ALL PLUMBED-IN

It's not just eccentric old codgers who don leather helmets and goggles to experience wind-in-the-hair motoring on three wheels - these cars continue to grab the interest of all-comers and, as Arnold Wilson discovers, it is not at all surprising.

HISTORICAL PERSPECTIVE

Mention three-wheeler cars to the man in the street and he will doubtless think of the fibreglass Reliant Robin or if he's a bit older then he might recall the Bond with its Villier 2-stroke engine and chain driven front wheel or even the idiosyncratic three-wheeler aptly called the Bond Bug. These cars have two wheels aft but only one at the front. Corner them too briskly and they will lift an inside rear wheel and then slowly turn turtle.

Why? Because the centrifugal force developed during cornering will tend to push the car off the road at a tangent and as there's no wheel at the front outside corner to counteract this, the vehicle becomes unstable.

However, if you reverse the wheel configuration, the car becomes almost as stable as a 4-wheeler. H.F.S. Morgan was well aware of this and in 1910 he started

production of a three-wheeled car, fitted with an air cooled 1100cc vee-twin JAP engine, (followed later by a water cooled unit) driving the rear wheel via two beefed-up motor cycle chains. In 1933 an optional four cylinder water-cooled Ford 8 engine became available. Three wheeler production continued until 1952 but the water-cooled JAP engined version was always more popular.

The enduring feature of the car was its independent front suspension using a coil spring and sliding pillar at each side - a set-up which is still used in the present day Morgan 4-wheeler sportscars. The 3-wheeled Morgan enjoyed considerable success in racing, particularly in trials and hill climbs, often with HFS himself in the driving seat.

THE BRA SUPER SPORTS

At the last count there were some sixteen 3-wheeler kits available with almost half following the lines and style of the 1930s JAP engined Morgan. The rest, including the Free Spirit, Lomax, Grinnal Scorpion and Triad have their own special bodies and are powered by a variety of engines including the Renault 5, Citroen 2CV, Mini and Ford. The cars which are Morgan inspired tend to use motor cycle engines with the Honda CX series being the most popular.

The BRA Super Sports is the brainchild of John Berry, assisted by Peter Ibbotson, both being life-long motoring enthusiasts and owners of original Morgan three-wheelers. (The same company also used to produce the pre-war styled MGB-based P-type and Cobra 289 replica).

DONOR VEHICLE

As mentioned earlier, the donor vehicle is the Honda CX500 motor cycle with a 500cc (or 650cc) water cooled vee-twin engine manufactured between the mid '70s and the early '80s. It drives the rear wheel through a 5-speed gearbox and a short drive shaft. Virtually all the Honda motor-bike parts are used, except the frame, front wheel and front suspension. These bikes are readily available costing between £400 and £600, and Honda's long history of motor cycle technology makes the bike absolutely ideal as the mechanical basis for a three-wheeler car.

THE KIT

BRA's hallmark has always been the quality of their engineering and the CX3 Super Sports is no exception. The kit, which costs £2200 plus VAT, contains all the special parts required including a spaceframe, front wishbones, pedals and pedal box, handbrake and gear linkages, fibreglass cowl, scuttle, rear body section and mudguards. The body side panels, floor and bulkheads are in zintec, while the bonnet is made of aluminium. Also included is a petrol tank and front coil spring/damper units.

Extras, which can be bought direct from BRA or through any other supplier, include exhaust pipes and silencers, aero-screens, seats, tonneau, wheels and tyres, wiring loom, leather-covered steering wheel plus a few sundry items. If the whole lot were bought from BRA this would add another £900 or so (plus VAT) and if you then add, say, £500 for the Honda motor-bike and allow around £400 for reconditioning parts and purchasing one or two Ford parts, then we reach a grand total of £4700 including VAT. This figure was confirmed by Peter Ibbotson and Geoff Still, who recently built a car which cost £5000.

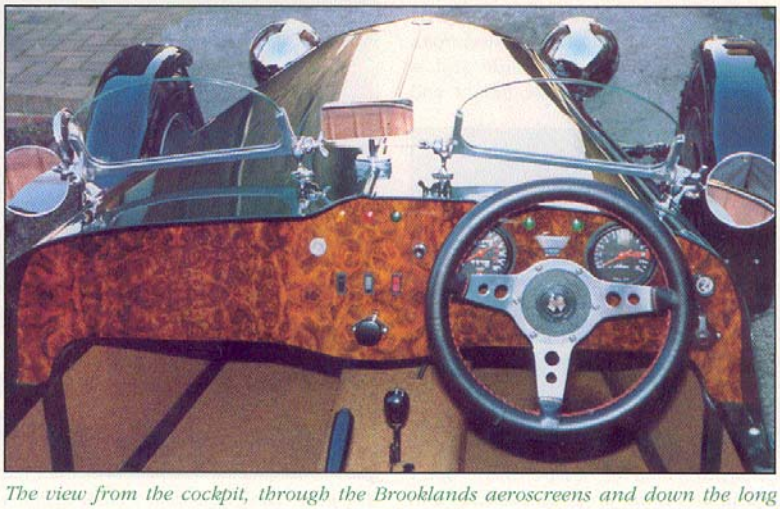
CHASSIS

The chassis is a jig-built spaceframe, fully triangulated making it light and very strong. It is fabricated in 1" square (25mm) 16 gauge tubing, MIG welded and pre-drilled to take all the major mechanical parts. Suspension pick-up points are bushed to prevent tube collapse; this being particularly important for the large bearings in the swinging arm rear suspension. The chassis frame comes in red oxide primer leaving the builder to add whatever final protection he feels necessary. Most will probably use Finnigins Hammerite Smooth but for a really first class job there's little to beat powder coating.

Some driver protection is afforded by the top chassis rail (there are no doors) at either side, while frontal impact will be absorbed progressively by the wheels and suspension followed by the transverse chassis members directly in front of the engine. Rear impact will be spread over the area of the spare wheel which is mounted almost vertically. There is

The kit includes the spaceframe chassis plus all the body panels, front suspension etc. and costs £2200 plus VAT

Rear wheel and suspension are straight from the Honda motor-bike. Also, at the top of the picture, the seat belt anchorages can be seen bolted directly to the chassis member



The view from the cockpit, through the Brooklands aeroscreens and down the long bonnet is impressive and very evocative of motoring in the early '30s

provision on the chassis for seat belt mountings.

ENGINE AND TRANSMISSION

The Honda develops 50 or 65 bhp (depending on the model) at a heady 9000rpm, and is water cooled via a radiator sited just behind the engine. It is partly in the air-stream but an electric cooling fan should be fitted behind the radiator to prevent overheating in slow moving traffic.

One of the first design problems was to convert the foot operated gear change of the 5-speed gearbox into a conventional hand change gearstick system. This was achieved using a rod arrangement resulting in a gear shift which is in line and sequential - in other words there is no conventional 'H' pattern. A forward push engages first gear and then the gear stick springs back to the mid or neutral position, while flicking it rearwards engages gears two to five, but the gear lever always springs back to the central position. You only know which gear you are in by either remembering how many times you've flicked the gear backwards or watching the rev. counter and listening to the engine note. When the gearbox is actually in neutral, i.e no drive, a green light shows on the dash panel.

Additional bearings prevent any whiplash of the lengthened shaft which carries the drive from the gearbox to the backwheel. The final drive is by crown wheel and pinion but without the differential gears and pinions as there is only one wheel to drive and the original Honda 18" alloy wheel is used, complete with its tyre and tube.

SUSPENSION AND BRAKING SYSTEM

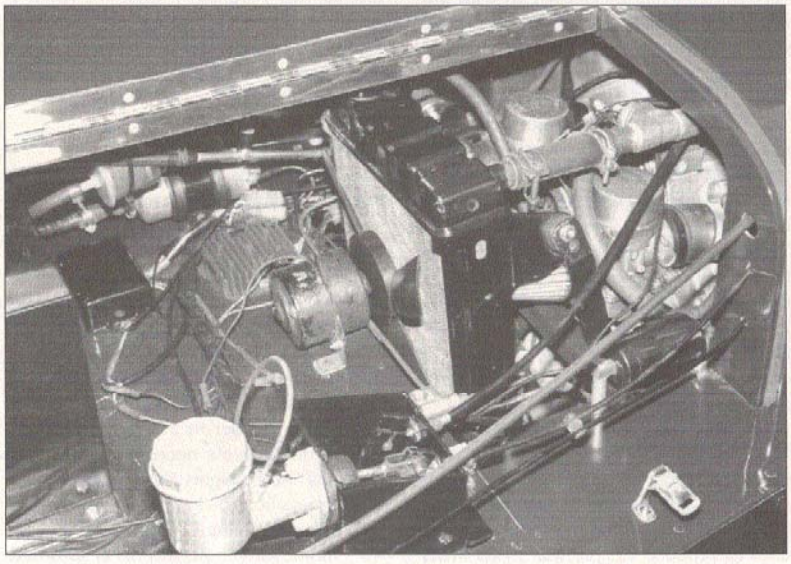
The front suspension is by unequal length wide-based wishbones designed by BRA with an appropriately rated Spax coil/damper unit at each side and is adjustable for camber, ride height and damper setting. Ford Cortina Mk 1V or V discs, callipers, hubs and stub axles are used linked to Ford Transit upper and lower ball joints.

At the back of the car, the Honda motorbike suspension is utilised unmodified with a coil spring/damper unit at each side. Stiffer springs were not necessary as the weight of the car's rear is about the same at the back of the bike. Steering is by rack and pinion borrowed from a Mk1 or 11 Ford Escort.

The braking system is right up to scratch with 93/4" (247mm) diameter Cortina discs and two-pot callipers at the front operated from the brake pedal, while an Escort handbrake mechanism works the Honda bike rear wheel brake. Pedal pressure is quite satisfactory with no servo-assistance as the car weighs a little less than 8cwt (400kg), while the braking is located just where the weight is, that is over the front wheels.

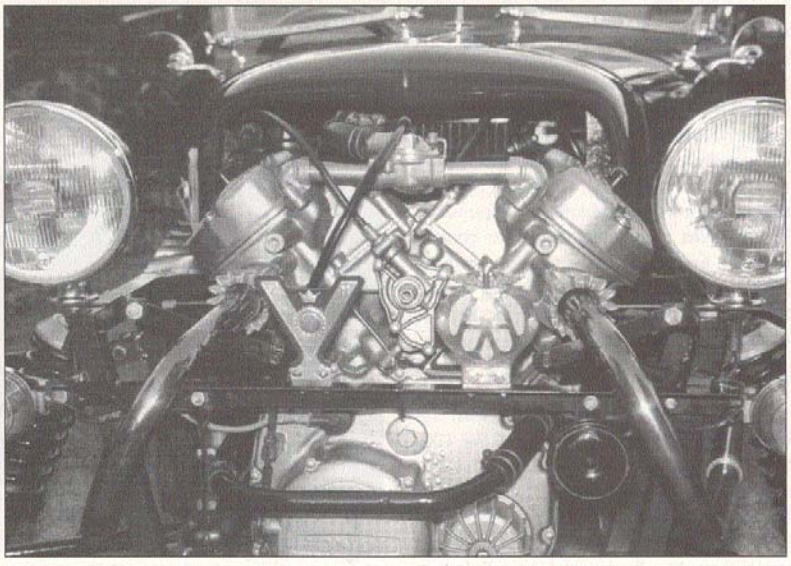
INSTRUMENTS AND ELECTRICS

The main instruments and switches are transferred from the Honda and include the speedometer (120mph) tachometer (12,000 rpm, red-lined between



The Honda radiator is located behind the engine - the electric cooling fan is a precaution against overheating in slow moving traffic

Unequal length wishbones, Spax coil/damper units, uprights, stub axles and disc brakes come from the Ford Cortina



The water cooled vee-twin Honda engine develops 50bhp at 9000 rpm and it is not too dissimilar in appearance to the JAP engine used in pre-war Morgans

9500 and 10,500 rpm), temperature gauge, push-button starter and the lights and indicator switches. The wiring harness also comes from the Honda, extended as required to reach the lights and other ancillaries as necessary.

OWNER-BUILDERS VIEW

Peter Ibbotson was more than happy to point me in the direction of Ossett, near Wakefield, where Geoff Still had recently completed a CX3 Super Sports. Geoff, a plumber and heating engineer, has no special training in motor mechanics but he does possess a lot of common sense and is used to solving problems in his day-to-day work.

"The car was really quite straightforward to build", recalled Geoff, "and I started by supporting the chassis on two trestles and spraying it with primer followed by several coats of Ford Province Green (like BRG) cellulose.

"I panelled the body sides, floor and bulkheads using the accurately cut-to-size zintec pieces supplied with the kit - these were all riveted in place. Everything, including the unattached bonnet, wings and rear body section were then etch primed, given three coats of primer and four top coats, well rubbed down between every other coat". Geoff has his own spraying equipment and did all the work himself, either in the back garden or his small garage.

The next step was to install the engine/gearbox unit, the lengthened drive shaft and finally, the rear wheel and suspension. According to Geoff, this all went in quite easily, with small problems solved by a `phone call to Peter Ibbotson in Doncaster.

We then discussed the wiring of the three wheeler. "I removed the motor-bike harness" explained Geoff, "labelled all the ends and spread it out on a ladder in the garage. I extended or shortened the ends as required until I could see that it was ready to fit into the car."

He soon began to realise that with the extra headlight, electric pump and cooling fan, the original wiring might well become overloaded and blow the 20 amp fuse. Increasing the size of the fuse would merely move the problem to the weakest point of the wiring which might overheat, melt and possibly catch fire.

"I talked over the problem with the motorbike lads in the pub, and they made various suggestions, one of which seemed to solve my dilema" said Geoff. "As I couldn't take a lead from the sealed ignition switch unit, I took a 6mm cable from the battery to two solenoids and then through fuses to the fan and headlights. The solenoids are dead until the ignition is switched on, so the only `always live' part is the battery to solenoid lead. I've split the load and kept the power down in the original harness and it all works very well."

Geoff Still has every right to be pleased with the look of the completed car

THE COMPLETED CAR

The finished car looked absolutely superb in its British Racing Green livery and its polished chrome and stainless steel fittings, with the beautifully painted body panels reflecting a perfect mirror image of the sky and surroundings.

Slipping off one shoe, I stepped over the side of the cockpit onto the seat and then slid down between the body side panel and the central tunnel into the snug driving position. As the bench seat is fixed, the pedal box has to be accurately placed to accommodate the driver. I found the seating position just about right, sufficiently low to feel that you are in the car and protected, yet just high enough to see over the fascia and along the bonnet. All the controls are very light, with the steering fairly high geared to produce a quick response to the smallest movement of the wheel.

It was a great feeling to blast along the road looking straight down the long bonnet to the chrome headlights and front mudguards and to watch the wishbone suspension at work. The stylish Brooklands aeroscreens deflected some of the air over my head, but in really cold weather a pair of goggles and head protection would be required.

The suspension was softer than I expected, giving quite a comfortable ride, but with excellent road-holding on the corners. If I were pressed for criticism, I would single out the exhaust note which was embarrassingly loud when the throttle was opened up - much like a motorbike really!

How does Geoff sum up the car after driving it over several hundred miles? "It handles very well and goes quite quickly, but I'd like a bit more power under my right foot - a 650cc engine would be nice. The disc brakes at the front are excellent, inspiring a lot of confidence and I soon got used to the in-line gear change, although it did feel distinctly odd at first. Everywhere I go people stop to admire the car, some even recalling the original JAP powered Morgans of pre-war years.

"On fine sunny days, it's wind-in-the-hair motoring - even my wife enjoys it, but in cold weather a woolly hat or helmet is needed. On the negative side, I think the exhaust is a bit too noisy although many people say it sounds terrific. Also, there's no wet weather equipment or spare wheel for the rear. However, all things considered, it's a great little car and real pleasure to own and drive."

Beribo Replica Automobiles Ltd, Wheatley Hills Garage, Thorne Road, Doncaster DN2 5AL. Tel: 01302 323325.

Will It Fit Your Garage?

Length overall	-	3353mm (11ft 0ins)
Height overall	-	940mm (37ins)
Width	-	1473mm (58ins)
Wheelbase	-	2337mm (92ins)
Weight	-	400kg (880lbs)