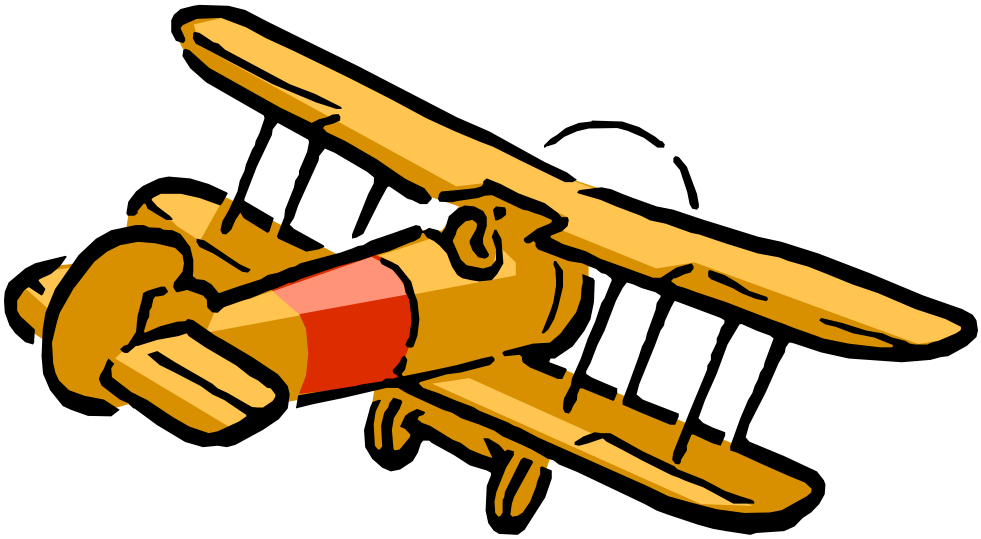

AMA Charter #1605

New Member Guide

(AMA Membership Required to Fly)

Version 2-2017

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ACKNOWLEDGEMENTS

Special Thanks To:
Don Ramsey, Ken Bauske, Raymond Kohn, Kirk Massey, Larry Bonnette

Tower Hobbies – Sig Mfg. – Horizon Hobbies – Sanyo Mfg. - AMA

INTRODUCTION

The Tri-County Barnstormers Welcomes You: Enjoy the action-packed world of Radio Control, or "R/C" as it is commonly called. The Tri-County Barnstormers can be of great help to the newcomer. Come out to our flying field and talk with Club members. Don't be shy! Tell them that you are thinking about getting started in R/C and ask for advice. Learn from our experience. In addition, Barnstormers offers an "Instructor Program" whereby we can teach you how to fly R/C airplanes. Your progress, and flying skills, will be greatly enhanced with our help.

The AMA: Barnstormers, like all other organized flying Clubs, require that you be a member of The Academy of Model Aeronautics (AMA), and have proof of membership with you at all times. Membership in the AMA provides you with extended liability insurance protection that protects both you and our Club. An AMA Membership Application is included with this package, or you can contact the AMA directly by phone, or via the Internet.

AMA – Academy of Model Aeronautics
5161 E. Memorial Drive Muncie, IN 47302
Phone: (765) 287-1256 Toll Free: 1-800-435-9262
Fax: (765) 741-0057 www.modelaircraft.org

The Importance of Safety: Model aircraft are not toys, and if operated improperly, can be extremely dangerous. Our Club rules, regulations, and flight training programs are designed to make this hobby as safe as possible. Please read and follow the AMA National Safety Codes, and all Club and Flying Field Rules. Failure to follow all Safety Codes and Flying Field Rules will result in the AMA denying insurance coverage in case of an accident, hence the importance of knowing these regulations.

Reading & Viewing Reference Materials

There's Lots of Information Available: There is a great deal of informative material that is readily available. It can help you learn about this hobby far more quickly, thus avoiding most of the more common and frustrating mistakes.

Below is a brief listing of some of the information materials you should review:

Magazines:
Model Airplane News
R/C Modeler
R/C Report
Model Aviation (Included with your AMA Membership)

Books & Videos:
Model Airplane News - Getting Started in R/C Book
R/C Modeler Flight Training Course
The AMA Membership Manual
Books by Harry Higley (available at Hobby Shops & On-Line)
First U.S. R/C Flight School – One Week to Solo (2 Hr. Video)

Internet Sites:
www.tri-countybarnstormers.com
www.rcmmagazine.com
www.modelairplanenews.com
http://fly.hiway.net/~dknight/hobby.html
www.rcuniverse.com
www.radiocontrolzone.com
www.easyrc.com
www.modelaircraft.org
www.towerhobbies.com
www.horizonhobbies.com

Read Articles, Ads – Watch Videos, And Visit Web Sites: Reading the articles and ads in the R/C magazines listed above can provide you with a great deal of information and guide you towards additional sources for reading materials, videos, and web sites. Some of the web sites above offer airplane model reviews that cover both construction and flying characteristics for a wide variety of planes. Visiting advertisers web sites, and learning more about the products they offer can add significantly to your knowledge. Some web sites, such as www.easyrc.com offer the beginner a great deal of information that can be very helpful.

The Academy of Model Aeronautics (AMA)

The AMA Provides a Variety of Services And Benefits To Its Members: These member services range from Model Aviation magazine that is sent to all AMA members each month, and various types of insurance plans such as:

Commercial General Liability Coverage: AMA liability protection applies to bodily injury or property damage caused by an AMA member from accidents arising from the operation of model aircraft, rockets, cars, and boats in accordance with the AMA National Safety Code(s).

Accident / Medical Coverage: The Accident / Medical coverage applies to injuries resulting from flying or model operations regardless of who causes the accident.
It reimburses an AMA member in accordance with policy terms and conditions for only medical expenses.

Fire, Vandalism, and Theft Coverage: The AMA provides up to $1,000 for loss of aircraft models and accessories, including R/C equipment. Claims must be accompanied by a police report. Note: There is no coverage if theft was from a member's unlocked vehicle or dwelling. There must be signs of forced entry. Is "excess" to any other applicable coverage.

Group Term Life Insurance: Policies are optionally available to AMA members and their spouses with death benefits up to $200,000.

Vision Care Plan: The AMA, in cooperation with OUTLOOK Vision Services, provides up to 50% savings on frames, lenses, and contact lenses. Insurance is optionally available to AMA members and their families.

Established Safety Code: The AMA has established National Safety Code(s) by which all Chartered Clubs, and Members must follow in order to maintain full insurance coverage. Failure to strictly follow the AMA Safety Code(s) will result in insurance coverage being denied.

Many other AMA services are provided to both individual members and Chartered Clubs: Upon joining the AMA, you will receive their Annual Membership Manual that highlights many of the services offered, and provides details concerning its insurance coverage programs.

All Barnstormers Club Members MUST Have A Current AMA Membership Card To Fly.

SELECTING YOUR FIRST PLANE AND RADIO

Your First Plane Should Be a Trainer: By all means, get an airplane that is specifically designed to be a TRAINER. A boxy looking trainer may not be exciting, but it will have the flight characteristics that you need for learning to fly R/C. It is very important to resist the urge of learning how to fly with any other type of plane, other than a trainer. The process of learning how to fly takes time and experience. Scale model airplanes, aerobatic aircraft, and multi-engine planes are NOT appropriate for this initial learning phase.

The "High Wing" Trainer: Your first trainer should be a "high wing" airplane (wing mounted on top of the fuselage) for best stability in flight. Typically, a trainer will have a "flat-bottom" wing with a curved top so it can fly slow enough for you to keep up with it. The cross-section shape of the wing is called the "airfoil". Some trainers have semi-symmetrical airfoils that provide increased flying capabilities, which is helpful, as you become a more proficient flier. Another characteristic of a good trainer is a generous amount of wing "dihedral" (the upward "V" angle of the wings when viewed from the front).

The .40 Size Trainer As a Kit or ARF: Many different types and sizes of trainers are available. Consider the always-popular .40 size engine/plane combination. Your local Hobby Shops, Magazine Advertisements, and On-Line Hobby Dealers (such as Tower Hobbies, Horizon Hobbies, and many others), can provide you with a wide selection of choices ranging from "Kits" which provide you with all the necessary wood and most hardware items, which you use to build the plane and then cover it yourself -- To ARF's (Almost Ready to Fly) models, which come pre-built and covered, only requiring basic assembly procedures to complete the plane. Most trainers (as well as many other styles of aircraft) are available as ARF's and are typically built using the same materials and construction techniques utilized in kit built planes.

The Engine: Purchase the best engine you can afford. You will have to choose between a 2-cycle or 4-cycle type of motor. 2-cycle motors are typically less expensive and have fewer moving parts. A 4-cycle motor is quieter, provides a more pleasant engine sound, and uses less fuel, but is a bit heavier, and slightly less powerful. As a result, a plane designed to use a .40 2-cycle engine might specify a .50 or .60 size 4-cycle engine in order for the plane to achieve the same flying performance. Most kits and ARF's will specify acceptable engine sizes for both 2-cycle and 4-cycle engines on the cover of the box.

The Radio: Purchase the best radio you can afford. Futaba, JR, Airtronics, and Hitec are some of the most popular brands. Talk to your instructor about which brands to consider. This is especially important if the instructor will be using a "buddy box" to train you. A "buddy box" is a hard wire connection between two radios of the same brand. The instructor can fly the plane using one radio, and then pass control of the plane to the other radio by simply pressing a button on his radio. If you get into trouble while flying your plane, the instructor releases the "trainer" button on his radio, and immediately takes control of the plane. If you and your instructor have different brands of radio equipment, simply passing the radio back and forth can be an effective technique as long as the plane is flying at a sufficient altitude to permit the instructor to correct the problem before the plane crashes.

A basic “computerized radio” is well worth the slightly higher cost. The added features offered by a “computer radio” will come in very handy as you progress in your flying skills, and when flying different types of models.

One of the most used features on a radio is “Dual Rates” (D/R). This permits you to pre-adjust the control surface throws via the radio, and then accessing those adjustments by just throwing a switch on the radio, thus eliminating the need to manually adjust the control rod linkage to change the various control throw settings.

Additional Learning Aids: Recent advancements in R/C technology have developed “Flight Stabilization Systems”. These are electronic additions to your receiver / servo connections, which will automatically correct any aberrant flight condition, and return your plane to straight and level flight, by just “releasing” the control sticks on your transmitter. These devices can literally replace the need for a “buddy box”, and enhance your learning experience. As of this writing, Futaba (PA-2 Pilot Assist Link), and FMA Direct (Co-Pilot), both offer “Flight Stabilization Systems” which can be used on any type of aircraft or helicopter.

Flight Simulators: If possible, try out R/C flying on a “Flight Simulator”, which is a computer program installed on a standard PC. These can really help you learn how to fly, and the crashes cost you nothing. A Flight Simulator cannot only help you learn how to fly, but can also provide the means for practicing advanced maneuvers as you progress, without the fear of crashing. There are many good brands of Flight Simulators on the market, the better one’s do an excellent job of duplicating the flying experience, and also provide a hand held controller that duplicates the R/C transmitter’s look and feel. The Barnstormers clubhouse has a Flight Simulator installed on a PC that you can try.

Electric Planes: Over the past couple of years, electric planes have become increasingly more popular. However, they are typically underpowered and have difficulty taking off from grass runways, thus they are most often hand launched. Also, because electric planes are typically very lightweight, they do not fly well on windy days. Thus, fuel powered aircraft continues to remain your best choice for learning how to fly R/C planes.

Electric planes are evolving quickly. Improved motor design and better battery systems are making electric aircraft increasingly more viable. Many gliders come with an electric motor and folding prop. The electric motor powers the glider up to a high altitude, and then the motor is shut off via your transmitter, and the R/C controlled glider can be flown gracefully around the field as you hunt for “thermals” (rising wind currents which provide increased lift to the glider). As the glider loses altitude, the electric motor can be turned on via the transmitter in order to regain altitude once again.

FLYING FIELD RULES

TRI-COUNTY BARNSTOMERS R/C FLYING CLUB

TO ALL MEMBERS AND GUESTS: **Revised June 2005**

1. Only Barnstormers members, prospective members, and out of our area guests, with current AMA membership are to use the flying facilities. Prospective members (with current AMA membership) may fly up to three (3) different sessions at which time they must decide whether or not to join the Club. If they do not elect to join, they must not further utilize the field. Guests residing out of our tri-county area, with current AMA membership, are welcome at all times.

2. There should be no flying over the Pit Area or Spectator Area, or Neighbors at any time. When the wind is from the north or northeast, right hand patterns should be used. All turns must be such that your airplane is kept well to the east of the Pit and Spectator Areas. Do not fly over the space between the Pavilion and the runway! Do not fly when the field is being mowed.

3. No airplanes or equipment should be placed on or along the runway, or any refueling or other servicing done in this area. Engines should not be started in the Pavilion or Spectator Area when occupied. When starting your engine, position your aircraft so that the prop blast does not blow debris, exhaust residue, etc. on your neighbor's equipment.

4. Any extensive ground running of engines must be done well away from the Pit, Spectator, or Pavilion Areas. Please have some concern for possible damage to your neighbor's hearing.

5. A flyer is permitted to stand on the runway when taking off, landing, or test flying a new aircraft, etc., but must move off the runway as soon as possible as a courtesy to other flyers. Do not use the Pit Area, the Taxi Area, or any space between the Pavilion and the runway for a runway. Flyers should always remain on the west side of the runway in the Flight Stations.

6. An airplane on landing approach has the right-of-way. A flyer taking off must determine that no airplane is in the landing pattern. An airplane that has landed should be cleared from the runway immediately and prior to another airplane taking off. Taxiing into the Pit Area or Flight Station Area is forbidden. Observe the Taxi Lane.

7. Buzzing or low passes over any person/persons are prohibited. Any low passes or attempted 3-D Maneuvers may not be conducted within 60' of the Flight Stations.

8. Frequency Control is by the use of "Frequency Pins" hanging on a board near the Pit Area. Flyers are to take a Pin bearing the number that matches their transmitter frequency number and place their current AMA membership card in the clear plastic pocket provided on the board above their frequency pin. Under no circumstances are you to turn on a transmitter until you have placed your AMA card in the pocket and have the Frequency Pin in your hand! When glider and power flyers are separated, it is their mutual responsibility to insure that there is no frequency conflict. Courtesy in rotating the pins when several flyers using the same frequency are present is up to the flyers involved. Please do not leave your card and keep pin if you are making extensive adjustments or repairs and other flyers are waiting their turn. Flyers should use the Flight Stations to insure separation and pilot safety.

9. All broken propellers, plane pieces, rags, paper, bottles, cans or any other trash are to be picked up and carried away by you. The only trash pickup service at the field is by members!

10. Parents are to take responsibility for the conduct of their children.

11. Please close and lock all buildings and the entrance gate when you are the last person leaving the flying field. In the event of personal injury, fill out the Barnstormer Accident Report.

12. All model aircrafts (Gliders, Foamies, Helicopters) that do not fly some form of a standard flight pattern shall be flown from pilot stations located at the south or north end of the pit fence and flown so as not to interfere with the normal flight pattern or flight line air space. This rule will not apply during sanctioned events for that type of aircrafts or if those aircrafts are the only users of the field.

LETS ALL PRACTICE COURTEOUS AND SAFE FLYING

Academy of Model Aeronautics National Model Aircraft Safety Code

Effective January 1, 2014

A. **GENERAL**: A model aircraft is a non-human-carrying aircraft capable of sustained flight in the atmosphere. It may not exceed limitations of this code and is intended exclusively for sport, recreation, education and/or competition. All model flights must be conducted in accordance with this safety code and any additional rules specific to the flying site.

1. Model aircraft will not be flown:
(a) In a careless or reckless manner.
(b) At a location where model aircraft activities are prohibited.

2. Model aircraft pilots will:
(a) Yield the right of way to all human-carrying aircraft.
(b) See and avoid all aircraft and a spotter must be used when appropriate. (AMA Document #540-D.)
(c) Not fly higher than approximately 400 feet above ground level within three (3) miles of an airport without notifying the airport operator.
(d) Not interfere with operations and traffic patterns at any airport, heliport or seaplane base except where there is a mixed use agreement.
(e) Not exceed a takeoff weight, including fuel, of 55 pounds unless in compliance with the AMA Large Model Airplane program. (AMA Document 520-A.)
(f) Ensure the aircraft is identified with the name and address or AMA number of the owner on the inside or affixed to the outside of the model aircraft. (This does not apply to model aircraft flown indoors.)
(g) Not operate aircraft with metal-blade propellers or with gaseous boosts except for helicopters operated under the provisions of AMA Document #555.
(h) Not operate model aircraft while under the influence of alcohol or while using any drug that could adversely affect the pilot's ability to safely control the model.
(i) Not operate model aircraft carrying pyrotechnic devices that explode or burn, or any device which propels a projectile or drops any object that creates a hazard to persons or property.
Exceptions:

- Free Flight fuses or devices that burn producing smoke and are securely attached to the model aircraft during flight.
- Rocket motors (using solid propellant) up to a G-series size may be used provided they remain attached to the model during flight. Model rockets may be flown in accordance with the National Model Rocketry Safety Code but may not be launched from model aircraft.
- Officially designated AMA Air Show Teams (AST) are authorized to use devices and practices as defined within the Team AMA Program Document.
(AMA Document #718.)

(j) Not operate a turbine-powered aircraft, unless in compliance with the AMA turbine regulations.
(AMA Document #510-A.)

3. Model aircraft will not be flown in AMA sanctioned events, air shows or model demonstrations unless:
(a) The aircraft, control system and pilot skills have successfully demonstrated all maneuvers intended or anticipated prior to the specific event.
(b) An inexperienced pilot is assisted by an experienced pilot.

4. When and where required by rule, helmets must be properly worn and fastened. They must be OSHA, DOT, ANSI, SNELL or NOCSAE approved or comply with comparable standards.

B. **RADIO CONTROL (RC)**

1. All pilots shall avoid flying directly over unprotected people, vessels, vehicles or structures and shall avoid endangerment of life and property of others.

2. A successful radio equipment ground-range check in accordance with manufacturer's recommendations will be completed before the first flight of a new or repaired model aircraft.

3. At all flying sites a safety line(s) must be established in front of which all flying takes place. (AMA Document #706.)
(a) Only personnel associated with flying the model aircraft are allowed at or in front of the safety line.
(b) At air shows or demonstrations, a straight safety line must be established.
(c) An area away from the safety line must be maintained for spectators.
(d) Intentional flying behind the safety line is prohibited.

4. RC model aircraft must use the radio-control frequencies currently allowed by the Federal Communications Commission (FCC). Only individuals properly licensed by the FCC are authorized to operate equipment on Amateur Band frequencies.

5. RC model aircraft will not knowingly operate within three (3) miles of any pre-existing flying site without a frequency-management agreement. (AMA
Documents #922 and #923.)

6. With the exception of events flown under official AMA Competition Regulations, excluding takeoff and landing, no powered model may be flown outdoors closer than 25 feet to any individual, except for the pilot and the pilot's helper(s) located at the flight line.

7. Under no circumstances may a pilot or other person touch an outdoor model aircraft in flight while it is still under power, except to divert it from striking an individual.

8. RC night flying requires a lighting system providing the pilot with a clear view of the model's attitude and orientation at all times. Hand-held illumination systems are inadequate for night flying operations.

9. The pilot of an RC model aircraft shall:
(a) Maintain control during the entire flight, maintaining visual contact without enhancement other than by corrective lenses prescribed for the pilot.
(b) Fly using the assistance of a camera or First-Person View (FPV) only in accordance with the procedures outlined in AMA Document #550.
(c) Fly using the assistance of autopilot or stabilization system only in accordance with the procedures outlined in AMA Document #560.

C. **FREE FLIGHT**

1. Must be at least 100 feet downwind of spectators and automobile parking when the model aircraft is launched.

2. Launch area must be clear of all individuals except mechanics, officials, and other fliers.

3. An effective device will be used to extinguish any fuse on the model aircraft after the fuse has completed its function.

D. **CONTROL LINE**

1. The complete control system (including the safety thong where applicable) must have an inspection and pull test prior to flying.

2. The pull test will be in accordance with the current Competition Regulations for the applicable model aircraft category.

3. Model aircraft not fitting a specific category shall use those pull-test requirements as indicated for Control Line Precision Aerobatics.

4. The flying area must be clear of all utility wires or poles and a model aircraft will not be flown closer than 50 feet to any above-ground electric utility lines.

5. The flying area must be clear of all nonessential participants and spectators before the engine is started.

FLIGHT TRAINING PROGRAM

Getting Started: It is not recommended that a beginner try and teach himself to fly R/C. It is very similar to learning to fly real airplanes, in that you should go through a learning phase with an instructor before you try and pilot the airplane yourself. When you seek help, the following should happen:

1. An instructor should check all details of your plane.
2. An instructor should test fly your plane.
3. You should fly up high until you are capable of controlling the model.
4. With an instructor present, you should fly lower until you have the confidence and control to make your first landing.
5. Lastly, you should make your first take-off, and then solo flights.

This Is a Proven Method: Unless it is followed, most people will not be successful. The time to accomplish all this varies by individual. Stick with it. Stay with an instructor until you are confident.

Plan on sharpening your skills with a lot of flight time on a trainer type aircraft before moving on to a more advance model.

Finding an Instructor

Volunteer Instructors: The following members of Barnstormers have volunteered to be instructors and are willing to spend time helping you. Feel free to phone them and make arrangements for help.

Ray Haley	**rayhaley1@earthlink.net**
Jimmy Andrews	**jandrews123c@comcast.net**
Kirk Massey	**sales@newcreations-rc.com**
Tom Butler	**tebutler@consolidated.net**
Robert Daffin	**rdaffin3@yahoo.com**
Keith Jarvis	**tropix43@yahoo.com**
Steve Tinsley	**twotins@consolidated.net**
Larry Bonnette	**bonnette_l@yahoo.com**

For an up to date list of instructors please visit the tri-county barnstormer's web site.

Instructor's Checklist Before Flying

Outline

I. Student Pilot

a. Have an AMA card and Barnstormers Club membership
b. Know and understand AMA Safety Codes and the Flying Field Rules
c. Understand the frequency control system at the field
d. Read the manual for your radio, plane, and engine
e. Understand the function of the plane's controls and trim settings
f. Understand, the Instructor will do his best!!!

II. Radio System and Controls

a. Know your radio system's history: New, used, or crashed
b. Is the radio system properly installed, and batteries charged
c. Are the control surfaces properly hinged
d. Are the pushrods and control horns secure, and do they work freely
e. Do control surfaces have proper throws and direction
f. Check transmitter signal output and range check the radio

III. Aircraft and Engine

a. Fuel proofing the engine compartment, and tank areas
b. Check engine, fuel tank, and propeller for proper mounting
c. Wings, stabilizer, and vertical stabilizer should be mounted securely
d. Check wing and tail for proper alignment and warps
e. Check landing gear mounting and alignment
f. Check the plane's center of gravity (CG) and lateral balance
g. Check the aircraft for reasonable weight and engine size
h. Check engine operation (both high and low speed)
i. Vibration check the radio at all engine speeds – if an ignition engine is used, check for radio interference

Details

Instructor Checklist Details: The following is a detailed explanation of the Instructor Checklist above. The new student should understand what is required of him, his aircraft, and what the instructor is looking for. The goal of the checklist is to logically set forth the order of the steps required to successfully fly a new plane.

The Instructor's Decisions: The Instructor will not accept a plane that is constructed poorly, or is too advanced for the beginner student. If the instructor requests that you make changes to your aircraft prior to flying, please do so, and accept the instructor's recommendations as a concern for your safety, as well as the safety of others at the field.

Give The Instructor Helpful Information: Each person has a different level of knowledge about aviation. It is more difficult to teach someone who does not have a basic knowledge of flight controls and their functions, than a person who already has that information. It is helpful to the instructor if you provide him with any information that you think would be useful, so he can adjust his instructions appropriately.

The Point By Point Details – From The Instructor's Point of View: The following narrative describes the above Instructor's Checklist in detail from the Instructor's point of view, so you as the student will know what is happening:

I. Student Pilot

a. Have AMA card and Barnstormers Club membership

No question here. Any time you give instruction to a student pilot, the student MUST be a member of the Barnstormers Club, and MUST have an AMA card or other acceptable proof of AMA membership. The AMA Membership provides liability insurance, and is necessary in order to protect the student, the instructor, and the club in case of an accident.

b. Know and understand AMA Safety Codes and Flying Field Rules

The rules are there for very good reasons. Model aviation can be a very dangerous sport if the necessary safety precautions are not taken. Read the AMA Safety Codes, and the Barnstormers Flying Field Rules, and do what they say. Remember: AMA Insurance is void if any of the Safety Codes or Flying Rules are violated! Follow the rules!

c. Understand the frequency control system at the field

An absolute MUST for safety! Never turn your radio on without following the Barnstormers frequency control system at the field. Doing so, even for a second, may crash someone else's aircraft and possibly put the spectators and yourself in danger.

d. Read the manual for your radio, plane, and engine

You should learn and understand the operation of your radio system, the plane, and your engine, before meeting with the instructor. Failure to do your homework puts an unrealistic burden on the instructor. Proper engine "break-in" procedures are described in your owner's engine manual. Follow the engine manufacturer's suggested break-in and operational procedures.

e. Understand the function of the plane's controls and trim settings

You should learn and understand basic flight theory - what the controls do, and how such control movements affect the plane's flight. The instructor will demonstrate this on the student's plane.

f. Understand, the Instructor will do his best!!!

This is the Disclaimer. The instructor is NOT going to pay for your aircraft if he crashes the plane. You will most likely crash it yourself, if you try to fly it without the help of the instructor, so you are always better off with an instructor's help.

II. Radio System and Controls

a. Know your radio system's history. New, used, or crashed

The instructor will want to know how much care and worry to give the radio system. If it's used, he will want to think about the batteries, prior abuse, storage conditions, etc. If it's been crashed the week before, he may want it to go back to the factory for a checkout. Even if it's new, he will want to be careful.

b. Is the radio system properly installed, and batteries charged

The servos should be securely mounted on servo trays or hardwood. They should be mounted on rubber grommets, protected from vibration, and be properly aligned. The servo trays or the hardwood mounts should be securely mounted to the aircraft. The battery and the receiver should be wrapped in foam and the wires routed away from the

servos. Look for metal-to-metal contact points that could cause radio static. Check that the antenna is routed away from the servos as much as possible and that the antenna wire has not been shortened. Look to see how the antenna exits the fuselage. Make certain the batteries are fully charged. Note: Hot weather, and storage in a hot car, can take a toll on batteries. Take a screwdriver and check all screws, everywhere you can reach, for proper tightness.

c. Are the control surfaces properly hinged

Check for at least three hinges per control surface. Look for evidence of a good glue bond. Hinges should be "pull-tested" to insure their strength. Check for binding when the control surface is moved.

d. Are the pushrods and control horns secure, and do they work freely

First, check where all the control horns are attached to the airframe. The pushrod holes in the control horns should be parallel with the hinge line of the control surface. All clevises should be closed securely with some type of "keeper". This "keeper" can be a short length of plastic fuel tubing that is slipped over the yoke of the clevis or a locking metal slide that secures the clevis pin in place. Check for slack, loose fit, or wear on all threaded connections, and pull on them to test the fit. If the connections are nylon-to nylon, watch out, this type of setup has been known to wear quickly.

Now is the time to get the frequency stick from the field's Frequency Control Board, and turn on the radio for the first time. Make the student aware that this is his responsibility. Impress upon him how important this is. Turn on the transmitter and receiver. Listen for straining servos when you work the controls. A buzz in the servo may indicate binding. Lean over and check for servo buzz on the throttle servo at each end-point of the carburetor throw. Look for flexing pushrods, and confirm smooth positive movement. Look for pushrods that hit the inside of the fuselage when deflected. Do not accept any binding, or unnecessary flexing. Everything should be tight and work smoothly.

e. Do control surfaces have proper throws and direction

Stand back, and make sure that all control surfaces move in the right direction. Make adjustments to insure adequate throw, while avoiding excessive throws. If the radio has dual-rate switches, be sure to check the control throws on both high and low rates. Never change the servo reversing switches in the transmitter with the engine running. Everything should be setup properly before starting the engine.

f. Check transmitter signal output and range check

If the transmitter is equipped with a "signal output" meter, check the reading on the meter when the radio is first turned on, and use this reading as a future reference point when the radio is turned on again. Range check the radio by pushing the transmitter antenna down to its fully "closed, or collapsed" position, and then walk approximately 100 feet away from the plane. The instructor will then turn on the receiver (in the plane), and you will turn the transmitter on. All control surfaces should operate properly. If the control surfaces do not operate properly, your radio system has failed the "range check", and your radio system needs to be checked prior to flying.

Now turn off the radio. Since you are finished with the frequency for now, have the student return the frequency stick to the Frequency Control Board. Have him do this in order to teach him proper and courteous habits. Frequency control needs to be second nature to the student.

III. Aircraft and Engine

a. Fuel proofing the engine compartment, and tank areas

If the beginner forgot to do this, the useful life of the plane will be greatly reduced. Tell him how to fix the problem. All areas which can come in contact with fuel, must be fuel proofed.

b. Check engine, fuel tank, and propeller for proper mounting

Check the engine mount and make sure it will support the engine being used. Look for any incorrect thrust angles on the engine or mount. Check all screws for correct torque (tightness). Make sure the prop is tight, and that it is safe. Safe means no extremely sharp edges, cracks, or made of unsuitable material. Nylon is unsuitable on a very cold day, since it can become brittle and can break. Check the prop diameter and pitch to make sure they are appropriate for the plane and engine. If the student is using a 4-Stroke engine, the propeller should be mounted to the engine shaft with a "jam nut" in addition to the standard prop nut. The fuel tank should be mounted with foam padding to prevent engine vibration from reaching the tank and causing foaming. The centerline of the fuel tank should not be lower than 1/2 of an inch below the center of the carburetor. The fuel tank should be clean, with all lines installed properly. Fuel lines should not be twisted, or excessively long. Be sure to recommend the use of a fuel filter.

The Instructor should explain that "glow fuel" contains alcohol that will absorb moisture (humidity) from the air, and this can ruin the fuel if the container is left open. Also, storing fuel in a hot place is not advised. The Instructor should check the fuel for proper nitro, and oil content, to insure that it is consistent with the engine being used.

c. Wings, stabilizer, and vertical stabilizer should be mounted securely

These items must not come off in the air! Look closely for proper installation. Again, pull on the control surfaces and see if they are loose. Examine hold down bolts, blocks, or dowels, for enough strength to support the wing and stabilizers.

d. Check wing and tail for proper alignment and warps

Look at everything just to make sure there are no surprises at take-off. Improper alignment, or warps, of the various flight surfaces can create serious flight problems.

e. Check landing gear mounting and alignment

The landing gear should be securely fastened to the plane. It is not uncommon for additional structural support to be added inside the fuselage at the point where the landing gear is attached for added strength. Try pushing the plane by hand along the ground to check the landing gear alignment. The plane should track straight.

f. Check the plane's center of gravity (CG) and lateral balance

A proper center of gravity (CG) is very important. If it is improperly set, the plane could crash. Also check the balance laterally for a heavy wingtip.

g. Check the aircraft for reasonable weight and engine size

The instructor should evaluate the wing and power loading of the plane and explain the difference between the wing loading characteristics of a trainer, and that of a heavy scale model. Is the plane too heavy? Is the engine too large, or too small? The instructor should explain how the wing loading affects how the plane flies, and impacts on the stall speed of the plane.

h. Check engine operation (both high and low speed)

Now is the time to turn the radio ON for the second time. Have the student follow proper frequency control procedures, and check that everything is done correctly. The student should NOT use his fingers to start the engine. Suggest he use an electric starter, or at the very least, a chicken-stick.

Start the engine. (If using an electric starter – Current AMA Safety Rules suggest turning the propeller backwards until resistance is felt at the compression stroke of the piston, install the glow plug igniter, then place the rubber starter cone firmly against the spinner, and finally, activate the electric starter to start the engine.) Make sure the engine will idle smoothly and that it is not too lean. If the engine is new, set the mixture as rich as safety allows. Explain to the student how to set an engine, and show him how to hold the nose up to check for a lean run. Poor engine runs often cause crashes, so impress on the student that he needs to do this right.

i. Vibration check the radio at all engine speeds – If an ignition engine is used, check for radio interference.

Just before the first flight, run the engine speed up and down while range checking the radio. Look for excessive vibration in the airframe and control surfaces. Watch to see that the radio does not "glitch" during this check. If the plane has an ignition engine be sure the radio does not pick up "noise" from the ignition system. Resistor plugs on gas engines are recommended to reduce "ignition noise". All radio wiring should be as far away from the engine as possible.

LEARNING HOW TO FLY

Your Planes First Flight: The instructor will fly your model for the first time to make sure it is performing properly before you try and fly it. When a new R/C model takes off for the first time, there is no way of knowing exactly what it will do, and how it is going to fly. The instructor's experience and reflexes are already conditioned to properly "trim out" the plane in order for the model to fly straight and level.

Once the aircraft is "trimmed out", the instructor will take-off and fly the plane to a safe altitude, ("several mistakes high" as the old saying goes) before he turns the controls over to you.

The Student Takes Control of the Aircraft: You will quickly find out that it is very easy to over-control an R/C model, and to get disoriented – EVERYONE DOES IT AT FIRST! – If you get into serious trouble on your first flight, quickly hand the transmitter back to the instructor so he can rescue the airplane. The instructor will level the plane off, fly to a safe altitude, and then let you try it again.

NOTE: With a "buddy box" the instructor would release his "trainer button" and immediately take control of the plane without it being necessary for you to pass your transmitter back to the instructor. Also, if you are using a "flight stabilization system", you only have to "let go" of the controls on your transmitter, and the plane will right itself immediately and fly level. And, that is how a flight stabilization system can replace the buddy box.

The Left/Right Control Reversal Problem: In addition to not over-controlling the plane, another problem that beginners need to overcome in learning to fly R/C is the left/right control reversal that happens when the model is flying towards you one minute, and away from you the next. But, with practice you will easily adjust to this.

Fly Your Trainer as Often as You Can: Learning to fly R/C aircraft is not difficult; it's just a lot different than anything you have ever done before. After you get a few flights under your belt with an instructor at your side, you will begin to feel more comfortable at the controls. Soon you will be flying by yourself with little thought to the moves required. It will just come naturally! Don't get discouraged if you have a minor crack-up, repair the damage, and get back in the air as soon as possible. Fly your trainer as often as you can. Practice – Practice - Practice

Keep Basic Records: Keep track of your progress. This is most helpful if more than one instructor is helping you. As you progress, your records will serve as a background for each instructor to use. Also, keep basic records of the time and number

of flights to determine when batteries need recharging. Battery life is a most important consideration. A plane mounted battery voltage indicator system can be used to let you know when your receiver batteries are running low.

Flight Skills & Pilot Training

Below is a Check List of the skills you should master before flying without the assistance of an instructor. You should also use this Check List each time you advance to a higher performance aircraft.

AMA Membership and Insurance is Required: Please remember that AMA Insurance is not valid unless you are a capable flier, OR, have the assistance of such a person.

Check Off Each Item When Mastered

Pre-Flight Inspection of Equipment
Know the AMA Safety Codes and Field Flying Rules
Engine Operation
Straight and Level Flight
Making Turns
Figure Eight Flight
Rectangular Flight Path, Both Left and Right Patterns
Slow Flight, Stalls and Spins
Steep Turns, Loops, and Rolls
Landing Patterns
Landing
Taxi to Take-Off Position
Take-Offs
Dead Stick Landings
Solo Flight

Routine Flying Checklist

Each day of flying entails various regularly performed tasks. They are referred to as the "Routine Flying Checklist". Eventually they will become second nature, but initially, you should refer to the Checklist to avoid overlooking any necessary tasks.

At Home: (Remember, it's a long drive to the field)

Repair Any Damage to Your Plane
Charge Your Transmitter And Receiver Batteries And Test Them For Proper Operation

Check All Screws, Horns, Hinges, Pushrods And Connectors
Load Your Plane And All of Your Flying Equipment. Use a Checklist, So You Don't Forget Something That You Will Need At The Field

At The Field:

Carefully Assemble Your Plane
Get Frequency Pin Before Turning On Your Radio
Check All Control Surfaces For Proper Throw And Movement
Range Check Your Radio, If Necessary
Move Necessary Starting Equipment Out To The Flight Line
Put Fuel Into The Plane
Secure Your Plane, Or Have a Helper Hold The Plane, While You Start Your Engine, Check For Proper Mixture
Use a Timer To Avoid Running Out of Fuel While Flying
Keep Track of Your Flight Times To Track Battery Endurance

At The End of The Day:

Note Any Unusual Things That Require Checking
Empty The Plane's Fuel Tank, And Run The Engine Dry of Fuel
Oil The Engine With "After Run" (Or Similar) Engine Oil
Clean The Plane And Note Any Damage Requiring Repairs
Carefully Disassemble Your Plane

Eventually this Checklist will become second nature and become part of a regular routine you follow each time you prepare to go to the field. In addition, the more times you go the field and fly, the more you will be able to "fine tune" the flying equipment that you take to the field. You don't want to take too much, but if you take too little, your flying day could be cut short for the lack of a simple tool or fastener.

Flying in Emergency Situations

Disorientation And Incorrect Commands: The most common situation that a beginner will face is disorientation. Sometimes the model just doesn't seem to react correctly, or you may give a wrong command, or simply fall one step behind the airplane. If you have enough altitude, you should have enough time to stop the panic, let go of the controls briefly, sort things out, and then get your plane back under control. This is where an instructor can help. Also, a "Flight Stabilization System" can help the beginner avoid a crash, just let go of the controls, and the plane will right itself and fly level.

Losing The Plane In The Sun: A common error by many new pilots is flying facing the sun. Everything goes well until the model flies directly into the sun, the model disappears, panic sets in, and the model could be lost while you struggle to relocate it. Try to always fly with the sun at your back, or at the least, not directly in your eyes!

Engine Failure While Flying: Another common emergency situation is an engine failure during flight. If this should happen yell out "DEAD STICK" to notify other fliers that you are in trouble and need flying space. Remember, you still have a wing, and the radio still works. Most of the time you will be able to glide the model in for a normal landing. Don't over react and dive for the runway – you will probably overshoot and land in the high-grass anyway. If you are too low to make it back to the runway, concentrate on landing as slowly as possible in the rough. If you keep the model under control, touchdown right side up, and bring it in as slowly as possible, chances are the damage will be minimal, if any. Don't panic and pull full up elevator in a desperate attempt to keep the model from hitting the ground! If you do, it will most likely stall and hit the ground hard, causing more damage than if you flew it all the way down to the ground.

Engine Stall (Failure) Just After Takeoff: This is a special situation that requires immediate attention and action from the pilot. In almost every case, the best thing to do is to lower the nose to keep the model from stalling, and land the model straight ahead. **Do not make the fatal mistake of trying a quick turn back to the runway! It almost always leads to a crash!** Just after takeoff the model doesn't have enough airspeed or altitude to make a turn. Even if it does, you'll be landing downwind at high speed, probably resulting in damage that could have been avoided by landing straight ahead into the wind. If you keep the model under control, touchdown right side up, and bring it down as slowly as possible, chances are the damage will be minimal, if any.

Radio Failure Or Interference During Flight: This problem will almost always result in a crash. However, you should never give up trying to gain control of the model as long as it is still flying. Even though it may not respond, bring the throttle all the way

back to idle, and leave it there. Hold the transmitter high into the air to make sure you are sending the best signal possible.

Another form of radio interference is a "glitch", or momentary loss of radio contact. The model will be flying normally, then suddenly jolt or bounce a couple times, and then continue on normally as if nothing happened. Most of the time a glitch is a definite warning that a radio problem exists**. Don't ignore it!** Throttle back and bring the model in for a landing as quickly as possible. Check the radio, receiver, all wires, and servo connectors. Check everything thoroughly before flying again.

Safety First: Flying R/C model aircraft is an enjoyable way to spend your time, however, things don't always go as planned, as I've described above. The safety of spectators, other pilots, and your own personal safety, is of utmost importance. Follow the AMA Safety Codes, and the Field Flying Rules. Don't fly your model near people, animals, or buildings so that if an emergency situation does arise and the model crashes, and believe me it happens to everyone, no one will be hurt.

Personal Safety: When starting your engine, always remember that a spinning propeller is very dangerous, and the arc of the spinning blades often times can't be seen. A good idea is to paint the tips of the blades white, yellow or orange so you can see the arc as the blades are spinning. (Use a minimal amount of paint or it may cause an imbalance in the propeller). Never get comfortable being around a spinning propeller - your focus of attention, and caution, should be at its highest. When you fly, don't get distracted. Don't let people talk to you while you are flying. When flying, if you look away from your plane, if only for a second, it can take a few moments to relocate your plane in the sky, and in those few moments, you can crash the plane. Pay attention to what you are doing all the time.

Good luck, and happy flying.

After The Crash

Everyone Crashes Sooner or Later: If you have followed the suggestions in this guide, you have a good chance of learning to fly without major difficulty. However, almost everyone crashes sooner or later. This section will help you get back into the air quickly, and more importantly, safely. To safely fly again after a crash you must do the following:

Collect All The Pieces From The Crash Site
Prepare The Aircraft For Rebuilding (If You Want to Rebuild)
Clean The Engine
Check The Radio For Damage

Collect And Clean The Pieces: Just after the crash you are in no mood to make a decision about rebuilding the plane. So the best thing you can do is to collect all the pieces and take inventory of your collection. Make sure you have all the radio parts, push rods, etc. Clean off all the oil and fuel from the parts, and put them in your car. After some thought at home, you might be surprised how little work is required to repair the aircraft.

Re-Clean The Plane At Home: At home, re-clean all the plane's parts with a strong solvent, to insure that all the oil and fuel is removed from the various parts (test clean the different finishes on your plane to insure that there are no adverse reactions to the solvent). Any oily or fuel residue left on the plane will hinder the repair process. Dispose of the cleaning rags carefully, following the solvent manufacturers recommendations.

The Repairs: The actual repair process is similar to building the kit, with you supplying, or making, the parts. Be sure to check that the adhesives that you use to repair the damaged sections are compatible with the planes various construction materials.

Cleaning An Engine: A dirty engine wears out much faster than a clean one. Today's engines are expensive, so protect your investment, especially after a crash. Buy a quart of denatured alcohol, a funnel, a can of gun or machine oil, and some cheesecloth or other fabric, appropriate for straining.

Clean the engine by brushing all the dirt off the outside of the engine. Remove the carburetor, and submerge the engine and carburetor in the alcohol. Again, brush the engine and carburetor. Remove the cylinder head and the crankcase back-plate, submerge the parts in the alcohol again, and rotate the engines crankshaft to remove any remaining dirt. Brush all the parts and lay them on a clean cloth to dry. Once dry, oil the entire engine, rotating the crankshaft to distribute the oil. Reassemble all the parts, applying a small amount of oil to each of the screw threads and mating surfaces during

the assembly process. Strain the alcohol back into the container, or properly dispose of the dirty alcohol. Your engine is now ready to be run.

Check The Radio For Damage: Your radio should have been well protected with a thick layer of foam that was wrapped around the radio receiver when you first installed it into the plane. Despite this protection, the radio gear can still sustain crash damage. All the parts may seem to function normally after the initial check, but one or more of the components may be faulty. Any loose connectors or solder joints can easily cause a major problem when the plane is flown again and subjected to the engine vibration. The following simple test may show up a hidden problem.

Check The Servos: Rubber band the transmitter sticks together to produce full servo deflection. Now tap the receiver and each servo with a rubber-handled screwdriver. If this causes any servo arm movement at all, you have a problem that requires attention from the manufacturer.

Many servos operate with an internal gear train. The gear teeth of the internal gear train can sometimes be damaged during a crash. Test the servo gears by turning the servo arm in each direction to its full throw. If it does not turn smoothly, tends to skip or encounter resistance, then you may have broken gears that need replacement.

Check All Electrical Connections: Finally check all the electrical connectors to make sure that a good connection is being made between the male and female connectors.

When Repairs Are Completed: Reset all control surface throws to their original settings. Make sure all surfaces move in the proper direction. Range check your radio to make sure the radio and the receiver are functioning properly. You may also want to range check your radio a second time with the engine running to make sure that the added vibration of the engine does not have a negative effect on the radio equipment.

During your first flight, reset the trim settings, and watch for problems. Fly cautiously until you are sure that the plane is functioning properly.

PLANE & EQUIPMENT MAINTENANCE

The Heart of Any R/C System: No matter how sophisticated your R/C system may be, the batteries are the heart of that system. Battery technology is constantly evolving, and new types of battery systems are becoming available as they become commercially viable.

At the present time there are three types of battery systems commercially available: Nickel Cadmium batteries, referred to as NiCad (or, NiCd); Nickel Metal Hydride batteries, referred to as NiMH; And, the most recently developed battery technology to become commercially available is the Lithium-Ion batteries, referred to as Li-Ion, and the Lithium-Polymer Batteries, referred to as Li-Poly.

Understand the Battery System You Are Using: Each of these battery systems has its own unique characteristics and maintenance requirements. The maintenance procedures that work for one battery system can destroy another type of battery system. Therefore, it is important to carefully read and understand all the literature available about the type of battery system that you are using, and follow the manufacturer's recommendations.

NiCad:

Among rechargeable battery technologies, NiCd rapidly lost market share in the 1990s, to NiMH and Li-ion batteries; market share dropped by 80%. A NiCd battery has a terminal voltage during discharge of around 1.2 volts which decreases little until nearly the end of discharge. NiCd batteries are made in a wide range of sizes and capacities, from portable sealed types interchangeable with carbon-zinc dry cells. Compared with other types of rechargeable cells they offer good cycle life and performance at low temperatures with a fair capacity but their significant advantage is the ability to deliver practically their full rated capacity at high discharge rates (discharging in one hour or less). NiCd batteries can still be found in your transmitter. Therefore, this section will discuss the care and maintenance required for NiCad battery systems. **It is important to note, that this information IS NOT applicable to NiMH, or Lithium battery systems, which require a very different maintenance and charging schedule.**

Nickel Cadmium Batteries – NiCad

Charging

Charging: When you purchased your transmitter and receiver package it probably came with NiCad batteries, along with a standard "charger" and directions for initially charging your battery packs. Typically, this type of charger is attached to your batteries for a charging cycle of about 14 to 16 hours. Thus, it is referred to as an "overnight" charging cycle.

Special Chargers: After-market battery charges are available which can be adjusted to charge your batteries at a higher charging rate, thus taking less time for the battery pack to reach a full charge. Some of these specialized chargers can recharge a NiCad pack in as little as 15 minutes. (**CAUTION:** Despite the convenience of a fast charging rate, there are negative consequences to repeatedly doing so that will be discussed later in this section.)

There are a wide variety of after-market chargers available, each having its own unique qualities and characteristics. It is beyond the scope of this guide to discuss the merits of each brand of charger, but as you learn more about NiCad batteries and charging systems, you will be able to select a charger that best suits your needs. Take the time to learn about after-market chargers before buying one.

Charging Basics: The amount of electricity that flows into the battery is measured in milliamperes (mA). A fixed-rate charger (like the one that came with your transmitter and receiver package) provides a constant rate of charge for a given voltage. (Example: 50 mA at 4.8 volts for the receiver battery pack). Therefore: If the "capacity" of the receiver battery is rated at 500 mAh (milliampere hours), then it is theoretically rated to deliver a total of 500 mA for one hour, or 50 mA for 10 hours. Likewise, when charging such a pack you divide the charger's milliampere charging rate, into the batteries capacity to approximate how long it will take to charge. Therefore, in theory, a discharged 500 mAh battery pack, will require approximately 10 hours to reach a full charge using a charger that is rated at 50 mA. However, electrical variances such as the internal resistance within the batteries themselves, and other factors, can cause these theoretical estimates to vary, resulting in the charging cycle being significantly longer than the theoretical estimates would indicate.

Special Note: Even though battery manufacturers "rate" their batteries as being able to deliver the specified milliamperes per hour. In reality, manufacturers "rate" their battery's capacity over a two-hour discharge cycle, and not one hour as the rating would imply. So, in the above example, a battery pack having a 500 mAh rating, will probably

not be able to deliver 500 milliamperes over one hour, but is actually "rated" to deliver 250 milliamperes over 2 hours.

Specialty Chargers Are Adjustable: Specialty chargers have the ability to adjust both the charging rate, measured in milliamperes (mA), and also have a setting for the number of cells in the pack being charged (hence, they provide variable mA rates at different voltages in order to charge a wide variety of battery packs. Thus, a NiCad battery can be "quick charged" by using the higher milliampere (mA) setting when using such a charger.

Peak Detection: Many specialty charges offer built-in "Peak Detection Circuits", which means that the charger "senses" when the battery pack is fully charged, and "automatically" reduces its charging rate down to a more conservative "overnight" charging rate, thus protecting the battery from "over-charging" which can prematurely destroy the battery pack. If your charger does not have built-in "Peak Detection Circuits", then you have to keep track of how long the battery has been on the charger, and turn the charger off to avoid "burning up the batteries" by overcharging them.

Charging Cautions: When a battery pack is charged at a faster rate than the standard "overnight" charging rate, the batteries tend to degrade more quickly over time. The higher the charging rate, the more serious the degradation can be to the battery pack. Also, if a battery is left on a high rate of charge for too long a period of time, this too can prematurely destroy your battery pack, hence the value of "Peak Detection Circuits" that will protect your batteries from over charging. Even leaving your battery pack on an "overnight" charger for a very long time (over 3 days) can eventually degrade your battery.

Various Charging Rates: There are 4 different charge rates for NiCad batteries: Overnight, Quick, Fast, and Trickle. These rates are determined by the formula C/X, where "C" is the "capacity" of your battery pack, and the "X" is the "Charging Rate Variable".

The "Overnight" Charge Rate: For Example: If you are charging a 500 mAh battery pack at the "overnight" charge rate, the "Charging Rate Variable" used for an "overnight" charge is "10". Therefore, the formula is C/10. Thus, a battery pack having a 500 mAh capacity is divided by 10, which equals the suggested charging rate of 50 mA. This rate is the most commonly used in R/C, and is also the safest. It is the safest because a battery pack can be left on this charge rate for an extended period of time (a day or two) without damaging the battery pack.

The "Quick" Charge Rate: The formula for charging a battery pack at the "quick" charge rate is C/3. Therefore, as in our above example, a battery pack having a 500 mAh capacity divided by 3 yields a charging rate of 166 mA. The higher charging rate will fully charge your battery pack in about 3 hours. Do not leave your charger

connected to the battery pack for more than 6 hours or serious damage could occur to your battery pack.

The "Fast" Charge Rate: This is the fastest of all charging rates. Even though most NiCad batteries can accept a "fast" charge rate, it is not recommended for R/C receiver and transmitter batteries because of the potential battery damage that can be caused. But, in less critical situations such as batteries that are used to power the electric motors on electric planes, a "fast" charge rate can be used. The formula for charging a battery pack at the "fast" charge rate is 3C (or 3 times the capacity of the battery pack). Therefore, a battery pack having a 500 mAh capacity multiplied by 3 yields a charging rate of 1500 mA or 1.5 Amps. (CAUTION: Such charging rates on a routine basis will seriously degrade the life of the battery.)

The "Trickle" Charge Rate: The "trickle" charge rate replaces the energy that a NiCad loses by just sitting around. A NiCad can be left on "trickle" charge indefinitely without damaging the battery packs, and will keep them 100% charged. The formula for charging a battery pack at the "trickle" charge rate is C/50. Therefore, a battery pack having a 500 mAh capacity divided by 50 yields a charging rate of 10 mA. It is important to note that discharged batteries cannot be charged-up at this charging rate, only maintained. A "trickle" charger should only be used AFTER the battery pack is fully charged, preferably at the "overnight" rate.

NiCad Battery Cycling

What Is Battery Cycling: Cycling a rechargeable NiCad battery is defined as the controlled discharge of the battery, at a fixed discharge rate, until a pre-determined voltage is reached, and then recharging the battery to a full charge. The time it takes to discharge a fully charged battery down to its pre-determined voltage is recorded. The pre-determined voltage for NiCad batteries is 1.1 volts per cell (sometimes 1.05 volts per cell is used, depending on the manufacturer's recommendations). Thus a 4-cell receiver pack would be considered "discharged" when the voltage reaches 4.4 volts, and an 8 cell transmitter pack would be considered discharged when the voltage reaches 8.8 volts.

Important: In order to obtain a valid reading, the rate of discharge should be adjusted so that the batteries become fully discharged in about one to six hours.

Why Cycle NiCad Batteries: The only sure way to test the overall condition of a NiCad battery is to cycle it. No other test exists that will tell you whether or not a NiCad is deteriorating and losing capacity. A second reason to cycle NiCad batteries is to eliminate a condition referred to as "memory". When NiCad battery packs are recharged frequently without ever being fully discharged, the battery pack acquires a "memory" of this shallow charging condition, and the overall capacity of the battery pack becomes less than its rated capacity even though the voltage readings would indicate a

fully charged battery pack. The only way to eliminate this "memory" is to fully discharge the battery pack, and recharge it, hence the importance of cycling NiCad batteries.

Evaluating a NiCad's Condition: Cycling provides the following information: The amount of time it takes to discharge the pack, and the amount of fixed current that was being removed from the pack. Thus, we can calculate the actual operational capacity of the pack and compare it to the rated capacity listed on the battery pack.

For Example: If a 250 mA load is placed on a battery pack, and the battery pack becomes fully discharged in 1 hour, then the battery pack has an operational capacity of 250 mAh (250 mA load times the number of hours (1) to discharge, equals 250 mAh of capacity). If that same battery pack is "rated" at 500 mAh, then there is a serious problem, and the battery pack should be replaced. Anytime a battery pack has an operational capacity that is "less than" 80% of its rated capacity, it should be replaced.

Various Brands of Chargers and Cyclers Are Available: Battery cyclers are commercially available that automatically cycle your batteries and display the necessary readings so you can evaluate the condition of your battery pack. Brands such as the Accu-Cycle Plus by Hobbico, and the Cirrus Cycle-Pro are two such models. Many other manufacturers, such as AstroFlight, FMA Direct, Hanger 9, Hitec RCD, and Wattage also offer NiCad battery chargers and cyclers. Check them out.

Special Note: It is often wise to cycle NiCad batteries at least twice consecutively (if not three times), using the last readings as being the accurate reading of the batteries operational capacity.

Nickel Metal Hydride Batteries - NiMH

General Information: The NiMH battery is rated at 1.2 volts per cell, just like the NiCad batteries. The NiMH battery technology typically offers almost twice the mAh operational capacity as NiCad batteries. Hence, they can provide considerably more power for the same size and weight of a NiCad.

NiMH batteries require a different charging and maintenance schedule than do NiCad batteries, and do not tolerate high charging rates well. Thus, they do not lend themselves to the fast charging rates and quick turn-around times provided by NiCad batteries.

Since the NiMH batteries have the same rated voltage per cell, some after-market charges have enough adjustable range in their mA charge rate settings to accommodate the lower charging rates associated with NiMH batteries, and therefore can be used to charge both NiCad and NiMH batteries. It is important to read the manufacturer's literature that comes with your after-market charger to insure proper use of your charger

on NiMH batteries. And, like most batteries, NiMH batteries can be damaged by overcharging.

Lithium – Poly Batteries – Li-Poly

Battery Types

In the dark ages of electric flight, we used Ni-Cd and NiMH batteries, but now the standard is Lithium-ion Polymer (LiPo) and that will be the focus here. These batteries are sometimes referred to as battery packs or simply packs.
There is another type of battery chemistry called a Lithium Iron Phosphate (LiFePO4) that some use for flight packs, but are more often found in receiver and transmitter packs. They are usually referred to as LiFe packs or A123 packs, referencing their makeup and brand name. Each type has its advantages and disadvantages, but because LiPos are the de facto standard in electric flight, I'll concentrate on them.

Safety First

Rumors abound about safety, or lack thereof, when using LiPo batteries. Much of that is leftover from the early days of LiPo packs and the lack of information available to the user
at the time.
Incorrect chargers were used, incorrect voltage cutoffs were used, and they were being discharged at levels that the packs couldn't support. As chemistries, protective circuits, and information improved, LiPo batteries have become a safe and suitable source of power. Here are a few simple rules for increasing your safety:
• Always store batteries in a fire-safe container.
• Always charge with an appropriate charger designed for LiPos.
• Always follow the manufacturer's instructions for charging and discharging rates.
• Always size a pack according to its usage.
• Never overcharge.
• Never over discharge.
• Never use a puffed pack.
• Never use a pack that has visible damage (dents, cracks, etc.).
• Never charge a pack unattended.
• Never disassemble or reconfigure a damaged pack.
Most accidents involving LiPo packs are the result of not following one of these rules. Understand the charger you're using and follow the manufacturer's guidelines and they will serve you well. Charge safely.
Understanding the Labels
Labels contain plenty of information, but understanding them is often confusing. A few simple definitions will help you.

• 3S, 4S, etc.: Battery packs are composed of a number of cells in series and this number represents that. If the pack is listed as a 3S pack, then it has three individual

cells connected in series within the pack, each with a nominal voltage of 3.7 volts. The pack's total will then be listed as an 11.1-volt pack. A 4S pack would be 14.8 volts, etc. (four cells x 3.7 volts = 14.8)

• Capacity: The capacity rating of a LiPo battery tells its output potential, or how long you can take power from the battery at a given rate before it reaches the cutoff voltage, or is discharged. The faster you take power from the battery, the less time it will last. Many times, our batteries' capacities are listed in milliampere hours (mAh) instead of ampere-hours (Ah). This is merely a metric conversion to a smaller unit—1 ampere hour = 1,000 milliampere hours, so 2.2 Ah is 2,200 mAh.

• Discharge rating: "C" represents a measure of the rate at which a battery can be discharged relative to its maximum capacity. If the battery is discharged at a rate higher than the discharge rating, the battery may be damaged, or worse, could pose a safety hazard, like a fire. If a battery's discharge rating is 15C, it means that the most power that can be drawn from it at one time is equal to 15 times its capacity. Using the example of a battery which has a capacity of 2,200 mAh, this means that greatest flow of electricity you can safely get from the battery is 15 x 2,200 = 33,000 milliamperes (or 33 amperes). The discharge rating listed on the battery's label is based on what the manufacturer believes the pack will handle during discharge without degrading the pack. These discharge ratings, sometimes mistakenly referred to as C ratings, can be optimistic and are best used as a guideline. Packs with higher discharge rates have lower internal resistance (IR), which is a good thing. Many batteries with provide two discharge ratings such as 30C/60C. These represent the continuous and burst ratings. The first number means that it will continuously support a 30C discharge, and for short bursts (typically less than 15 seconds) it should support 60C. This allows for spikes during rapid throttle changes, but shouldn't be something you use regularly. If you need higher current levels, buy a higher capacity/rated pack.

• Internal Resistance: This represents the internal resistance of a cell or pack. Some chargers will test the IR for each cell within a pack during the charge cycle. As internal resistance increases, the battery efficiency decreases. So as a general rule, the lower the resistance the more punch a battery will provide. It's nice to know, but not something to get hung up over as a beginner. As a rule, packs advertising a high discharge capacity will have a lower IR. Battery pack labels are often the manufacturer's attempt to put its product in the best light. A pack rated as a 65C pack and sporting small-gauge wires to the connectors won't really handle that amount of current. Sometimes packs come with large-gauge wires, but they're soldered to tiny tabs inside the pack, which negate the benefit of those monster wires. Shop carefully and use the best battery you can afford. Memory If you're beginning to fly electric-powered aircraft and your only experience has been with Ni-Cd or NiMH packs, you're probably wondering about memory effect. Older Ni-Cd and NiMH batteries suffered from an effect termed memory in which the way the battery had been discharged in the past would affect its performance in the future, even after being fully recharged. The good news is with LiPo and LiFe packs, there is no such concern.

Sizing Your Battery Pack

If you're new to electric-powered models, you will probably follow the manufacturer's recommendation for an appropriate pack for your aircraft. That's what you should be doing. As you expand your hangar, you may decide to add a bigger battery or need something that isn't specified. You need to do enough research to get a feel for what type of current the setup will pull under full throttle and size your pack accordingly.
If your airplane requires a 3S setup using a typical 2,200 mAh pack and you change to a "hotter" motor—meaning one that is more powerful and will pull more current—you need to see if your current packs can handle it. If your current power system is pulling 20 amps with your 2,200 mAh 15C pack, but your next motor upgrade will pull 35 amps, that pack won't be happy. Let's look at why. The 15C pack is technically capable of pulling 33 amps (2,200 mAh x 15 = 33,000 mAh or 33 amps), so your 20-amp requirement was well within its limits. Now looking at the new setup with the motor requiring 35 amps, you see that the pack is undersized, if only by a couple of amps. That's enough to cause problems that can be costly in the long run. I recommend buying a quality LiPo pack that is well beyond the projected requirements of the setup. Running a pack at its limit will guarantee a short life and wasted money. Pay attention to the label and notice if it gives two ratings such as 30C/60C. These represent the continuous and burst ratings as previously mentioned.

Charging and Storage

Always balance charge when you can. Balance charging evenly distributes the energy stored in the battery across the multiple cells inside. This will prolong your pack's life and ensure better service from it. You can get away with fast charging at the field without balancing if your regular routine is balance charging at home. There are debates about charging and storage levels, but the safe bet is to store batteries at something other than fully charged or fully discharged. Most good balancing chargers offer a storage mode that takes them to a level of approximately 3.8 volts per cell. The important thing is not to leave them fully charged or discharged for long periods of time.

The Secret to Long Life

The secret, at least for your batteries, is to charge to 4.1 volts per cell as opposed to the full 4.2 volts per cell, and never discharge them to full discharge level. Working your packs in between the two ends of the charge/discharge levels will greatly increase their lifespan. Engineer/charger/ESC designer Doug Ingraham described it this way: "There are several things that cause degradation of lithium batteries. One is heat and for the purposes of RC modeling, this is most likely the one that causes the greatest degradation. The others have to do with the effects on the materials at both ends of the state of charge. "The lithium ions are forced into the carbon material on the plates at both ends of the state of charge. This causes a breakdown in the material, and in future charge cycles less ions can be held causing degradation in capacity. It is mostly at the ends (full and empty) that this damage occurs so staying away from the ends even a little can help extend the life of the cells."

Several chargers offer a charge cutoff labeled “Long Life” or something similar and they stop the charge at 4.1 volts per cell. From Doug’s explanation, you can see that using the 4.1 volts keeps you off the top end and setting an ESC low-voltage cutoff above the traditional 3 volts per cell will keep you off the bottom end. Unless you’re a competitor trying to squeeze every last bit out of your flight, this will serve you well and save you money.

Disposal

When your batteries get to the point that they need to be disposed of, one of the simplest options is using a no-cost used rechargeable battery and cellphone collection program offered with a network of more than 34,000 collection sites throughout North America. Call2Recycle accepts NiMH, Lithium Ion (Li-Ion), LiPo, and Ni-Cd batteries weighing up to 11 pounds. Simply visit the program’s website, www.call2recycle.org, and enter a ZIP code to find a collection center near you. If you don’t have Internet access, call (877) 273-2925. Drop-off centers are located at corporate offices, healthcare facilities, manufacturers, military bases, and at major retailers such as The Home Depot, Lowe’s, Staples, and Best Buy.

Connecting It

The connectors you choose for your model are as important as any other piece of equipment. Connectors are designed for certain sizes or gauges of wire. As such, they are rated for specific maximum electrical throughput, just as wire is (as you learned in the terminology table). Like wires, if more electricity is put through a connector than it was designed for, resistance and heat will increase. You can use the connector table to find out what type of connectors you have and what their capabilities are. There are many types of connectors available, and most beginner models come from the factory with some type of preinstalled connector. This connector may or may not match the battery you have. Adaptors are available for many types of connectors and existing connectors on models or batteries can even be completely replaced with a connector of your choice. Many modelers with multiple airplanes try to keep the same type of connectors on all of their models and batteries for simplicity.

Ultimate Low-Tech Tester

Your hand is one of the best meters to gauge how your setup is doing. The magic temperature for a danger threshold is 140° on LiPo packs, and that is darn hot if you touch it. If your battery feels too warm, it probably is. Heat is wasted energy and a sign of trouble. If your motor is too hot to touch, it’s probably over-propped. If the ESC is too hot to touch, it’s probably undersized, as is the battery if it’s hot. If your connectors are warm, they’re a choking point in the circuit, causing high resistance and lost efficiency. Heat is a natural byproduct of our setups, but we need to size things accordingly to keep it at a minimum. A small, inexpensive IR temperature gun can be a valuable tool when troubleshooting.

Wrapping It Up

Don’t make your world more complicated than it has to be when trying electrics. Information abounds on the Internet, as do rumors and conjecture. “Experts,” and even experienced modelers, tend to load up newcomers with more information than they need to get started, and do it out of their exuberance for the hobby. Do your homework, study the manufacturer’s information, and try to make the best decision you can. Don’t obsess over it! Most Plug-N-Play systems work well and are well matched. There’s plenty of time to venture out on your own. Don’t over test your batteries on the bench. That doesn’t replicate actual flight conditions.

FLYING FIELD & MEETING LOCATIONS

Directions to the Flying Field

The Barnstormers Flying Field
916 Tafelski Road
New Waverly, TX 77358

Directions: Take I-45 north from Conroe. Exit I-45 at the New Waverly exit #102. Follow the I-45 feeder road north to the second stop sign at Hwy 150. Turn right on Hwy 150, and go east until it dead-ends at Hwy 75. Turn left at Hwy 75 and go north past an Exxon Convenience Store, then take a left at Tafelski. Follow Tafelski for about 1 mile past two 90 degree turns and watch for the Flying Field entrance on the right. Pull in and let the fun begin!

Directions to the Meeting Facility

Conroe Friendship Center
1202 Callahan Ave
Conroe, TX 77301

Time: Barnstormers invites you to attend its regular monthly meetings that are held at 7:30 PM on the first Thursday of every month at the Conroe Friendship Center.

Directions: **From the south** take I-45 north from Houston. Exit at the route Wilson Rd exit. Follow the feeder to Semands St. Take a right on to Semands St. Take your first right and follow the drivway to the "Friendship Center".
From the North follow I45 South to the north loop 336 (the Wal-Mart exit). Turn left onto 336 and continue to route 75. Turn right onto route 75. Follow route 75 to Semands St. on the right. Turn right onto Semands St. Follow Semands St. and take the 7th street on the left. Follow the driveway to the "Friendship Center"

GLOSSARY OF R/C TERMS

(Courtesy of Tower Hobbies Inc.)

Aileron – The hinged control surface on the back (trailing edge) of the wing furthest away from the fuselage. Servo power applied to the aileron makes the plane turn or roll.

Airfoil – The shape of the wing, as seen from the end. The three main airfoil types are flat-bottom, semi-symmetrical and symmetrical.

ARF – (Almost Ready To-Fly) An airplane which is largely pre-built and is usually covered at the factory. May also include an engine or motor.

BHP – Brake Horsepower. A term used to describe an engine's ability to produce power under controlled circumstances. Commonly used with an RPM measurement to indicate a rated condition such as "1.24 BHP @ 13,000 RPM".

Control Surface – A movable surface on a plane designed to change the plane's flying direction. May be used alone, or in combination. See Aileron, Flaps, Rudder, and Elevator.

Dihedral – The upward angle of the wings, as seen from the nose. Dihedral enhances the planes flying stability. Trainers tend to have high dihedral, but aerobatic planes have little or none.

Displacement – Refers to the volume of space a piston displaces as it travels from one extreme position to the other, and implies an engine's ability to produce thrust. It may be measured in cubic inches (cu.in.) or cubic centimeters (cc). The most popular displacement range in the U.S.A. is .40-size (that is, engines with a displacement of around 0.40 cu.in.). However, displacements can range from as little as .049 (for 1/2A kits) up to 7.32 cu.in. for some gas engines.

Elevator – A hinged control surface connected to the back (trailing) edge of the horizontal stabilizer. Moving the elevator makes the plane climb or dive.

Engine – A mechanical device that provides flight power (thrust) by means of internal combustion. The two main types of engines in R/C are the gasoline engine (which burns a gasoline and oil mix) and the more common glow engine (which burns an alcohol nitromethane and oil mix). Glow type engines include 2-stroke and 4-stroke engines.

Fin – A slang term for the Vertical Stabilizer.

Finishing – The final stage of building, in which covering and/or paint and trim are applied.

Fixed (Landing) Gear – Landing gear that cannot be moved and remains in takeoff/landing position throughout flight. See also: Retractable Landing Gear.

Flap – The control surface on a wing closest to the fuselage. Moves up or down, to increase lift or drag.

Flat-Bottom – A wing airfoil that features a flat underside. Typically in trainer airplanes.

Four-Stroke (4-Stroke) Engine – An engine in which the piston travels up and down twice to achieve combustion. Produces more torque (power) than 2-Stroke engines of similar size, as well as a more "scale" sound, greater economy, and the ability to swing bigger props. Less common than 2-Stroke engines, but more often used in large or giant-scale airplanes. Where engine requirements for a kit are listed, 4-Stroke engines are usually the second range listed and marked as such. See also: 2-Stroke Engine.

Fuel Tank – The container that holds the plane's fuel supply.

Fuselage – The long, narrow body of a plane.

Glow Fuel – An alcohol-based fuel which includes nitromethane in the mixture. Glow fuels are often labeled by the percentage of nitromethane included, i.e. 10% nitro, 25% nitro, etc.

Glow Plug – The part of a glow engine which produces the heat needed to ignite glow fuel. Glow plugs provide heat; while spark plugs provide an ignition spark in gasoline engines.

Horizontal Stabilizer – The portion of the tail that includes the elevators, which control the plane's up and down movement.

Kit – An airplane that requires the modeler to do most, or all, of the building work. Wooden and/or plastic parts on most modern kits are shaped or pre-cut to a large degree to minimize work; hardware packages included with planes vary widely in quality and completeness. See also: ARF, RTC, and RTF.

Landing Gear (Gear) – The wheels and supporting structures on an airplane. The two main types are Tricycle and Taildragger gear. See also: Main Gear, Mains, and Tailwheel.

Leading Edge – The front of the wing.

Li-Ion – An abbreviation for Lithium-Ion, one of the newest types of rechargeable batteries. Like NiCds, they are generally described by their storage capacity (mAh) and/or the number of cells contained in the pack, and the voltage rating of the pack.

Li-Poly – An abbreviation for Lithium-Polymer, one of the newest types of rechargeable batteries. Like NiCads, they are generally described by their storage capacity (mAh) and/or the number of cells contained in the pack, and the voltage rating of the pack.

Loop – A basic aerobatic maneuver in which the plane starts from a straight, level flight path and then climbs up, around and over, until it returns to the original level flight path.

Main Gear – The two landing gear "legs" located under the wings. Also referred to as Mains.

Motor – A mechanical device that creates thrust for flight by using battery power for "fuel".

NiCad (NiCd) – An abbreviation for Nickel Cadmium, the most common type of rechargeable battery. These batteries are generally described by their capacity to store power (measured in milliamps), and/or the number of cells in the pack, and the voltage rating of the pack, i.e. 1700 mAh NiCad, 4-cell, 800 mAh NiCad.

NiMH – An abbreviation for Nickel Metal-Hydride, one of the newest types of rechargeable batteries. Like NiCads, they are generally described by their storage capacity (mAh) and/or the number of cells contained in the pack, and the voltage rating of the pack.

Nitro (Nitromethane) – The "power" ingredient in glow fuel. Nitro fuel equals glow fuel.

On-Board Gear – A term which can have several meanings. In its broadest sense, on-board gear can mean everything in the airplane. More generally, however, on-board gear refers to a more specific group of items, usually including the receiver, batteries, and servos. In electric models, it would also include the motor, motor batteries, and the ESC (electronic speed control) or the on/off switch.

Pitch – A term with two different meanings. Pitch (referring to an airplane) is the tendency for its nose to unexpectedly move up or down without pilot input. Pitch (referring to a propeller) measures how far forward the prop will travel (in inches) in one complete revolution. An 11x7 propeller, for example, is a prop that is 11 inches in diameter and will pull a plane 7 inches forward with each revolution. See also: Roll and Yaw.

Power Plant – A slang term for engine, which is sometimes also used in reference to a motor.

Prop – See Propeller.

Propeller – The whirling device on the plane which turns engine/motor power into thrust. May be carved from wood, or molded from reinforced plastic or nylon.

Pushrods – The rods that connect servos to the movable parts of the plane.

Radio – Short for Radio Transmitter. See below.

Radio Transmitter – The part of a radio system that a pilot operates to transmit control signals to a receiver.

Receiver – The radio component within the plane that receives the transmitter signal and relays its command to the servos.

Receiver Battery – The radio receiver's power source.

Retractable (Land Gear) – Land Gear that can be retracted up into the fuselage and/or wings, for reasons of improving looks, aerodynamics, or both. May also be called simply "retracts". The alternative to fixed (landing) gear.

Roll – A term with two meanings. A roll is a basic aerobatic maneuver, in which the plane rotates around an imaginary centerline that runs from the center of the prop shaft through the end of the fuselage. However, roll can also be used to describe an unwanted tendency of a plane to roll without pilot input. See also: Pitch, and Yaw.

RPM – Revolutions Per Minute. Used to describe an engine's crankshaft rotational operating range.

RTC – Ready To Cover. Describes a plane in which most major sections of the plane have been built, and are ready for covering or painting. Surfaces may or may not be factory sanded.

RTF – Ready To Fly. A somewhat loose term used to describe a plane which requires very little or no work to prepare it for flight. Usually features a significant degree of factory assembly and factory-applied covering. Some RTF's may also include a transmitter, receiver, engine, (or motor) and other smaller items.

Rudder – The hinged part of the Vertical Stabilizer that moves the plane's tail to the right and left.

Scale – A term with two meanings. Scale may mean the relationship in size between a model and its full sized original counterpart, for instance, "1/12 scale, 1/5 scale, etc." However, scale can also refer to the model's trueness to the original's looks and/or features. Exact-scale models are rare. Most scale models include at least some design

compromises. Exact- (true-, precise-) scale models would be the most authentic, followed by scale, sport-scale, and stand-off scale (i.e., looks more authentic when you stand off a ways).

"Second" Plane – A plane designed for, or ideal for, pilots who have mastered a trainer. Similarly, "Third Plane" typically refers to a good first low-wing plane, etc.

Semi-Symmetrical – A wing airfoil which is neither flat-bottomed nor completely Symmetrical.

Servos – The radio components that do the physical work in an airplane, by moving the pushrods that are connected to the various parts/control surfaces of the plane.

Span – An abbreviated term for wingspan. See Wingspan.

Stab – An abbreviated term for stabilizer. See Stabilizer.

Stabilizer – See Horizontal Stabilizer and/or Vertical Stabilizer.

Symmetrical – Describes an airfoil which has the same shape on either side of an imaginary horizontal center-line.

Tail – The part of the airplane located on the rear of the fuselage. Includes both the vertical stabilizer and horizontal stabilizer.

Tail-dragger (Gear) – Landing gear that includes two main gears (usually located under the wings) and a rear tail-wheel attached to the underside of the fuselage. Holds the plane in a nose-up attitude while on the ground. Also used to describe the plane, i.e., "It's a tail-dragger I built a year ago…"

Trailing Edge – The rear edge of the wing.

Tricycle (Landing) Gear – Landing gear that includes two main gears (usually located under the wings) and a nose wheel. Often found on trainers, it holds the plane roughly level and provides very stable ground handling.

Trim – A term with two meanings. Trim (in relation to finishing) refers to additional decorative elements (graphics, lines, etc.) added to an existing finish. Trim (in relation to flying) refers to making mechanical adjustments to the control surfaces that will allow the plane to fly predictably and well.

Two-Stroke Engine – The most common type of glow engine, one in which the piston travels up and down once to achieve combustion. Where engine requirements for a plane are listed, the 2-Stroke engine range is usually the first (or only) range listed. See also Four-Stroke Engine.

Vertical Stabilizer – The portion of the tail that provides side-to-side stability. The hinged portion of the vertical stabilizer is called the rudder.

Wing – The large, horizontal surface that creates lift (the force that carries a plane into the sky) as it moves through the air.

Wing Area – The surface area of the wings, as measured in square inches. General rule: the more wing area, the more lift produced.

Wing Chord – The depth of the wing, from the front (leading) edge to the back (trailing) edge.

Wing Root – The place where the wing joins the fuselage.

Wingspan – The length of the wing, as measured from one wing tip to the other.

Wing Tip – The end of the wing furthest from the fuselage.

Yaw – An undesirable characteristic in airplanes. A plane that yaws is one in which the tail or nose (or both) will make undesirable side-to-side movements away from the desired flight path. See also Pitch and Roll.

Z-Bend – A shape often used to connect a control rod to a servo. So named for the two 90 degree bends that make it look like a letter "Z".

BARNSTORMERS CLUB CONSTITUTION & BY-LAWS

Montgomery County Radio Control Club
Doing Business As
Tri-County Barnstormers
Constitution and By-Laws
Last Amended April 2004

Constitution: The fundamental principles or make-up of the Club
By-Laws: The standing rule of the group

I – Club Name

The Club is incorporated under the name: **Montgomery County Radio Control Club**
The Club will do business as: **Tri-County Barnstormers**

II – Objectives

1. To promote interest in Radio Control Model Airplanes.
2. To encourage assistance, cooperation and interchange of ideas and techniques of radio control model building and flying among members.
3. To encourage safety, proficiency and sportsmanship in flying radio control model airplanes.
4. To plan and conduct programs and activities to enhance member's proficiency and enjoyment of the sport, with equal attention to beginner and expert.
5. To plan and conduct other activities and events to increase family interest and participation in radio control modeling.

III – Membership

Membership is open to anyone with an interest in model aviation. Prospective members will complete a "Membership Application Form" and present the form along with all current fees and dues, along with proof of AMA membership, when required for the class of membership desired, to an officer (officer defined below) of the Club. The Membership Application will be presented to the Regular Membership by the presiding officer at the next meeting for approval/rejection by

the Club Regular Members. The applicant must receive at least 80% approval of the Regular Members voting.

There shall be five (5) classes of membership:

Regular Membership: A "Regular Member" shall be defined as an individual who is 18 years of age or older, and has paid annual dues at the Regular Membership rate as established by the Club. A Regular Member shall have full voting rights concerning all activities and functions presented before the membership and may participate in all Club activities and functions. Every Regular Member must have a current and valid membership in the AMA.

Family Memberships: A "Family Member" is defined as the spouse, minor child, and adult student child of a "Regular Member". Family Members are not required to pay annual dues. A spouse shall be defined as the legally married companion of a "Regular Member". A minor child shall be defined as a "Regular Member's" minor child who is less than 18 years of age. An adult student child shall be defined as the "Regular Member's" adult child who is (are) 18 years of age and older, but less than 25 years of age, and is (are) a full time student in an accredited college, university or other accredited educational institution. "Family Members" may participate in all Club activities and functions. Any Family Member that flies, or otherwise engages in utilizing radio control equipment at the Club flying field must also have a current and valid membership in the AMA. Family Members shall NOT have voting rights at Club meetings. Any Family Member who is 18 years of age or older may pay his or her annual dues at the Regular Member rate and shall immediately be considered a Regular Member and have all the voting rights and privileges of a Regular Member without limitations.

Junior Membership: A "Junior Member" is defined as a minor child less than 18 years of age whose parent is not a member of the Club. A Junior Member shall pay annul dues at a rate established by the Club for such class of membership. All Junior Members must have a current and valid membership in the AMA. Junior Members shall have NO voting rights at Club meetings.

Student Membership: A "Student Member" is defined as an adult member 18 years of age and older, but less than 25 years of age, whose parent is not a member of the Club, and is enrolled as a full time student at an accredited college, university or other accredited educational institution. A Student Member shall pay annual dues at a rate established by the Club for such class of membership. All Student Members must have a current and valid membership in the AMA. Student Members shall have NO voting rights at Club Meetings.

Associate Membership: An "Associate Member" is a special class of membership granted by a majority vote of the Executive Committee. An Associate Member is defined as an adult member 18 years of age and older, and does not fly model aircraft or otherwise engage in utilizing radio control equipment at the Club flying field. An Associate Member is not required to pay annual dues, and is not required to be a member of the AMA. An Associate Member shall have NO voting rights at Club Meetings.

IV – Officers and Committees

1. The officers of the Club shall consist of a President, Vice-President, Secretary, Treasurer and Editor. All of the officers shall be elected. All of the officers shall be Regular Club members. An officer may hold more than one officer's position on a temporary basis, until an additional officer can be appointed by the President.

At the September meeting, the President shall appoint a nominating committee consisting of three (3) Regular Members to recommend officers for the next year. The recommended nominees shall be selected from those members who are, or will be, classified as Regular Members prior to the election vote in November.

At the October meeting the nominating committee will make its report to the membership, which report shall be entered in the Club minutes for that meeting.

At the October Meeting the President shall also call for any additional nominations from the Regular Membership. These additional nominees shall be selected from those members who are, or will be, classified as Regular Members by the election vote in November, and shall be entered in the Club minutes for that meeting.

At the November meeting the President may call for any additional nominations from the Regular Membership, and any additional nominees shall be included on the ballot and all nominations shall be read to the members present and a vote called.

All elections shall be by written ballot supplied by the Club Secretary to all Regular Members present at the November meeting. Regular Members will mark their choices on the ballot, and each ballot shall include space for the Regular Member's printed name, signature and AMA number for identification purposes. The candidates receiving the largest number of votes shall be considered elected to fill such office. A written ballot shall not be required for any officer's position in which a nominee is running un-opposed. The election results shall be entered in the Club minutes for that meeting.

Any Regular Member not able to attend the November election meeting may cast an absentee ballot for the candidates of their choice by mailing a plain paper ballot indicating their choices for each position, and include his/her printed name, signature and AMA number, and sending their ballot to the Executive Committee at the Tri-County Barnstormers mailing address prior to the November election meeting, or by submitting his/her written ballot to a Club officer prior to the November election meeting. Should a Regular Member cast an absentee ballot, and another ballot at the meeting, then both ballots will be thrown out and neither shall be counted.

The elected officers shall be installed at the December meeting by asking them to promise to abide by the Club's Constitution and By-Laws which immediately qualifies them to serve until their successors are installed as herein directed.

2. **President:** It shall be the duty of the President to preside at all meetings and meet with the Executive Committee as his/her convenience permits, and act as a spokesperson in all matters pertaining to the Club. He/she shall appoint Regular Member(s) to fill the un-expired term(s) of officers who have to leave their office. He/she may sign written contracts and binding obligations which are approved and authorized by the Club, and perform such other duties as necessary.

3. **Vice-President:** The Vice-President shall, during the absence or disability of the President, act in the President's stead, and shall have all the powers granted to the President. In the event of resignation, retirement, or incapacity of the President, he/she shall become President for the un-expired term of office. He/she shall plan, direct and administer all field activities. The Vice President shall perform additional duties as directed by the Executive Committee

4. **Secretary:** The Secretary shall record and report the minutes of each meeting and maintain accurate records of all Club matters, maintain files of all Club correspondence, and keep records on all grievance proceedings. The Secretary shall perform additional duties as directed by the Executive Committee.

5. **Treasurer:** The Treasurer will keep accurate financial records, be responsible for all funds collected and keep funds in a bank. He/she will report the financial condition of the Club at each regular meeting. Funds may be disbursed by checks. The Treasurer shall disburse funds for authorized Club related activities and supplies. All Club expenditures, at the discretion of the Executive Committee, are subject to review and approval by a majority vote of the Executive Committee. There shall be an audit of the Treasurer's records by a two (2) "Regular Member" team that is selected and appointed by a majority vote of the Executive Committee. No existing officer shall be appointed to the audit team. The audit shall be completed during the month of November prior to the new officer installation at the December meeting. Results of the audit shall be read to the membership during the December meeting. The Treasurer shall perform additional duties as directed by the Executive Committee.

6. **Editor:** The Editor shall publish a monthly newsletter. The Club newsletter shall be issued each month following a regular Club meeting and shall be distributed to all dues paying members and Associate Members not later than five (5) days prior to the next scheduled monthly Club meeting. The Club newsletter shall be known as "THE PROP WASH – NEWSLETTER OF THE TRI-COUNTY BARNSTORMERS R/C CLUB". The editor shall perform additional duties as directed by the Executive Committee.

7. **Executive Committee:** The Executive Committee will consist of the President, VicePresident, Secretary, Treasurer and Editor and shall direct the affairs and business of the Club. All Club expenditures, at the discretion of the Executive Committee, are subject to review and approval by a majority vote of the Executive Committee. An officer of the Executive Committee may resign at any time. The President shall select and appoint a Regular Member to fill the vacant and un-expired term of office of any officer.

V – Club Initiation Fee and Dues

1. **Initiation Fee:** The Club initiation fee shall be $150.00. All new Regular Members shall pay the initiation fee. All Family Members, Family Members who elect to become Regular Members, Junior Members, Student Members, and Associate Members, as defined herein, shall be exempt from paying an initiation fee. Once paid, no Initiation Fee or portion thereof, is refundable for any reason.

2. **Annual Dues:** The Annual Dues may be prorated to reflect the remaining months of the Club's current fiscal year. Once paid, no Annual Dues, or portion thereof, is refundable for any reason. The annual dues may be changed or amended for each class of membership by a 2/3 majority vote of a quorum present at any regular meeting of the Club, provided that:

A. A copy of the proposed change in the dues is mailed to each member at his/her last known address, not more than fifteen (15) days, nor less than five (5) days, prior to the meeting at which such change shall be offered for vote.

B. Any member not able to attend the meeting may cast an absentee ballot "For" or "Against" the change in dues by mailing a plain paper ballot indicating his/her vote, and include their printed name, signature and AMA number to the Executive Committee to the Tri-County Barnstormer mailing address prior to the meeting, or by submitting his/her written ballot to a Club officer prior to the meeting. Should a member cast an absentee ballot and also vote at the meeting then both the written ballot and the vote at the meeting will be thrown out and neither shall be counted.

C. Any vote of the membership that is taken by written ballot will be open to review by any member at or before the end of the meeting. The counted ballots will be left on the table and anyone wishing to review the vote will be welcome to do so.

3. **Delinquent Dues or Assessments:** If any member has not paid the Club dues, or Special Assessments, within 60 days after the due date, and after sufficient notification of such, his/her name shall be automatically removed from the Club roll and his/her membership shall automatically be terminated.

4. **Resignation:** If a member in good standing resigns from the Club said member shall be immediately removed from the Club roll and his/her membership shall be terminated.

5. **Reinstatement:** Following membership termination, a member shall have 90 days in which to request reinstatement by submitting a completed Membership Application to the Executive Committee, along with all past dues and assessments, (another payment of an initiation fee shall not be required), and formally requesting "Reinstatement". However, such a reinstatement occurring within the first 90 days of termination shall not require a vote of the Regular Membership, but shall be granted by a majority vote of the Executive Committee, and if reinstatement is granted by the Executive Committee, the reinstated member shall be entered on the Club roll, and treated as a "New Member" as of that date. If a terminated member does not request reinstatement within the 90 day reinstatement period indicated above, he/she shall be required to re-submit a membership application, along with an initiation fee, and club dues payable for their class of membership, and shall be treated as a "New Member" in all respects, and his/her membership application will be presented to the Regular Membership by the presiding officer at the next meeting for approval/rejection by the Club's Regular Members. The applicant must receive at least 80% approval of the Regular Members voting

6. **Special Assessments:** A "Special Assessment" may be charged to the Regular Membership by a 2/3 majority vote of a quorum present at any regular meeting of the Club, provided that:

A. A copy of the proposed "Special Assessment" is mailed to each member at his/her last known address, not more than fifteen (15) days, nor less than five (5) days, prior to the meeting at which such change shall be offered for vote.

B. Any member not able to attend the meeting may cast an absentee ballot "For" or "Against" the "Special Assessment" by mailing a plain paper ballot indicating his/her vote, and include their printed name, signature and AMA number to the Executive Committee to the Tri-County Barnstormer mailing address prior to the meeting, or by submitting his/her written ballot to a Club officer prior to the meeting. Should a member cast an absentee ballot and also vote at the meeting then both the written ballot and the vote at the meeting will be thrown out and neither shall be counted.

C. Any vote of the membership that is taken by written ballot will be open to review by any member at or before the end of the meeting. The counted ballots will be left on the table and anyone wishing to review the vote will be welcome to do so.

VI – Meetings

1. Regular meetings of the Club shall be conducted during the first seven (7) days of each month, at such time and location as the Executive Committee may from time to time designate. A regular monthly meeting may be cancelled by a majority vote of the Executive Committee, provided that sufficient notice of such cancellation shall be mailed to the membership by mailing to the member's last known address not more than fifteen (15) days, nor less than five (5) days, prior to the cancelled meeting, and such notice shall state the regular meeting date, and the reason for cancellation.

2. The President may call special meetings with the approval of the Executive Committee and notice of such meeting shall be mailed to the membership by mailing to the members last known address not more than fifteen (15) days, nor less than five (5) days, prior to such meeting, and such notice shall state the date, time and purpose of such meeting and where it shall be held.

3. A quorum shall be necessary at any Club meeting to transact business. A quorum shall consist of 20% of the Regular Membership of the Club. Voting upon the acceptance or rejection of names proposed for membership shall be an exception to the Quorum rule. Any Regular Member unable to attend any meeting at which names shall be presented for membership may cast his/her vote "For" or "Against" acceptance of such membership in the Club by mailing his/her ballot to the Executive Committee, or hand delivering his/her ballot to a Club officer prior to the Club meeting at which such vote is taken. The applicant must receive at least 80% of the votes of the Regular Members voting for acceptance into the Club. Should a Regular Member cast an absentee ballot and another ballot at the meeting then both ballots will be thrown out and neither shall be counted.

VII – General Rules of Conduct

1. The Club, in intent and principle thereto, adopts the AMA Safety Code(s) and all amendments.

2. The Club shall adopt rules of conduct for the flying field by a majority vote of the Regular Members present during a meeting when a quorum is present, which rules may, from time to time, be altered or amended as necessary or desirable. No Club flying field rule shall be adopted that conflict with AMA Safety Code(s) and all amendments.

3. It shall be the responsibility of every member to abide by and to enforce such rules when at the flying field, and all members shall be responsible for the observance of all rules by their guests and visitors.

4. Robert's Rules of Order shall be the official responsibility of all members to observe and enforce such rules while at meetings or other Club functions.

5. Every member is expected to treat his/her fellow members in an honest and forthright manner. When the conduct of any member becomes detrimental to the character and welfare of the Club, or if any member conducts himself/herself in any way contrary to, or in violation of the Constitution, By-Laws, and/or Rules of the Club, or commits any safety violations, the Club shall follow the grievance procedure as set forth in Article XIV herein.

6. A member who fails to discharge his/her financial obligations to the Club and/or the AMA with reasonable promptness, and after due notice, shall be Prima Fascia guilty of misconduct and cause for termination per the terms specified in Article V, Paragraph 3, contained herein.

7. Each member will from time to time have an obligation to perform general field maintenance. This obligation will be performed willingly and in a timely manner.

8. Each member shall exercise fiscal responsibility and accountability when dealing with Club monies or properties.

VIII – Noise Policy

The membership has adopted a policy of 98 decibels at 3 (three) meters as the maximum permissible noise level of any model flying at the Barnstormers field. Any member not abiding by this noise policy is subject to the grievance procedures as outlined in Article XIV herein.

IX – Club Programs

1. The Club encourages events and demonstrations that promote the policies set forth in Article II – "Objectives" contained herein.

2. It is contemplated that the Club objectives and purposes can be attained only with the help and cooperation of the entire membership of the Club. To this end, the Club shall from time

to time, call upon individual members for assistance in carrying out the Club programs. Members shall be expected to reasonably support the Club programs, when called upon, by contributing a reasonable amount of their time and effort.

If a member shall refuse to assist the Club when called upon at reasonable times, without adequate reason (i.e. illness, job conflict, vacation, etc.) the Executive Committee may act against such member(s) under the Grievance Procedures outlined in Article XIV contained herein.

X – Guests and Visitors

Members in good standing may bring guests to the flying field, subject to the following conditions:

1. Guests will be advised of and must comply with all flying field rules.

2. If a guest flies, the guest must show proof upon request he/she is a current AMA member, unless the guest is under the direct supervision of a Club designated, AMA recognized Introductory Pilot. The Introductory Pilot must show proof, if asked, that he/she is an AMA recognized Introductory Pilot, and must follow all AMA rules when supervising the guest.

3. A guest may utilize the Club flying field and facilities on not more than three (3) separate visits without making application for Club membership, after which time the guest must apply for Club membership or cease utilizing the Club field and facilities.

XI – Club Dissolution And Distribution of Club Assets

1. **Club Dissolution:** The Club (the Corporation) may be dissolved with the approval of a 2/3 majority vote of the total membership. Such vote shall be by a written "Dissolution Ballot" supplied by the **C**lub Secretary and mailed to all Regular Members at their last known address. Regular Members will mark their ballot either "For" or "Against" the proposed "Dissolution of the Club (the Corporation)", and each ballot shall include space for the Regular Member's printed name, signature, and AMA number for identification purposes. Regular Members shall return their ballot to the Club (the Corporation) not later than the "Ballot Due Date" indicated on the ballot. The "Ballot Due Date" shall be established by the Executive Committee and be not less than 30 days from the original ballot mailing date.

A Regular Member's failure to respond to the "Dissolution Ballot" shall not be construed as a vote "For" or "Against" the proposed "Dissolution of the Club (the Corporation)". But instead, a Regular Member's failure to respond to the "Dissolution Ballot" shall result in that Member's name being eliminated from the total membership count that is used when performing the 2/3 majority calculations required for passage. The Executive Committee shall count all received ballots and perform the calculations necessary to determine the voting results. The voting results shall be reported to the membership at the next regular Club meeting and in the Prop Wash Newsletter that is sent to all Club members. If it is determined that the "Dissolution of the Club

(the Corporation)" proposal has passed by the required 2/3 majority vote, the "Ballot Due Date" shall be known as: "The Official Announcement Date of the Club's Dissolution", and shall be recorded as such in the official Club records.

Any current Regular Member in good standing on "The Official Announcement Date of the Club's Dissolution" shall have an interest in the distributed net proceeds from the liquidated assets of the Club (the Corporation). Any other class of membership, or a prior Regular Member who is currently not a Regular Member, or the estate of a deceased Regular Member whose death occurred prior to the "Official Announcement Date of the Club's Dissolution", or any member requesting reinstatement as a Regular Member under Article V Paragraph 5, for the purpose of receiving a portion of the Club's liquidated assets, shall not be entitled to any portion or share of the distributed net liquidated assets of the Club.

Special Circumstances: The act of selling or liquidating any or all Club assets shall not be construed as the "Dissolution of the Club (the Corporation), with such proceeds being distributed to the current membership. From time to time, in the normal operation of the Club, it may become necessary to sell some Club assets. Also, it may become necessary for the Club to relocate from its existing location and re-establish its facilities at a new location, thus requiring the sale or liquidation of all the Club's existing assets. The proceeds from a partial or total liquidation of Club assets shall not constitute a "Dissolution of the Club (the Corporation) and the proceeds from such a liquidation shall remain in the Club Treasury until such time the funds can be redeployed at a future date.

2. **Distribution of Club Assets:** Following the "Official Announcement Date of the Club's Dissolution", the Executive Committee shall begin the dissolution process. The Executive Committee shall make provisions to pay all of the liabilities of the Club (the Corporation), and begin liquidating all Club assets including, but not limited to, the Club flying site, all Club owned equipment, and all Club improvements. Once the liquidation process is completed, and all Club (Corporation) liabilities are paid, the Executive Committee shall distribute the net proceeds in the following manner:

The number of uninterrupted consecutive months each Regular Member of the Club has been a member of the Club, prior to the "Official Announcement Date of the Club's Dissolution", will be called "IndividualMonths". The IndividualMonths of the current Regular Membership will be totaled, and this number will be called "MemberMonths". The Net Proceeds from the liquidated assets of the Club (the Corporation) will be divided by the total "MemberMonths". The resultant number will be called the "MonthValue", and is the amount each month of Regular Membership is worth. Each current Regular Member will receive a portion of the distributed net assets of the Club determined by multiplying the "MonthValue" by his/her months of uninterrupted consecutive membership, also known as "IndividualMonths". Stated mathematically as follows:

"IndividualMonths" = Number of consecutive months you have been a member.
"MemberMonths" = Sum of all "IndividualMonths" of all current Regular Members.
"MonthValue" = Net Proceeds of the Club's liquidated assets divided by the "MemberMonths".
The Regular Member's Share of the Net Assets = "MonthValue" x "IndividualMonths".

For the purpose of the above calculations, no Club membership date prior to January 1st, 1989 shall be considered or used in calculating the total number of "IndividualMonths" of any current Regular Member.

A Regular Member's right to a share of the liquidated Club assets is not transferable, and cannot be assigned, or pledged in anyway, and shall not be considered a personal asset of the Regular Member.

Club Records shall determine the length of time a Regular Member has been a Regular Member of the Club. If any Regular Member disputes the accuracy of the Club's records, the member may present written proof of length of membership to the Executive Committee for review. Such written proof shall be in the form of signed Club documents, cancelled checks, and other forms of verifiable information. The Executive Committee shall review the submitted written proof and make a final determination. The determination of the Executive Committee shall be final. Any member that refuses to accept the final determination of the Executive Committee and takes legal action against the Club, the Executive Committee, or any member(s) of the Club in an effort to over-turn the final decision of the Executive Committee, shall immediately forfeit any and all rights to any share or portion of the net proceeds of the liquidated assets of the Club (the Corporation).

XII – Changes In the Constitution and By-Laws

This Constitution and By-Laws may be altered or amended by 2/3 vote of a quorum present at any regular meeting of the Club, provided that:

1. The proposed change was read, or otherwise provided, to the Club's Regular Members (not less than a quorum) at the last meeting.

2. A copy of the proposed change is distributed to each Regular Member at his/her last known address, not more than fifteen (15) days nor less than five (5) days, prior to the meeting at which such change shall be offered for vote.

3. Any Regular Member not able to attend the meeting may cast an absentee ballot vote for or against the changes in the Constitution and By-Laws by mailing a plain paper ballot indicating his/her vote, and providing their printed name, signature and AMA number to the Executive Committee at the Tri-County Barnstormer mailing address prior to the meeting, or by submitting his/her written ballot to a Club officer prior to the meeting. Should a member cast an absentee ballot and also vote at the meeting then both the written ballot and the vote at the meeting will be thrown out and neither shall be counted.

4. Any vote of the Regular Membership that is taken by written ballot will be open to review by any member at or before the end of the meeting. The counted ballots will be left on the table and anyone wishing to review the vote will be welcome to do so.

XIII – Club Activities and Assessments

Any newly proposed Club project or activity that will result in an expenditure, or assessment of $300.00 or more shall be approved by a two third (2/3) vote of a quorum present at any regular meeting, provided that:

1. The proposed activity or assessment was presented at the last meeting.

2. The activity or assessment is published in the monthly newsletter preceding the meeting that the vote will be taken.

3. Any Regular Member not able to attend the meeting may cast an absentee ballot vote for or against the changes in the Constitution and By-Laws by mailing a plain paper ballot indicating his/her vote, and providing their printed name, signature and AMA number to the Executive Committee at the Tri-County Barnstormer mailing address prior to the meeting, or by submitting his/her written ballot to a Club officer prior to the meeting. Should a member cast an absentee ballot and also vote at the meeting then both the written ballot and the vote at the meeting will be thrown out and neither shall be counted.

There shall be one exception to the above $300.00 expenditure approval requirement. That exception shall be if an emergency repair is required of any Club asset, including but not limited to: The repair of field maintenance equipment, the repair of damaged structures, or trees, or any other necessary expenditure that is/are necessary to facilitate immediate repairs or protect the Club's asset(s) from incurring additional damage as a result of exposure to the elements, or other damaging influences, or to remedy a serious safety hazard. It is understood that such circumstances require immediate attention. Therefore, in such cases, a majority vote of the Executive Committee shall be all that is required for any qualifying expenditure that is over $300.00.

XIV – Grievance Procedure

1. **Purpose:** The grievance procedure provides a mechanism to enforce existing safety rules and this Constitution's general rules of conduct, by providing a progressive disciplinary system when needed. Although most complaints can be resolved informally, if a complaint is serious or cannot be resolved informally, the matter should be referred to the Grievance Committee for its consideration by means of a Grievance Form to be filled out by the complainant and turned into the Grievance Committee Chairman. At least one witness is required to sign the Grievance Form.

2. **Grievance Committee:** Each year the Executive Committee shall appoint three (3) Regular Members to serve on the Grievance Committee. A member of the Grievance Committee may resign at any time, and the Executive Committee shall appoint a replacement member. In addition, the Executive Committee shall have the right to replace any member of the Grievance Committee at any time and for any reason, by a majority vote of the Executive Committee. The Grievance Committee shall use its judgment in the performance of its investigation, and submit

its investigative results and recommendations for actions, if any, to be taken against the accused to the Executive Committee. No member, officer, or committeemen, is/are exempt from the Grievance Procedure. The Grievance Committee and the Executive Committee shall consider the following guidelines when evaluating any grievance.

A. **GRIEVANCE FORM:** A Grievance Form (Copy Attached) will be filled out and turned into the Grievance Committee Chairman. The Grievance Form shall require at least one witness.

B. **FIRST VIOLATION:** The viewpoints of both, complainants and accused will be considered and a determination will be made if a violation has occurred. If a violation has occurred the Complainants name will be disclosed to the accused. The Club President will issue a verbal reprimand to the accused, and a record of the verbal reprimand will be maintained in the Club's permanent files. If the Club President is the accused, then the Vice President shall issue a verbal reprimand.

C. **SECOND VIOLATION**: The viewpoints of both, Complainants and accused will be considered and a determination will be made if a violation has occurred. If a violation has occurred the Complainants name will be disclosed to the accused. On the Second Violation, the Club President will issue a written statement of complaint to the accused. If the Club President is the accused, then the Vice President shall issue the written statement of complaint. The accused has the right to a written rebuttal, to be reviewed by the Grievance Committee and the Executive Committee. By a majority vote of the Grievance Committee and the Executive Committee, the accused member's flying privileges may be suspended for up to thirty (30) days. Written notice of this shall be issued, and a notice published in the Club Newsletter.

D. **THIRD VIOLATION:** The viewpoints of both, Complainants and accused will be considered and a determination will be made if a violation has occurred. If a violation has occurred the Complainants name will be disclosed to the accused. On the Third Violation, the Club President will issue a written statement of complaint to the accused.

If the Club President is the accused, then the Vice President shall issue the written statement of complaint. The accused has the right to a written rebuttal, to be reviewed by the Grievance Committee and the Executive Committee. By a majority vote of the Grievance Committee and the Executive Committee, the accused will be notified in writing, and the Club members will be notified via the Club Newsletter, that the Club's Regular Members will vote on the expulsion of the accused at the next meeting. Such expulsion shall require a two-thirds (2/3) majority vote of the Regular Membership present at the meeting. (A meeting quorum is required.) Voting will be by secret ballot at a regular monthly meeting. Said expulsion will last for one-year. The expelled member shall not be entitled to any refund of prior fees paid. The expelled member may reapply for membership after the expiration of the expulsion time period per the Reinstatement Procedures outlined in Article V, Paragraph 5.

3. **Two-Year Requirement:** The three violations and subsequent progressive penalties will not be enforced unless they are accumulated within a two-year period of time.

4. **Member Retaliation:** Any member receiving a Grievance, who directs any retaliation action against the person filing said Grievance, any Club officer, or member of the Grievance Committee, will be subject to immediate expulsion from the Club. This is to include threats, intimidation, physical harm, intentional equipment damage, or any other action deemed to be retaliatory by the Grievance Committee and the Executive Committee.

(Sample)

Tri-County Barnstormers Club Grievance Form

Date: _____ **Time: _____**

Nature of Violation:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____:

Signature: _____

Witness: _____

Additional Witnesses (Not Required):

1) **_____:**

2) **_____:**

3) **_____:**

(AMA Approved Club Grievance Form)

ADENDUM

Barnstormers Fee Schedule

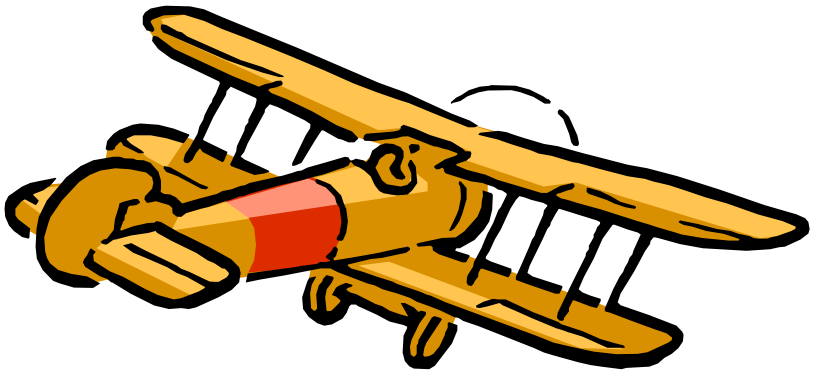
Initiation Fee:	**$150.00**	(A One Time Fee Payable by Regular Members Only Upon Joining the Club)

ANNUAL DUES:

Regular Member:	**$100.00**	(Paid Annually Each Year / Prorated @ $9.00 per Month for New Members.)
Family Member:	**None**	(All Family Members are Not Required to Pay Annual Dues.)
Junior Member:	**$ 35.00**	(Paid Annually Each Year / Prorated @ $3.00 per Month for New Members.)
Student Member:	**$ 35.00**	(Paid Annually Each Year / Prorated @ $3.00 per Month for New Members.)
Associate Member: None		(Associate Members are Not Required to Pay Annual Dues.)

SPECIAL ASSESSMENTS: (Only Regular Members Shall be Liable For Special Assessments Voted by the Membership.)

FLYING PRIVLEDGES: (Anyone Operating Radio Control Equipment at The Club Field MUST Have a Valid AMA Card, Or Other Proof of AMA Membership, on His/Her Person at All Times.)



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