USE THIS SAME LINE AS SANDING LINE FOR BOTTOM LEADING EDGE

PIN 1/8" SQ. BALSA ALONG LEADING EDGE TO POSITION RIBS PROPER DISTANCE BACK FROM L.E.

TWO 1/8" NO. 2 RIBS CEMENTED TOGETHER, OR CUT FROM SINGLE 1/4" SHEET BALSA.

VECO 2" BELLCRANK MOUNTED HERE

FRONT LEAD-OUT WIRE IS SWEPT-BACK (1/2" AT TIP).

NO BOTTOM COVERING HERE

L.G. STRUT HOLES

WING MOUNT HOLES

1/8" OR 3/32" TUBING

SULLIVAN "A-B" LEAD-OUT WIRES

1/8" SHEET ON BOTTOM, 1/16" SHEET ON TOP.

1/8"X1/4" BOTTOM CAP STRIPS, 1/16"X1/4" ON TOP.

CUT AWAY TOP FRONT CENTER COVERING TO HERE

1/8" SHEET BRACE BETWEEN TOP AND BOTTOM COVERING

TRAILING EDGE BOTTOM SANDING LINE

SOFT BALSA WING TIPS SANDED TO CONFORM WITH SHAPE OF RIB NO. 8

1/8" PLYWOOD, 3 1/8"X4"- BELLCRANK AND LANDING GEAR PLATFORM

1/16" DIA. PUSH ROD

NO. 8

RIBS TO BE USED IN LEFT WING PANEL ARE NOTCHED FOR LEAD-OUT WIRES

ALL RIBS 1/8" SHEET- 2 OF EACH SIZE REQUIRED. (4 EACH, NO. 2)

USE CRAYON ON CENTER PART OF CLOTH HINGES TO KEEP FREE OF DOPE.

1/16" PLYWOOD OR 1/8" BALSA

ROUND OFF EDGES

SHADED AREAS SANDED AWAY AFTER ASSEMBLY

CROSS SECTION OF WING AT RIB NO. 1

1/8" BALSA FUSELAGE SIDES BACK OF THIS POINT

NOTE MODIFIED TANK VENTS (SLIPSTREAM PRESSURIZED)

— SCALE IN INCHES —

0 1 2 3 4 5 6 7 8 9 10

RUDDER OFFSET ABOUT 1/8"

FROOM T21- 2" TANK (TOP IS EVEN WITH EDGE OF MOTOR MOUNT). TANK IS FLUSH WITH INBOARD SIDE OF FUSELAGE.

1/8" PLYWOOD DOUBLERS

TANK FAIRINGS (SEE SECT. A-A)

CROSS SECTION OF FUSELAGE AT A-A

1/16" PLYWOOD

1/8"X1/2" PLYWOOD OR HARD WOOD

FAIRLEAD MADE FROM SAFETY PIN

USE 4-40 WASHERS UNDER FRONT MOTOR LUGS ONLY FOR SLIGHT OUT-THRUST.

1/4" SQ. BALSA IS SLICED DIAGONALLY TO MAKE TRIANGULAR FAIRING STRIPS AS SHOWN.

PUSH ROD

1/8" PLYWOOD

1/16" WIRE TAIL SKID

1/8"X1/2" INSIDE FRAMEWORK

4-40 BLIND MOUNTING NUTS AND SHORT BOLTS USED ON LEFT L.G. STRUT TO CLEAR BELLCRANK

FRONT VIEW OF LANDING GEAR STRUT

LANDING GEAR STRUT OUTLINE-1/16" SHEET DURAL- (2 REQUIRED- 1 RIGHT HAND, 1 LEFT).

1/2" PLYWOOD MOTOR AND TANK MOUNT

1/8" CROSS-GRAINED BALSA BETWEEN FUSELAGE SIDES (CURVE TO MATCH WING CAMBER).

WING ATTACHMENT DETAIL

2" WHEELS

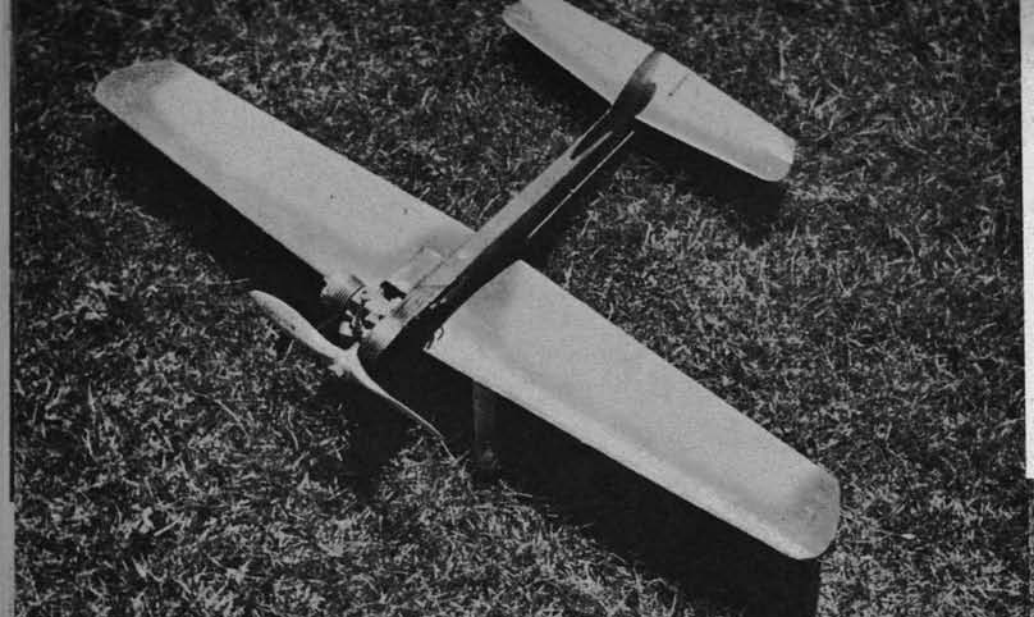
BEND LINES (SEE FRONT VIEW AT RIGHT FOR BENDING ANGLES).

USE 1/2" WOOD SCREWS (AND MODEL CEMENT) TO ATTACH WING TO THE ASSEMBLED FUSELAGE.

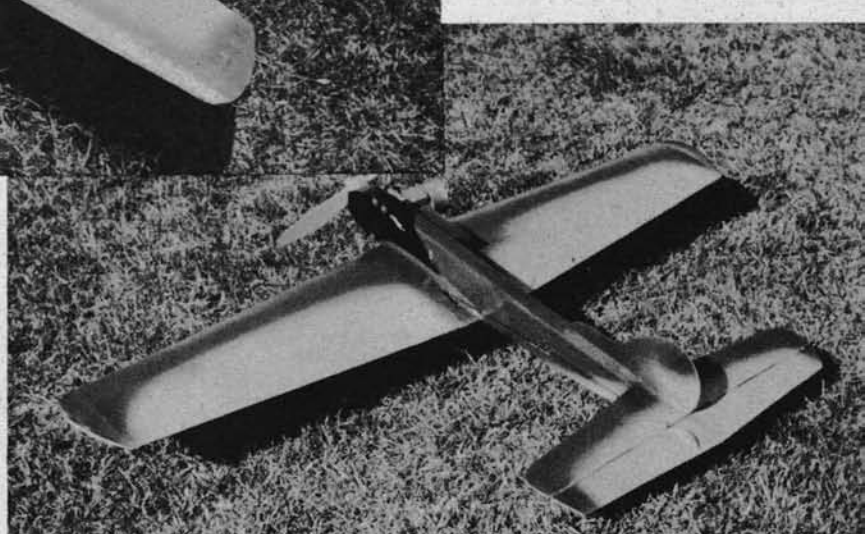
Pied Piper

span 30"

the pied piper



Functional is the word, bub. Beauty does not go with combat and rat racers. So who cares? These galloping profiles take the .29's - .35's.



Finish? Four coats clear and sanding filler, three coats of base color, one spray-can trim.

High average speed imperative and this m easy service, a good acceleration, stab

by BILL JUDGE

After a direct hit in his "Woody" combat, your old Wyoming fire-breather has another hot airplane, this time a proved rat racer.

► When Rat Racing was approved by AMA, most of us were agreeably surprised that the rules turned out so well. Chief accomplishment was standardization of the length of heats, and the number of pit stops per heat. Of course, the usual hue and cry went up almost before the rules were given a fair chance. After the smoke had blown away, it was found that with the heats so clearly defined, Rat Racing in medium and small sized contests was one of the few events that paid its own way. As far as the Nationals is concerned, Rat Racing has been the shirt tail relative of its more blue blooded cousin, Team Racing.

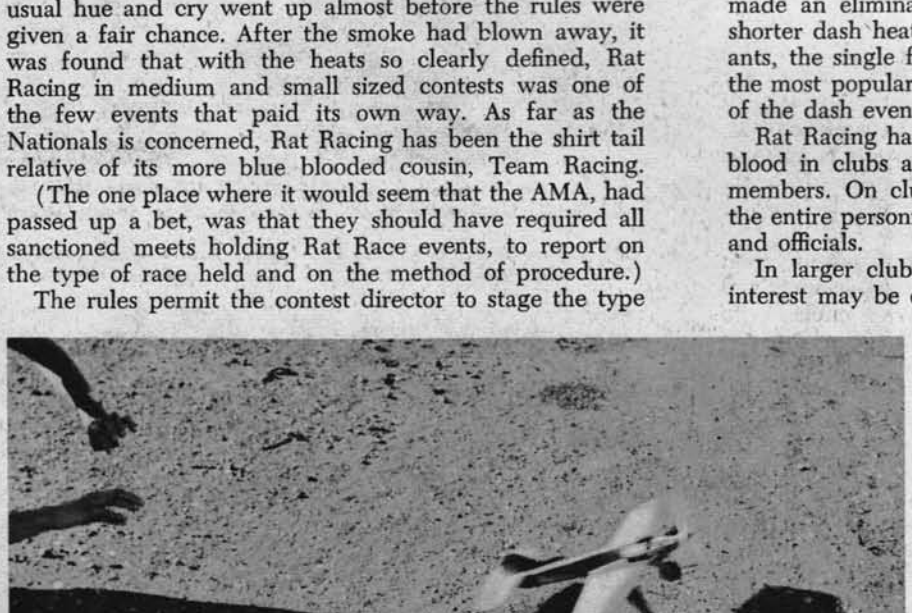
(The one place where it would seem that the AMA, had passed up a bet, was that they should have required all sanctioned meets holding Rat Race events, to report on the type of race held and on the method of procedure.)

The rules permit the contest director to stage the type of race best suited to his locality and field of entra subject to the race being composed of heats as defi

Three types of races can be scheduled. If there many contestants and a minimum of time, a race can made an elimination contest by holding a series of shorter dash heats. If there is a small number of cont ants, the single final 140-lap heat may be held. Proba the most popular type is to have the qualifiers, or winn of the dash events, go into the 140-lap final.

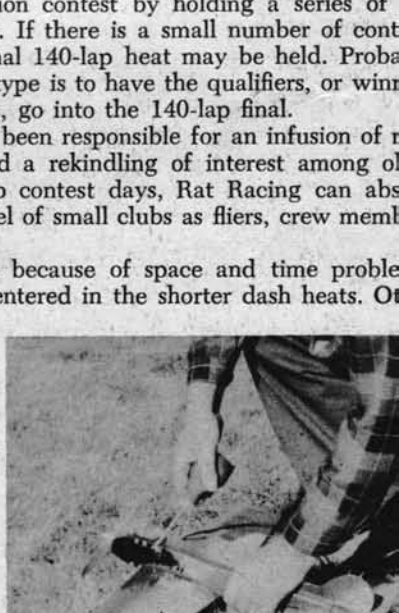
Rat Racing has been responsible for an infusion of n blood in clubs and a rekindling of interest among ol members. On club contest days, Rat Racing can abs the entire personnel of small clubs as fliers, crew memb and officials.

In larger clubs, because of space and time proble interest may be centered in the shorter dash heats. Ot

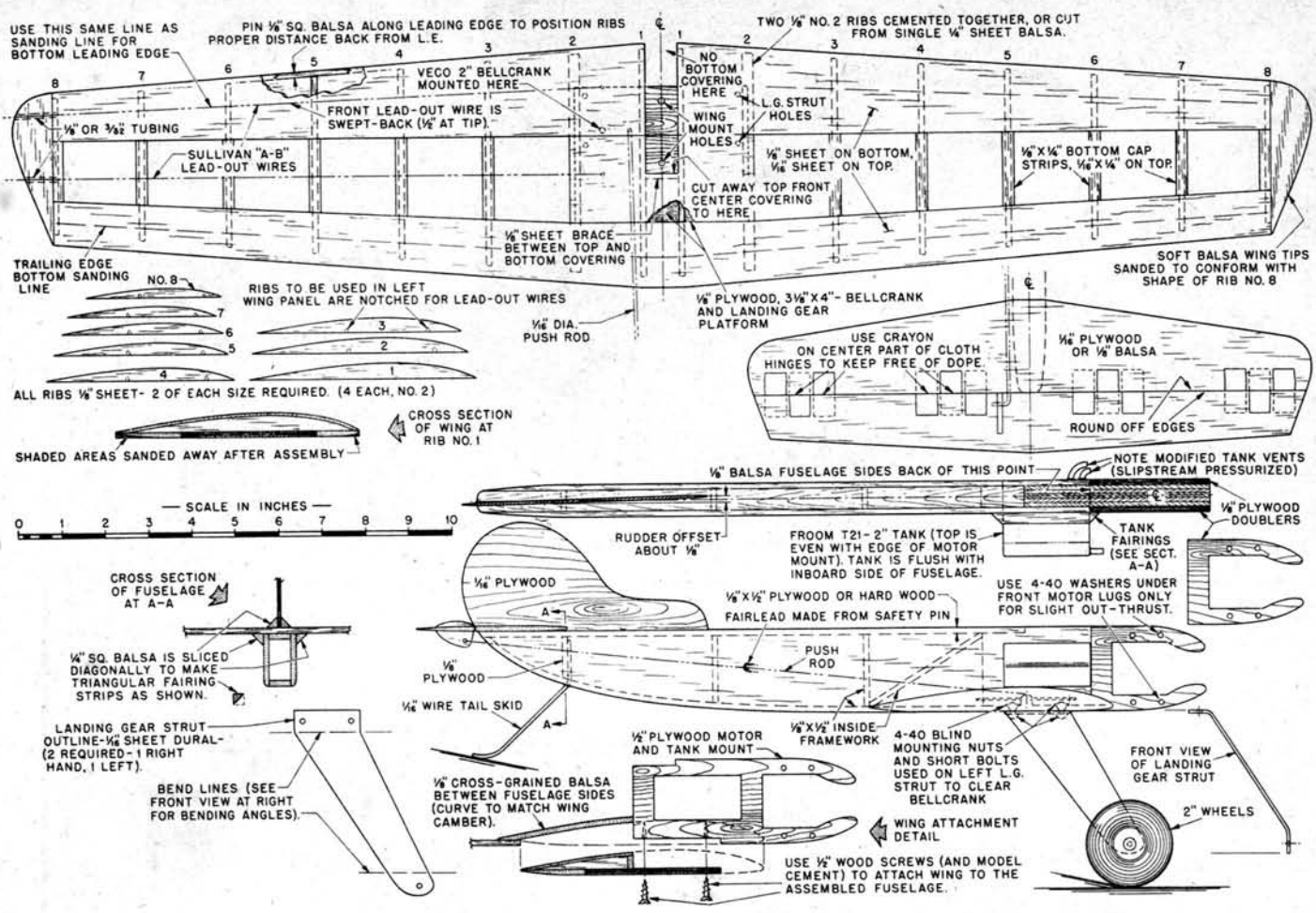


Two-foot take-off, by the yardstick! Just one of the many Wyoming-style bullets shows style!

Fifteen-ounce weight means lower impact—well, now, as well as, jack-rabbit take-off ability.



The hands are connected to Bill but, anyw Pylon Brand squeeze bulb good for fas



FULL SIZE PLANS AVAILABLE. SEE PAGE 60.

factors, such as smooth or surfaced flight areas, may lead to concentration on the small speed types of models, with fast motors, hot fuels, racing props, etc. Winners in this type of club contest generally are those few that are well acquainted with speed stuff and take the trouble to build models for this type of race.

If the majority of club members prefer this type of race, there is nothing more to be said. However, the intent of Rat Racing is to give every type of model an equal chance. If the majority of club members prefer to see the laurels passed around, matters can be adjusted within the club. There is no need for special legislation, classification, or discrimination against any type of model.

First, there is a popular type of start that is different from the one outlined in the rule book. All models and crew members are located outside the flying circle. With the starting signal, the crew members start motors. Models are then carried in turn to the flying circle and released in the order of the starting of the motors. Lap counts start with the release of the first model.

This type of start gives a handicap to the slower but easier to start motor over the hot but cranky motor. It also prevents giving a crew-cut to green crew members who always seem to run in every direction but the right one.

Second, take-off and landings should be changed from the smooth surfaced area to a rougher one that favors good take-off and landing characteristics of a model plane.

Third, concentration should be made on the longer races with their greater number of required pit stops, take-offs and landings on this rougher terrain.

This type of start, rougher terrain, and increased number of pit stops, are great equalizers. (*Continued on page* 38)

Ground surface, smooth or rough, can be basis of interesting local rules variations, shifting emphasis from speed to dependability.

Make these things one, two, three—that's how simplicity pays off. Team racer type landing gears avoid bouncy landings and take-offs.

The Pied Piper

(*Continued from page 23*)

If there are club objections to this method of control, there is nothing that says there cannot be two brackets in the elimination heats. One bracket composed of the fast models, the other bracket of the somewhat slower models; the final race or heat to be of the 140-lap, two pit stop type, composed of the winners of both brackets.

Yet another method of control is to appoint a different event director for each day of club racing. He should have the authority to select the racing site and name the type of racing to be held on that day.

To meet all types of contest conditions, the rules permit contestants to enter two models, at the time of registration. The point here, of course, is that a contestant may go to any contest armed with two types of models. The small fast model and the larger model with the good landing and take-off characteristics.

In the first type of contest Rat Racing mentioned, that of short fast heats, it would seem that the contestant's logical choice would be the small fast model, if the terrain is smooth. If rough, he can afford no take-off flips in this short dash, so his choice should be the larger model.

In the second type of contest racing, with the smaller number of contestants and longer race, his choice would again depend upon the ground surface and upon his competition. The race isn't always to the swift. Dependability is just as large a factor as speed.

In the last type of race with the mixed heats of both fast and endurance types, the contestant can use either style of model, or can change models between heats, or even change motors in either model between heats.

DESIGN

Rat Racing is divided into three important parts: the model, the motor and the crew. We intend discussing only the first two, but in closely competed races the pit crew is just as important as the model and the motor.

In designing a model for any event, one should consider the problems peculiar to that event. The best model is the one that answers those problems most satisfactorily.

In Rat Racing we need a model capable of maintaining a high average top speed. Every portion of the design must contribute to this speed. So we must consider fast and easy service by the pit crew, ground stability, fast acceleration, flight stability and top speed.

The Pied Piper is strong in all these departments. It weighs in at 15 ounces, without fuel. This means fast acceleration, short take-off space and lower impact on landings.

The parts that do the most work and absorb the most punishment, the motor and tank mount, the landing gear and bellcrank platform, are beefed up in an integrated unit. The typical weakness of the profile model, the joining of the wing and fuselage, is not present in the Pied Piper. This joint is more solid than in most box-fuselage models.

Since the motor is profile mounted toward the outboard wing and the bellcrank is inboard mounted, perfect control is maintained at all times without extra weight in the outboard wing tip.

The center of gravity is well back, and the wheels are well forward and wide apart for good ground stability. A team racer type landing gear avoids bouncy take-offs and landings.

The center of lift is located at 35-40% of chords, the aspect ratio is seven to one. The center of gravity and center of resistance are located below the thrust line. All of these points contributing good flight stability at all speeds. There is no hunting or tail wagging in flight.

The fuel tank is pressurized by slip stream and well located for easy starting and good fuel feed at high speeds. The tank is of sufficient size to accommodate .29's or .35's and for experimenting with different fuels and props.

Motor and tank are out in the open, run cool, and permit easy service by the crew. Quite often green crew men have to be used; consequently, the less complicated the starting procedure the better. Under the rules you can use a fuel shut-off or not, as you prefer. With the use of green crew members, the wisest choice would be just a tank.

The wing features a new type of construction easy for those of limited experience. It is light but sufficiently strong, since the center of the model absorbs the punishment. The wing is a thin, lifting, speed type which tapers toward the tips.

The stab and elevator areas are large, and shaped to give good control at all speeds with low proportionate braking action. This model can be looped or figure-eighted.

CONSTRUCTION

Start from the bottom up when building the wing. Place waxed paper over the plans. The planking for the leading and trailing edges go down first, then the cap strips and the center plywood platform, after it has been drilled for bellcrank and landing gear. Blind mounting nuts are used for the landing gear and ⅜" Phillips-head bolts are the right length to allow clearance for the bellcrank. After fitting, the landing gear is added when the rest of the model is completed.

Before adding ribs, place bellcrank in position and draw lines where the lead out wires go. Wires go between the ribs and the bottom cap strips, so ribs are temporarily located, wire positions marked, and ribs notched before cementing. Top leading and trailing edge, center planking, and cap strips are added after installation of bellcrank, lead out wires and push rod. Stab, rudder, fuel tank and top of wing and fuselage joint are faired in with triangular strips split from ¼" sq.

The Pied Piper was finished with four coats of clear and sanding filler, three coats of base color and one coat of spray-can trim.

Motors: Choose a motor that has plenty of sock, is easy to restart when hot and, considering refueling time and weight saving, reasonably economical to operate. By applying these requirements to your local or general conditions, your choice should be easy. I prefer the good .29's and .32's although the top displacement allowable is .36.

On the smaller sized props, the smaller motors will turn up just as fast, are easier to restart when hot, and more economical to run.

In every contest, and sometimes in every event, a motor will start revving up, that will cause all contestants within hearing distance to turn their heads to listen. Such a motor is above average in performance, one of the "good ones." Despite the high standard maintained by manufacturers, and numerous inspections designed to uphold those standards, occasionally there are motors that prove to be exceptionally good. Others are "dogs." Extremes occur in all fields of manufacture. If you are fortunate enough to own one of the good motors, baby it and take care of it, use it only in contests, as there is only so much time at peak RPM on any motor.

You are fortunate if you own such a motor because, unless you are lucky, finding one can be expensive. There are three ways that you can acquire such a motor. The first is to buy and try, and rebuy, until you hit. The second way is to buy a motor and then buy extra parts, replace each part or parts until you find the combination that clicks. The third method is to purchase a motor from a firm that deals in, or reworks, motors and have them guarantee results. This latter method may look expensive but after you've had a taste of the first two methods, it can be inviting.

Some manufacturers prolong the useful peak of their motors by methods that will permit them to still sell motors at competitive prices. One of these methods is to impregnate the walls with lead, another to temper the liner beyond the hardness of the usual liner; third (a high priced motor) uses chrome sparingly in the interior.

Further use of chrome can be made to prolong the life of a motor that is beyond the cost point of the manufacturer who must stay within the popular-price bracket. This more extensive use of chrome will cost about the price of an additional motor but will maintain the peak of a hot motor to the life of that of several other motors.

I am told that chrome is bonded to the basic metal in the form of a network of lacy veins. While it may look solid to the eye, there are many small openings in the coating. Since the coating is not a solid wall, there is less friction between the piston and liner, resulting in less drag, less wear and higher RPM. In addition, oil is caught in the openings, assisting in lubrication and cooling, again reducing drag and wear. Chrome is the hardest metal used in model motors and other contact surfaces such as the crankshaft and crankpin may be coated with it.

The reason for the high cost of chroming is that chrome seems to be contrary to work with; it may take several attempts before the right pattern of coating is deposited.

Any of the above methods are resistant to careless methods of breaking in of motors or to lean runs that would ruin a motor without such extra protection. A few years ago, it would have been impossible for you to reach the top in modelling, unless you were especially adept with tools, had a well equipped machine shop and well lined pocket book. At the present time, while it still takes a chunk of change, it is possible for anyone to reach the top, because there are others that will do the work for you, both manufacturers and specialists. How far you want to go, depends on your ambition. For a good model, such as Pied Piper in Rat Racing, a good motor is required, and a good pit crew can take you right to the top.