

LIVE WIRE

R/C TRAINER

For the first time, —
A MODEL SPECIALLY DESIGNED FOR R/C TRAINING!

"LIVE WIRE R/C TRAINER" INSTRUCTIONS

DESIGN NOTES.....

The "Live Wire R/C Trainer" has been developed as a full fledged radio control model aircraft from the ground up, every aspect of its design is meant for controlled flight and in no way is it a converted model of any sort. Its design incorporates exceptional stability, instantaneous maneuverability, controlled climb and is broad enough for all radio applications. The construction is simple and straightforward to provide ruggedness and ease of construction with a long life span. It is offered as a trainer because of its relatively small size which takes up less room, its simplicity of assembly which allows it to be quickly built, its fuel proof flight characteristics which allow the roughest amateur to pilot it and lastly, because of its rugged construction which means it will last for many, many flights. It is a proven design too, with hundreds of flights being logged by it during the development stage. Everything learned during this development has been incorporated into the final kit model so that you have a really perfected design to work with.

POINTS TO BEAR IN MIND.....

This is a radio controlled model aircraft. Therefore, it is different from all other types and no matter what type of models you have used before there are some things that are done differently in R/C which you must know about if you are to have success, experience has shown this to be true. First of all, the "Live Wire" is designed with a removable R/C unit, this was done to give you easy access to the R/C apparatus so that checks are easy to make and changes in equipment are simple. This unit has been arranged so that it meets the maximum tolerances of all radio manufacturers; in other words, any radio may be installed without changing any of the dimensions, simply follow the instructions given by the radio manufacturer and those that come with the kit. Above all, do not make any changes in the battery arrangements, these have been tested and work well giving exceptionally long life. Arranged as they are they provide the model with its best trim, any alteration could throw the model out of balance and spoil its flight. The control system provided is the result of experimenting with all known types. It is the only one which will give positive control under all conditions with this installation. The thing to bear in mind here is that it must work freely without the slightest bind, the 1/8" rubber used with these escapements is the most powerful that they are built to work with, therefore, the power available is low and any bind will prevent consistent operation. Above all, never attempt a flight unless you are positive that your controls are working perfectly. The main thing that controls the power flight of your model as well as the glide is the angle at which the wing and tail is set. This is the main control over your angle of climb and it governs the recovery of your model to level flight from such things as stalls, loops, etc. Properly set, these angles will provide a low rate of climb and yet give instantaneous recovery to level flight. Improperly set, they can cause erratic flight with excessive climb or no recovery at all from abnormal positions, in R/C an erratic flight can mean serious trouble with far greater consequences than in other types of modeling. The wing and tail angles used with the "Live Wire" have been carefully worked out and chosen because they provide the most desirable type of flight. The wing is set at a 5 deg. positive angle and the tail at 3 1/2 deg. positive, you should check your model very closely against the plans to make sure that it is exactly as shown, shim the panels to the proper angles, if necessary, but be sure they are right! The balance of your model, C.G. location is the major factor in controlling the glide and it should be watched closely. In R/C a rather steep glide instead of the floating free flight type is most desirable. This gives greater control over the model when the engine is dead as well, allowing the model to penetrate the wind to a far greater extent. The ideal point for the C.G. to be is shown on the drawings and every effort should be made to bring it there. Slight differences in workmanship and wood weights can cause some difference at this point between models, therefore, check this C.G. carefully before final mounting of the engine.

Otherwise, if you use the same care in building a R/C model as would be used in the other types you should get along right well. If in doubt about construction procedures at any time while building the "Live Wire", consider it as a control line stunt model and go ahead with your work as you would with a model of that type.

CONSTRUCTION.....

With this model the first thing to be built is the R/C unit. You need not have your radio before constructing it as the radio installation can be made at any time. If you wish to fly the model for sport only, it is still necessary to build the unit as it provides additional strength to the fuselage. The unit is built from strips and sheet as shown on the plans, the plans are exact size. The procedure is to build up two sides right over the plans from the size strips indicated. The sides are then set up on a flat surface and joined with the end strips to form a box, check its alignment carefully with a square. The sheeting is then added to form the floor and battery compartment giving the unit much additional strength. The additional hardwood mounts, hooks and terminal block can now be added to make it ready for the radio installation.

FUSELAGE.....

The fuselage is a simple box type built up from sheet and bulkheads with the addition of some stringer fairings off of the wings. The procedure is to set up the R/C unit in its required place right on the top view of the drawings, the fuselage is built around it using the box and the drawings to provide perfect alignment. The first step is to pin the no. 3 bulkhead to the front of the box and the no. 4 bulkhead to the back of the box; the rest of the bulkheads can then be erected in their respective places on the drawings. The two long lower sides can then be cemented to the bulkheads being sure not to stick them to the box as it must be removed later. You can then go ahead and build the rest of the fuselage up by adding the middle sides and the cabin sides. After this, the backbone can be put on along with the fairing stringers. Before finishing off the top nose fairing, the engine mounts and fuel tank must be installed. The 1/8" sheet reinforcing is now added everywhere shown, do not skimp on this as it provides great strength! After this, bulkheads 1A and 2A may be mounted and the tank covered over with sheeting. The fuselage is now taken off of the bench and the hardwood gear block cemented in place, use lots of cement to hold it well. The dural gear can now be screwed to this block with the required wood screws and the entire bottom covered with 1/8" sheet. The final step is to put on all fairing blocks and to finish up the little incidentals that are left. When finished, sand the whole structure well to prepare it for covering.

RUDDER AND FIN.....

The fin is a simple sheet structure. It is best to build it flat on the bench blocking up one side sheet with scraps so that it aligns properly. The remaining sheet side is then bent around the 1/4" spar and cemented in place, spring paper clips are a help in holding it in place. Cement on the solid tip and sand to shape. The rudder is airfiled from 1/8" sheet and held to the fin with good fabric hinges, cemented well. The fin is mounted on the fuselage with its spar imbedded into the backbone of the fuselage, make sure it is in neutral alignment.

CONTROLS.....

The rudder control system should now be installed in the fuselage and R/C unit. First, mount the escapement and bellcrank as shown in the R/C unit. Check this out on the bench by hooking the rubber up to the escapement and operating it. The bellcrank should work freely and must not bind in any way. If it should, try bending the escapement arm of the bellcrank very slightly to obtain better alignment, it can be aligned perfectly in this manner. Next, slip the R/C unit into place in your fuselage and plot a straight line from the pushrod hole in the bellcrank to the rudder horn, use the drawings for reference. Drill holes for the pushrod through the fuselage, they may be slightly oversize but not too big as they tend to dampen out vibration of the rod. The pushrod is made by bending a right angle on one end for the bellcrank connection, the rod is then slipped in place and hooked into the bellcrank after which it may be cut off to the required length. Fashion the bicycle spoke adjusting link at the rear and adjust to length. The pushrod keepers may be made as shown. After completion, operate the system a number of times to make sure that it is perfect, it should work with less than one row of knots in the rubber motor.

WING AND STABILIZER.....

The stabilizer is a simple structure of ribs plus the leading and trailing edges. Cement it together and cover with tissue. The wing design is of the highest strength to weight ratio known. This gives the additional strength required to perform violent maneuvers plus making it almost indestructible. It has a tried and proven airfoil and special care should be taken to build in the tip incidence as shown. This incidence is in both tips and gives good stall recovery plus additional stability. The construction is begun by placing the lower sheets for one half in their place on the drawings, add the leading edge and lower spar. The trailing edge sheet should extend over the edge of your bench slightly so as to leave room to grip it with spring paper clips when adding the top sheet. Add the incidence blocking as shown and cement the ribs in place. Now, add the top trailing edge sheet, hold in place with the paper clips, note that both trailing edge sheets bend up due to the incidence blocking. Next, put on the sheet wing tips and the top spar allowing the whole thing to dry thoroughly so that your tip incidence will stay in place. After drying, proceed to build the opposite half in the same manner. When finished, the two halves may be joined at the meeting parts forming the correct dihedral. The center section reinforcements are now added and the remaining sheet cemented in place. The cap strips may now be put on and the whole wing sanded down for covering. Cover it with heavy tissue and when drying, pin it down to the bench so as to keep it warp free.

COVERING AND PAINTING.....

The whole model including the entire fuselage is covered with heavy tissue, it is easiest to apply when damp. The model should be painted with a fuel proof dope for protection, a good finish should be had but one which adds considerable weight. Colored dope is recommended but do not use a great number of coats, just enough to give a good job as the weight and cost can build up rapidly with a model of this size.

RADIO INSTALLATION.....

You will note that all radio gear is installed in the R/C unit, thus, the installation can be done right on your bench and out of the model. Before starting this part, you should study the radio manufacturers instructions thoroughly so that you may follow them to the letter, by doing this, you assure yourself successful radio operation. The one exception may come in regard to the flight batteries, the kit plans show specific ways of using pencils and hearing aid batteries, however, these arrangements meet with the full approval of the radio manufacturers and have been proven to give superior life and performance with this model. Wiring diagrams are also shown that meet all requirements. In wiring the receiver, it is advisable to keep all wires as short as possible and use no. 24 quality stranded hook up wire. Where ever possible, tack these wires to the R/C unit with a spot of cement to hold them in place. When turning the wires from the floor of the R/C unit up to the receiver, take them up the corner posts of the box and then out to the receiver, this helps prevent interferences. Do not forget to use a "restrainer cord" as shown it will keep your receiver from going too far ahead during hard landings etc. It should be made from a good strong binding type wire. Take your time and make a neat, clean installation; after completing it, check your radio out making sure it operates according to instructions. It is important that you check everything before going to the field, always do this and your troubles will disappear.

PREFLIGHT CHECK.....

In preparing to make your first flights, the best insurance in the world is a complete preflight check, by following this method, a successful flight is practically assured. First, assemble the model completely as for flight, next, choose a flat smooth surface on which to set it such as a table. Now, build up a pile of books on the table so that when the bottom of the fuselage rests on them, the model will be clear of the table. Next, place a piece of about 1/2" square wood on top of the books so that it will be cross-wise to the fuselage of the model. Next, set the model on this wood and move the piece of wood fore and aft until the model will balance on it. When the most satisfactory point is found, this will be the C.G. of your model, transfer the point up the side of the fuselage to the wing and you will have an accurate check of your C.G. location. It should fall within 1/2" of the spot shown on the drawings, if not, add weight or adjust things until it does. The second check is to see that the wing and tail angles are correct. This is done by setting the model on the table and blocking up the tail skid until the bottom of the fuselage is parallel to the table top. Now, you can measure the height from the table to the leading edge and from the table to the trailing edge, subtract the two and you have the amount of incidence that is in the wing, it should agree with the same measurement taken from the plans. If not, shim the wing until it is correct and later make the shims permanent. The same procedure should be used for the stabilizer to be sure it is correct also. By holding a long straight edge above the fuselage and along its center line, you can check your fin and engine for alignment, they both should be straight. After giving your model one last thorough looking over, it should now be ready for flight.

FLYING.....

Up until this point, you have probably thought that all these instructions said was "not to do this" and "to be sure to do that" and you are about right. However, there has been a reason for it as you are now ready to fly with a model that is ready also! You should have your radio in operating order and turned on for the first flight, just remember that you are not going to use it unless you have trouble and only then if you feel that it might be of some help. The second flight will be time enough to try your hand at piloting. Your model should be test glided first; to do this, simply run with it at a good speed and launch it with a fair shove towards a spot about 50 ft. ahead of you on the ground. Be sure to hold the nose down, otherwise, it may "balloon up" on you and you will not know what the trouble is. The glide should be long and with the tail slightly higher than the nose, you do not want a flat hanging type of glide for R/C. Try the glide several times to make sure of yourself, if the nose tends to rise, try a 1/16" shim under the trailing edge of the tail, if the nose drops, put the shim under the leading edge. Add or subtract from this until the glide is satisfactory. Your first power flight should be an easy one with all in order. Simply set your engine for about a 40 second run and prepare for the launch. In as much as the "Live Wire" has a low rate of climb, be sure that everything is clear for some distance in front of your launching

point, of course, the launch should be made directly into the wind and the speed of your launch adjusted accordingly. If little wind is blowing, you should run about as fast as you can and head it in level flight towards a spot on the ground approximately at the horizon line, the model should leave your hand and fly level for some distance before breaking into a shallow climb. During the first flight, watch to see if the model turns excessively and note which way. Before your second flight, adjust the rudder enough to compensate for this turn. In making your first R/C flight, there are two things that should be remembered, the first and most important is to remember that when in trouble, leave the "radio button" alone! The model is exceptionally stable and you will probably do far more harm than good by madly pushing the "button" and hoping that you will get the right control, as a rule, the model will right itself and your troubles are gone. The second thing to do is to try to accomplish straight flight and to make this straight flight directly upwind, the "cardinal rule" of R/C flying is to keep your model upwind always, as in this way you have a safety margin to play with. With this in mind, launch your model as before and after it has gained about 100 ft. of altitude, you can push the button momentarily for your first turn. Note how much it turned with this short push and in which direction, you will then know in which direction it will turn next and you will have a gauge as to how long to hold the "button" to get the desired turn. You will soon note that the nose starts to drop after about 70 deg. of a turn, if you wish to go around further, simply release the button and push it twice in a row holding it on the second push until you need to repeat. This is called "beeping" and in this manner you can make as great a turn as you wish, don't worry about mistakes during your first few times as it comes naturally after a while.

The "Live Wire" is capable of any maneuver you might desire and they all are based on two maneuvers, the turn and the spiral dive to build up speed. Once the spiral dive is completed, you have excessive speed which can be used to do loops, chandeliers, immelman turns, rolls etc., time will teach you the complicated maneuvers but you should learn about the spiral dive first. The spiral is accomplished by simply holding the model in a turn longer than usual, the nose will drop until the fuselage is vertical and it really loses altitude fast. For this reason, always have plenty of altitude, at least 300 ft., before starting into one. The model will stay in the spiral as long as you hold the "button", when you wish to recover, simply release the button and wait, it will come out of the spiral immediately and go into a short dive followed by a zoom and ultimate level flight. In view of this, always be sure of sufficient altitude for the pull out. To get a quicker pull out and higher zoom as far a loop, give the button a short jab as the model comes out of the spiral, it is quite effective. The next thing to learn is how to approach for a landing, the "Live Wire" can be brought back nearly every time even in brisk winds. If you are upwind when the engine quits, bring the model around until it is flying directly down wind in a straight line and off to one side of the spot where you wish to land. You should glide past the spot far enough so that the altitude you will have will be just enough to get you back to the spot, when you reach this point, simply make a 180 deg. turn and head to the landing point. There is nothing you can do if you have underestimated the altitude needed, but, if you are coming in too high, you may make "S" turns to lose the altitude and ultimately get your heading again. Practice will soon show you just how far down wind it is practical to start from and it is wise to make many short flights rather than a few long ones until you have accomplished good landings.

As a beginner, there is little more that you need to know, however, we do know that as you get on with your R/C flying, you will find it to be truly the "ultimate of model flying" and we wish you all the luck in the world with this wonderful hobby!

"LIVE WIRE" PARTS LIST

R/C Unit.....

- 3- 1/4" x 1/4" x 24"
- 1- 1/4" x 1/2" x 26"
- 2- 1/8" x 2" x 24"
- 1- 1/8" x 1" x 25"
- 1- 5/16" x 3/8" x 2 5/8" Pine

Fuselage.....

- Bulkheads
- No. 1- 1/8" x 3 1/4" x 4"
- No. 2- 1/8" x 3 13/16" x 4"
- No. 3- 1/4" x 4" x 5 3/4"
- No. 4- 1/4" x 4" x 5 1/8"
- No. 5- 1/8" x 3" x 3 9/16"
- 1- 1/8" x 3" die cut Blkhd. sheet 9"

Structure

- 2- 1/8" sheet shaped rear keels
- 4- 1/8" x 2" x 18" Front keels
- 2- 1/8" Sheet shaped cabin sides
- 2- 1/8" x 2 1/2" x 26" bottom covering
- 1- 3/16" x 1/2" x 18" backbone
- 1- 3/16" x 3/16" x 24" stringers
- 1- 1/8" x 1/4" x 24" cap strip and Reinf.
- 1- 1/8" x 2" x 18" Fill in sheet
- 1- 1 1/4" x 2 1/4" x 3 1/2" Shaped Nose Block
- 2- 3/4" x 1" x 2 5/8" Cowl Blocks
- 2- 3/8" x 1" x 2 5/8" Cowl Blocks
- 1- 1/2" x 1/2" x 4" Pine Cabin Block
- 1- 1/4" x 1 1/4" x 4" Maple gear block
- 2- 3/8" x 3/8" x 4 3/4" Maple mounts

Wing.....

- 17- 1/16" precut ribs
- 2- 3/32" precut tips
- 4- 3/16" x 3/16" x 24" Spars
- 2- 1/4" x 7/16" x 24" L.E.
- 7- 1/16" x 3/16" x 22" Cap Strips
- 1- 3/16" x 1/2" x 12" Reinforcements
- 2- 1/16" x 2" x 18" C. S. Covering
- 4- 1/8" x 2" x 24" L. E. Sheeting
- 4- 1/16" x 1 1/2" x 24" T. E. Sheeting

Stabilizer.....

- 1- 3/8" x 3/8" x 20" shaped L.E.
- 1- 7/32" x 7/8" x 20" shaped T.E.
- 1- 3/32" x 1" x 10" Tips
- 1- 1/16" x 2 1/2" x 18" Center covering
- 1- 3/32" x 3" die cut rib sheet "

Fin and Rudder.....

- 1- 1/16" x 4" x 12" sheet sides
- 1- 1/8" x 1 3/4" x 6 1/4" dorsal fin
- 1- 3/8" x 3/8" x 3" fin tip
- 1- 1/8" x 1" x 5 3/4" rudder

Hardware.....

- 1- dural landing gear
- 1- R/C bellcrank
- 1- R/C rudder horn
- 1- 1/16" x 20" wire
- 1- 1/32" x 6" wire
- 8- #4-1/2" wood screws
- 2- 4-40 bolts, landing gear
- 4- 4-40 nuts, landing gear
- 1- 3/16" x 20" Dowel
- 2- Sheets Sky Sail

