

2015 Club 40 Rules for the Airplanes- Section 16 (Version 12/20/2014)

16.0 Classes (in the order they were established)

16.1 Club 40 Silver

16.1.1 Airframes:

The World Models Sky Raider Mach II ARF or ARC, per instructions

The World Models LA Racer 40 ARF, per instructions

The Sanaloma Laser, Inc, Club 40 Raider Kit, uses WM hardware or allowed substitutes.

All factory versions are approved. You may modify older versions to match current factory versions. You may use wooden blocks to modify the new LA Racer to install the older wire gear.

You may Mix and Match fuselages, wings, landing gear and empennages

16.1.2 Minimum weight: Minimum weight without fuel is 4 lb. and 8 oz.

16.1.3 Engines:

Recommended: Thunder Tiger Pro .40 BB ABC w/Muffler

Acceptable Alternatives: SuperTigre GS-40, GMS .40 ABC BB, Evolution .40NT and .40 NX, OS .40 BB sport engines or any clones/copies of the listed engines

16.2 Club 40 Bronze:

16.2.1 Airframes: See 16.1.1.

16.1.2 Minimum weight: Minimum weight without fuel is 4 lb. and 4 oz.

16.2.3 Engines:

Thunder Tiger GP-40 or GP-42, OS .40 or 46 LA, OS .40 FP, Magnum .40 GP, Tower Hobbies 40 or clones of the listed engines are allowed.

16.3 Club 46 Gold

16.3.1 Airframes: See 16.1.1.

16.3.2 Minimum weight: Minimum weight without fuel is 4 lb. and 8 oz.

16.3.3 Engines:

Sport engines of .46 cubic inch maximum displacement with a maximum street price of \$160.

Pre-approved Engines: O.S. 46AXII, O.S. 46AX, O.S. 46FX, Thunder Tiger Pro 46, SuperTigre GS-45 Dual BB ABC, GMS .46 ABC BB, Evolution .46NX, Magnum XLS 46, ASP S46All, or any clones/copies of the listed engines, or any Club 40 Silver engine as listed in 16.1.3.

16.4 Requirements:

16.4.1 Airframe:

A minimum of 3 hinges per aileron, 4 per elevator and 3 per rudder are required.

Wheels must have minimum diameter of 55 mm and minimum width of 20 mm. Hint: Stock wheels (60 mm) or DuBro 2 1/4 Low Bounce (57 mm)

Planes must have canopy, original or very similar.

Pushrods, if replaced, must exit the fuselage sides in the same position as original specification.

Servos controlling the pitch, roll and yaw functions shall be of adequate strength for the weight and speed of the aircraft. Two-screw servos especially must be mounted securely and of adequate strength.

Batteries shall be of adequate capacity for the size and number of servos used.

16.4.2 Engine, tank, Prop:

All engines must be stock, with stock carburetor, and muffler with original baffle, if any.

Engine mounts must be of the beam type. No backplate mounts allowed.

Planes must be capable of standing at idle for 30 seconds and being shut off on command.

Props shall be unmodified and commercially available. Balancing only will be allowed as defined in Section 7.5 of AMA Pylon Regulations or RCPRO Club 40 Procedures.

No "bubbleless" tanks. The tank may only be pressurized with muffler pressure.

16.5 Allowed Modifications

16.5.1 Airframe: Assemble according to the manual, with the materials provided, except for:

Recovering plane is allowed

No airframe modifications other than repairs or reinforcement.

Dual aileron servos are allowed.

Control surfaces may be hinged with the supplied metal or CA hinges, other CA hinges, plastic hinges or hinge points (Robart or similar).

Hinge lines may be sealed using tape, stick-on plastic covering, or iron-on plastic covering.

Do not remove any wood except to clear for Sport muffler or move throttle servo to the side.

16.5.2 Propulsion System:

Shimming the engine mount to change the thrust line is acceptable.

Parts, which may be changed and may come from any source: Bearings, Gaskets (& head shims), Glow plug, head and crankcase bolts, propeller nut & washer and Remote needle valve assembly.

16.5.3 Prop / Spinner:

1. Any spinner of not more than 2.5 inches in diameter is allowed.

2. Spinner weights that fit inside a spinner, Heavy Hub and aluminum Safety Spinner nuts are allowed.

16.5.4 Fuel tank:

Any brand of clunk-type tank may be used. Tanks may be raised or lowered to allow for consistent engine runs.

16.5.5 Hardware:

Control horns, push rods and linkages may be replaced with similar hardware.

No EZ-type connectors on ailerons, elevator or rudder. They are only allowed on throttle. Also see section 8, especially a. and i, of AMA Pylon Regulations or RCPRO Club 40 Rules.

Nylon wing bolts are allowed.

You may substitute machine screws, nuts and screws of same or larger diameter (#4 SAE is fine)

Race CD will have the final say on legality of "modified" aircraft.

Inspectors may use templates or a "standard" aircraft. See Technical Inspection Form

Any modification deemed to be an attempt to provide for speed enhancement, shall not be allowed.

**RCPRO Club 40
Racing Regulations & Procedures
2015**

(Version 12/16/2014)

**These regulations are derived from the
AMA Radio Control Pylon Racing Regulations
Rules Governing Model Aviation
Competition in the United States**

RCPRO stresses that all flying shall be done in compliance with the AMA Safety Code.

RCPRO recognizes three (3) classes of Club 40 Pylon Racing, Club 40, Club 40 Bronze and Club 46. All are intended for multi-channel RC aircraft powered by conventional two-stroke glow engines. The task consists of an ROG (rise-off-ground) takeoff (or, in the case of the RCPRO Warbird Racing concept, an air start) followed by left turns around a closed course marked out by pylons. The builder of the model rule does not apply.

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1. General

1.1. Cross-references. The AMA Safety Code, including documents 530 and 540-B and FCC regulations covering the pilot and his/her equipment, shall apply.

1.2. Penalty for infractions. Unless otherwise stated, the penalty for any infraction of these rules is disqualification from the contest.

2. Defined Terms

Backplate mount: A backplate-type, radial engine mount is not allowed. Must use beam mounts.

Black flag: A signal from the starter that an aircraft is disqualified from the heat in progress and will receive a score of zero points. A pilot given the black flag must immediately fly his or her airplane to clear airspace away from the course and land as soon as it is safe to do so.

Commercially available: Prop can be obtained within 14 days by any consumer at a price that is independent of whom the consumer is.

Engine: A two-stroke cycle, glow ignition, reciprocating-piston internal combustion engine. For purposes of events requiring stock or commercially available engines and parts, the "engine" is defined as the complete unit, ready to run, needing only propeller, fuel, and starting voltage

Engine displacement: The total swept cylinder volume of the engine.

Pressurized fuel system: Any system, other than a simple, continuously open conduit between the fuel tank and a muffler or pipe, by which fuel is delivered to the carburetor at greater than ambient atmospheric pressure. A fuel tank containing a flexible bladder that prevents bubbling or foaming of the fuel but does not generate pressure is not a pressurized fuel system.

Remote needle valve: A manual fuel-metering device located on the fuel feed line, between the fuel tank and the carburetor or venturi. The sole purpose of the remote needle valve shall be to regulate the amount of fuel flowing from the tank to the engine. A device that supplies pressure to the fuel system, or is adjustable by radio control, or combines any other function with the metering of fuel is not a remote needle valve. The use of a remote needle valve does not constitute modification of the engine's carburetor or venturi, and is encouraged in all events.

Stock: Unmodified.

3. Measurement Methods and standards

3.1. Engine Displacement. Engine displacement (total swept cylinder volume) is calculated by multiplying the cross-sectional area of the cylinder bore, in square inches, by the stroke of the piston from bottom dead center to top dead center, in inches, using the following formula: $(1.2 \times \text{cylinder diameter}) \times (1.2 \times \text{cylinder diameter}) \times 3.1416 \times (\text{total piston stroke})$.

3.4. Projected Span. The projected span of the wing is the straight-line distance from tip to tip, disregarding dihedral.

3.6. Weight. Weights specified are for the complete aircraft, ready to fly except for fuel. At least one aircraft from each heat shall be weighed immediately after the heat with any residual fuel remaining in the tank. In addition, the Contest Director (CD) may require any aircraft to be drained of fuel and weighed at any time.

3.8. Wing thickness. This may be determined using a "no-go" gauge with an opening of the specified thickness, or by comparison with a "standard" airplane.

4. Safety

4.1. General. Consideration of safety for spectators, participants, and contest personnel is of the utmost importance. Hazardous flying over the racecourse or any flying over controlled spectator areas or pits during competition is a black flag offense. Alcoholic beverages shall not be allowed in the pits or on the racecourse. Intentional hazardous flying, unsportsmanlike conduct, or consumption of alcohol during competition shall be cause for immediate disqualification from the contest. 72 MHz transmitters shall be equipped with conventional, collapsible antennas made from telescoping sections of metal tubing or an easily removable, non-collapsible antenna. Contestants shall keep their transmitter antennas collapsed or removed except when flying or preparing to fly at the starting line. Non-removable, non-collapsible antennas are prohibited. 2.4 GHz antennae do not need to be removable or collapsible.

4.2. Crowd control; protection of on-course personnel. All RC Pylon events and all other events, regardless of sanction, in which engine-powered RC model aircraft are flown in speed competition over a closed course shall be governed by the following safety procedures:

4.2.1. Every person going onto the racecourse or between the designated sideline and the racecourse (see racecourse diagram), and all officials, whether on or off the course, shall properly wear a helmet approved by OSHA, DOT, ANSI, SNELL, NOCSAE or other recognized organization that certifies safety equipment.

4.2.2. Pit and spectator areas shall be separated from the racecourse by at least the minimum distances shown in AMA document 540-B. Every person desiring to go within 275 feet of the pylon line shall first be required to sign a "Waiver of All Claims, Release of Liabilities, and Indemnity Agreement for Radio Control Pylon Events" on a form supplied by AMA Headquarters (HQ). It is the CD's responsibility to return all of such signed waivers to HQ at the conclusion of the event.

4.2.4. All judges, timers, lap counters, and other racecourse officials shall be located in compliance with document 540-B

In addition, all participants and racecourse workers shall be briefed on the safety aspects of their involvement in the event and instructed in the proper performance of their duties and the use of all safety equipment, communications systems, and timing devices.

4.3. Absolute authority of CD. During a racing event, an unforeseen situation may arise that requires immediate controls. Therefore, the CD is authorized to initiate any special procedure he or she deems necessary to eliminate a situation that may be considered unsafe.

4.4. Authority of the Starter. The starter acts for the CD in all matters arising on the racecourse. Unless overruled by the CD, the starter's actions and decisions concerning the start, finish, and operation of each heat are final.

5. Challenges to Legality

5.1. Challenge by contestant. Any contestant may have another contestant's engine or aircraft inspected for compliance with the rules by posting a challenge fee of \$25 cash with the CD. As soon thereafter as is practicable, the CD and at least one other person appointed by the CD shall inspect the challenged engine or aircraft. If the engine or aircraft is found to be legal, the challenge shall be dismissed and the owner of the challenged engine or aircraft shall be given the \$25. If the engine or aircraft is found to be illegal, the owner shall be disqualified from the contest and the \$25 shall be returned to the protester.

5.2. CD's option. At any time, the CD or the CD's designee may inspect an engine or aircraft entered in the contest without requiring the posting of a challenge fee.

6. Availability of Engines and Parts

All of 6 removed. ,We are using easily available engines.

7. General Model Aircraft Requirements

7.2.1. The engine of every aircraft shall be capable of shutting off the engine by transmitter command.

7.2.2. A pilot who can not shut off his engine on command after a heat shall be given one warning. Upon a second instance of shutoff failure, the pilot shall receive a score of zero for the heat. Upon a third such instance, the pilot shall be disqualified from the contest.

7.3. Flight controls.

7.3.1. Steering: Every aircraft shall be equipped with a positive means of steering on the ground using a dedicated, operable servo(s). In addition, while in flight, all aircraft shall be positively and independently controllable in pitch, roll and yaw modes using dedicated, operable servos. Mixing of control functions is permitted so long as the aircraft remains positively and independently controllable in both pitch and roll modes at all times while in flight.

7.3.2. Fuel/air mixture: There shall be no adjustment of the engine's needle valve from the ground while the aircraft is in flight. As all engines are equipped with an RC carburetor, in-flight adjustment of the engine's fuel/air mixture by partially throttling back is permissible.

7.4. Spinner or prop nut. On all aircraft, the front end of the engine crankshaft shall be covered with a rounded spinner or safety nut.

7.5. Propeller.

7.5.1. Propellers shall be fixed-pitch, with two (2) blades of equal length, area, and shape. Metal propellers are prohibited. Where wood is the material specified, the propeller shall be made from a single piece of wood. Wooden propellers may be finished with a clear coating for purposes of waterproofing or balancing only.

7.5.2. This event requires stock, commercially available propellers. However, the following modifications may be made without penalty:

a. One blade may be sanded on the top (front) side only for balancing.

b. One side of the hub may be sanded for balancing.

c. 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.

d. Edges and tips may be sanded, but only as much as necessary to remove sharp molding flash.

7.6. Airworthiness.

7.6.1. General. Materials and workmanship shall be of satisfactory standards. The CD or the CD's designee may refuse permission to fly or may disqualify any aircraft which, in his or her opinion, is not safe and airworthy in terms of materials, workmanship, radio installation, radio function, design details, or evidence of damage.

7.6.2. Repairs. Any aircraft that has been damaged after a safety inspection or has a known history of problems shall not be permitted to fly until it has been satisfactorily repaired and reinspected. Materials used for repair may come from any source. However, if a pilot chooses to completely replace a damaged wing or fuselage, the replacement wing or fuselage may come only from that pilot's alternate aircraft. In other words, a pilot may not use more than two wings or two fuselages, or both, during one contest.

8. Preflight Inspection of Aircraft

During registration, all aircraft shall undergo a safety inspection to ensure that, at a minimum, the following requirements have been complied with:

a. Push/pull rods or cables, control horns, and servo leads shall be installed in such a way that they will not become disconnected in flight. Clevises shall be physically held closed by short pieces of fuel tubing or similar material. Metal clevises shall be protected from deterioration of the threads due to vibration by means of a jam nut, thread treatment such as Loctite® or Vibra-Tite®, or a similar method. Ball-links shall be tight.

b. All screws holding the engine to the mount and the mount to the firewall shall be in place and secure.

c. The radio receiver and battery pack shall be surrounded by soft foam rubber or other vibration-dampening material and adequately protected against contamination by engine exhaust, raw fuel, or fuel residue.

d. Batteries shall be of adequate capacity for the size and number of servos used

e. Servos controlling the pitch, roll and yaw functions shall be of adequate strength for the weight and speed of the aircraft. Two-screw servos especially must be mounted securely and of adequate strength.

f. Control surfaces shall be firm on the hinge line without excessive play. Safety inspectors shall be alert to the danger of excessive play whenever electronic servo throw reduction is used in combination with a mechanically inefficient linkage.

g. All screws holding the servos to the servo rails or trays and holding any trays to the airframe shall be in place and secure. Rubber grommets shall be used on all servos designed to accept them. If the heads of the servo mounting screws are small enough to pull through the grommets, washers shall be used to prevent this.

i. Pushrods shall have only one threaded end that is free to turn. The other end shall consist of a "Z" bend, an "L" bend with keeper or collar, a metal clevis that is soldered on, or a threaded ball-link that is glued or otherwise secured so that it cannot turn.

j. Wings, if removable, shall be securely attached to the fuselage with bolts or screws.

k. Wheels shall be securely attached and shall turn freely.

l. The aircraft shall be free of stress cracks and any other indications of structural damage.

9. Number of Aircraft Entered

Each pilot may enter up to two aircraft. If two are entered, both shall be inspected.

10. Aircraft Marking

RCPRO member number is preferred. NMPRA markings may be used, if desired. See the AMA Pylon Rules, section 10.

11. Advertisements Advertising of an RCPRO Club 40 racing contest through any media should include the following information

a. RCPRO Club 40 classes that will be run.

b. Airframe and engine rule variations, if any;

c. Course length and number of pylons, if different from the 2-pylon, 400-foot, and 10 lap course.

d. If fuel is supplied; the nitro content and makeup of the lubricant content.

e. Brand and size of propellers to be supplied, if any

f. Whether ROG or Air Start

12. Test Flying

a. Only during times allowed by the CD.

b. Some form of radio frequency control shall be observed.

c. All persons, other than the pilots and their callers who are actually test flying, shall remain behind the designated sideline.

d. Participants shall be required to wear helmets.

13. Operation of the Race

(Refer to AMA Safety Document 540-B and AMA or RCPRO Addendum A, *Racecourse Personnel and Their Duties*.)

13.1. Racecourse. (Two Pylon)

13.1.2. Pylon height shall be a maximum of 20 feet and a minimum of 15 feet. Pylons shall be equal in height. There shall be no pilots' helpers at any of the pylons or near any judges.

13.1.6. Lap counters and timers are to be located a minimum of 175 feet from the pylon line and looking toward the start/finish line

13.1.7.1. ROG Engine Starting Procedures: Prior to starting the engines, the planes will be held to allow identification by cut judges and lap counters.

A. Pilots have a maximum of one (1) minute to start their engines.

B. Once the starting period has elapsed, those started in the time allotted, shall stand at idle for 30 seconds.

C. At the end of 30 seconds, there may be a standing race start, or alternatively, the planes may be restrained by the pilots' callers while the throttles are brought to full in preparation for start..

13.1.7.2. RCPRO Warbird-style Engine Starting Procedures (air start):

(from RCPRO Warbird Rules)

After the aircraft flying in the heat have been identified to the pylon judges, and radios have been checked to insure they are operating, the starter begins a 90-second timing clock. Pilots and their callers then have 90 seconds to get their engines running. Pilots are allowed 1 takeoff. Once either of their aircraft main wheels leaves the ground a takeoff has been made. If during the 90-second window an engine dies and a takeoff has not been made, the plane may be restarted.

Two common scenarios that allow an engine re-start if time is remaining on the 90-second clock.

1. The engine dies when the pilot attempts to takeoff.

2. The plane noses over and stops the engine.

Take Off Procedures & Direction:

Contestants may take off on a first-come, first-served basis, but the starter will control access to the runway. Callers will carry, or guide, the pilot's aircraft onto the runway, and should take great caution when handling aircraft with the engine running, so as to not pose danger to themselves or others. Taxiing of aircraft onto the runway to take off is prohibited. The starter will determine what direction aircraft must use to take off. This will generally be dictated by the wind direction. If the take off direction is from right to left, the aircraft must be carried to a position on the runway beyond the left most pilot station and released from there. This is a safety procedure to help compensate for aircraft that tend to turn to the left on take off, due to engine torque and/or wind.

13.1.8 Heat Start procedures.

13.1.8.1. ROG Heat Start Procedure. At the end of the idle period, any pilot who is not prepared for takeoff (facing #1 pylon with both hands on the transmitter) is disqualified from the heat and shall not be allowed to fly or run his/her engine in the course. In addition, this pilot will not be granted a "refly" as described in 13.1.15. The starter shall check that all pilots are in position and ready to control their aircraft before giving the signal to launch. Each pilot shall confirm his/her "ready" status by a nod of the head or other agreed signal. However, the pilots are only entitled to one, immediate confirmation. Timers' clocks shall be started with the first drop of the starter's flag. No more than four aircraft per heat are allowed. Except in Warbird style racing, all takeoffs shall be ROG. No mechanical device shall be used to assist in launching the aircraft. A mechanical stooge may be used to hold the aircraft until they are released by the starter to start the heat. Laps shall be flown in a counterclockwise direction, with all turns to the left

13.1.8.2. Warbird Style Heat Start Procedure.

(from RCPRO Warbird Rules)

An audible 45 second countdown is used to start the heat. For consistency, it is best to use a recording but the flagman could speak the countdown into a PA system. The flagman or designee will announce as the clock counts down to 30 seconds, 15 seconds, and then countdown from 10 seconds to the start of the heat. The heat begins when the clock reaches zero and the starter drops the green flag. At this time all aircraft are to be to the left of the start/finish line. Failure to meet this requirement is a jumped start, and results in disqualification for the heat. Loops to avoid jumping the start are not permissible. Pilots, who find they are about to jump the start, can execute a legal sharp left pitchout turn circle back to the start/finish line.

The flagman determines when the countdown clock is started. The objectives are to get the heat started in a safe and timely manner. The countdown clock may be started before the 90 second engine start clock has ended. It may also be started some time after the 90 second engine start clock has ended. The flagman should start the 45 second countdown when:

1. All of the aircraft that are allowed to takeoff have done so.
2. All of the aircraft have had ample time after takeoff to reach flying altitude and get in the traffic pattern.

Here are the 2 extreme scenarios for starting the 45 second clock:

1. All aircraft get their engines started almost immediately and takeoff quickly. The countdown clock is started before the 90 second engine start time clock ends.
2. All aircraft get their engines running just before the 90 second clock ends. The countdown clock cannot be started until all aircraft meet conditions 1) and 2) above. This could be well after the 90 second clock ends.

13.1.8.3. Unless otherwise specified, (for example, an RCPRO Warbird style air start) the following starting procedure shall be used. Lane assignments shall be determined by drawing lots or by another random method at the start of each heat. In 4-plane heats, the aircraft shall be flagged off the starting line in two groups, the first group being the aircraft in lanes #1 and #3 and the second group being the aircraft in lanes #2 and #4. The starter shall use two distinct motions of the starting flag to signal both groups approximately one-half (1/2) to one (1) second apart.

13.1.10. If equipment and/or personnel is available, aircraft are to be signaled the moment they break the plane ("gate") established by the 2 pylons and the flaggers' positions. **(See 13.2.2.b)**

The judges shall use an appropriate method to notify pilots of cuts. If possible, such notification shall be simultaneous; however, it is not grounds for a refly if the pilot does not receive notification of a cut before the completion of the heat.

13.1.11.1. AMA-Style cut procedures. If a pylon is cut, that lap shall not be counted. In addition, a cut penalty shall be assessed for any flying over the designated sideline, pit, or spectator area or in "no-fly" zones clearly identified at a pre-race pilots' meeting. A pilot who cuts twice in the same heat shall receive a score of zero points and, if both cuts occur before the last lap, the starter shall give that pilot the black flag.

13.1.11.2 RCPRO Warbird-Style cut procedures

Effect of cuts on Points Awarded- (from RCPRO Warbird Rules)

If an aircraft cuts one pylon, by not flying past it, that aircraft will only receive 1 point, regardless of finish position. Any aircraft cutting more than one pylon will receive no (0) points for that heat. Aircraft finishing without cuts behind aircraft receiving cuts, will be have their finish position advanced one place in their standing for each aircraft ahead of them that received cuts. The following four-plane heat example illustrates the point scoring system:

- 1st place finisher with 1 cut – 1 point
- 2nd place finisher with 2 cuts – 0 Points
- 3rd place finisher with no cuts – 4 points
- 4th place finisher with no cuts – 3 Points

3.1.12. AMA Style: Pilots, whose planes move forward before their launch signal, shall receive a cut for that heat. A blatant early takeoff is a black flag offense. In the event of a midair or takeoff contact between aircraft, or at any other time during the heat, the starter is empowered to black-flag any pilot whose aircraft may be damaged or whose flying becomes erratic or dangerous. This decision is entirely at the discretion of the starter and is not subject to protest.

13.1.13. The starter may interrupt a heat in progress at any point if he or she believes that an unsafe condition exists. Unsafe conditions include, but are not limited to, persons or vehicles approaching the racecourse; full-scale aircraft in the area; sudden wind, rain, or lightning; or an out-of-control model. A heat that is stopped due to unsafe conditions shall be reflowed at the earliest convenience of the officials and contestants, preferably before the beginning of the next round.

13.1.14. Aircraft shall not fly lower than the tops of the pylons at any time except for takeoff and landing. A pilot flying below the top of a pylon more than once in any heat (for example, below the top of #1 twice, or once below the top of #1 and once below the top of #2) shall be warned once, during or after the heat in which the low flying occurs. Another such violation in any later heat shall be cause for a black flag. Determination of low flying shall be made by the starter and is not subject to protest.

13.1.15. In the event of a dead heat, where the finish order of a heat is disputed or scoring equipment failure occurs and a clear-cut decision cannot be made as to the outcome of the heat, the heat shall be declared void and rescheduled for another attempt ("re-fly"). The re-fly shall be held at the earliest convenience of the pilots and officials, preferably by the end of the round during which the void heat was originally scheduled. All pilots who were originally scheduled to fly in the void heat shall be called up again for a re-fly. A pilot will not be granted a re-fly under the following conditions:

1. If a pilot is not ready for flight prior to the engine starting period elapsing.
2. If a pilot receives a zero in the original heat not as a result of a dispute or scoring equipment failure. (Examples of a zero not as a result of dispute or scoring may include but are not limited to: nose over on take-off, mid air collisions, and double cuts.) This situation will be decided by the starter. Except for zero earned as a result of items 1 and 2, none of the prior scores or results from the void heat shall carry over.

Race Operating Methods

13.2.2. The operation of a two-ylon race may be conducted by either of the following methods:

- a. Method 1:** Requires a starter, four (4) lap counters and two (2) cut judges (a minimum of seven (7) people). Cut judges are stationed in line with the pylons. They record cuts and relay them to the starter. Therefore, the responsibility for flying the proper distance lies solely with the pilot and his or her caller.
- b. Method 2:** This is the same as Method 1 except it requires flaggers for each aircraft. They signal (by flag, shutter or light) when each aircraft has passed the respective pylon and record cuts as in Method 1. This method requires a much larger number of workers including an extra communications person standing with each group of flaggers.

14. Heat matrix. Note: The following instructions assume that four-plane heats will be flown. Two- or three-plane heats may be a better choice in situations where there are not many entries, not enough racecourse workers, a narrow runway, or inexperienced pilots. In any case, the number of columns in the matrix always must equal the number of airplanes per heat.

Divide the entries into four columns of separate frequencies or groups of frequencies so that each frequency appears in only one column. Column totals should be adjusted so that the number of entries in each column is as equal as possible. Pilot numbers should be assigned according to the following matrix. If a particular column has less than the indicated number, simply skip that number. Use the matrix schedule to set up the heats for each round. All pilots shall be given an equal number of opportunities to race

15. Scoring

15.1. Points per heat, AMA style. After each heat, points shall be awarded based on the order of finish. If the matrix is set up for four-plane heats, the result is four (4) points for first place, three (3) points for second place, two (2) points for third place, and one (1) point for last place. If the matrix is set up for three-plane heats, the winner receives three (3) points, second place two (2), and last place one (1) point. If the matrix is set up for two-plane heats, the winner receives two (2) points and second place receives one (1). Zero points are awarded for a no-start (DNS), failure to complete the heat (DNF), double cut (XX), or black flag (DQ).

15.1.a. For races with more than 8 participants, we heartily recommend Paul Herman's NMPRA matrixing and scoring program and the NMPRA JudgeTimer program for lap counting.

15.1.1. RCPRO Warbird Racing style points reduction procedures. Check 13.1.11.2)

15.1.1.a. For races with more than 8 participants, we heartily recommend Paul Herman's RCPRO Warbird matrixing and scoring program.

15.2. Adjustment of the matrix during the contest. Sometimes, attrition or other factors may result in a number of "bye" or solo heats. In such a case the CD may be tempted to rematrix the remaining entries. Remember that consistency is part of the task of racing, and depriving a contestant of an easy win when competitors are not prepared to come to the starting line alters the task. Therefore, rematrixing should only be done at the completion of a round, and even then only after a pilots' meeting to obtain the pilots' informed consent to the decision.

15.3. Ties and flyoffs. The winner of the event is the pilot who has accumulated the most points after the conclusion of all heats. If time permits, and there is no frequency conflict, ties shall be broken by a flyoff race. Otherwise, the best single race time shall be considered in determining final placings. If a prize is to be awarded for the best single race time of the event ("fast time trophy"), race times achieved during flyoff races shall be eligible for the fast time trophy

15.4. "Mains" or "Features". In the very last round of the day, all remaining racers may be ranked according to points or fast times and race in "Features/mains". This should result in closer, more exciting races.

We encourage all RCPRO Club 40 race promoters to consider use of the NMPRA JudgeTimer, sometimes called Judgeman, program for lap counting and timing. It may be downloaded FREE from the NMPRA site. You can test it using your mouse or keyboard input. In actual use, you will need push button signalers for the lap counting personnel. There is an article in the RCPRO forums on how to do this quite easily.

ADDENDUM A: RACECOURSE PERSONNEL AND THEIR DUTIES (Derived from the AMA document of the same name) Version 2007-2015

The material presented here is intended to “flesh out” the bare bones of the rules in a way that is helpful and readable. New CDs and racecourse workers should look here first for answers to frequently asked questions about how to conduct an RC Pylon race.

Please note, the suggestions contained in this addendum are not “rules,” however, experience has shown that following these suggestions greatly improves the odds of conducting a race that complies with the rules and that contestants will consider fair and enjoyable.

Additional information, as well as illustrative diagrams and photographs of racecourse equipment, may be found in the NMPRA’s *Pylon Racing Procedure Guide*. Contact AMA Headquarters for information about how to obtain a copy.

1: Personnel Overview.

1.1: Three Pylon: In addition to the CD, the personnel required to fully staff a three-ylon race at which four-plane heats will be flown consist of the following:

Starter

Assistant starter

Four timers/lap counters

Four pylon #1 flaggers

Pylon #1 chief judge

Pylon #2 cut judge

Pylon #3 cut judge

Pit boss

Scorekeeper

Fueling station supervisor

Transmitter impound supervisor

This brings the total to 17. Some of these positions can be combined if necessary. For example, an experienced starter may be able to get along without an assistant. The scorekeeper can double as pit boss. Fuel and transmitter impound functions can be combined so long as strict attention is paid to ensuring that all transmitters brought to the impound are turned off.

At smaller meets, the crew can be further reduced by one timer/lap counter and one pylon #1 flagger if the aircraft are flown in three-plane heats rather than four-plane heats.

1.2: Two Pylon:

1.2.1: To normally staff four plane heats:

Starter.

Four lap counter/timers.

One pylon #1 cut judge.

One pylon #2 cut judge.

Score-keeping official.

This totals 8 individuals.

For small events, the pilots from the previous heat can be the lap counters/timers and the score-keeping official can be the starter. That totals 3 officials and at least 8 pilots.

1.2.2: Also, three plane heats would require a minimum of 3 officials and 6 pilots.

Additional club members volunteering to be lap counters/timers will allow a race with less than 6 pilots participating.

2. Starter and Assistant Starter. The starter’s primary duties are to signal the start and finish of each heat, coordinate the efforts of the other racecourse workers, and transmit the scores and times from each heat to the assistant starter or scorekeeper.

The starter should be equipped with the following:

(a) A clipboard containing heat result sheets, in sequential order, with the pilots’ names filled in and blanks for each pilot’s finish position, number of cuts, official time, and points earned for the heat;

(b) A signal flag, preferably one bearing the classic black-and-white checkerboard pattern; and

(c) A walkie-talkie or headset radio.

(d) A bullhorn to repeat the cut information, so the Cut judges know it was received, and the pilots know it occurred.

Other helpful accessories are some numbered dice or cards for random assignment of aircraft to starting lane positions, and a large starting clock with a clearly visible sweep hand.

The assistant starter’s primary duties are to help the starter deal with the paraphernalia listed above (chiefly the clipboard) and to act as a second set of eyes and ears for the starter in case of a close finish or other complication.

The starter and the CD should not be the same person, so the CD can act as an impartial arbiter if questions arise concerning operation of the race.

The starter should stand ahead and to the left of the starting line, as viewed from the pilots standing area facing pylon #1. Before each heat, the starter should direct the pilots or callers to hold up the aircraft one by one, so that all the racecourse workers can clearly see and identify them. If wing tags are not used, the starter should then broadcast (via walkie-talkie or bullhorn) a unique identifying number or color for each aircraft.

After identifying the aircraft, the starter should remind the pilots to make sure their transmitters and receivers are turned

on and functioning properly. It is a good idea to ask to see a “wobble” of confirmation from one of the control surfaces on each aircraft. After that, the starter announces, “You’re on the clock,” and the starting procedure for that heat is ready to begin.

If one or more pilots have trouble starting their engines, the starter should not delay the launch signal. To do so would unfairly penalize those who got running promptly by allowing their engines to overheat. However, even if the pilots in the first of two groups in a staggered start (see paragraph 13.1.9.) are unable to go, the pilots in the second group still must wait for the second launch signal.

A good way to signal the two groups for a staggered start is to press the tip of the starting flag against the ground as the starting clock winds down, then abruptly raise the flag for the first launch signal. This prevents any chance of flinching ahead of time, and makes it easy to immediately drop the flag downward for the second launch signal.

During the heat, the starter and assistant starter should keep track of the lead aircraft and remain apprised of any cuts via walkie-talkie. The starter should strive to inform the pilots and callers, using the bullhorn, of any cuts as they are called by the cut judges. However, the fact that a pilot did not hear this information right away is not grounds for a reflag.

The starter should call “up and out” to any pilot who appears to have double-cut or who is otherwise disqualified.

At the finish, the starter should wave the checkered flag for the aircraft in the order in which they complete their required number of laps. Then the starter and assistant starter should double-check via walkie-talkie with the timers/lap counters individually for each pilot’s finish position, elapsed time, and cuts (if any), fill out the heat result sheet, and send it in to the scorekeeper with the winner of the heat.

Note that it is possible for a pilot who has already cut once to cut again on the 11th lap. This counts as a double-cut and results in a score of zero points even though the pilot received the checkered flag.

In the case of a “photo finish,” the starter and assistant starter must determine the order of finish. Stopwatch times should not be used as a tiebreaker because manually operated stopwatches are not precise enough for this purpose.

Any disputes concerning the order of finish, times, cuts, etc., should be resolved promptly at the conclusion of the heat. If a pilot believes that a mistake in lap counting or calling of cuts has affected the order of finish, the order of finish can be changed only if the timer/lap counter or other racecourse officials involved freely admits making a mistake or if all the pilots in the heat agree on a different order of finish.

3. Timers/Lap Counters. The job of each timer/lap counter is to follow one aircraft, to the exclusion of all others, for the duration of the heat and to accurately record the laps completed and the elapsed time for that one aircraft. Ideally, the timer/lap counter’s eyes should never leave his or her assigned aircraft between the time it is held up on the starting line for identification and the time the starter gives it the checkered flag at the end of the heat.

Standard equipment for the timer/lap counter consists of a stopwatch and a hand-held clicker or similar device for counting laps. At least one of the timers/lap counters should also be provided with a walkie-talkie, headset radio, or other means of communicating with the starter on the racecourse. Alternatively, a graphic display visible to the pilots, callers, and starter and actuated from the sideline may be used.

All of the timers/lap counters should start their stopwatches at the first launch signal from the starter. This is a reference from which all elapsed times are measured.

Each timer/lap counter should record a lap completed each time his or her assigned aircraft crosses the start/finish line. If the pilot of the aircraft is called for a cut and the cut information is relayed to the timer/lap counter, the timer/lap counter should make a mental note that the pilot will not be finished after 10 laps, but must go 11 laps to complete the heat.

On the pilot’s last lap, the timer/lap counter should watch for the aircraft to cross the start/finish line and stop the stopwatch at the instant it does so.

If the stopwatches are capable of a “split” function, it is a good idea to get both a 10-lap and 11-lap time for each aircraft, just in case the pilot should cut on the 10th lap and need to make one more to complete the heat. (Experienced pilots will often make an 11th lap whether they need to or not, just for this reason.)

4. Pylon-Cut Judges.

4.1: General:

Cut judges are stationed a minimum of 175 feet from the pylon line and 25 feet behind the pilot positions, in accordance with the AMA 540-B document, looking directly out (i.e., perpendicular to the pylon line) toward the pylons.

When the aircraft are held up for identification before the beginning of the heat, the cut judge should report by walkie talkie the identifying word(s) previously assigned by the starter.

As viewed from the sideline, it is physically impossible for an aircraft to go the required distance to the pylons and also to cut inside the pylons on the same turn.

A turn is legitimate (i.e., there is no cut) if any part of the aircraft goes past the pylon. If there is any doubt about a possible cut, the pilot should be given the benefit of the doubt.

If there is a cut, the Cut Judge reports it to the Starter by walkie-talkie, saying “Low green, Low green”, “High red, High red” or if there are a small number of participants and the “Lane Matrix” is not used, the agreed-upon name for the airplane that cut “Yellow, Yellow”, “Patriotic, Patriotic” or “Gee Bee, Gee Bee”. In the case of Warbird Style cut reporting, the cut judge may simply put a check mark next to the appropriate aircraft lane or color on his/her notebook or dry-erase board, then report the total number of cuts recorded for each aircraft at the end of the heat.

4.2.1: If there is one cut judge at each pylon: *Equipment for AMA style scoring is a walkie-talkie to report cuts. For Warbird style scoring, a pad to record cuts will do.*

4.2.1: If there are Flaggers for each plane: Like the timers/lap counters, the flaggers each watch one aircraft, to the exclusion of all others, for the duration of the heat.

The primary function of each flagger is to signal the pilot when his/her aircraft has gone the required distance to *the* pylon and therefore can turn without cutting. The secondary job of each flagger /cut judge is to notify the Starter and lap counters if the aircraft turns before getting to the pylon.

The flaggers' standard equipment consists of **(a)** a color-coded signal light, shutter, or flag with which to signal a turn, and **(b)** some form of "cut" indicator with which to signal a cut. The flagger must choose between these two types of signals every time a signal is given. The "turn" and "cut" signals are mutually exclusive.

When the aircraft are held up for identification before the beginning of the heat, the flagger for each lane should flash or waggle the turn signal device to indicate recognition of his/her assigned aircraft.

After launch, and after the aircraft crosses the start/finish line on each succeeding lap, the flagger should do as follows: If the signal device is a flag, hold the flag aloft so that it is clearly visible as the aircraft approaches, then drop it smartly the instant the aircraft intersects the imaginary plane established between the pylon and the flagger's . If the signal device is a shutter or light, activate it crisply at that same instant and hold it in the open or "on" position for one or two full seconds at least, so the pilot and caller are sure to see it—but not much longer than that, to avoid confusing the other pilots.

As viewed from the sideline, it is physically impossible for an aircraft to go the required distance to the pylons and also to cut inside the pylons on the same turn. Therefore, if you have signaled the pilot that he/she has gone the distance, you should not call a cut.

Also, resist the temptation to "help" the pilot by signaling too soon. This will just mislead the pilot into thinking the racecourse is shorter than it actually is, and possibly cause the pilot to cut on the next lap. The pilot is relying on you to be precise, consistent, and impartial.

A turn is legitimate (i.e., there is no cut) if any part of the aircraft goes past the pylon. If there is any doubt about a possible cut, the pilot should be given the benefit of the doubt.

5. Three pole, with multiple cut judges -Pylon #1 Chief Judge. The pylon #1 chief judge is stationed with the pylon #1 flaggers and should be equipped with a walkie-talkie or headset. The chief judge communicates aircraft identification information to the flaggers at the beginning of each heat, confirms any cuts called by the flaggers, and relays cut information to the starter. Other than the starter, the pylon #1 chief judge should be the most experienced worker on the racecourse.

6. Other pylons (Section 4.1 General applies.)

6.1: Pylon #2 and #3 Cut Judges. The primary job of the pylon #2 and #3 cut judges is to watch all of the aircraft in each heat and relay cut information to the starter. Standard equipment for the cut judges includes a chair and sunshade, a walkie-talkie or headset, and a note pad or dry-erase board on which to jot color schemes and other aircraft identification information for each heat.

The #2 and #3 cut judges should be positioned on the sideline, looking out toward their respective pylons at an angle sufficient to see whether the aircraft are cutting (see racecourse diagram in AMA rules).

Each of the cut judges may also be equipped with an ordinary transmitter antenna, fishing rod, or thin dowel mounted vertically on a stand or stake in front of his/her chair to help judge whether the aircraft are staying outside of the imaginary vertical line extending above the pylon, and/or an air horn to "toot" as an offending aircraft passes the pylon.

7. Pit Boss, if needed. The pit boss calls up the pilots by heats to fuel and place their aircraft in the ready area. A public address system or bullhorn is helpful in this task. Both the pit boss and the scorekeeper, if possible, should be equipped with walkie-talkies to communicate with the starter. In addition, one of them should have an air horn to sound in case of a sideline cut.

The pit boss may be the same person who conducted safety inspection at registration. (See 8. Preflight Inspection of Aircraft.)

8. Scorekeeper. The scorekeeper collects heat results from the starter and records scores on a master list or scoreboard as the contest progresses. This may be done manually or, if suitable computer equipment and power supply are available, scorekeeping may be done via computer using any of several commercially available matrix programs.

The scorekeeper may be the same person who set up the heat matrix at registration. (See 14, Heat Matrix, and 15, Scoring.)

The scorekeeper should take care to differentiate a pilot's place in the heat (that is, his or her finish position) from the points awarded for that place. The two numbers are usually the reverse of each other: a pilot who finishes first will have a "1" under "Place" on the heat card, but a "4" under "Points." On the other hand, a pilot who finishes 4th (last) in the heat will have a "1" under "Points." (If three-plane heats are being flown, the numbers to watch out for are "3" and "1.") To reiterate: a better finish results in more points, not fewer.

9. Fueling Station Supervisor, if needed. This person runs the fueling table. He or she should ensure that each pilot who brings an aircraft to the ready area drains it of fuel, then refuels it from the common supply. After fueling, the aircraft should be placed in the ready area and not taken back to the pits.

The fueling station supervisor should be equipped with an accurate scale for weighing-in of aircraft that are returning to the pit area after flying a heat. Usually the heat winner (who may also be carrying the completed heat result sheet for the scorekeeper) will need to stop at the scale to verify that his/her aircraft is at or above the minimum allowable weight. The fueling station supervisor can supervise the weighing-in operation as well.

10. Transmitter Impound Supervisor if needed. This person should be provided with a large rack or folding table, protected from the sun and rain, on which to collect and safeguard the contestants' transmitters. Transmitters should only be given to pilots who are on their way to the ready area, and should be checked when brought in after each heat to ensure that they are not left on.

The transmitter impound supervisor may also be one of the people who helped with registration, inspection, or setting up the matrix

11. When first beginning having races, the Starter and the Lap Counters can be other pilots. In that case, the only non-flying volunteer workers are the two Cut Judges. The Scorekeeper may also be a pilot.

Notes from Ken Erickson, RCPRO Club 40 Committee Chairman:

Explanation of Changes for 2015

The addition of a third class to RCPRO Club 40 Racing, Club 46, required re-ordering Section 16, which covers the engine and airframe for each class.

The restriction against the use of backplate mounts and requirement to use beam mounts, which has been in Section 2 for many years, has been copied into **Section 16, Requirements:**

Quite a few of us are using LiFePo4 batteries. There were sentences about batteries in Sections 8 and 16, but they were different and contradictory.

Both of these have been replaced with "Batteries shall be of adequate capacity for the size and number of servos used."

In section 16, it was moved from "Allowed Modifications" to "Requirements"

The requirement that only 4 screw servos be used to control pitch, roll and Yaw was replaced by the following: Servos controlling the pitch, roll and yaw functions shall be of adequate strength for the weight and speed of the aircraft. Two-screw servos especially must be mounted securely and of adequate strength.

In section 13.1.8, after the sentence "No mechanical device shall be used to assist in launching the aircraft", we voted to insert the following: "A mechanical stooze may be used to hold the aircraft until they are released by the starter to start the heat." Several groups have been having humans holding the airplanes, which were at full throttle, until the Starter signaled the release. They then ran back to count laps or call for the pilots. This was felt to be a dangerous practice. We decided "Launching" is making it go forward, "Holding" is preventing it from going forward.

The Addendum has not changed.

Explanation of Changes for 2014

Our rules are based on the AMA Pylon Racing Regulations. We have separated them into two documents, one corresponding to Sections 1 to 15 of the AMA Regulations, previously called "Procedures", and one corresponding to Section 16, previously called "Rules for the Airplane", a one-page listing of the rules for the airplane. They are still two documents, but the names have been changed to reflect what they truly are: "Sections 1 to 15, Procedures" and "Section 16, The Airplane". This was done with the 2013 Rules.

The changes, both of which are in "Section 16, The Airplane" are as follows:

1: We added: "All factory versions are approved."

Because: We wanted all stock, factory versions to be usable. However, only the modifications which are listed later are allowed. The committee members wanted the planes as stock as possible.

2: We replaced "You may modify the cheek/nose area of the kit and older Sky Raiders to match the current WM product. Do not enclose. Do not pinch narrower than the narrowest of current or previous airframes from WM."

With: "You may modify older versions to match current factory versions. You may use wooden blocks to modify the new LA Racer to install the older wire gear."

Because: The previous statement only covered Sky Raiders. We believe the new statement allows the same changes to the Sky Raiders as the old one, while allowing retrofit of the stock wire gear to the new LA Racers. A Hint: Home Depot sells a 1/2x2x24 piece of oak, which I have used repair SR2s when the gear blocks have been ripped out.

Sections 1-15 and the Addendum have not changed.

Explanation of Changes for 2013

A change to Section 1, voted in for the 2011 rules eliminated Backplate Mounts. However, the section was not edited at that time. That has been done in the 2013 version.

The changes in "Section 16, The Airplane" are as follows:

1: The sentence "You may Mix and Match fuselages, wings, landing gear and empennages." has been added just after the listing of the three planes allowed. The dimensions of the wings, horizontal stabilizers and elevators are identical. The only difference is the location of the wing servos. We already allowed mixing if those were the parts you had left after crashes. The ability to use such a hybrid is now extended. Occasionally the particular new model is not available from the distributor.

2: In "**Propulsion Systems Regulations:**", the sentence "Must be capable of standing at idle for 30 seconds and being shut off on command." has been added. This requirement was in early versions of the one-page document, has always been in the "Sections 1 to 15, Procedures" document. The vote to again include it in Section 16 was unanimous.

To enforce this, it is recommended that the following procedure be used: In 2013 each engine will be run, on the line, at idle for 30 seconds with no one holding the plane; and the plane must stand in place without moving during that time. This will be done during the first round only. If an engine does not idle for 30 seconds the pilot will get a zero for that heat. (Because it is a "Did not start" the heat.)

3: Under "**Fuel Tank**" The words "clunk-type" were added to the sentence allowing any brand of tank. The partial sentence "No "Bubbleless" tanks." was added. The two sentences concerning the use of internal bladder tanks were removed. The argument was presented that "Bubbleless" tanks have been used for years in Texas. Everyone else voted to allow only "clunk-type" tanks. Some of the points brought up were about the fueling stations, the perception that the additional expense would seem necessary to newbies, and general desire for simplicity.

Explanation of Changes for 2011

There are a few changes in the RCPRO Club 40 "Rules" document and also in the "Procedures" document. Starting from the top of the "Rules" document, they are:

New Wording in "Airframe Regulations": Wheels must have minimum diameter of 55 mm and minimum width of 20 mm. Hint: Stock wheels (60 mm) or DuBro 2 1/4 Low Bounce (57 mm).

Reason: We want as much uniformity as possible in the airframe drag.

We have been informed that the stock wheels wear away for those flying from hard surface runways. Some get very small. We were asked to specify a minimum size for wheels in use and to allow a harder wheel, slightly smaller than the stock wheel. As I fly from grass at almost all the fields around Columbus, In, I did not know this. After verifying the wear, by checking with committee members and other promoters around the country, I checked out available wheels. The DuBro Low Bounce wheels are harder rubber and the same width as the stock wheels. They are 57 mm in diameter. This change was submitted to the committee and officers and approved. New stock wheels are 60 mm in diameter. When your wheels have worn to 55 mm in diameter, get a new set of stock wheels or a new set of DuBro Low Bounce or some other 20 mm wide hard wheel.

New Wording in "Propulsion Systems Regulations":

Wording transferred in from the "Procedures" document, with clarification: Parts, which may be changed and may come from any source: Bearings, Gaskets (& head shims), Glow plug, head and crankcase bolts, propeller nut & washer and Remote needle valve assembly.

Reason: This was the only line about what goes up in the air that was not in the one-page "Rules" document, where it belonged. The clarification, after much discussion, is that head shims may be removed, changed or added. We do not recommend it, but it is not forbidden. AMA rules silently allow this; we state it. Note that Backplate Engine Mounts have been removed and are not to be used.

New Wording in the line for “Acceptable Alternatives”: or any clones/copies of the listed engines.
Reason: We were asked to allow more brands of engines. If someone has a sport .40 engine, probably not as good as the best brand, they should still be able to give it a try. This wording was submitted to the committee and officers and was approved. **We do not recommend buying a cheap, inferior engine, if you do not have a .40.** But we do want people to get their feet wet in this event with sport engine to which they already have access.

New Wording in the line for “Sport/Novice Class Engines”: or clones.
Same reason.

Changes in the “Procedures” document:

The “Parts which may be changed” line was removed, transferred to the “Rules” document.

Reason: See above.

Recommendations for the matrixing and scoring programs from Paul Herman were added in the appropriate places.

Reason: They work fine, and have for years.

A recommendation for the NMPRA JudgeTimer program, written by Stan Douglas and significantly updated by Hank Kaufman was added.

Reason: Once you check it out, you will know. It is great. You can test it using the mouse or keyboard.

The “Addendum: Racecourse Personnel and their Duties” has not changed.