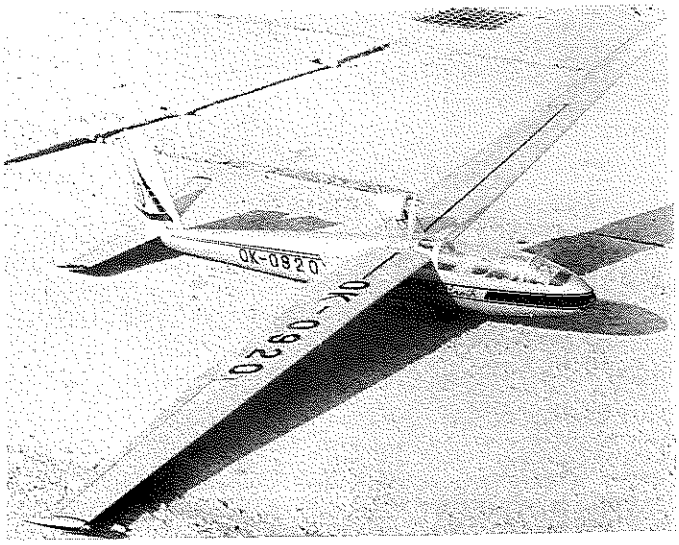
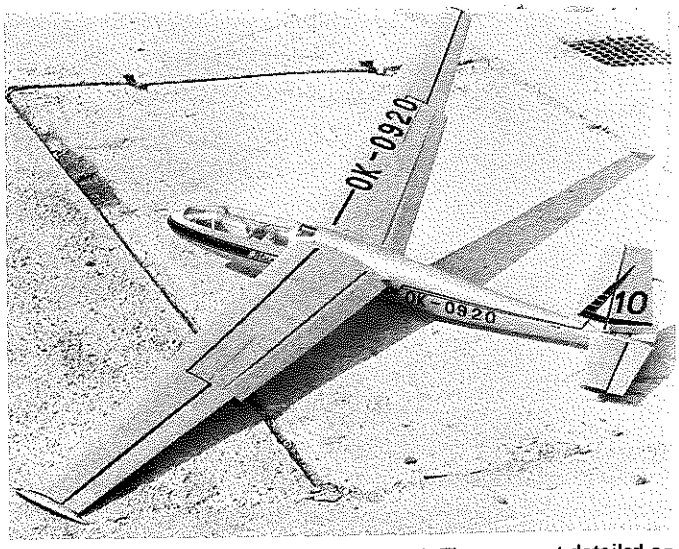


The L-13J version of the Blanik. In this powered configuration, the model could be entered in Sport or Precision Scale.



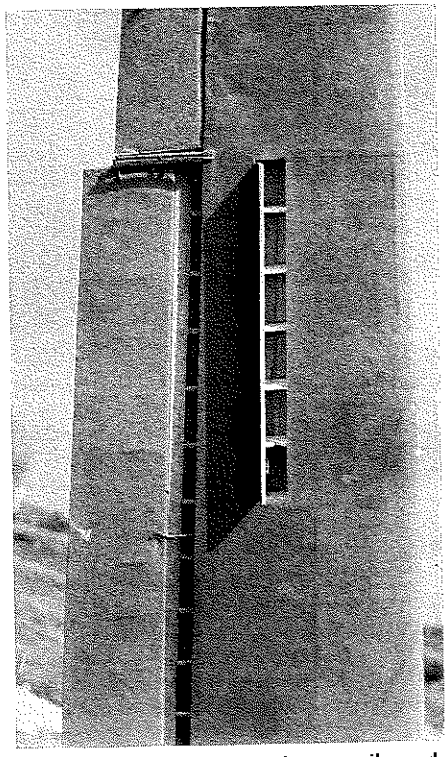
The L-13 with Fowler-like flaps extended. These are not detailed on plans, though enough info is given for scratch building.

BLANIK L-13

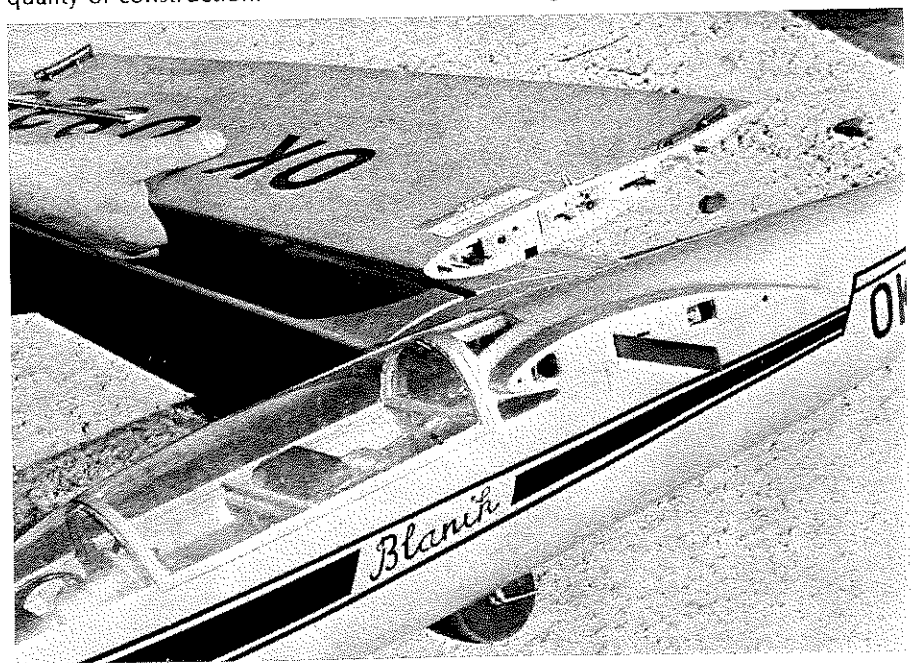
By L. HOUHA . . . We saw this model as published in the Czechoslovakian model magazine *MODELAR* and had to have it. The plans and original photos were furnished by *MODELAR's* editor, Vladimir Hadac, and the text was translated by Jiri Havel. We tried not to change the character of expression when proof reading.

• The Blanik glider is one of the most popular Czechoslovakian aircraft. Its creation started in 1953, and the first test flight of the prototype was performed in the spring of 1956. Since that time, it has been used on many airfields of the Czechoslovakian Svazavm aeroclub and in many other countries of the world, and serves for basic training as well as for contest flying. It has been used to achieve some outstanding performances in Czechoslovakia and even abroad, and is a holder of Czechoslovakian and world records. It holds an unofficial world record in total number of produced gliders, which is now over 2500, and another world record in the time of production. It is a really unique success which is a credit to its outstanding quality of construction.

Blanik is a double-seat, all-metal glider with classic tail surfaces, and a wing with negative arrow (swept forward) shape. Wingspan is 16.2 metres, length is 8.4 metres. The Czechoslovakian version, with additional engine, is equipped with a three-cylinder JAWA M 150 engine placed on a pylon above the fuselage. Detailed technical specifications, drawings in scale 1:50, and photographs of both versions of the Blanik glider can be found in *Modelar*



Bottom view of wing panel shows spoiler and flap extended. Flap runs out on track at each end. Spoilers top and bottom.



With one wing removed, the various control linkages are displayed. Note that primary support joiner is flat spring steel. Mold will have to be carved to form canopy unless a stock item can be found to suit.

magazines No. 12/1962, No. 10/1969, and No. 2/1979.

The Model Blanik is designed as a 1:5 scale model. Both halves of the wing and elevator surfaces are removable from the fuselage, as well as the pylon for the engine. The interior of the cockpit is not equipped in detail with scale instrumentation, the wheel is not retractable, and even the lift flaps are not functional because their efficiency on the model is not too remarkable. For those who wish to equip the model with flaps, there is a shape of flaps and their extended position shown on the drawings. The wheel is shown in its retracted position because the visible part of it is quite enough for landing.

Prototype of the model has been constructed and tested by Mr. L. Houha, and the latest version of the drawing has been issued on the basis of his experiences.

For control of the model, four-channel R/C equipment is required (the prototype used Varioprop). You will not find the placing of servos, receiver, and batteries on the drawing, because it depends on the type of radio which would be used. Having this in mind, it is necessary (before starting the construction) to decide about the placing of all R/C parts and to check the movement of servos in comparison with the length of control arms to assure required movement of control surfaces.

The Blanik is quite a complicated model, suitable just for experienced modelers. Its construction without previous experience with similar larger models is risky, and could waste your time and material. *(Put differently, but nevertheless right to the point. wcn)*

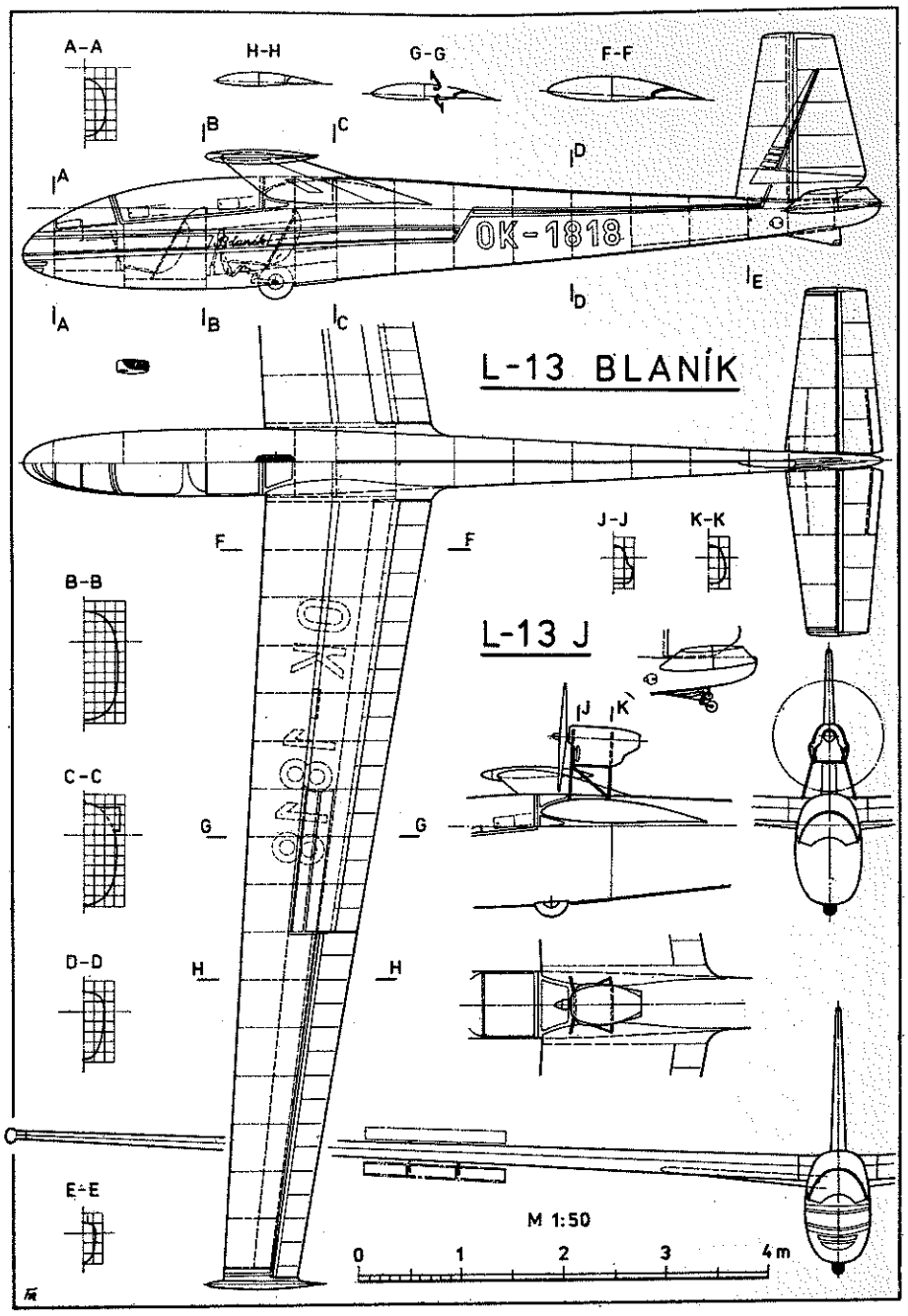
There are two versions of the model on the drawings and described in the construction guide. First one is the classic glider with marking L-13, second one is the glider with additional engine on the pylon, and bears marking L-13J.

CONSTRUCTION

Before starting construction of the model Blanik, it is recommended to study the drawings and construction guide carefully. Pay attention to construction itself, and as well, to all the construction materials, which have to be first class quality. If you should decide to build a precision scale model with all construction details, you would first of all need to collect the additional drawings and photographs for one particular full scale aircraft and fulfill all missing details into the construction drawings of the model. Some changes of the drawings could even be caused by the type of R/C equipment used.

WING

The wing is composed of two panels which are connected to the fuselage by means of metal couplers, inserted into pockets in the wing and fuselage. The position of both wing halves is assured by wooden locator tabs in the fore and aft parts of the root rib. It is necessary to pay attention to symmetrical alignment of both wing halves and the shape of the airfoil must be maintained, because only with the proper airfoil will the wing have the expected performance.



SCALE VIEWS FROM FEBRUARY 1979 *MODELAR* MAGAZINE

The assembly of the wing has to be done on a truly flat board and directly over the drawings. Before starting the assembly, it is necessary to prepare the shims which are used to achieve the right shape of the wing and their sizes are possible to see from the cross-sections through ribs K1 and K17. The root rib is NACA 63A612, the tip one is NACA 63A608 (see *Modelar* No. 9/1975).

Before starting the assembly of the wing, the main spar (K19) has to be prepared. It has to be thinner starting from K10 to the tip of the wing, and in the root part it must be reinforced by means of K20, K21, and strips K22. The "pocket" for metal couplers K81 is created by parts K23, K24, and K25; all have to be glued by epoxy.

The assembly itself is normal. All needed shims have to be placed on the drawing, part K19 over them, as well as parts K26 and K27 (together with aileron, do not cut it now). Step-by-step, insert and glue all ribs K1 through K18, top strip K26 and parts K28 and K29. Apply reinforcing parts K30, holders (K31 and K32) for control arms, reinforcing K33 for hinges of ailerons, parts K34 for ribs K1, K4, and K8, tongues K35 with K36 and corner reinforcing K37. Attach mechanism arms K38 and K39, insert rod K40 with wire ends K41 and rod K42, and fix their position by soldering of washers K43. Insert bar K44 with bearings K45 (glue them into the rib by epoxy), solder the positioners K46 and arm K47 for spoilers (care about its position!). After

Plans on next two pages.
Text continues on page 80

watch it go by, wait until it has lost about half of its altitude, then swing it gently around through a 180° turn until its nose faces you, and *let it land itself.*

Yup.

This is the big secret to setting a sailplane down without damage: it has to land itself. You cannot land it safely using the transmitter sticks . . . all you can do is position it for the landing, then let it glide in on its own.

Why? Because elevator controls airspeed. If you find yourself too high, and try to correct by applying down elevator, you'll only increase the airspeed. This will cause the plane to:

a) dive into the ground . . . the nose-shattering "dork" you see at contests; or

b) "zoom": that is, flatten out near the ground at high speed and slowly balloon back up into the air, finally slowing down and settling in for a landing at approximately the same place it had in mind before you start fiddling with the elevator. Neither of these is the ideal landing.

On the other hand, what happens if you find yourself too low? You pull a little up elevator to gain altitude, right? And it works; your plane rises a few feet. But you've traded precious airspeed for those few feet of altitude, and so, in theory at least, you're no better off than you were. In practice, one of three things will happen next:

1) Luck is with you, and a bubble of warm air, and/or a sudden drop in wind velocity occurs, letting you stretch your glide a few extra feet.

2) Luck is neutral, and you mush in at a dangerously low airspeed, touching down just about where you would have anyway.

3) Luck is against you, and you stall one wingtip, snaprolling into the ground with a dull thud.

If you've been thinking ahead a bit, you've probably figured out by now what makes or breaks a sailplane's landing: *it's all in where you make that 180° turn.* Make it too soon and you'll come back upwind too high; make it too late and you'll never get home.

So this is what you've got to practice: judging where to start your turn. I can't help you much here . . . it's something you've got to learn from experience, based on your wind conditions, your field, your airplane. And the quickest way to learn from experience is to make each experience as nearly identical as possible. That's the reason for the imaginary window in the sky. That's the reason for letting the model assume its natural, hands-off airspeed. That's the reason for staying off the elevator control as much as possible.

And that's the reason for going off by yourself to learn. So you can relax and step back and observe how the plane is flying: How high is it when it passes through the "window"? How fast is it dropping? Where did it land that time, and how should I adjust my turn to make it land closer to where I want?

In your practice, try to stick closely to the figures shown in the drawing. Keep you window at least phone-pole high; any lower can endanger other modelers on the field. And you'll need at least 100 feet between you and the window, for a couple of reasons.

First, you can't tell much about a model when it passes right above you . . . it has to be out towards the horizon if you want to judge its attitude and altitude accurately. Second, you want to get into the habit of making a broad, gentle turn . . . at least 100 feet in diameter . . . for your final approach. Tight turns do funny things to your airspeed. Wide turns let you observe the plane (and the air) more accurately during what full-scale pilots call "the crosswind leg." And wide turns make it easy to get the wings back to level position before touchdown.

So now you're on your own. Don't expect to become expert in just three or four attempts. But a good morning of consistent practice should improve your landing skills visibly. And remember: it's just like learning to swim or ride a bike. Once you have the technique down, you'll never really forget it. •

Blanik . . . . . *Continued from page 17*

sanding of all ribs, glue on the covering sheet (K48) which has to be first glued together from boards of given thickness and sanded on the upper side.

The aileron is assembled together during the assembly of the wing. Insert the ribs K49 through K57 and connect them together by K58. Next, cut the ribs K11 and K17 and glue in the nose part K59. Let it dry, and then cut the aileron from the wing and insert the parts K60, hinges K61, and an arm K62.

Now the wing can be taken from the workboard. The nuts in arms K38 and K39 have to be fixed by means of glue. Insert ribs K63 through K71 (the same number of them are in the real flap), check the movement of control surfaces, and glue on the lower covering sheet. Now place it again on the drawing with shims and let it dry. Next, glue K72 (leading edge) on as well as rib K73, match together the tip of the wing with ending part K74 and glue it on together with K75. Attach triangle parts K76 and

sand to shape.

Spoilers K77 and K78 have to be matched with openings in the cover and then glue in the hinges K79. Then glue in the bearings K80 for arms of K47. The closed position of spoilers has to be adjusted by bending of the arms K47.

The other wing panel has to be assembled by the same manner.

FUSELAGE

The fuselage also has to be assembled over the plans, on a flat surface. The base of the fuselage is created by two side parts T1, which are reinforced on their internal surface by means of T2 and T3 and uprights T4. The side parts attach to the drawing by pins and glue in parts T5, T6 and bulkhead T7. Attention, T7 is not perpendicular! Before assembly, put together parts T8 and T9 creating a "pocket" for K81 and glue it on bulkhead T7. Follow by parts T10 through T13, which hold ribs T14 and T15, creating a short center section. Between nose parts of those ribs insert the block T16 and exactly against slots insert T17 for tongues K35.

Glue in bulkheads T18 through T20 of the front part of the fuselage and reinforcing T21, and as well, insert bulkheads T22 and T23 into the tail part of the fuselage. On the top surface of the side parts and connecting bars T6, glue on the block of styrofoam (T24) which has to be sanded to shape. Finally glue on prepared part T25, upper sheeting T26, and part T27.

After detaching the fuselage from the working board, glue on plate T28 for landing gear and a styrofoam block T29 creating the lower rounded part of fuselage (the block has to be first shaped similarly to the upper block). The walls of the hole for the landing gear have to be reinforced by means of parts T30 and into the longitudinal gap glue in the reinforcing T31. The nose of fuselage (T32) is fitted and on the tail of the fuselage, prepare the block T33 (but glue it on after finishing the hinges of rudder). The lower rounded part of the fuselage is covered by sheet T34. Insert on T17 parts T35, fill the gaps between T14 and T15 and cover the root fairings T36.

The surface of the fuselage has to be shaped using pattern cross sections 1 through 6, glue on ribs T37 for connection of fuselage and stabilizer and on the forward bottom part put on support part T38. Finish the cross section between center section and the wing and finish overall surface of the fuselage by sanding.

Put on the covers for instruments T39 and T40 and insert instrument panels T41 on bulkheads T18 and T19. Next, glue on forward fixed part of canopy T42 with frame T43 and insert the windows T44 and T45 between bulkheads T10 and T11 (internal part of fuselage has to be painted before inserting windows). Prepare (not glue!) the ending part T46 (can be hollow block), glue on spines T47 and reinforce the lower part of the fuselage with fiberglass (ending behind the hole for landing gear and roughly 20mm above the lower contour of side parts).

Removable cover of pilot's area has to be assembled from parts T48 through T51, which are step-by-step glued into the glass covering T52 which is matching the shape of the fuselage. Whole cover is attached by three hinges (T53) on the right side and in its closed position is held by small snaps.

The control mechanism for ailerons and spoilers has to be attached by brackets T48 and T54 on the bulkheads T11 and T12 already during the construction of the fuselage. Part T60 for control arm of elevator is glued on wall T23 by epoxy and fabric. Axial movement of bar T55 and arms T61 is limited by T58 and the holder of arms T56, T57, and T62 is reinforced by part T59. The axis of rudder T63 with soldered arm T64 and tubing T64 has to be inserted into the bearing T54 in the fuselage and the control bar has to be fixed in it by a soldered washer. After inserting support bearing T66 and soldering of support part T58, the end of axis has to be bent and part T67 has to be glued in.

The landing gear is created by a semi-pneumatic wheel on the axis T69 in the fork T63, which has to be, after spraying of the model, attached on the T28 by means of two screws and washers with nuts. The tail skid is solid, which is unlike the full scale aircraft.

TAIL SURFACES

The elevator is built in two parts, both attached to the fuselage by means of two couplers V27 and arms of T61. Stabilizer is assembled from ribs V1 through V5,

beam V6, and false leading edge V7. Both tubes V8 have to be glued in exactly parallel and reinforcing V9 for hinges is covered by sheeting V10 which upper surface has to be first sanded for painting. Put on the tip blocks V11, leading edge part V12, triangle parts V13 and rib V14, and finish it by sanding.

The elevator has to be assembled same way from parts V15 through V25. It is attached to stabilizer by hinges V26, for which the slots in V24 must be created (large enough to assure full movement of elevator).

The rudder is very similar to the elevator from the construction point of view. The fin portion has to be assembled from the construction details S1 through S12, the covering sheets have to be matched with the fuselage and glued on by epoxy. In its top, glue in the hinge S13 and insert tube T54 into the part T25 so that both parts have a common axis. The rudder itself is created from parts S14 to S26. In its bottom part, it has to be inserted through hole and glued on the part T63, on the top it is attached by S27 through hinge S13.

CONTROL MECHANISM

All parts used to transfer motion of servos to control surfaces have to be made very carefully. Mutual free moving between parts of control mechanism *(control linkage slop to you! wcn)* must be minimized, especially by complicated gears with short arms, to avoid dead motion and bad neutrals of controls. On the other hand, too tight mechanism causes too high loading of servos, and fast discharging of batteries. The push-rods between arms within the wing and/or fuselage are recommended to be made from hard balsawood (plastic arrow shafts would be better from weight point of view), the other bars could be made from steel wires of 2mm diameter. For connection between control bars and control arms the plastic clevises (similar to Dubro) could be used. There is no more access into some areas covered by sheeting, and for such places the mechanism placed in it has to be finished very carefully.

The length of control bars and arms are designed for Varioprop servos. The procedure for build in of mechanism has been already described in the paragraphs for wing and fuselage.

CONTROL EQUIPMENT

As we noted before, equipment is not on the drawing. Basically we can even use it to adjust center of gravity of the model; it means usually the batteries are in very front part of fuselage, receiver behind it, and finally servos. All parts of control equipment have to be protected by plastic foam (rubber) material and styrofoam against vibration and against movement, for example by landing.

SHEETING AND PROTECTION OF THE SURFACE

The final wooden surface has to be sanded carefully, painted and/or sprayed by filler, again painted by clear dope and again sanded. All parts of the model have to be covered by paper of different thickness: wing, front part of the fuselage, ailerons, elevator, and rudder by medium weight paper; the rest of the surfaces by lightweight paper. Before final painting (or spraying) the surfaces must be well painted by clear dope and carefully sanded.

COLORS

Blanik gliders delivered to aeroclubs or exported abroad have standard coloring as on the drawing. Whole aircraft has the color of natural duraluminum; only the stripes on the fuselage, wing and tail surfaces, including the name Blanik and the mark of the producers are painted in red, blue, green, or black color. The Czechoslovakian registration is always in black letters. The messages for personnel (like "Do not push here") are red. The interior of cabin, like sidewalls, floor, and so on, are gray; shields of instrument panels are beige. Some Blaniks in aeroclubs of Svazarm have non-standard color design, mostly quite attractive.

VIEW NO. 1 shows Blanik from Aeroclub Kladno. It is on all surfaces ivory white; on the side walls there are three color stripes starting from above blue, black and red. On the top of the fuselage there is a blue stripe widened to blue keil on the rudder stab. Name "L13 Blanik" on the left side of nose and on the right side of rudder as well as name Kladno on right side of nose and left side of rudder, are black. The wing from above view has a blue stripe on the nose of wing, after it there is a black stripe, and approximately in the center of wing there is red stripe interrupted for the registration letters. Bottom surface of the wing is the same excluding the black stripe. The wing tips are red. Elevator does not have any trimming stripes.

VIEW NO. 2 shows Blanik from Aeroclub Kunovice. Basic color is again natural duraluminum. The fuselage is orange from above, same color as the vertical stab and rudder, stripes on the wing and wing tips. On the side walls, there is white keil stripe. Rudder above the national flag is black. Colored surfaces are divided by black line interrupted for registration letters. The width of this dividing line is 4mm for wing, 6mm for fuselage, and 2mm for side stripe (sizes valid for model!). On the left side of the nose there is a black diablo (devil) with black-gray bat wings and red flame painted on the green circle. This glider is placed now in the museum at Kbely, Prague.

VIEW NO. 3 shows Blanik delivered to USSR for their aeroclub called Dosaaf. Wing tips, rudder, and three stripes are orange (according to customer wishes even other color), the names DOSAAF and Blanik written by Cyrilic alphabet on

both side walls are blue and symbol LET is white-blue. The red asterixes have white-red contours. All other messages and description is red. Soviet registration letters on usual places are black.

Blaniks delivered to USSR from beginning they had standard coloring (like for Czechoslovakian aeroclubs). In interrupted middle stripe on the nose it was named DOSAAF (cyrilic) in the same color as the stripe itself. On both halves of the wing from top and from bottom, they were red asterixes contoured by red and white lines.

BLANIK L13J WITH AN ENGINE

(Hmmm . . . an interesting subject for Sport or Precision Scale competition! wcn)

Engines from 2 to 2.5cm³ (0.12-0.15) can be installed (similar to actual aircraft) on the pylon. The construction of wing and tail surfaces is not changed. The fuselage has to be equipped by parts needed for attachment of the pylon. Between walls T7 and T12, the ribs T71 have to be glued in and on them as well as on T7, the parts T72 and T73. After covering of center section, the holes for pylon supports M2 and M3 have to be drilled. The holes for screws have to be drilled in accordance with M7.

PYLON AND ENGINE HOLDER

The supports M2 and M3 (for both sides, the front one and back one are bent from one piece of wire) solder together with supports M4 and M5 . . . the best way is to use a special jig for it corresponding to the shape of the center section and in the same time, solder the nuts M7. Whole construction has to be attached to engine holder M1 by means of thin wire and epoxy glue. The shape of M1 must conform to bay M8, which consists of two parts connected with screws into the M6, soldered on supports M4 and M5, and on consoles M9, attached to motor holder. Fuel tank M10 has to be arranged according to engine used. Its volume has to be designed on the base of specific fuel consumption of an engine and desired running time, but it can be even limited by timer or by an additional R/C channel.

In case a glow engine is used, the engine pod and the surface of fuselage (at least) has to be protected against methanol fuel by means of fuel-proof colorless enamel.

Coloring shows in View No. 4. On the prototype, the fuselage from top as well as engine bay have been white, other color trimming has been dark red (stripe on the wing contoured by white line). The name L13J has been white, Czechoslovakian flag has been contoured by white lines. The upper stripe on the engine bay has been interrupted by symbol LET, lower one by name of engine JAWA. Black registration if going through trimming is contoured by white line. All other surfaces natural duraluminum.

FLYING

Before the first takeoff, check again very carefully the trim of the wing and its position in relationship to the fuselage and elevator. Also check the position of the center of gravity and the symmetry of the model. If necessary, use additional ballast to bring the position of center of gravity on its right place in accordance with the drawing . . . see arrow and the letter T. For the first test flight, the CG could be a little bit shifted in the direction of the nose of the model, because it would increase the stability. On the other hand, shifting of CG in opposite direction, behind the location pointed as T, would decrease the stability of the model. *(It's the same everywhere! wcn.)* Check function of R/C equipment in all positions of the model and be sure batteries are freshly charged.

If model has been assembled carefully, in accordance with the drawing, it should fly without any trouble and it would need just to know its behavior (which is usually not same for all models and can be typical) and to obtain the pilot experiences with it. Blanik as a model is stabile enough from all points of view, it is fast enough (do not want to fly with it like with A/2 glider!) and it can be good controlled in all flight positions. Blanik is gliding very well, especially near the earth surface, and it is recommended to have it in mind to land the model without landing flaps.

For first flight with powered model (motor without throttle control) fill the

tank just enough to check the behavior of the model and after it, you can possibly give more fuel. If you would use powerful engine, try first flights with lower rpms, for safety. •

Pylon . . . . . *Continued from page 28*

5.2.8. Weight.

Weight less fuel, but including all equipment necessary for flight shall be at least 2200 grams (4.85 lbs.) and not more than 3000 grams (6.60 lbs.) if ballast is used, it must be permanently and safely affixed.

5.2.9. Fuel.

Fuel to a standard formula for glow plug and spark ignition motors will be supplied by the organizers. Its composition shall be 80% Methanol, 20% Lubricant.

5.2.10. Racing Course Specification.

The triangular course will be laid out as follows: The course of 10 laps with individual length of 400 meters (1312.4 feet). Total distance travelled is 4 kilometers (2.49 miles). The race starts at the start-finish line. All take-offs will be ROG, no mechanical device will be used to assist the aircraft, but hand pushing is permitted. The race course specification may be modified in the interest of safety or to suit existing field condition if safety is not compromised. The pylons should have a minimum height of 4 meters (13.12 ft.) and should not exceed 5 meters (16.40 ft.) height.

ORGANIZATION FOR RADIO CONTROLLED PYLON RACING CONTESTS:

5.2.12.4.

A sideline judge will be posted in front of the pit area on the spectator side of the racing course. The sideline judge will record as an infringement, any overflight of the pit or spectator areas. The judges at the No. 2 and No. 3 pylons will record a cut pylon (infringement). At the end of each race the sideline and pylon judges will inform the race starter of any infringements by any contestant.

5.2.12.6.

The race starter is in charge of each heat; the starter will first ensure that all contestants and race officials are ready to commence. Each signaller will have a flag or light of a distinctive color, the starter will arrange for each model to be identified by one signaller before the start of any heat.

A radio operation check from each contestant will be made prior to starting motor(s).

A maximum of 1 minute will be allowed for starting and adjusting the motor(s), at which point the race will commence. A competitor will be allowed an additional 1 minute to become airborne before being disqualified from that heat.

5.2.12.10.

Starting positions in all races will be determined by draw, with the No. 1 position being closest to the No. 2 Pylon.

Models will be flagged off the starting line at 1-second intervals with timing commencing at the drop of the flag for that particular model.

5.2.12.12.

Each competitor may have only one helper in each race and the helper may release the model at the start and give the pilot verbal information regarding the flying course of his model and official signals.

The designation "competitor" may refer to an individual or team entry of no more than two persons. Any award will be made jointly to team members.

5.2.12.13.

In the event of a collision or contact between two airborne models, both models must be landed immediately, even though they are able to continue flying. The contest director is required to give such competitors a second opportunity to record a score in that round, provided that in his opinion the aircraft is still airworthy or the competitor has an airworthy reserve model.

In the event of a malfunction of the timing, lap counting, signalling, or other such equipment which is the responsibility of the organizers, the competitor(s) affected by such malfunction shall be given the opportunity to record a score for that round.

5.2.13. Scoring.

5.2.13.1.

The flight of each model shall be timed with a stopwatch. Timing shall be commenced when the starting signal is given to each individual competitor. The lap scorers stop their watches after ten laps have been completed. They are not concerned with how many infringements their flyer has made. The pylon and sideline judges, after the heat has finished, notify the race starter which models have made infringements.

If one infringement is made, one tenth of the flyer's time (for ten laps) is added, to give his corrected time. If two infringements are made, the pilot's flight is cancelled.

5.2.13.2.

Points shall be awarded after each race as follows: The contestant's corrected time in seconds is deducted from 200.

No points will be awarded if a model