:**

A radio controlled Quarter Midget Model Aircraft is an aircraft in which the propulsion energy is provided by a piston type engine - the lift is obtained by aerodynamic forces acting on the supporting surfaces, which, except for control areas, must remain fixed in flight. The model must be of a semi-scale type and their general lines must be in accordance with those of full-sized aircraft.

Competitors may be required to justify any unusual or unconventional features of their Model Aircraft design with documentary evidence of similar full-sized aircraft

#### **2. Engine:**

Engine's must be of the reciprocating piston type, be commercially available and have a maximum total swept volume of 3.50 cm<sup>3</sup>

#### **3. Shut – Off:**

The engine shall be equipped with a positive radio-controlled shut-off. The pilot shall be able to shut off his engine by radio control on the ground or in the air.

#### **4. Silencer:**

The Engine shall be fitted with a silencer, within which length there shall be an expansion chamber of not less than 19mm diameter with a minimum length of 32mm.

The silencer shall have a single orifice with a maximum outlet diameter of 10mm.

Alternatively, such other muffler as is produced by the manufacturer of the Engine used and specified by the manufacturer for that Engine may be used, even though it does not meet the above specifications.

#### **5. Propeller:**

Only fixed pitch propellers to be used. Construction shall be either of wood or composite resin continuous fibre.

#### **6. Spinner:**

A rounded nose-spinner or safety nut is required.

#### **7. Fuselage:**

**Cross-section** - the fuselage shall have a minimum height of 12.7 cm and a minimum width of 7 cm. Both minimum dimensions must occur at the same cross-section location.

#### **8. Landing Gear:**

At least two wheels with a minimum diameter of 38 mm shall be used. Where applicable, a third wheel of any size may be used. The two main wheels must be a minimum lateral distance of 100 mm apart when the model is at rest on the ground. A retracting undercarriage is permissible.

#### **9. Lifting Surfaces:**

##### **a) Area:**

The total area of the wing shall be a minimum of 1935 cm<sup>2</sup>. On biplanes with different size wings, the smaller wing shall be at least two-thirds of the larger wing. Flying wings and Deltas will not be allowed in this event

b) **Wing Thickness:**

The depth or thickness of the wing must be a minimum of 22 mm at the root chord of a monoplane and 15 mm if a biplane. On a biplane with wings of different size, the smaller wing must be at least 13 mm thick at the root.

If the wing is not uniform in thickness, then the thickness must decrease in a straight line from root to tip as viewed from the leading or trailing edge.

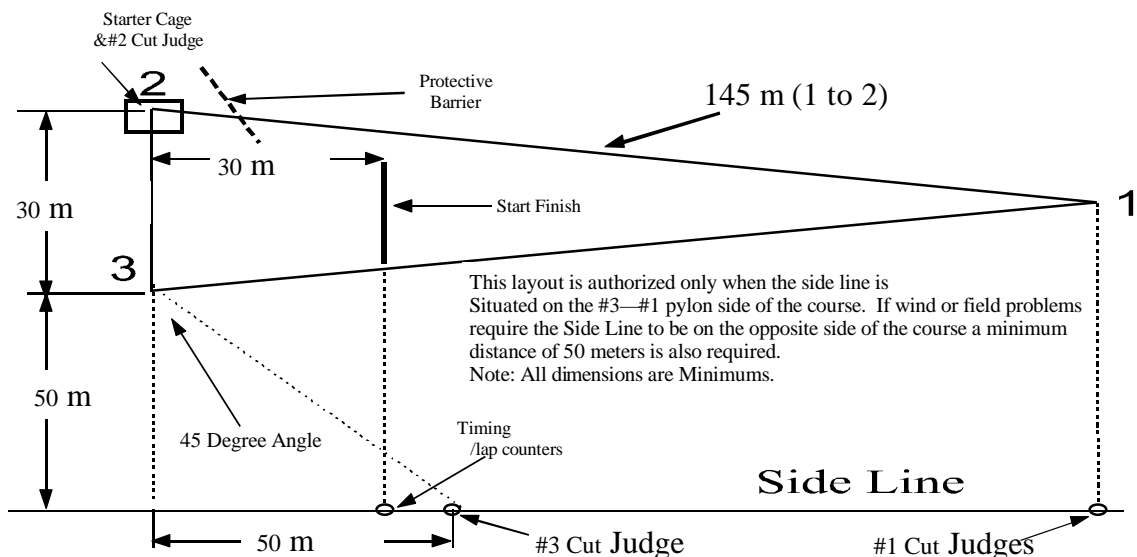
**Note:** "Root" is defined as the innermost wing section, excluding fillets that may be measured without removing the wing from the fuselage. On a completely exposed wing, such as that of a parasol monoplane or the top wing of most biplanes, the root is that section of the wing that is intersected by a projection of the outline of the fuselage as seen in the top view, ie. the root section would be 50 mm from the centre line of an exposed wing on a Model Aircraft with a 100 mm wide fuselage.

**10. Weight:**

The minimum weight of the assembled aircraft, ready for flight but less fuel, shall be 1134 grams.

**11. Quarter Midget Course Layout:**

The layout of the course is shown below.



The following Australian **General Pylon Racing** Rules shall apply (Including all Paragraphs contained therein). Unless otherwise stated in the QM Rules above.

**5.1 Safety & General Rules:**

**5.2 Race Organisation:**

#### 5.3.4. **HALF A PYLON RACING RULES (1/2A)**

##### **1. Definition of a Half A (1/2A) Model Aircraft.**

A radio controlled Half A Model Aircraft is an aircraft in which the propulsion energy is provided by a piston type engine - the lift is obtained by aerodynamic forces acting on the supporting surfaces, which, except for control areas, must remain fixed in flight. The model must be of a semi-scale type and their general lines must be in accordance with those of full-sized aircraft.

Competitors may be required to justify any unusual or unconventional features of their Model Aircraft design with documentary evidence of similar full-sized aircraft

##### **2. Engines.**

Engines must be of the reciprocating piston type to a maximum displacement of 1.8 cm<sup>3</sup>. All engines above 0.051 in<sup>3</sup> must be fitted with a muffler having a minimum volume of 12 cm<sup>3</sup> and a maximum volume of 25 cm<sup>3</sup>. (A test method is described at the end of these rules) The muffler is permitted a single orifice (excluding pressure nipple) of diameter not more than 8 mm. The volume measured is to include any header, which is part of the muffler. Tuned pipes or multi-path (eg. magic muffler) type exhaust systems are not permitted.

##### **3. Shut – Off**

The Engine must be able to be stopped within 20 seconds if requested by the starter.

##### **4. Fuel.**

- a) For glow-plug engines up to 0.83 cm<sup>3</sup> capacity and for all compression ignition engines, the fuel shall be unrestricted.
- b) For glow-plug engines with a capacity exceeding 0.83 cm<sup>3</sup>, the fuel shall be supplied by the race organisers and shall comprise 80% methanol and 20% castor oil.

##### **5. Fuselage.**

The cross section of the fuselage at the cockpit shall be minimum of 57 mm in width and 100 mm in depth at the same longitudinal section; this latter dimension may include windshield, canopy or headrest but excludes wing fillets.

##### **6. Wing**

- a) The minimum wing area, including the area displaced by the fuselage, but not including fillets or stall strips, shall be 12.90 dm<sup>2</sup>.
- b) If flaps are fitted, the wing area is to be measured with flaps retracted.
- c) In the case of biplanes with different size wings, the area of the smaller wing shall be at least two-thirds of the area of the larger wing.
- d) The minimum wing thickness at the root, measured outboard of any fillet, shall be 19 mm for a monoplane and 13 mm for a biplane.
- e) On a biplane with different size wings, the smaller wing must be at least 9 mm thick at the root.
- f) On a completely exposed wing, such as on a parasol monoplane or the top wing of most biplanes, the "root" is that section of the wing that is intersected by a projection of the outline of the fuselage as seen in the top view.

##### **7. Undercarriage**

Hand launching of the aircraft is permitted [5.1.3.4.], the installation of an undercarriage is optional.

### 8. Weight

The minimum all-up weight without fuel shall be 500 gm. The maximum all-up weight without fuel shall be 1 kg

### 9. Propeller

Only fixed pitch propellers to be used. Construction shall be either of wood or composite resin continuous fibre.

### 10. Muffler Volume Measurement

#### Test Equipment:

Burette or similar accurately calibrated liquid measuring cylinder.

#### Safety Equipment:

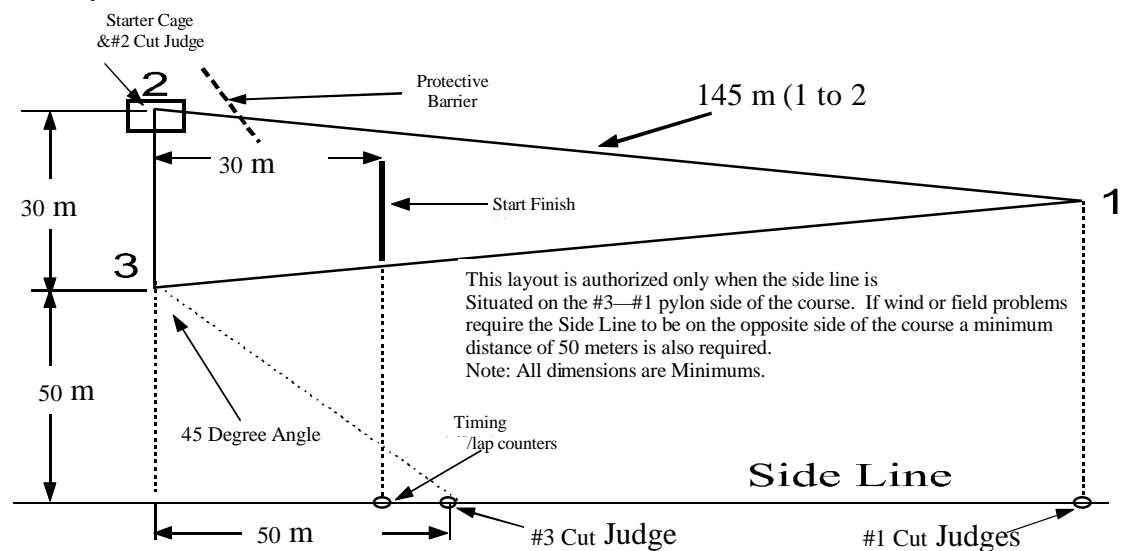
Rubber gloves. [Methanol is toxic]

#### Method:

- Ensure that the piston of the Engine is at top dead centre.
- Block the pressure nipple orifice with a very short sealed length of fuel tubing.
- Note the liquid level in the burette. Hold the engine so that the muffler orifice is uppermost and fill the muffler with the test liquid (clean, standard fuel or methanol), from the burette until the muffler is just full.
- Block the orifice with a gloved finger or thumb and move the engine so as to dislodge any air bubbles in the muffler.
- Add any extra test liquid necessary to fill the muffler.
- Note the final liquid level. Calculate the difference.

### 11. Half A Course Layout

The layout of the course is shown below.



The following Australian **General Pylon Racing Rules** shall apply (Including all Paragraphs contained therein). Unless otherwise stated in the above Half A Rules.

#### 5.1 Safety & General Rules:

#### 5.2 Race Organisation:



### **5.3.5 QUICKIE 500 RULES**

*Q500 is an introductory class of pylon racing.*

#### **5.3.5.1 Engine**

The engine must be a commercially available, front-intake, side-exhaust. The engine shall be stock, except for modifications as listed below.

##### **5.3.5.1.1 Displacement**

Maximum displacement is 7.6cc (0.46 cubic inches).

##### **5.3.5.1.2 Exhaust System**

The engine shall be equipped with an expansion chamber muffler or zero-boost muffler as provided by the engine manufacturer for that particular model.

The muffler shall be stock, except for modifications as follows:

(a) Replacement of bolts, or screws and welding or gluing to improve reliability is permitted.

(b) The muffler may be tapped for a pressure fitting to supply pressure to the fuel system.

Tuned mufflers and tuned pipes are prohibited.

##### **5.3.5.1.3 Intake**

The carburettor as supplied by the manufacturer shall be used and must be capable of reducing the engine speed to idling. The carburettor and any associated remote needle valve shall be stock, except for longevity-enhancing modifications as follows:

(a) Adjustment screws and idle needle valves may be held in place with commercially available thread locker, epoxy, or other adhesives and safe tied with rubber bands, wire, or plastic ties.

(b) Barrel retaining screws or pins may be replaced with commercially available screws or pins of harder material and may be held in place with commercially available adhesives. Barrels may be de-burred for smoother movement and may be safe tied with rubber bands, wire, or plastic ties.

(c) Throttle arms may be modified or replaced.

##### **5.3.5.1.4 Fuel Feed**

Other than muffler pressure, no fuel system pressurization is permitted.

##### **5.3.5.1.5 Modifications**

The following parts may be substituted for the original engine parts and may come from any source:

Backplate mount (provided the crankcase volume is not varied)

Bearings

Gaskets

Glow plug

Head and crankcase bolts

Propeller nut (spinners may be used)

Propeller washer **forward of the propeller**

The head clearance of the engine may be altered from the manufacturer's setting by adding or removing head shims.

#### **5.3.5.1.7 Approved Engine List**

A list of permissible engines is published by the relevant pylon racing governing bodies. Criteria include purchase price and power output in both the normal takeoff rpm range and the presumed in-air ("unloaded") rpm range. See [Annex 1](#) for current engine approval list.

#### **5.3.5.2 Wings**

##### **5.3.5.2.1 Area**

Minimum 3225 cm<sup>2</sup> (500 square inches).

##### **5.3.5.2.2 Wing Span**

Minimum 1270mm (50 inches), maximum 1321mm (52 inches) projected.

##### **5.3.5.2.3 Chord**

Constant for at least 1207mm (47-1/2 inches) of span.

##### **5.3.5.2.4 Airfoil Thickness**

Minimum 30mm (1-3/16 inches) for at least 1207mm (47-1/2 inches) of span.

##### **5.3.5.2.5 Wing Construction**

Wings must be of foam core or built up type construction. Composite, hollow moulded wings are not allowed.

#### **5.3.5.3 Fuselage**

##### **5.3.5.3.1 Depth**

Minimum 89mm (3-1/2 inches) at its deepest point, which must occur within the wing chord.

##### **5.3.5.3.2 Width**

Minimum 73mm (2-7/8 inches) at its widest point, which must occur within the wing chord. Width and depth points need not coincide.

##### **5.3.5.3.3 Cross Section**

The fuselage shall have a simple, rectangular "box" cross-section with a maximum radius of 6.5mm at the corners. Diamond-shaped cross sections are prohibited. Fillets or fairings between the fuselage and wing are prohibited. Canopies and turtle decks are acceptable but shall not be included in width or depth measurements. The front firewall shall be a rectangular, flat plate measuring at least 57mm by 57mm inches. The perimeter of the front firewall may be rounded to a maximum radius of 6.5mm.

##### **5.3.5.3.4 Engine Installation**

The engine and engine mount shall be fully exposed. No cowling or streamlining of the engine is permitted. A back plate type radial engine mount that replaces the stock engine back plate may be used so long as it displaces the same crankcase volume as the stock back plate assembly. Corners and edges of the engine mount may be rounded to a maximum radius of 6.5mm.

#### **5.3.5.4 Weight**

The weight of an assembled aircraft, ready for flight, but less fuel shall be a minimum of 1580grams (3-1/2 pounds) and a maximum of 2040grams (4-1/2 pounds).

#### **5.3.5.5 Landing Gear**

The landing gear shall be fixed, with at least 2 main wheels of a diameter not less than 57mm. The main wheels shall be at least **150mm** apart, measured parallel to the

wing span. No wheel pants, wheel spats, or strut fairings shall be used to streamline the main landing gear. Struts shall be either round wire, at least 3mm in diameter, or flat stock no more than 3mm thick. Flat stock may be filed or otherwise shaped to an airfoil cross-section but must have a blunt leading edge. Nose or tail wheels, if used, may be streamlined or enclosed.

### **5.3.5.6 Propeller**

#### **5.3.5.6.1 Material**

*Propellers shall be made from glass fibre reinforced nylon by an injection moulding process.)*

Propellers containing continuous filament carbon fibre **or fiberglass** are not permitted.

#### **5.3.5.6.2 Dimensions**

Minimum diameter **250mm**. Nominal pitch 6 inches, as indicated by the manufacturer's stamp or packaging.

#### **5.3.5.6.3 Modifications**

Propellers shall be stock and commercially available. One blade may be modified for balancing.

### **5.3.5.7 Fuel**

The organisers shall supply fuel to a standard formula for glow plug motors containing 80% methanol and 20% castor oil.

### **5.3.5.8 Special Provisions**

#### **5.3.5.8.1 Inspections**

Routine inspections are encouraged: The CD or the CD's designee may elect to check the top 3 finishers engines for legality at the end of the contest.

#### **5.3.5.8.2 Rule Variations**

The engine rules specified have been used to limit the cost and power output of engines used in this event. Any variations from the rules specified above should be noted in all pre-contest publicity. Note: Any variation that results in the use of engines larger than 0.46 cu. in. displacement, tuned mufflers, or tuned pipes will result in the aircraft not being sanctioned as Quickie 500.

### **5.3.5.9 Pylon Course Layout**

Either the FA1 course (Refer to rule 5.3.1.7) or the QM course (Refer to rule 5.3.3.11) may be used.

The contest organisers should advise in pre race publicity which course is to be used.

### **5.3.5.10 General Rules**

The Australian Safety & General Pylon Racing Rules shall apply (Including all Paragraphs contained therein) unless otherwise stated in the Q500 Rules above.

## **Annex 1. Approved Engines for Q500**

The following engines are approved for use in Q500.

### **AMPRA Championships, National Championships**

Thunder Tigre .46, OS 46AX, OS 46FX, Super Tigre G45

### 5.3.6 CLASS FA3R – PYLON RACING MODELS WITH LIMITED TECHNOLOGY

**Intention:** *This class is defined for pylon racing at a limited level of technology in aircraft aerodynamic design, aircraft construction and power plant with maximum safety.*

**Rules strategy:** *The technical rules have the intention that speeds will not increase substantially over the years in order to maintain safety and controllability of model pylon racing aircraft. This is achieved by a simple and strict model formula, definition of propeller dimension and limitation of exhaust systems. The technical rules will be developed in such a way that the average course speed (nominal race distance divided by race time) will be limited to 200 km/h. The criterion will be applied to the average times made by the best half of the competitors in all international competitions over a year that have been flown under the standard FA3R rules below.*

*Within the FA3R rule strategy is it possible to define locally or nationally different definitions for the engine, fuel, propeller and exhaust systems ( rules 5.3.6.6 – 10), but not for the model. Annex 5.3.6.A1 gives examples of formulas based on current practice in some countries. Organisers have to make clear whether a competition is flown according to the standard rules as given in 5.3.6.6 - 10 or to a different formula for the engine, propeller, exhaust system and fuel,.*

*The FA3R rules and Annexes are basically identical to the FA1 rules and Annexes*

#### 5.3.6.1 Definition of Radio Control Pylon Racing Model Aircraft:

This is a Model Aircraft, which the propulsion energy is provided by a piston type engine. Lift is obtained by aerodynamic forces acting on the supporting surfaces, which except for the control areas must remain, fixed in flight.

The model aircraft must be of conventional design with forward wing and an aft empennage.

#### 5.3.6.2 Technical Specifications of Pylon Racing Model Aircraft

##### 5.3.6.3 Weight

Weight, less fuel but including all equipment necessary for flight, shall be at least 1700 g and not more than 2200 g. If ballast is used it must be permanently and safely affixed.

##### 5.3.6.4 Fuselage

###### 5.3.6.4.1 Depth and width

The fuselage shall have a minimum height of 89.0 mm and a minimum width of 73.0 mm. Both dimensions must occur within the wing chord. The fuselage shall have a rectangular cross section over the whole length and the side wall shall be parallel to the vertical axis of the model aircraft (rectangular box cross-section). A maximum radius of 6.5 mm is permitted for the corners of the fuselage.

###### 5.3.6.4.2 Fairing

Fillets or fairings between the fuselage and wing are not permitted.

##### 5.3.6.5 Lifting Surfaces

###### 5.3.6.5.1 Area of Surfaces

Total projected area of the main wing, must be at least 32.0 dm<sup>2</sup>.

###### 5.3.6.5.2 Chord

The main wing must have a constant chord over at least 1200 mm of span.

#### **5.3.6.5.2 Wing Span**

- a) Minimum wing span shall be 1270 mm
- b) Maximum wing span shall be 1320 mm.

#### **5.3.6.5.3 Wing Thickness**

Wing thickness must be at least 30.0 mm over a wingspan of at least 1200 mm.

#### **5.3.6.6 Engine(s)**

Engine(s) must be of the single cylinder reciprocating piston type, with a maximum total swept volume of 6.60 cm<sup>3</sup>. Propellers must rotate at the speed of the crankshaft. Engine shall have only one front intake and one side exhaust. Only commercially available engines are allowed of which

a minimum number of 25 were built. No modifications are allowed to crankcase, cylinder, cylinder head, piston, con rod or crankshaft or to the technology of the bearings.

Engine air intake cross sectional area is limited to 114.0 mm<sup>2</sup> (12.05 mm diameter).

Engine installation

The engine including silencer and the engine mount shall be fully exposed. The front firewall shall be a rectangular, flat plate measuring at least 57.0 mm by 57.0 mm. Corners and edges of the engine mount may be rounded to a maximum of 6.5 mm

#### **5.3.6.7 Exhaust system:**

**a) General description:** The engine shall be equipped with an expansion chamber muffler, zero-boost muffler, or tuned muffler as provided by the manufacturer for the engine being used, and having a single exhaust outlet with a maximum outlet area of 40.2 square millimetres (equivalent to the area of a round hole measuring 7.15 mm diameter).

**b) Inner configuration or tuned mufflers:** A tuned muffler used in this event shall have only one internal part, a straight tube or extractor of the type commonly known as a "mini-pipe". The mini-pipe shall have a constant, circular cross section and constant inside and outside diameter, with the following exception: the sidewall of the tube may be thickened not to exceed 2 mm wall thickness, within 12.7 mm of the front end of the mini-pipe where it attaches to the header.

**c) Outside dimensions:** The distance from the centre of the piston to the centreline of the muffler shall not exceed 70 mm. The overall length of the muffler shall not exceed 185 mm, measured from the front of the header to the back of the exhaust outlet. The outside diameter shall not exceed 45 mm and both the inside and outside diameter of the outside shell of the muffler shall remain constant for at least 75 mm.

**d) Modifications:** No modifications to the muffler, as provided by the manufacturer, are permitted except that the muffler may be tapped for a pressure fitting to supply pressure to the fuel system.

#### **5.3.6.8 Fuel pressure**

If the tank is pressurised, only the pressure from the silencer is permitted.

#### **5.3.6.9 Propellers and spinners**

- a) Only fixed propellers which are commercially available shall be used.

- b) The propeller shall either be of a chopped fibre filled injection moulded type or wood.
- c) Composite resin continuous fibre construction propellers are not allowed.
- d) The propeller shall have a minimum diameter of 222 mm.
- e) Wood propellers may be modified from a commercial product or can be home made .
- f) For injection moulded propellers the type and dimensions must be indicated on the propeller by the manufacturer. The recommended rpm limit for this type as given by the manufacturer must not be exceeded during flights.
- g) For injection moulded propellers changes to the propeller blades are not permitted, except for:
  - i) One blade may be sanded on the top (front) side only for balancing.
  - ii) One side of the hub may be sanded for balancing.
  - iii) The shaft hole may be enlarged, but only as much as necessary to fit the engine crankshaft. The enlarged hole shall be concentric with the original hole.
  - iv) Edges and tips may be sanded, but only as much as necessary to remove sharp moulding flash.
- h) A rounded nose spinner with a maximum diameter of 38.0 mm and a nose radius of not less than 5 mm must be fitted. The spinner shall be made of metal only.

#### **5.3.6.10 Undercarriage**

The undercarriage may have a two or three wheel design with the two main wheels having a minimum track of 177.0 mm, fixed on the outside of the fuselage or main wing. The diameter of the two main wheels shall be not less than 57.0 mm. Only non retractable landing gears are permitted. Wheel fairings or fairing between landing gear and fuselage, i.e. Fillets, wheel pants or similar, are not permitted. Nose or tail wheels, if used, may be streamlined.

#### **5.3.6.11 Shut-off**

The engine shall be equipped with a positive radio controlled engine shut-off which has a fail-safe to the off position. The pilot must be able to shut off his engine by radio control, on the ground, or in the air.

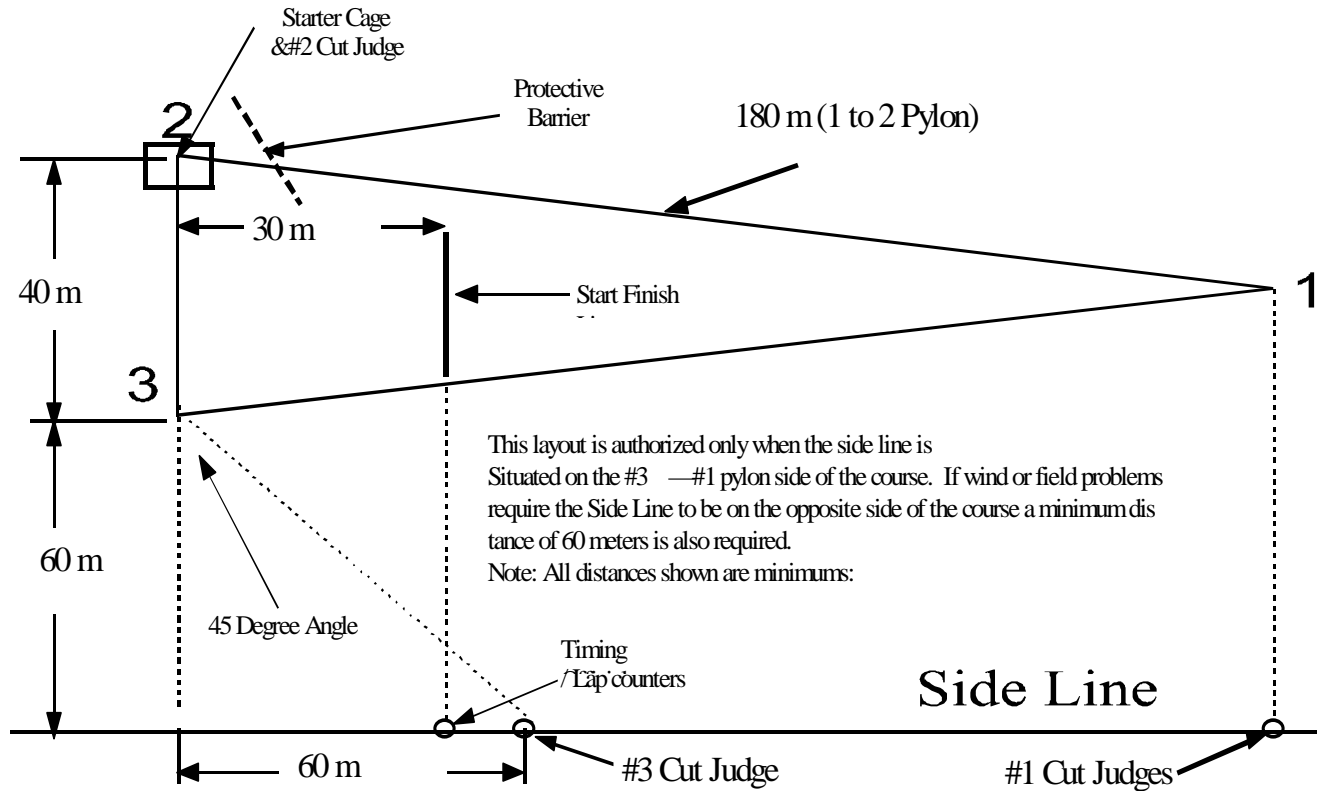
#### **5.3.6.12 Fuel**

The organisers will supply fuel to a standard formula for glow plug and spark ignition motors. Its composition shall be 80% methanol, 20% castor oil – unless it is specified otherwise, in the Pylon Class Rules.

#### **5.3.6.17 Race Course, Distance**

Formula Australia One (FA1) - Course Layout:

The triangular course will be laid out as follows. The course is 10 laps with individual length of 400 m. Total distance traveled are 4 km.



*The Australian Safety & General Pylon Racing Rules shall apply (Including all Paragraphs contained therein). Unless otherwise stated in the Rules above.*

#### ANNEX 5.3.6.A1

##### FA3R AS A MULTI-FORMULA CLASS

FA3R is defined here by a standardised model and the way a competition is held. The power plant including its silencer, propeller, fuel (5.W12) can be specified differently from the standard rules by the organiser of a competition if he wishes to do so.

This makes it possible to make the class flexible for local preference, different requirements in pilots' ability, airfield or noise constraints etc. The organiser shall publish these rules, either by specification or by the class identification code (see below) or by publishing the deviation of the standard FA3R rules in the invitation to the contest.

A few examples are given here which could be used independently or in combination:

1. A requirement to use only (unmodified) engines from a selected list with their standard exhaust system and an appropriate propeller definition.
2. New pilots may be attracted by adding a price limit in order to create a local or national class which uses cheaper engines that are easily available locally, even with a slightly different cubic capacity.
3. Replace the 114.0 mm<sup>2</sup> (12.05mm diameter) venturi - 80/20 fuel combination by a 64.0 mm<sup>2</sup> (9 mm diameter) venturi - 15% Nitro fuel combination for easier engine characteristics.
4. An internal tube in the exhaust system is not allowed, in order to reduce the tuning effect in order to reduce engine power.

5. A different propeller definition, eg a minimum diameter of 250 mm or only certain propellers to be selected from a list of commercially available propellers may be chosen in order to limit speed/rpm and/or noise.
6. An electric powered class with electric motors allowed from a list of commercially available motors in combination with a type of limiter or a governor for rpm control (eg 14.000 rpm) in combination with some standard propeller.
7. Composite wings and/or fuselages not allowed in order to reduce cost and to avoid high technology model aircraft. This may help to create a national class that attracts young pilots.
8. Add a noise limit .
9. Deviation from the standard rules should not compromise safety.

Since variations to the standard formula are usually for national competitions to create a “beginner friendly” or locally popular racing class, it is recommended to give a such a national class a unique code consisting of FA3R, the national identification and a class identification, for example FA3R-GER-E1, for a German FA3R class for a formula with electric motors or FA3R-NED-86dB for a Dutch class with a noise limit of 86 dB(A) at 3 metres.