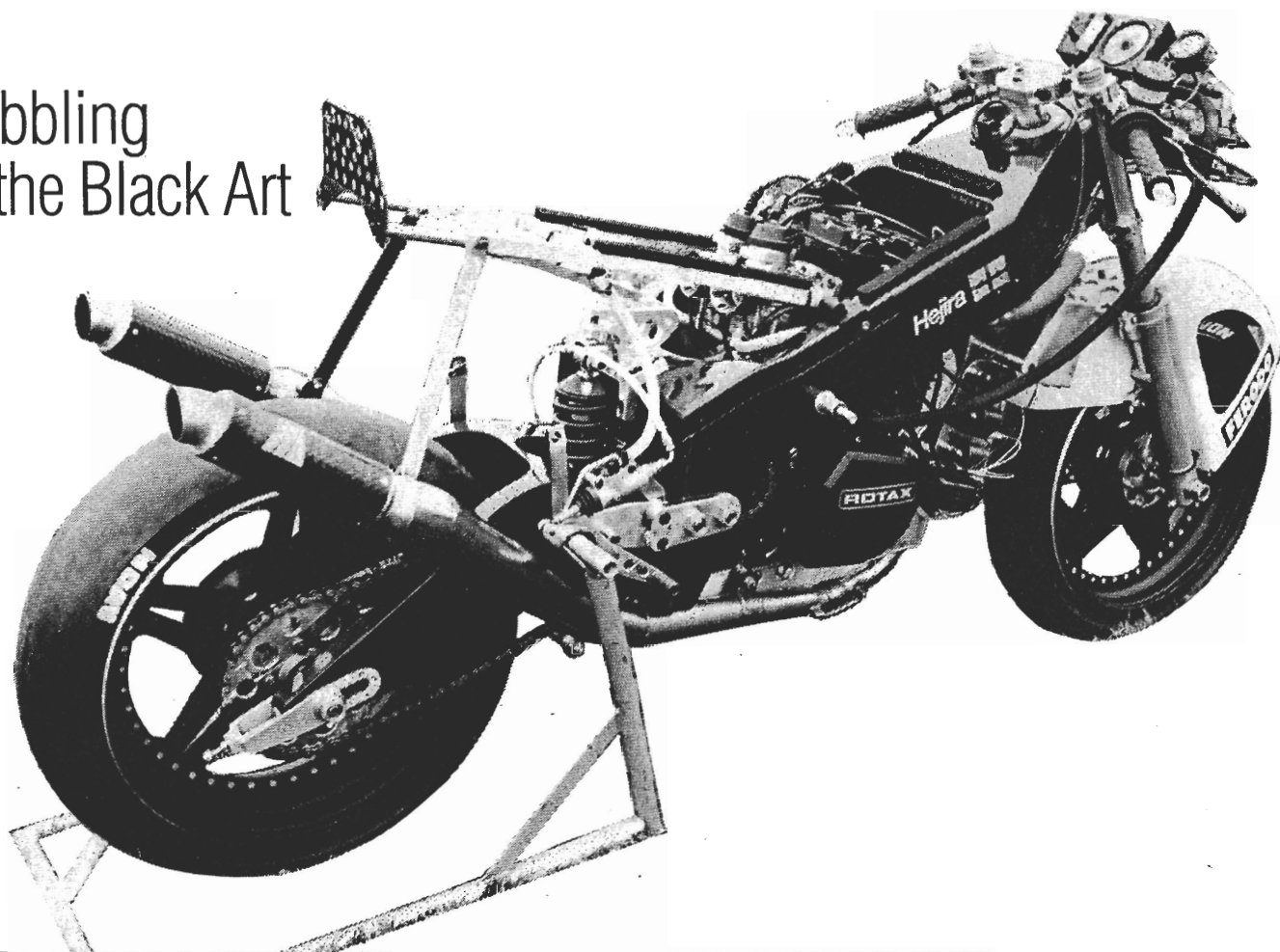


Dabbling  
in the Black Art



## HEJIRA'S CARBON SINGLE

*Talked about by many but understood by few, carbon fibre is an immensely strong, light high tech material finding its way onto more and more racing motorcycles. Jim Greening takes a good look at one of the wonder stuff's most recent developments*

**C**arbon fibre is a real buzz phrase, tripping off the tongue with no trouble. Yet CF engineering remains something of a black art even in racing car circles where the stuff is almost commonplace.

For reasons that will become evident, motorcycle racing has barely scratched the surface, much less exploited the undoubted advantages of carbon fibre frames. So far, the technique has been mainly restricted to providing lighter and stronger alternatives to glass fibre fairings and seats, which hardly tax the moulder's expertise.

As for thinking about frames, well, there is a communication block between the car and bike racing worlds. The auto people are the acknowledged CF experts who admit ignorance about motorcycle requirements, though some would like to find out. At the same time, our parochial industry appears reluctant to recognise that outsiders have anything of value to offer.

The facts are really very simple. A carbon fibre frame is no easy thing that can be designed in five minutes, or simply produced from an aluminium original. Because carbon fibre acts in a different way to aluminium, a direct copy could be inefficient and even dangerous.

So, for a bike team, carbon fibre amounts to lots of debate, a learning curve,

a prototype and development. And who wants to know about something that's not an instant winner these days?

To be fair, racing as it affects Britain offers zero incentive for innovation. There are no cash-rich British 250cc GP teams to act as a springboard for technical advancement. (Step forward, please, you brave British JJ Cobas types.) In 500 GP racing the Yamaha strategists have neatly side-stepped possible technical embarrassment by making certain their engines cannot be obtained without approved frames. So much for the pious nonsense about the GPs becoming the equivalent of car F1.

What is left for the ambitious bike engineer? Next to nothing in national racing where the unhealthy preoccupation with production-based competition stifles innovation at birth. Of all the Supercup and Superbike teams, only Norton and Roton could (but don't) legally tread the carbon fibre route — and that's through a quirk of the regulations. Fortunately, there is the unfettered Sound of the Singles to provide an alternative to the dreary conformity — indeed, it has come up trumps with a carbon fibre breakthrough.

It is little surprise to discover Derek Chittenden of HRD (Hejira Racing Developments) being responsible for this piece of SoS exotica. He does have a working rela-

tionship with the car engineers, and spent hours discussing feasibility plans before taking the plunge. Now his ambition is manifest in carbon fibre, so the proving trials can start.

Less surprising is that the new frame and swinging arm look nothing like the chunky steel frame used as a dimensional pattern. Instead of the multitude of tubes, there are deep box sides, aggressive angles and acres of support round the steering head area. It's all very purposeful looking.

Derek's instructions to the CF man were for a rigid frame. Rigid, period: "A chunk of RSJ with a wheel at either end," as he irreverently puts it. Consequently the matting was applied quite liberally, with plenty of multi-direction patterns to distribute the stresses around the strong points, notably the swinging arm and steering head areas. Top quality F1 material and high temperature resins were used, and nothing was skimped in the quality product that wouldn't have disgraced Senna's bum.

Chittendon had anticipated a strong and light structure, of course. What he got was a lightweight frame that could benefit from being less strong — and therefore lighter still. Too strong? Just say umpteen times too strong, though I do believe I caught Derek's lips slowly counting up to 30! Frame weight is unspecified because Hejira would rather quote the overall 25-30lb saving on the dry figure.

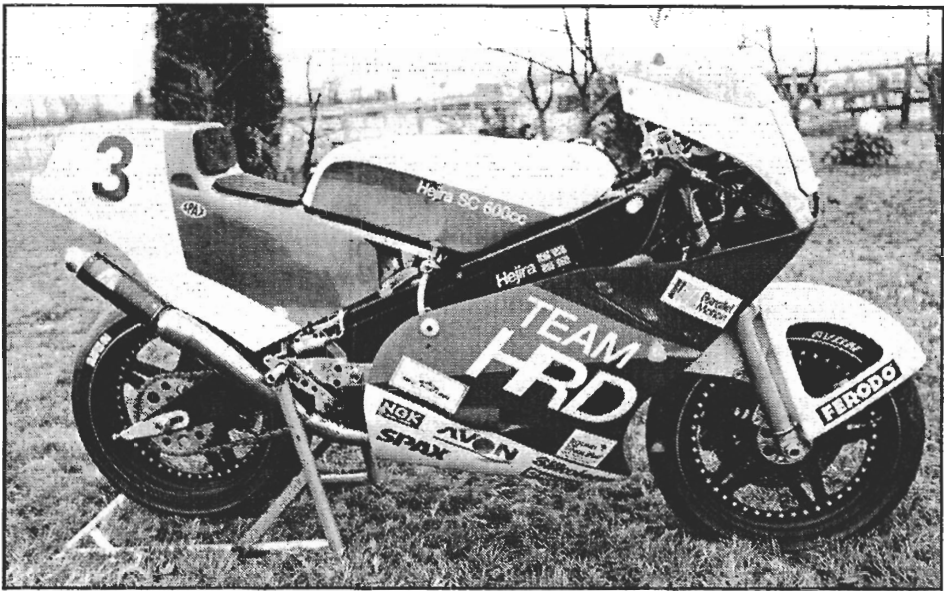
The steel master is currently going through a stiff test schedule using finite element stress analysis to identify accurately the position, size and direction of the loads. What will almost certainly emerge, after testing and racing the prototype, is a range of three CF frames to cater for most pockets and engines with different power ratings.

The basic model for smaller engines will make more use of down-market material, though without compromising strength. This should sell at around the average aluminium price. An intermediate model is mooted to employ extra hybrid material, and what might be termed the "GP" will get the ultimate high-quality, high-strength treatment. Wall thickness in the low-stress areas is not likely to exceed 1.6mm.

Meanwhile the works Hejira CF carries a 600cc twin-cam Rotax with 38mm smooth bore Amals and Mex-Porting by George Mansfield. Rear engine mounts are sited just forward and above the swinging arm pivot, twin aluminium plates look after the bottom and front, and a head steady connects to the upper shock mounting. By changing plates, Hejira reckon to have a quick fix for 20 different engines, including the rotary Norton.

Rear suspension is by Spax with revised bottom linkage. Front forks are Marzocchi, not the most fashionable things among the proliferation of upside down units. But strength is high, stiction low and adjustability uncomplicated, which isn't a bad combination for going racing.

Since AP are demanding mega orders



for calipers, Hejira is switching to Billet made by Ken Harrison, just across the road from Brands Hatch. Otherwise it's business as usual with Avon supplying development tyres for fitting to the Astralite wheels.

An air of fresh optimism exudes from the Hejira's establishment, the dismal 1991 season being put down to experience learned the hard way. (In the worst tradition of British racing, Hejira's sponsor walked out.) Now the two-man team of Hejira regular Martin Bartlett and Max Powell is being run entirely in-house.

*Hejira's development carbon chassis is massively over-engineered but still represents big weight savings over metal frames. Hejira plan to develop this basic design then produce a range of three chassis to suit several different types of engine - and a wide range of budgets!*

