

# CONTROL LINE CLASS A RAT RACING

## **1. Definition of a Rat Racing Event**

- a) A racing event is a contest during which three eliminating races are followed by a final race, in which three model aircraft participate simultaneously in each race, flying around the same circuit, each of them being entered by one team consisting of one pilot and one mechanic. In exceptional cases, a race may be run with only two teams.
- b) No member of a team may be a member of another team.
- c) A race is run over a set number of laps corresponding to the distance to be covered with at least one landing for refuelling and at least two landings for refuelling for the final. The time taken by each model aircraft to cover that distance after the starting signal is registered.
- d) The eliminating races are run over 100 laps, corresponding to 10 kilometres. The final race is run over 200 laps, corresponding to 20 km.
- e) During the race the pilots remain in the centre of the circuit. Their only function is to control the model aircraft. The mechanics are placed outside the flight circle, as defined in paragraph 2. Their function is to start and adjust the motor and to refuel when the model aircraft is on the ground, and generally, to deal with the different operations that enable the model aircraft to race. The motor must be started by flicking the propeller by hand.
- f) During a race, the mechanics must wear a safety helmet, with a chinstrap, strong enough to withstand the impact of a flying team racing model aircraft.

## **2. Rat Racing Site**

A rat racing site must consist of four concentric circles which shall be marked on the ground:

- a) Circle to be used by the mechanics: 19,6 m radius. This is called the flight circle, and is divided into six equal 60 degree sectors. At each sector a starting and refuelling area, one meter in length, shall be marked on the outside of the flight circle and be known as the "pitting area".
- b) Circle at 19.1 m radius shall be marked with a broken line. It indicates the point beyond which the pitman is not permitted to reach to retrieve a model. This is called the safety circle.
- c) Circle to be used by the pilots: radius 3 metres. This is called the centre circle. The centre of this circle shall be marked with a white spot of 0,3 m diameter.
- d) Circle at 2m radius, and known as the inner circle, shall be marked with a broken line in a contrasting colour.

### **3. Definition of a Rat Racing Model Aircraft**

Model aircraft in which the propulsion energy is provided by a piston motor(s) and in which lift is obtained by aerodynamic forces acting on the supporting surfaces which must remain fixed in flight except for control surfaces.

### **4. Characteristics of a Rat Racing Model Aircraft**

- a) Maximum swept volume of motor(s) :
  - i) 2,5 cm<sup>3</sup> with double ballrace
  - ii) 4.0 cm<sup>3</sup> with plain bearing.
- b) Minimum total projected surface area : 8.5 dm<sup>2</sup> (130 sq in)
- c) Total maximum weight : 700g
- d) Models must be of profile fuselage type, and must conform to the general profile definition, height between: 50 to 100 mm; minimum length: 300mm; maximum width: 20 mm, excluding tank. Pod and boom fuelage is forbidden.
- e) The engine must be suction fed. Pressure fuel systems are not allowed. All air for the combustion process must pass through the venturi. Pressure refuelling system is only allowed for models with maximum tank capacity of 15cm<sup>3</sup>.
- f) Propeller must be commercially available plastic/glass composite type; moulded carbon fibre glass propeller is forbidden.
- g) Minimum diameter of the wheel(s): 25 mm. The use of metal wheels is forbidden. Models must have a fixed landing gear with minimum of one (1) wheel, and must be capable of unassisted ROG takeoff. Hand launching is permitted only when it is the Circuit Marshall's opinion that the flying site or model will not permit a safe ROG.
- h) The model aircraft must fly in the anti-clockwise direction.
- i) The model aircraft must remain in a correct state according to para.4 (a) - (h) throughout the full race, otherwise it will be disqualified.

### **5. Controls - Technical Verification**

- a) Line Length: The radius of the flight circle is 15,92 m. It is measured from the axis of the control handle to the axis of the propeller for a single motor model aircraft and to the axis of symmetry for a multimotor model aircraft.
- b) Control System: Two control lines must be used. If constructed of single steel wire each, these must be of 0,35mm minimum diameter with no minus tolerance allowed. In all cases the lines shall be measured using a suitable instrument with measuring surface diameters of 5 mm minimum and 8 mm maximum. Before every race a load test shall be applied to the assembled control lines and the model aircraft in flying order equal to 30 times the weight of the model, to a maximum of pull 20kg. The control handle must be built so that the distance between the axis of the handle and the points of flexibility of the two cables does not exceed 40 mm.

No intentional twisting and/or linking of the two lines together shall be permitted between the point of exit of the model aircraft and a point 300 mm from the handle. The use of flexible grouper(s) attached to the wing tip and extending a maximum of 2 cm is permitted.

## **6. Organisation of Races**

- a) Three competing teams (in exceptions only two) will fly simultaneously in each race after having been drawn for order. Qualifying races with less than 3 teams will be put at the end of the draw, in order to allow a three-team races with teams which have been granted an attempt.
- b) The teams may be allowed to run their motors just before entering the circle under the organiser's supervision so the running does not interfere with the starting procedure of a race. Mechanics are not allowed to walk with a running engine.
- c) A pitting area (2.(a)) is occupied by each of the model aircraft which are to participate in a race. The model aircraft of the team designated first during the draw occupies the place chosen by that team. The other teams choose one of the remaining free pitting areas in order of the draw. The chosen pitting areas are considered occupied until the race is finished.

For the final race, the choice of the pitting areas shall be according to the results in the semi-finals. The team with the fastest time chooses first, the team with the second fastest time chooses next, etc.

In case of a tie the teams' second fastest times in the semi-finals will decide the order of choice.

- d) After entry to the circuit, it is forbidden to start a motor before the first signal has been given by the Circle Marshal, unless allowed by the Circle-Marshal.

## **7. Race from Start to Finish**

- a) Two timekeepers are assigned to each team. They stand outside the flight circle, near the pitting area of the model aircraft that they control. They are in charge of the timekeeping and lap counting for their particular team.
- b) A first signal given by the Circle Marshal authorises the mechanics to proceed with the warming up to the motor(s), during 90 seconds. A second signal (visual and acoustic) announces the end of the warming up period and orders the mechanics to stop motors.
- c) A period of 30 seconds is allowed for final preparations (filling up the tanks) and the Circle Marshal announces the last five seconds by reverse counting.
- d) The starting signal is given by the Circle Marshal through a visual signal (flag) and a sound signal. For the last 3 seconds of the countdown and at the starting signal the mechanics must be standing erect close to their model aircraft and the pilots must be crouching on the border of the centre circle, with one hand touching the ground and with their control handles as close to the ground as defined by the judges. The starting signal must be "sharp" to enable accurate timing.
- e) Model aircraft must fly at a normal height of between two and three metres, except for overtaking, taking off or landing.

- f) Pilots must keep their controlling hand and the model aircraft on a plane perpendicular to a line joining their shoulders and passing through the centre line of their body, pilots must also keep their controlling hand on the vertical line between the middle of the chest and the top of the forehead, except when overtaking, taking off and landing when an exception of three laps is allowed.
- g) Overtaking must be done by overflying. The model aircraft is not in any case allowed to fly over six metres height when overtaking. The pilot being overtaken must on no account carry out any manoeuvre to impede the overtaking competitor and must leave space for the overtaking pilot when the overtaking is finished.
- h) The model aircraft is allowed to fly a maximum of two laps without the motor running.
- i) Landings take place inside the flight circle.
- j) The model aircraft must touch the ground with its motor stopped before the mechanic is allowed to catch it.
- k) After the mechanic has caught the model aircraft, he must go to the nearest free pitting area from the point at which the model aircraft was stopped. A pitting area is occupied if a mechanic is standing at such an area, even if his team's model aircraft is still in the air.
- l) After the mechanic has caught the model aircraft, but only then, the pilot is allowed to put one foot outside the centre circle.
- m) During the refuelling and the restart of the motor, and until the time when he releases the model aircraft, the mechanic must keep the model aircraft in contact with the ground by at least one point and with the centre line outside the flight circle. During that time the pilot must be crouching or sitting inside the centre circle. He keeps one hand on the ground and his handle and his lines as close to the ground as defined by the judges until the model aircraft starts again.
- n) The race ends when the number of laps completing the required distance has been covered by all the competing model aircraft or, when the official time limit has been reached, which is fixed at 10 minutes for an eliminating race or a semi-final race and at 20 minutes for the final race.
- o) When the model aircraft has finished the race or when it cannot continue after a stop, its pilot must sit down or crouch outside the centre circle as long as the other competitors are still engaged in the race, unless the Circle Marshal allows him to leave the circle earlier.

## **8. Definition of an Official Flight**

An official flight is recorded for every participant in any race not granted an attempt.

Attempts are granted as follows:

- a) Any team in an eliminating race or a semi-final race which has been interrupted through an obstruction or collision for which it was not responsible shall be granted an attempt.

b) In a final race which has been interrupted through an obstruction or collision before any of the participants has completed 100 laps the final shall be stopped and all competitors, except any who have at the point of stoppage of the race been disqualified, shall be granted an attempt. The remaining teams will proceed with the re-fly, no replacement for the disqualified team.

c) If, before 50 laps of an eliminating race have been completed by any of the teams who started the race, only one team remains in the running and flying alone, the race will be declared void and considered an attempt for the remaining team. A team which has been granted an attempt is allowed to participate in another race.

## **9. Warnings - Eliminations**

### *A TEAM SHALL BE WARNED:*

a) If a pilot interferes with or obstructs another pilot either by his conduct in the circle (for example by raising the handle above his head during take-off), or by a manoeuvre of his model aircraft preventing another model aircraft from flying or landing normally.

b) If a pilot, instead of walking around the centre, stands in the same place or walks backwards or continuously keeps the centre spot of the circle between him and the model aircraft.

c) If the pilot's flying style does not conform to para. 7.f).

d) If a pilot applies physical effort to increase the speed of his model aircraft during the official flight.

e) If the height level of the flight prescribed by the rules is exceeded.

f) If, during the start of the race or during the pit stops, one hand is not on the ground, the control handle, the lines and the model aircraft are not as close to the ground as defined by the judge(s) and/or the centre line of the model aircraft is inside the flight circle.

g) If a mechanic services the model aircraft outside the designated pitting area.

h) If the pilot does not leave space for an overtaking pilot when the overtaking is finished.

i) For any other flagrant breach of the rules.

### *A TEAM SHALL BE ELIMINATED FROM A RACE :*

j) If the pilot steps outside the centre circle before the mechanic has taken hold of the landing model aircraft, and/or the pilot does not act in accordance with rule 7.i) and m).

k) If the mechanic steps into the flight circle (with either foot) or reaches further than the safety circle (line) painted 0.5 m into the flight circle.

l) If the mechanic retrieves his model aircraft by any device.

m) If overtaking is done by passing under the slower model aircraft.

- n) If the pilot whose model aircraft is to be overtaken carries out any manoeuvres to impede the overtaking competitor.
- o) If a member of the team or the model aircraft causes a collision.
- p) If jettisoning occurs or if the model aircraft is not in the condition as stated in paras.4.a) to i).
- q) If the model aircraft flies more than two laps with the motor stopped.
- r) If the model aircraft is recovered with the motor running or prior to touch down with the motor stopped.
- s) If the mechanic does not act according to rules 7.k) and l).
- t) If the team has accumulated three warnable offences during the eliminating race (100 laps).
- u) If in the final (200 laps) the team has accumulated four warnable offenses.

## **10. Team Qualification and Classification**

- a) Each competing team must take part in at least one eliminating race to qualify for the finals. The contests will be organised on three eliminating races.
- b) There is a tie between some teams when their best times in any single eliminating race are equal and also between their second best (and so forth in case of three flights). If there still exists a tie between some teams, new eliminating race(s) will be organised between these teams until an adequate number of teams is qualified. In that case, departure will be made by an individual draw.
- c) The three teams having registered the three best times during the eliminating races qualify for the final race.
- d) The competing teams which have participated in the final race will be placed at the head of the classification, only taking into account the times of flights during the final race. Classification of any team that has not completed any race within the official time limit but was not disqualified, shall be ranked according to the number of laps completed in the best race.

If more than one team is disqualified in the final race, they are placed in the order of the number of laps completed. A disqualified team is always placed after any team that has retired without a disqualification.

A competing team that has qualified for the final, and not present at the time of the start of the final competition to begin, or has withdrawn themselves, will be disqualified from the final and not be classified in the finals. The next better team will be the replacement in the finals.

## **11. Judges and Timekeepers**

- a) Two timekeepers, equipped with electronic stopwatches registering at least 1/100th second, with a timing limit of minimum of 15 minutes will be allotted to each team. The stopwatches may be replaced or complemented by a computerized timing system of equal or better accuracy.
- b) The time retained is the average of the registered time, made up to the next upper 1/10th second. A maximum tolerance of 0,18 seconds is allowed between watches. Any single watch exceeding this tolerance shall not be counted in the average.

## **12. Duties of the judges**

- a) The judges is responsible for observing the conduct of each team during the race. Teams will be informed of any offence by a combination of visual and loudspeaker verbal warnings . After a maximum of three offences a team will be eliminated from an eliminating or semi final race. In the final a team will be eliminated after a maximum of four offences.
- b) Warning and cancellation are notified to each team by means of three colours:  
  
Green - First warning (first offence)  
Amber - Second warning (renewal of the first offence or a new one)  
Red - Third warning (renewal of previous offences or a new one)  
For the final only (200 laps), renewal of previous offences for the fourth time or a new offence a team shall be disqualified by the judges verbally announcing "Colour -fourth offence. Disqualified. Land your model immediately".
- c) A time penalty of 5 seconds shall be given to a team starting the engine(s) during the countdown before the starting signal.
- d) In the final, a time penalty of 5 seconds shall be given to a team with the third warnable offences.