# LANDING APPENDIX

## 1. INTRODUCTION

This landing appendix is provided to create a comprehensive set of landing rules for all the flying competitions hosted by the General Aviation Commission (GAC), and may be included as an appendix in the various rules of the GAC.

These rules shall be under the control of the Precision Flying subcommittee.

## 2. GENERAL RULES

The object of the landing test is to assess the pilot's skill in landing.

### 2.1. TYPES OF LANDINGS.

The follow types of landing may be included into the competitions with the following definitions:

#### 2.1.1. LANDING 1: POWER

A landing where the use of power, spoilers, flaps or sideslip is at the discretion of the pilot.

#### 2.1.2. LANDING 2: GLIDE

Abeam the zero line, the engine is throttled back to idle power. Power shall not be used thereafter. Flaps, spoilers and sideslip may be used at the discretion of the pilot.

#### 2.1.3. LANDING 3: FLAPLESS GLIDE

Abeam the zero line, flying with flaps fully retracted, the engine is throttled back to idle power. Power, spoilers and flaps shall not be used thereafter. Sideslip may be used at the discretion of the pilot.

#### 2.1.4. LANDING 4: BARRIER

The competitor will land after passing a marked barrier 2 meters high, placed 50 meters before the touchdown line. Use of power, spoilers, flaps or sideslip is at the discretion of the pilot. Approaches for the obstacle landing, where the wheels are lower than the obstacle before passing over it, are not permitted (creeping).

2.2. Circuits may be left or right hand as defined by the competition management. Circuits for landings 1 and 4 must be above 500 feet AGL. Circuits for landings 2 and 3 must be not less than 1,000 feet or more than 1,200 feet AGL.

2.3. All landings are to be made as close as possible to the zero area, within a strip 12 meters wide and 72 meters long. See Appendix A2. The strip will be marked and aircraft must keep within the strip.

2.4. All wheels, with the exception of the tail-wheel in the case of tail-wheel aircraft, must be marked by two perpendicular white lines (width about 5cm) on both sides of each wheel.

All aircraft main wheel covers (spats) should be removed prior to the landing competition. Any modification temporary or permanent, to the wheels, undercarriage, oleos or shock absorbers which is not approved by the manufacturer and the certification authority, is not permitted and may result in disqualification.

2.5. All landings are to be video recorded, to assist the jury.

2.6. A crosswind condition shall exist when the crosswind component of the wind, (that is the component at right angles to the runway in use), is 8 kts or more. Wind direction and speed shall be measured close to the zero-line by a suitable anemometer at 2 meters high and recorded for each landing.This will provide factual evidence in the case of one-wheel landings, which are allowed only when the chief landing judgehas declared a crosswind condition.The chief landing judge will decide when crosswind condition exist. Competitors will be advised by radio, and a conspicuous flag signal will be placed 30 meters before the zero line to advise competitors.

2.7. The maximum allowed tailwind component is 3 kts.

2.8. If the wind speed near the ground is more than 25 kts, gusts included, flying will be stopped. If the crosswind component, gusts included, exceeds the lowest published maximum demonstrated crosswind or a stated limit, flying will be stopped on the runway in use. The maximum crosswind component for the competition will be announced before the competition starts.

## 3. NORMAL AND ABNORMAL LANDINGS

### 3.1. NORMAL LANDINGS

3.1.1. Touchdown must be on both main wheels with a maximum distance of five (5) meters between main wheel 1 and main wheel 2, except when the international chief judge has decided that a crosswind condition exists. If the touchdown is in or after the zero area and the distance between the touchdown of the main wheels is 5 meters or less, the touchdown point for measurement is the touchdown of the first main wheel.If the distance is more than 5 meters, the touchdown point for measurement is the touchdown of the second main wheel.

3.1.2. The nose wheel must be off the ground at touchdown. Tail wheel aeroplanes must be landed in a configuration where the tail is lower than the horizontal attitude.

3.1.3. Touchdown on or after the zero area is measured when the aircraft is rolling on the ground after all bounces. In case of bounces before or after the line, the touchdown that is counted is that one which gives the highest penalty.

An aircraft is considered bouncing when one or both of the main wheels leave the ground after any touchdown, to a height of more than the diameter of the main wheel, or for a distance more than 15 m. (A jump into a 5 meter box must be calculated this way: Box meters minus 4 meters, minus the measured lift-off point before).

3.1.4. In the case of any part of the aircraft touching the ground before the zero area, the distance measured will be the distance from the touchdown point to the zero line. In the case of a tail wheel landing which is judged to be a three-pointer landing (the tail wheel may roll on the ground for a maximum distance of five (5) meters before the main wheels), the touchdown point of the main wheels shall be measured.

3.1.5. Touchdown on the upwind main wheel only is allowed when a crosswind exists.

3.1.6. Power has to be completely retarded at touch down and only sufficient power is permitted after the aircraft has come to a complete stop, to continue the roll to the end of the landing strip. After leaving the landing strip, the aircraft shall clear the runway.

3.1.7. All approaches and landings must be considered as being safe. If the international chief judge, competition director or his appointed representative is of the opinion that an approach or landing is deemed to be dangerous, flying will be stopped until the jury has made a decision (See A.7.1)

3.2. **ABNORMAL LANDINGS**

Abnormal landings in all four types of landing are defined thus:

3.2.1. Nose wheel touching the ground before the main wheel.

3.2.2. A tail wheel aircraft not in a configuration with the tail below the horizontal.

3.2.3. One main wheel off the ground at the initial touchdown, without authorized crosswind conditions, to a height of more than the diameter of the main wheel.

3.2.4. In crosswind conditions touchdown on downwind main wheel only.

3.2.5. Any part of the aircraft other than the wheels touching the ground.

3.2.6. Retraction of flaps inside landing strip before touchdown.

3.2.7. Touchdown with locked wheels.

3.2.8. One or both main wheels leave the ground, to a height of more than the diameter of the wheel, while nose wheel remains on it.

3.2.9. Any abnormalities (as defined in points 1 to 8 above) after any bounce (as defined in 3.1.3) must be considered to be an abnormal landing.

3.2.10. In the event of a competing aircraft not touching the ground in any of the landing tests or landing outside the strip, he will be penalized. (an aircraft not touching the ground in the landing test, or landing outside the strip)

## 4. SPECIFIC RULES FOR PRECISION FLYING

4.1. The landing test will be run as a separate event to enable the participation of all international judges to judge the event.

4.2. Each landing shall be followed by a full stop. Depending on the situation, the competition director may authorize touch-and-go landings.

4.3. The sequence of landings will be briefed.

4.4. For the calculation of the results in the case of a tie, the competitor with the lowest number of penalties in the first of Landing 3 (Flapless Glide) or Landing 2 (Glide) or Landing 4 (Barrier) will be awarded the place.

4.5. An official landing practice should be organized in order to run a final check of organization, staff, and systems involved in judging of landings. The two landings per pilot are required: Obstacle Landing and Idle Landing without Flaps.

4.6. Landing briefing must be attended by jury, judges, team managers and all competitors; the object being to define procedures, circuit discipline, signals, etc.

## 5. SPECIFIC RULES FOR RALLY FLYING

5.1. Each landing will be from a normal approach where the use of power, flaps, spoilers and sideslip is at the discretion of the pilot.

5.2. If the tailwind component exceeds 5 knots, the pilot will be informed by radio, and the chief landing judge will attempt to change the landing direction. He will inform the competition director if this is not possible, in which case the landing test of that stage will be cancelled.

## 6. SPECIFIC RULES FOR ANR

## 7. PROTESTS

The video recordings of the landing may be used by Chief Judge and two independent International Judges for checking the results of landings before final judging of the landings. After final judging, the video recordings of the landings may be used by the jury when dealing with protests, and may be shown or given to the competitor or team manager.

## 8. SCORING

Rally Rules Scoring

| | | |
|---|---|---|
| White line | | 0 |
| Area "A" | | 10 |
| Area "B" | | 20 |
| Area "C" | | 30 |
| Area "D" | | 40 |
| Area "E" | | 60 |
| Area "F" | | 80 |
| Area "G" | | 100 |
| Area "H" | | 120 |
| Area “X” | | 60 |
| Area “Y” | | 120 |
| Landing out of the landing box or rolling out of the box to the left or right | | 200 |
| Applying power after touchdown, within the landing box, | | 50 |
| Go around without touching ground, (without being forced) | | 200 |
| Go around instead of full stop | | 200 |
| No attempt to land at designated landing field | | 300 |
| Abnormal landing | | 150 |
| Penalties for abnormal landings will be given in addition to other landing; however, the maximum per landing will be | | 300 |

**Precision Flying – Maximum Penalties**

| | 1<br>Normal | 2<br>Idle | 3<br>Idle<br>no flaps | 4<br>Obstacle |
|---|---|---|---|---|
| Maximum penalties per landing | 400 | 200 | 200 | 400 |
| Outside the strip or no landing | 300 | 200 | 200 | 300 |
| Abnormal landing (A.3.10 a to h)) | 200 | 200 | 200 | 200 |
| Rolling out of the landing strip to the side | 200 | 150 | 150 | 200 |
| Power on the ground in the strip **touch and go only** | 50 | 50 | 50 | 50 |
| Non permitted use of power (in the air) | - | 200 | 200 | - |
| Non permitted use of flaps or spoilers (in the air) | - | - | 200 | - |
| Touching, destroying the obstacle or "creeping" over obstacle | - | - | - | 400 |

## 9. ORGANISATIONAL RULES

### 9.1. TRAINING PRACTICE

9.1.1. Landing practice for each competitor may be limited to not more than 2 landings after a navigation practice. Landing practice may be limited in the week prior to the competition week. Each competitor should be allowed 4 landings, in practice, in the competition week and prior to the start of the championship. An appropriate schedule will be prepared by the competition director.

9.1.2. Daily flying should be restricted to 08.00 - 18.00.

9.1.3. Training practice must not be interrupted for display or show practice.

### 9.2. LANDINGS LAYOUT

9.2.1. In locating the position of the landing strip on the runway, consideration should be given to the position of the judges, video camera operators and spectators. Neither judges nor video camera operators should be looking into the sun.

9.2.2. There should be clear distance markers along the runway.

9.2.3. Landing officials should be placed about 5 meters outside the distance markers, and be prepared to run along these markers to define the touchdown point. One landing official should be permanently stationed opposite the zero line.

9.3. It is important that the zero area is clearly marked. The jury will check the visibility of all markers prior to the landing competition.

9.4. Team managers only will be allowed to observe the landings from a position 15 meters opposite the touchdown line if safety conditions and aerodrome regulations so permit.

9.5. Spectators, conditions permitting, should not be allowed nearer than 30 meters of the landing strip. If possible, the spectator area should be fenced off for safety reasons.

9.6. Aircraft ground movements and traffic patterns must be carefully planned and briefed to the pilots. Useful aids are maps or sketches with detailed information.

9.7. Suitable marshals and ground controllers should be located in prominent positions, the ground controller being in direct communication with the competition director.

9.8. The competition director determines the starting order for the landing competition. His decisions are based on factors such as flight safety. Circumstances and capability permitting, the competition director is allowed to change this order for promotional purposes.

9.9. With good management, it is possible to have 3 - 4 competitive aircraft active in the circuit at any one time.

9.10. To provide a steady flow it will be necessary to judge approximately 30 landings per hour. A 10-minute break session for the judges in each hour and a 15-minute break session between each type of landing is advised.

9.11. Consideration should be given to a system of lights or ground signals on the final stages of approach, to signify by either red or green lights whether the competitor is cleared to land or he must go around again.

9.12. Only the international chief judge will be responsible for communicating the results of the competitor's landing to the secretary for entering into the competitor's record sheet in English, being the competition language.

9.13. Video recordings of landings must be arranged, as they are vital to enable the jury to come to a decision, in the case of a protest, based on factual evidence. The video crew should comprise at least two hand-held video cameras located about 10 meters from the runway and positioned about 20 meters before and after the "0" line. Video crews must be trained before the competition to provide the best camera location and viewing angle. A continuous following of the wheels, before, during and after the touchdown, is essential and runway markings must be visible on the videotape to enable final judgment on touchdown point and landing techniques. The video recorders must provide at least one hundred frames per second (100 fps) recording.

9.14. The video playback must be displayed on a TV set with a minimum 21" screen. The equipment must include the facility both of "freezing" and advancing frame-by-frame without picture interference.

9.15. An electronic recording system previously approved by GAC must be used. It must be in conjunction with visual judging. Only in the event of failure of the electronic recording system will visual judging will be used for that group.

## 10. INTERNATIONAL JUDGES AND OPERATIONAL OFFICIALS

10.1. The landing competition will be run under the control of the chief landing judge supported by the official responsible for landings. Each participating country will be invited to provide international judges to officiate under the chairmanship of the chief landing judge.

10.2. The chief landing judge will be responsible for the placing of the individual judges and for the recording of the results of each competitor. The competition director will not participate in judging the landings in any way whatsoever.

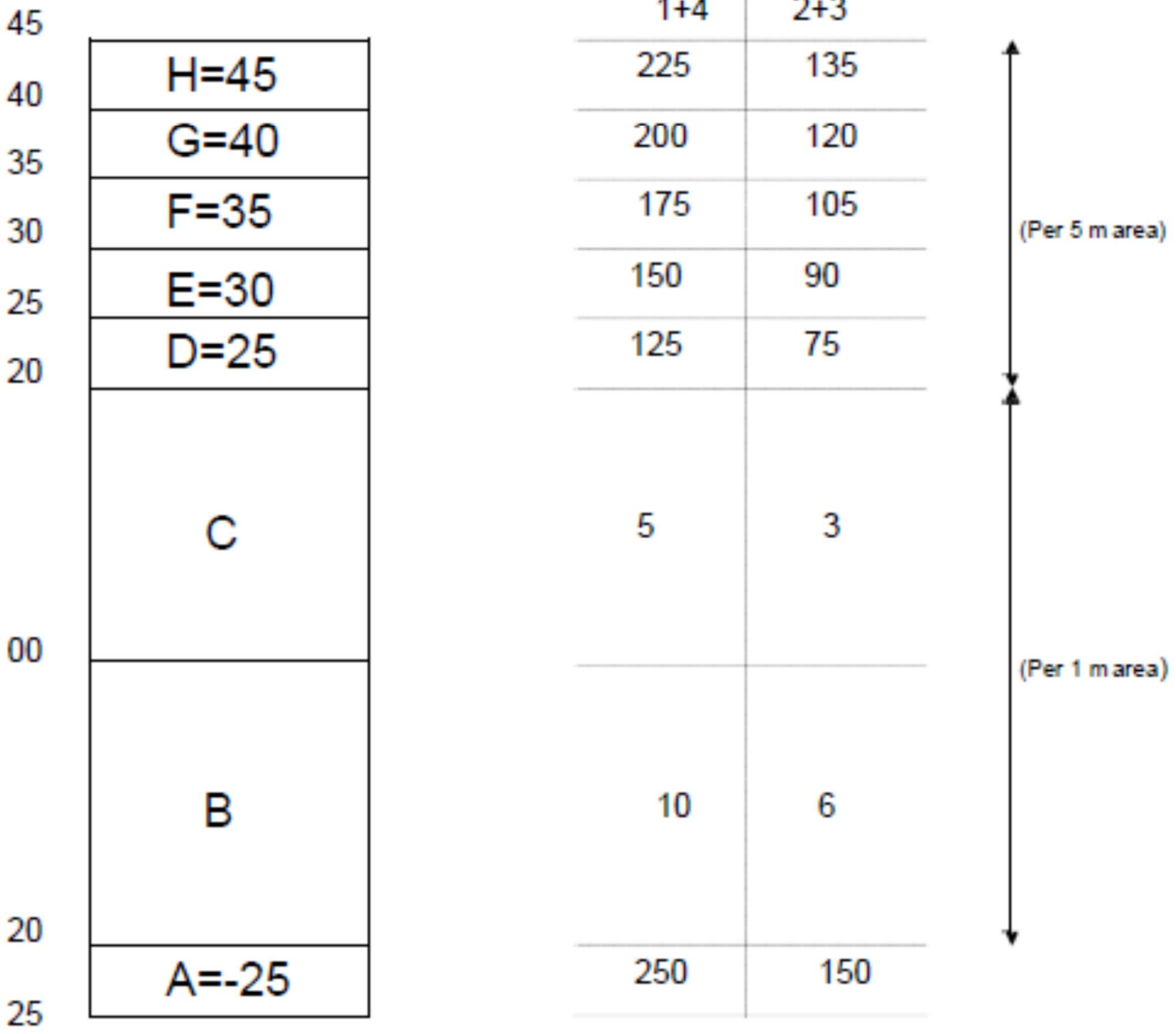
10.3. Judging comments must be made in the competition language (English).

10.4. In the event of the judges not being able to reach a definite decision regarding any landing, then the international chief judge should make the final decision. In the case of an abnormal landing the international chief judge must consult at least two other international judges.

10.5. It should be made perfectly clear that although the jury will be present in the same locality and making their own notes, these are only usable as supporting evidence, should they be required to decide a protest. At no time will they seek to influence any decision made by the judges. However, the president of the jury may, if the opportunity occurs, offer advice to the international chief judge if requested.

PRECISION SCORING

Penalty information for distance:




| Landings | |
|---|---|
| 1+4 | 2+3 |
| 225 | 135 |
| 200 | 120 |
| 175 | 105 |
| 150 | 90 |
| 125 | 75 |
| 5 | 3 |
| 10 | 6 |
| 250 | 150 |

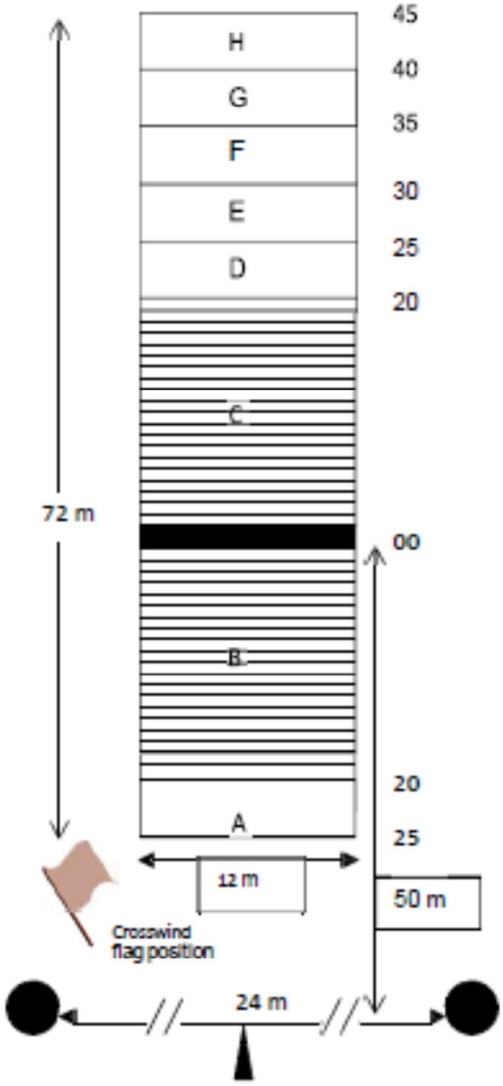
(Per 5 m area)

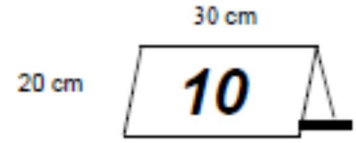
(Per 1 m area)

PRECISION RUNWAY MARKING

## APPENDIX A2

### RUNWAY MARKING INFORMATION




Markers.

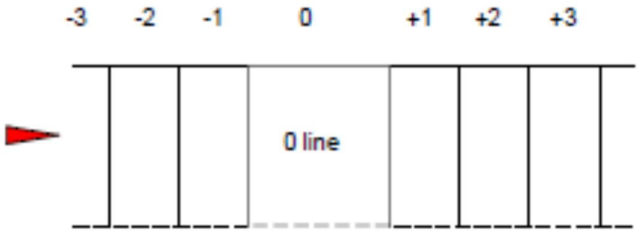
On both sides of the runway, to assist judges and video crew, there shall be runway markers at each 5-meter area till +20 area opposite the correct metre area.

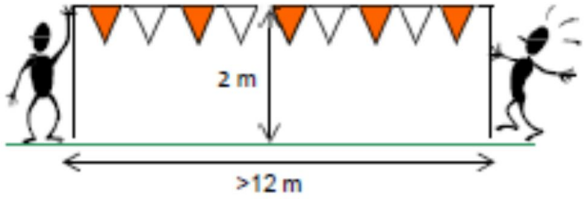
Markers shall be placed per 5-metre area beyond the –20 and +20 metres area in the middle of the correct area

The landing strip.
Each metre must be marked by paint or chalk (on grass) from –20 to +20 metre area, and outside that zone every 5 metre area (see picture). The zero area must be clearly marked.

Approach markers.
Two markers will be clearly positioned 24 meters apart at the 50 metres in front of the middle of the zero area. Aircraft have to approach in between these markers on their final approach path. Approaching from outside may be considered as dangerous

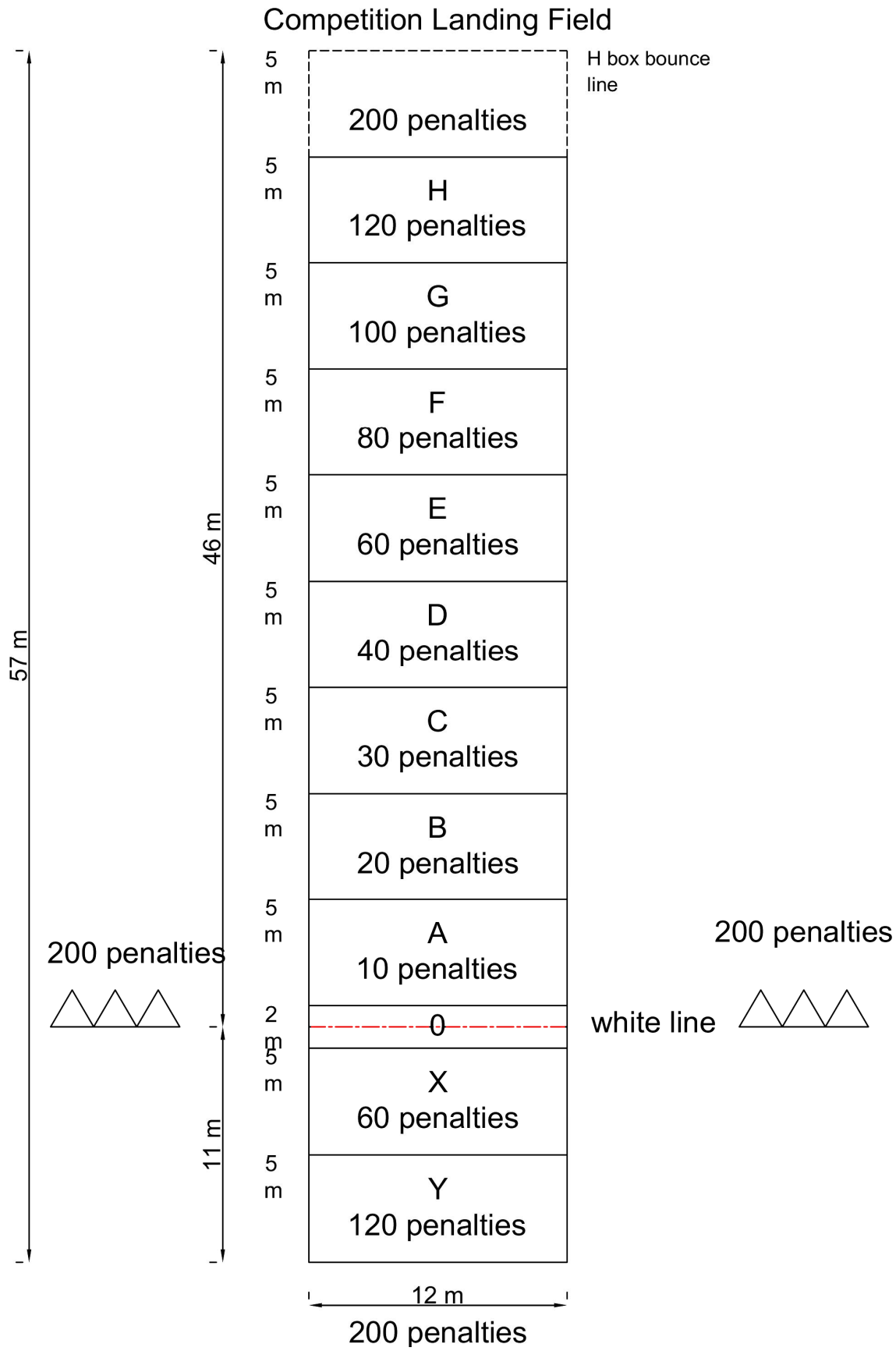
Zero area specification
There is an imaginary zero line. The zero area is per full metre on each side of this line. Outside the zero area scoring will be done per one meter area till the –20 and +20 meter area and beyond this per 5 meters till the limit of the landing strip




Obstacle specification
This is positioned 50 meters in front of the middle of zero area.
Thin cotton or nylon line with cloth flags in colour
Do not tie the line to poles!
It should slip off easily.
The height ( 2 meters ) should be checked at the runway centre line.

# RALLY LANDING BOX



# COMPARITIVE LANDING BOXES