Hill Top Flyers
FLIGHT TRAINING

1. Ground School:

Discuss the four principals of flight lift v/s weight and thrust v/s drag. Review weight and balance and the reasons for engine down thrust and right thrust.

1a. Explain the operation of the flight controls and the use of the buddy box.

1c. Tell the student what to expect when they first get their hands on the controls for the first time. Explain the apparent reversal of left and right when the model is coming toward you and how to correct.

1d. Explain why the nose drops when you bank the model.

1e. Review AMA National Model Aircraft Safety Code, AMA Radio Control Rules, and Hill Top Flyers Club Rules. See Appendix A.

1f. Explain the frequency board and transmitter impoundment.

2. Preflight:

For the first flight - check model static aerodynamics:

2a. Check model balance. Should be as per the plans or approximately 25% to the rear of the leading edge for trainer type airplanes, or no more than 35% for aerobatic type airplanes. For swept or tapered wings, balance at 25-33% of the MAC (Mean Aerodynamic Cord).

2b. Check alignment between horizontal stabilizer and wing. They should be parallel. Shim as required.

2c. Check incidence of horizontal stabilizer and wing. Normally 0^{o} to the thrust line. Some models are designed with a small positive incidence. Check the plans if in doubt.

2d. Check for warps in wing and correct aileron setting. A good starting point is to adjust so that bottom of the aileron aligns with the bottom of the wing. Ailerons and elevators should not have excessive throw. Should be as per plans, or no more than 0.5 inches in each direction for the 1st flight. If you have a dual rate radio, set 0.5 inches for the high rate and 0.3 inches for the low rate.

Preflight cont.

2e. Check all servos for correct operational orientation; secure mounting, and terminations. Check attachment points for ailerons, elevator, and rudder. Control surfaces should be secure with no binding or excess play.

2f. Check receiver battery voltage under 100 $\rightarrow$ 200 mA load. Should be greater than 4.8 volts dc for nicads. If you do not have a 25-50 ohm 10 watt dummy load resistor, test with the receiver and all servos on and one servo moving. Transmitter voltage should be in the green or greater than 9.3 Vdc.

2g. Range check the radio at 100' with the antenna down.

3. Flight Training:

All training should be done with a buddy box. Playing hot potato with the transmitter puts the student and model at too high a risk. The instructor pilot should always be vigilant and anticipate that the student will make mistakes during the training session. In the beginning of the training insure that the student will fly at an altitude that will allow time for the instructor pilot to correct mistakes. Even when the student appears to be able to control the model he can still get disoriented and put the plane in the ground in about two seconds. Be aware that the Hill Top field is unique in that all off runway landings will likely result in damage to the model. So keep the model within gliding distance of the runway at all times. Be aware that late in the afternoon the sun at the left, (west) end of the field can cause the model to become a silhouette and it will be more difficult to determine the orientation of the model. Worse yet, the sun is a magnet to all new flyers and at every opportunity they will fly directly into the sun blinding the student and instructor for a period of time.

3a. On the first flight of the day make sure that the control throws are not reversed on the buddy box and if necessary, have an experienced flyer trim the flight controls in flight prior to the student starting the flying session.

3b. Using aileron and elevator, demonstrate to the student and have him execute flying a racetrack pattern, with turns both to the left and to the right. Make turns with corrections for wind and the closest straightaway leg of the maneuver down the centerline of the runway. Bank angles should be 30º to 45º and no loss or gain of altitude.

3c. Using aileron and elevator, fly a horizontal figure 8 pattern with turns at each end of the runway and the crossover point at the center of the runway. The turns should be made with right turns at one end of the field and left turns at the other end. Bank angles should be 30º to 45º with no loss or gain of altitude.

Flight training cont.

3d. Using aileron and elevator, have the student execute a series of procedure turns. (Fly down the runway and execute a 90º turn away from the pit area, followed by a 270º turn back toward the pits and fly back up the runway). Bank angles should be 30º to 45º and no loss or gain of altitude.

3e. Repeat steps 3b thru 3d except by controlling the model using rudder and elevator only.

3f. Repeat steps 3b thru 3d above except by controlling the model by executing coordinated turns using rudder, ailerons and elevator. Demonstrate and then have the student practice the same maneuvers with minimum bank angles. Turn with the rudder and using opposite aileron, (cross control) to maintain wings level flight.

3g. Repeat steps 3b thru 3d except turns should be at minimum maneuvering speed.

3h. Explain, demonstrate and have student practice stalls and recovery from straight-ahead flight and at 45º bank angles.

3i. While at altitude, readjust the trim settings on the trainer transmitter and have the student demonstrate his ability to fly the plane with it out of trim as well as making the necessary adjustments to get the model back in trim.

3j. Taxi practice should be done prior to attempting take-offs. The student should demonstrate ability to low speed taxi from one end of the runway to the other with a minimum of corrections and no ground loops. Discuss and/or demonstrate the difference between models with conventional and tricycle gear. Discuss and demonstrate takeoffs in adverse and/or crosswind conditions and using the ailerons during the takeoff roll to keep the wind from lifting the windward wing.

3k. Landing approaches should be practiced with both left and right hand patterns. Student should start with fly-bys at altitude and normal speed. Turns on base and final should be at low bank angles, 30º to 40º. Each successive pass should be lower and slower consistent with the comfort level of the instructor and student. When the student demonstrates proficiency at flying the pattern and controlling the model while low and slow, landings can be attempted.

Flight training cont.

3l. When the student is able to make six consecutive take off and landings without incident and the instructor and student are comfortable with the progress, the student can make his solo flight.

3m. Familiarize the student with engine out procedure during flight and during takeoff. A common emergency is the engine out immediately after takeoff. This is typically caused by the engine being adjusted too lean.

How to properly execute a dead stick landing:

(Immediately push the nose to a 10º down angle and altitude permitting, make an immediate coordinated turn toward the field using rudder and aileron. If there is insufficient altitude to execute the turn, try to land on one of the dirt roads. If you see that you can't make the runway and will land in the trees, stall the plane just prior to contacting the treetops so you will hit with minimum airspeed. Retract the gear if applicable. If you are too high to make a normal dead stick approach fly a zig zag pattern on final to lose altitude, and/or cross control to crab or slip it in.)

3m. After the successful solo, notify the club secretary and the solo certificate will be issued.

APPENDIX A

NATIONAL MODEL AIRCRAFT SAFETY CODE
Model Flying MUST be in accordance with this Code in order for AMA Liability Protection to apply.

GENERAL
1. I will not fly my model aircraft in sanctioned events, air shows, or model flying demonstrations until it has been proven to be airworthy by having been previously, successfully flight tested.

2. I will not fly my model higher than approximately 400 feet within 3 miles of an airport without notifying the airport operator. I will give right-of-way and avoid flying in the proximity of full-scale aircraft. Where necessary, an observer shall be utilized to supervise flying to avoid having models fly in the proximity of full-scale aircraft.

3. Where established, I will abide by the safety rules for the flying site I use, and that I will not willfully and deliberately fly my models in a careless, reckless and/or dangerous manner.

4. At all flying sites a straight or curved line(s) must be established in front of which all flying takes place with the other side for spectators. Only personnel involved with flying the aircraft are allowed in front of the flight line. Flying over the spectator side of the line is prohibited, unless beyond the control of the pilot(s). In any case, the maximum permissible takeoff weight of the models is 55 pounds.

5. At air shows or model flying demonstrations a single straight line must be established, one side of which is for flying, with the other side for spectators. Only those persons accredited by the contest director or other appropriate official as necessary for flight operations or as having duties or functions relating to the conduct of the show or demonstration are to be permitted on the flying side of the line. The only exceptions which may be permitted to the single straight line requirements, under special circumstances involving consideration of site conditions and model size, weight, speed, and power, must be jointly approved by the AMA President and the Executive Director.

6. Under all circumstances, if my model weighs over 20 pounds, I will fly it in accordance with paragraph 5 of this section of the AMA Safety Code.

7. I will not fly my model unless it is identified with my name and address or AMA number, on or in the model. Note: This does not apply to models flown indoors.

8. I will not operate models with metal-bladed propellers or with gaseous boosts, in which gases other than air enter their internal combustion engines(s); nor will I operate models with extremely hazardous fuels such as those containing tetranitromethane or hydrazine.

9. I will not operate models with pyrotechnics (any device that explodes, burns, or propels a projectile of any kind) including, but not limited to, rockets, explosive bombs dropped from models, smoke bombs, all explosive gases (such as hydrogen-filled

balloons), ground mounted devices launching a projectile. The only exceptions permitted are rockets flown in accordance with the National Model Rocketry Safety Code or those permanently attached (as per JATO use); also those items authorized for Air Show Team use as defined by AST Advisory Committee (document available from AMA HQ). In any case, models using rocket motors as a primary means of propulsion are limited to a maximum weight of 3.3 pounds and a G series motor. Note: A model aircraft is defined as an aircraft with or without engine, not able to carry a human being.

10. I will not operate any turbo jet engine (axial or centrifugal flow) unless I have obtained a special waiver for such specific operations from the AMA President and Executive Director and I will abide by any restriction(s) imposed for such operation by them. (Note: This does not apply to ducted fan models using piston engines or electric motors.)

11. I will not consume alcoholic beverages prior to nor during, participation in any model operations.

AMA RADIO CONTROL

1. I will have completed a successful radio equipment ground range check before the first flight of a new or repaired model.

2. I will not fly my model aircraft in the presence of spectators until I become a qualified flier, unless assisted by an experienced helper.

3. I will perform my initial turn after takeoff away from the pit or spectator areas, and I will not thereafter fly over pit or spectator areas, unless beyond my control.

4. I will operate my model using only radio control frequencies currently allowed by the Federal Communications Commission. (Only properly licensed Amateurs are authorized to operate equipment on Amateur Band frequencies.)

5. I will not knowingly operate an R/C system within 3 miles of a pre-existing model club flying site without a frequency sharing agreement with that club.

6. I will not fly my model aircraft in any racing competition, which allows models over 20 pounds unless that competition event is AMA sanctioned. (For the purposes of this paragraph, competition is defined as any situation where a winner is determined.)

7. Every organized racing event requires that all officials, callers, and contestants must properly wear helmets that are OSHA, DOT, ANSI, SNELL or NOCSAE approved or comparable standard while on the race course. In addition, all officials occupying safety cages must wear protective eyewear.

HILL TOP FLYERS CLUB RULES

1. Mufflers are required on all models with internal combustion engines that are designed for mufflers. Installed mufflers must retain the internal baffling.

2. Transmitters must not be turned on without first having reserved the channel by placing your AMA/Club Membership card on the frequency board. Only one card is allowed per channel. Check transmitter turned off before leaving home.

3. If 2 operational radios, on 2 different frequencies, are used to control a model using a buddy cord, both channels must be reserved. This rule is in effect even though the secondary transmitter is not turned on.

4. Transmitters must be impounded under the shed whenever the transmitter frequency/channel is not reserved.

5. Only radios certified to be “narrow band” are allowed for aircraft control.

6. Model pilots should fly from the pilot stations designated, and maintain at least 20’ spacing from fellow pilots to reduce the possibility of transmitter interference.

7. Do not operate cell phones, ham radios, or 2-way radios within 50’ of an active flying station.

8. Do not taxi in the pit area. Always keep one hand on the model while transiting between pit area and runway.

9. All take-off rolls may begin anywhere on the runway. However, the pilot must control the speed and/or rotation to insure that the model does not leave the ground until it has passed the line defined as the end of the pit area. This line extends from the outside edge of the two end tables in the pit area.

10. As a courtesy to your fellow modelers, announce your intentions/status when approaching the runway for take off or landing, when you are “dead stick”, when personnel are on the runway, or when you do not have control of the model.

11. No alcoholic beverages or controlled substances are allowed on flying site. No persons under the influence of alcohol or controlled substances are allowed on the flying site. This rule extends to members, their families, guest, and spectators.

12. Any one that “shoots down” another flyer’s airplane by causing interference on the model’s frequency must reimburse the downed flyer the cost of his model. This cost includes the cost of the kit, any accessory items such as Monokote or broken retracts etc., plus the cost of repair or replacement of engine and radio.

13. As allowed by AMA, Hill Top Flyers RC Club has a very liberal policy regarding visitors with AMA membership, new pilots and demo flights for non-pilots.

    13.1 GUEST: Guest of Hill Top club members, flying on a buddy box, must be under the control of the inviting club member.

    13.2 VISITING PILOTS: Visiting AMA members may be invited to fly as a guest of a Hill Top club member. The club member must be present at all times while the visitor is flying. This invitation will be in effect for a period of 2 flying sessions or 30 elapsed days whichever occurs first. At the end of this period, membership is required in order to use this flying site. The inviting club member will record the visitor's name, address, phone number, AMA number and start date. This information will be forwarded to the club secretary who will maintain the visitor database. The start and ending date will be confirmed to the visitor by mail. At the discretion of an officer of the club, the invitation to fly as a guest can be revoked for any of the following.

    - Not demonstrating competence necessary for the safe operation of the model
    - Non-compliance with AMA and Hill Top Flyers safety rules.
    - Flying at the site when no other club members are present.

    The guest policy is for an individual guest, and the guest cannot extend the privilege to other AMA or non-AMA members.

    13.3 INTRODUCTORY FLIGHTS: Potential newcomers to the R/C hobby can participate in an introductory flight on a one time only basis, under the control of a club Introductory Pilot. The introductory flight should be conducted with a "buddy box", but can, at the discretion of the Introductory Pilot, be on a single transmitter.

14. FLIGHT TRAINING: Flight training is strongly recommended to all new R/C pilots. In order to qualify for flight training, the student must be a member in good standing of AMA and Hill Top Flyers. The club will not appoint instructor pilots for student training. A list of club members that have volunteered to be instructor pilots will be available to the student. The student should make his own contacts within the club membership for instructor pilots. Until the student has "soloed", the student pilot should not fly at the club site when spectators or other members are present. (See AMA Radio Control Rule #2). In order to "solo" the student must demonstrate to his instructor or an officer of the club or their designate, his ability to conduct a safe flight.