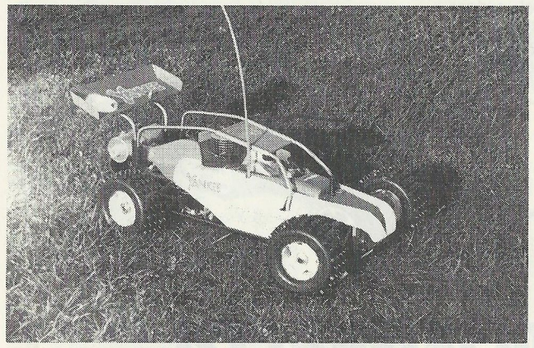
Yankee four by four

RRC Kit Review by John Chamberlain



THE PROSPECT of building the Yankee 4 × 4 1/8th Off Road Buggy was indeed an exciting one. The 1982 European Off Road Champion has a specification that is far in advance of any other of its' competitors on the market at present. It features independent suspension controlled by coil springs over hydraulic shock absorbers, permanent four wheel drive driven by shafts via three bevel gear differentials, and the whole lot stopped by a disc brake on the centre diff. An exciting specification indeed!

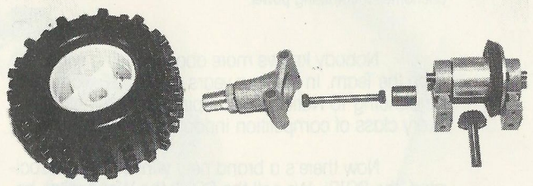
The Yankee range of off road cars, of which the 4 × 4 is top of the range, are made in a modern factory at Lyon in France. There are no written instructions with the kit but it does have several exploded diagrams showing the position of all the various components. Because of the complexity of the kit it is as well to familiarise yourself with all the components before trying to commence assembly.

1. CHASSIS ASSEMBLY

The chassis itself is a substantial dural pressing which comes in an anodised blue and has all the necessary holes accurately drilled in it.

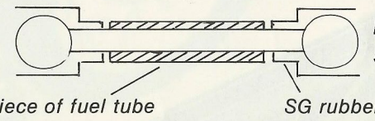
a) Rear Suspension – the first operation is to take the package of components that contains the rear suspension and transmission components and assemble these for attachment to the chassis. Whilst all the parts fit well, there are several points worth attention during assembly. Because the review car was going to be used in many future race meetings, it was decided to fit the optional hardened steel bevel drive gear. The standard kit issue is a nicely made nylon gear, but it was felt that the extra reliability to be offered by the steel gear was worth the extra expense.

The drive shafts are nicely machined ball end hexangonal faced type, as used in the PB Alpha. Rubber gaiters are not provided in the kit to protect these where they fit into their respective sockets on the diff or outer drive couplings. However, help was at hand in the shape of the SG Columbia 1/8 race car's drive shaft gaiters which are a perfect fit on the Yankee components. When



Rear diff in mounting blocks with pinion drive gear, hex-ball ended drive shaft, rear upright and shaft assembly and rear wheel.

fitting the drive shafts, first pack the drive sockets at each end with grease and then slide the gaiters into position. To ensure that these covers did not slide off during running, a length of fuel tube was pushed over the shaft to hold the covers firmly in position.

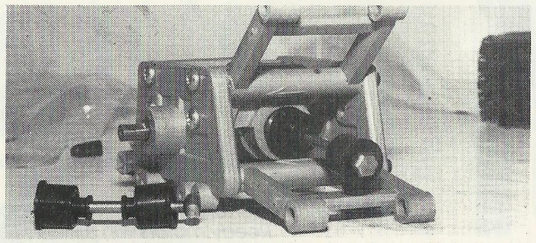


Before the pinion gear, on it's integral shaft, is fitted into its bearings in the rear bulkhead, it is essential to grind a flat on the shaft where the drive coupling to the centre diff will attach.

I used my invaluable Dremel Moto-Flex tool with a small grind wheel to make the necessary flat on the shaft.

Flats also need to be ground on the outer drive shafts where the threaded aluminium wheel adaptors will fit. Before fitting the grub screws to hold the adaptors onto their shafts, apply a good thread locking compund to them. Also at this point, remove the countersunk screw that holds the end plate into the diff, coat well with thread lock and refit into the diff. If this screw were to come out, all transmission is lost, so it is as well to lock it securely.

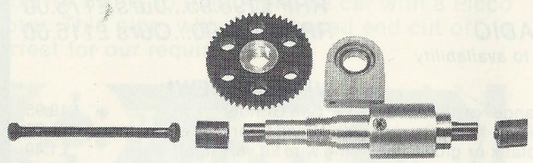
Finally, when fitting the wishbones, make sure the arrows moulded onto each one face forward. The rear geometry incorporates some toe-in and therefore it is essential that these wishbones are fitted securely!



Rear suspension assembly showing drive shaft fitted with SG covers fitted into diff.

b) Centre differential – with the rear suspension transmission firmly attached to the chassis, the next operation is to fit the centre diff and disc brake assembly. Particular points to note are as follows: – as with the rear diff, remove the end plate retaining screw, apply thread lock compound and reassemble. Also apply thread lock to the grub screws in the coupling between the centre and rear differential.

With the two assemblies now fitted, check to ensure the transmission rotates freely.



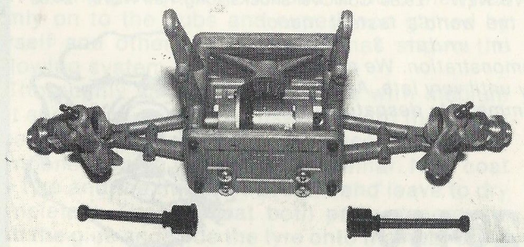
Centre diff with bearing support block, main nylon drive gear, and centre front drive shaft.

c) Front suspension – the front suspension/transmission assembly goes together in much the same way as at the rear. Remember firstly to securely thread lock the diff end plate screw in position. At the front, the SG drive covers can only be fitted to the inboard end of the drive shafts, due to insufficient space at the outer end. Once again, flats must be ground on the outer drive shafts where the wheel adaptor attaches, and ensure that these are then thread locked into position.

Also grind a flat on the pinion shaft where the drive coupling to the centre diff will attach.

Once the front assembly is completed, fit to the chassis making sure to fit the front centre drive shaft in position at the same time. I also fitted SG drive covers to both these couplings.

With the front end now firmly fitted to the chassis, turn the chassis assembly upside down. You will see at the front end that there are two holes in the chassis in between the four fixing screws that hold the front suspension in place. Now it is intended that screws provided in the kit go through these holes and screw into the diff bearing support brackets. However, holes have not been provided in these mouldings so these have to be drilled to accept the self tapping screws provided.



Front suspension with diff fitted showing drive shafts with SG drive covers fitted.

I must stress that these screws must be fitted, otherwise the differential assembly can move sideways in operation and will cause the drive gears to strip immediately! I can vouch for that fact, as I omitted to fit these screws and the front transmission failed while I was leading a final, during the cars' first outing – still that's another story.

2. MOTOR AND CLUTCH

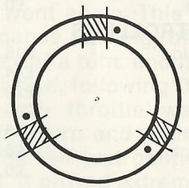
The kit comes complete with the motor mounting blocks already drilled and tapped for an ECM 21 which is Yankee's own car motor. However, these are not available in the UK and most users will probably opt for the OS 21, Picco 21 or OPS 21. From the layout of the motor and silencer in the chassis, it would be rather easier to fit a side exhaust motor than a rear exhaust and no doubt someone will soon prove me wrong! I fitted an OS 21 s/e with PB slide carburettor. Again because of the layout, a slide carb is really essential to enable a reasonalby straight forward linkage to be made.

The OS mounting holes do not line up with the ready fitted holes in the motor blocks and after some deliberation. I decided to lengthen the holes in the motor's crankcase to line up with the motor's blocks.

The flywheel provided in the review kit had its centre hole of Picco size and this was a loose fit on the OS. I found that tightly winding some PVC tape round the crankshaft easily made up for the slight oversized hole in the flywheel. The OS crankshaft then needs reducing ¼" in length to enable the clutch adaptor to screw firmly home.

With the flywheel now firmly in position, the next operation is to cut the three clutch shoes from the blank supplied. This is easily done with a sharp knife and the shoes should be shaped as in the diagram.

NOT TO SCALE



Cut blank as shown removing approx. 3/32 from length of each shoe.

After cutting the blank into three separate shoes, they should then be trimmed on their undersides as shown to reduce their weight, ensuring that the clutch will not engage at too low rpm and cause clutch drag.

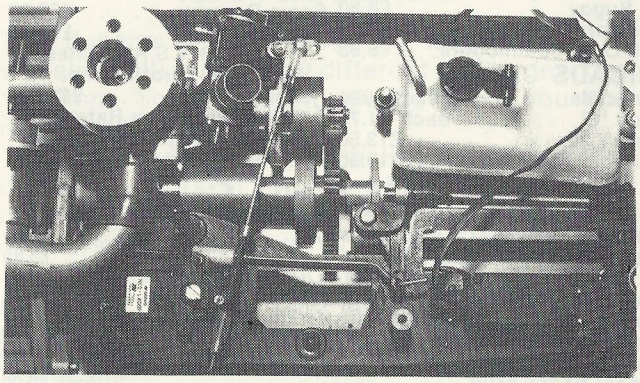
SIDE VIEW

Shaded area shows where material is removed from the shoe.

END VIEW

With the shoes fitted to the flywheeel, fit the clutch bell and then the whole motor assembly can be attached to the mounting plate on the chassis.

The silencer then needs to be fitted with a nipple to enable the fuel tank to be pressurised. Your local model shop will be able to supply one suitable for the job. To connect the motor to the silencer I fitted the OS manifold stub to the motor, sealing the joint with silicone rubber. To turn the exhaust through the required 90°, PB Racing Products manufacture a metal pipe with the required bend for fitting to their Alpha 82 car with a Picco motor. This pipe, with the swaged end cut off, is perfect for our requirements.



Engine installation showing throttle and brake linkages.

Now the system can be connected up using the correct size of silicone tube and the joints firmly held in position with strong cable ties. At this stage it is as well to fit a good quality air and fuel filter to the motor.

3) RADIO INSTALLATION

The radio plate is ready cut to accept most modern radio gear. I fitted JR 4000 servos and receiver and these went easily into the plate as shown in the instructions. To link the servos to the carburettor and brake, I utilised the PB overide linkage kit which contains a handy pair of springs, collets and fittings to do the job properly.

The steering servo is connected easily to the servo saver with a length of piano wire.

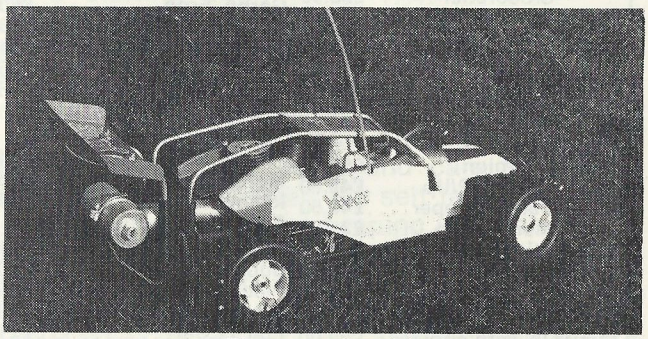
4) WHEELS AND TYRES

A strong glue joint is needed to hold the tyres firmly on to the hubs and experience gained by myself and other regular racers has shown the following system to work well.

Thoroughly sand down the hubs with medium wet and dry paper and do likewise with the gluing area of the tyre. Then degrease these two components with lighter fuel or similar. Now coat the tyre and the hub with Evostik and leave to dry completely. Then re-coat both parts generously with the glue and slide the tyre onto the hub. Once this has dried the joint should be able to take all the punishment we can give it!

5) BODY AND ROLL CAGE

The ABS body supplied is easily cut to fit onto the completed chassis. If you have a Dremel power tool, the cut outs can be made in minutes using a small point grind wheel. The roll cage is supplied ready to fit and when in position protects the body completely. All that is left to do is to fit the rear aerofoil on the wing wire and then admire your handiwork! Enamel paint is ideal to decorate the body and some nice vinyl stickers, which are supplied, to finish off the body.



The completed buggy

6) RUNNING THE CAR

With great anticipation, the Yankee was taken to our local grass circuit for setting up. The OS fired up very quickly and the mixture adjusted for even running. Down on the track and open the throttle – fantastic! The 4 x 4 just rockets away on the wet and frost covered grass as though it was on dry tarmac! The traction and stability have to be experienced to be believed. Once we were settled down and began to push the car harder into the turns, we found a little more understeer than was anticipated. Upon closer inspection it became obvious that the servo saver was set too loosely. A spacer of about ¼" thickness was fitted to compress the spring and to tighten up the device, and off it went again. This led to a much improved performance. Lifting off the throttle slightly on the apex of a turn, and the nose would turn in and the car turn, following the chosen line to perfection. If the throttle was completely closed whilst in the turn and perhaps the brake applied as well, the tail just gently slid out and was easily caught. It proved extremely difficult to spin the car out; the balance is so good.

The suspension works very well allowing the car to ride the bumps, and the dampers kept everything well under control. With the relatively short time that we ran the car for, it seemed that the rear springs are best when set firmly, with the fronts a little softer. With the range of adjustment available there is plenty of scope for fine tuning for any particular circuit and driving style.

To sum up, this is a well engineered and designed buggy and, carefully assembled, is a potential winner at any circuit. If you have ever wished that you could be a Hannu Mikola driving a works Quattro, you can now do the next best thing! Rush to your local model shop and buy a Yankee 4 x 4. See you at the circuit?