

Why Cramond's Yamaha is so special

Frame geometry makes the TC Yamaha ridden by controversial Dudley Cramond rather interesting, as Peter Clifford finds out

AS I HAVE found out through the personal experiences relayed through my early season articles, producing a racing frame is no mean task.

Building your first frame with limited resources is almost bound to be fraught with problems that can threaten to break one's resolve to prove the concept in competition.

In contrast to my own machines and my failure to achieve a successful result, Tommy Crawford's first invention has proved its tremendous potential. Riding the machine since August Dudley Cramond finished sixth in his first International race on the machine at Oulton Park after pulling through from 28th on

the grid in his first meeting on the circuit.

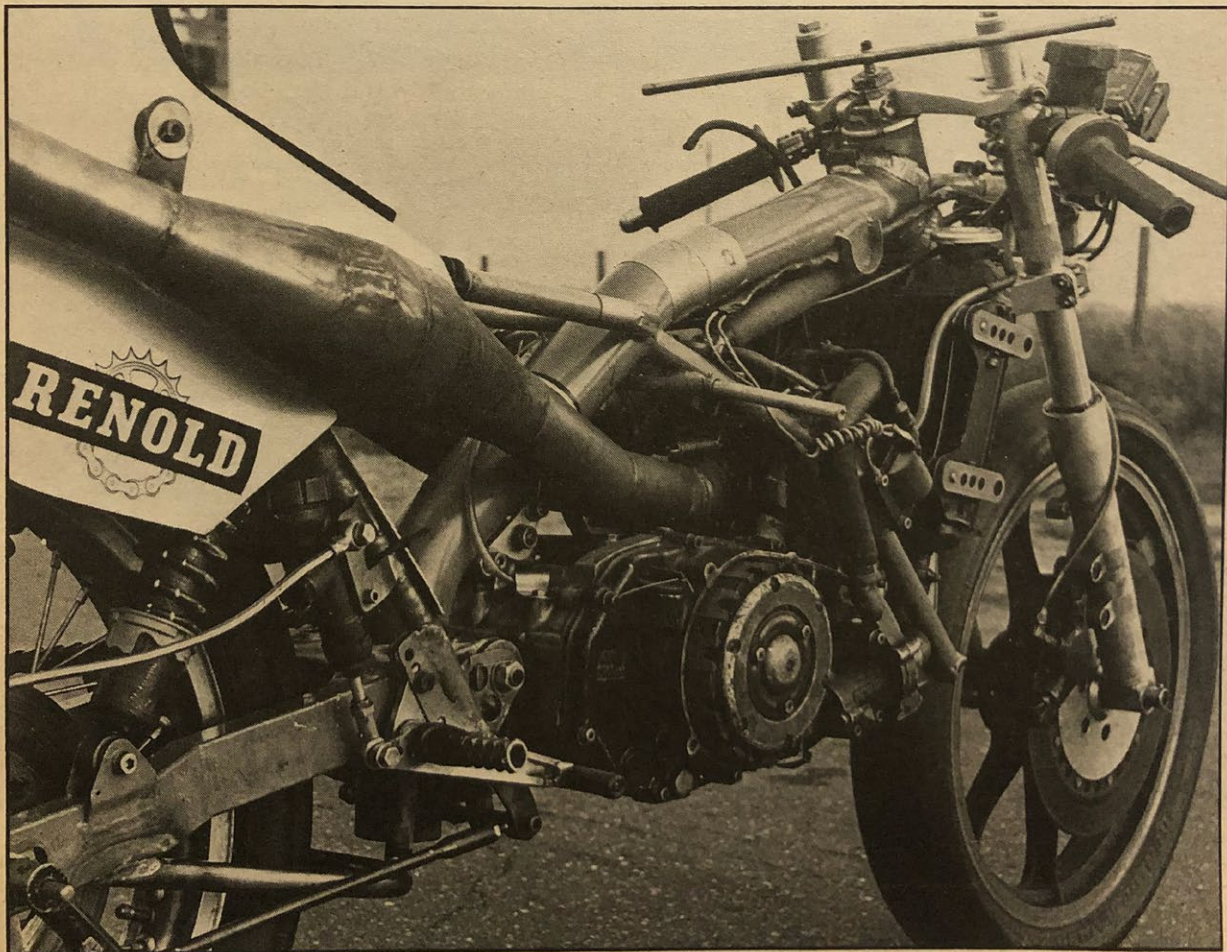
He followed that with a second place at the Scarborough International and was lying second to Kork Ballington at Donington when he crashed heavily.

On meeting Tommy Crawford and Dudley Cramond you cannot fail to be impressed with their dedication and enthusiasm for the sport and to proving themselves faster than the competition. The two South Africans have been friends for many years. Tommy sold Dudley his first road bike and raced against him at home when they both rode in the 250cc production class.

In fact, although now retired, Tommy was a rider of some note in South Africa,

winning the 1973 250cc production championship and beating the likes of Cramond and North at one time or another. The TC special which brought the two riders together again was built in North America when Tommy was working for Bassani, the legendary exhaust system manufacturer.

Without a proper frame jig to start his project, Tommy used his ingenuity and clamped the wheel rims in position between two iron girders, added the front forks and the swing arm that had been produced on a surface plate. With the engine mounted on blocks in position between the wheels he bent the 2½-inch diameter spine from 20 gauge chrome



Central feature of the bike is the two-and-a-half inch diameter spine which offers both lightness and rigidity.

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molib denum steel and began to join the two ends of the machine together.

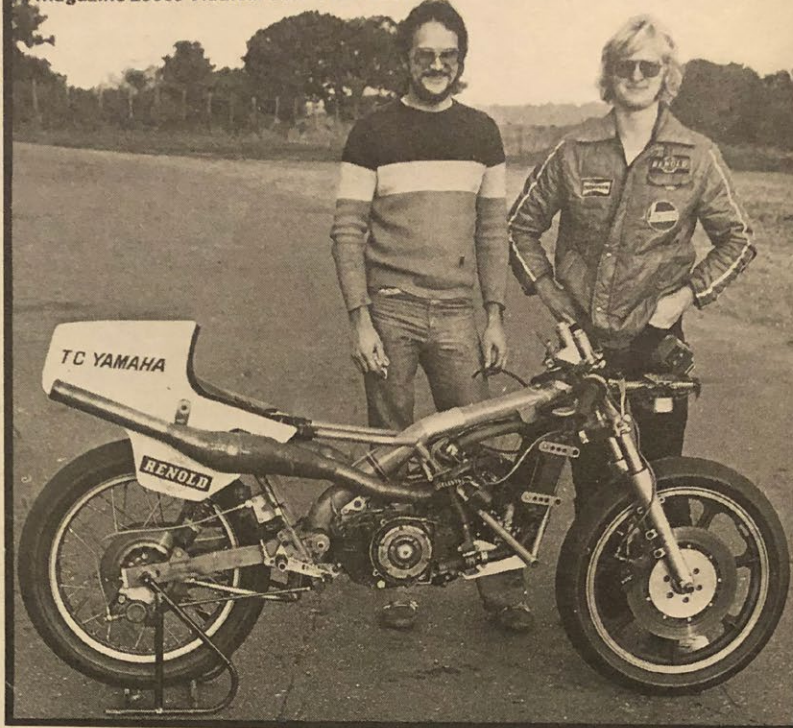
By using the adjustable steering head from a Can-Am trail bike Tommy was able to vary the rake angle to find the optimum by changing the cones in the head. The main principle of the frame is, naturally, lightness and rigidity and from the speed of the machine, both when cornering and in a straight line, it would seem to be successful. But it is more than just another Yamaha-engined special.

One of the more subtle advantages of Tommy's frame geometry is the control exerted over the rear wheel under acceleration. Thanks to the advice given by American Bruce Burness, Tommy was able to arrive at a rear suspension set-up that keeps the two final drive sprocket centres below the level of the swing arm pivot at all but full suspension deflection.

While being careful not to overdo this and have the suspension lock down under acceleration the effect is to make the rear tyre bite more firmly into the track and harder the machine is accelerating. Tommy does not believe in the absolute superiority of the cantilever suspension system and the machine has two S & W gas shocks with 60-90 springs and oil damping giving six inches of rear wheel travel.

The swing arm was a simple box section of conventional design which proved adequate until the end-of-season meeting at Brands Hatch when the latest wide rear tyre provided too much grip and began to flex the swing arm slightly. By adding a bracing strut under the swing arm the machine was well behaved once more in

Designer Tommy Crawford and rider Dudley Cramond with the 250cc machine that took the South African to the newcomer's award in our Motorcycle Racing Magazine 250cc Vladivar series last season.

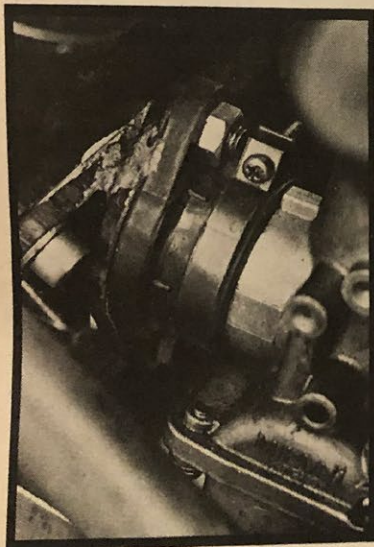


time for our Snetterton test session.

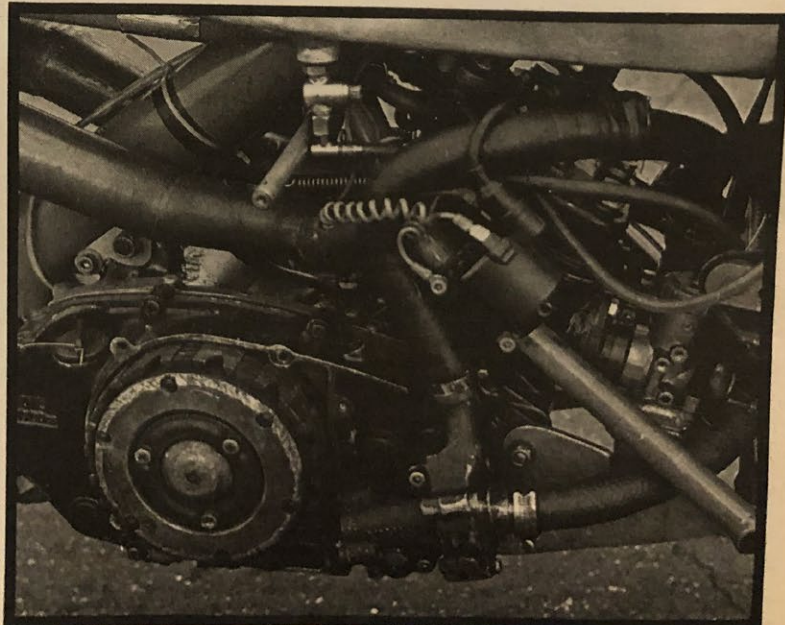
Such an instance demonstrates just how a frame designer must tread a tight-rope avoiding both too much weight and too little strength and, while the machine may work one weekend, more tyre grip or engine power may reveal a weakness by the next. When he built the machine in Los Angeles Tommy Crawford used Ceriani forks, Morris magnesium alloy

wheels and a Yamaha OW31 front brake caliper and Harry Hunt plasma sprayed aluminium disc.

Dudley's Donington disaster destroyed the front of the machine which now sports parts from his 750 Kawasaki, Kayaba forks and Kawasaki caliper and cast iron disc. The brakes really work, the front unit pulls the machine down from high speed really effectively. The pre-load



Right: Powerhouse of the TC Yamaha has the cylinder barrel reversed and (above) the carburetors mounted on the front of the crankcases.



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from the front forks prevents almost any dip and even when the back brake is applied quite hard the machine remains stable.

The hard springing that makes the machine so stable under braking borders on the excessive when cornering over bumps. Although, of course, spring rate is easily changed to suit the rider's personal weight and preference, the set-up that Dudley uses is quite extraordinary.

The machine is giving him so much information about the road surface that, at first, it is quite disconcerting. Every bump, every change in surface is relayed to the rider and it is not until you have done a good number of laps and begin to become accustomed to the harsh ride that you can begin to filter the information and separate the vital from the background.

When the feel begins to make sense you realise that although the machine is feeling every bump the tyres remain firmly on course even through the ripply right-hander of Riches and over the bumps entering the fast right-hander of Corams. The tyres themselves, both being slicks, although giving plenty of grip don't help the suspension situation as they deform very little and play little part in absorbing road irregularities.

The machine tracks dead true and is very precise, the steering is light and the machine does not appreciate the rider moving about in the saddle. The machine must be viewed as a finely balanced tool designed for riders of the calibre of Dudley Cramond who demand the very sharpest handling and have the ability to

make use of all the information it supplies.

The motor is no cart-horse either and as the rev counter needle climbs towards 12,500rpm it prompts one to wonder just what Tommy and Dudley have done to the engine. One look at any of the pictures of the machine will lead one to realise that it is no over-the-counter Yamaha engine. The high level exhaust system and ultra high ground clearance invite further inspection.

With the fairing removed the engine's special configuration becomes apparent. The cylinder barrel is reversed and hence the exhaust pipes face rearwards and the carburettors are mounted on the front of the crankcases. The benefits of this adaptation are many and the drawbacks seem few.

By producing an almost straight run for the expansion chambers restriction of gas flow is minimised and shock wave effect allowed to operate to full advantage. By moving the inlet port to the front of the engine the piston skirt is given a far easier life.

The thrust on the piston, which in a normal Yamaha engine forces the skirt into the intake port is taken in this engine by the smooth wall of the cylinder below the exhaust port. By this conversion the deep wear marks that normally appear on the rear of Yamaha pistons are avoided and the pistons seal more effectively and for longer.

Why Yamaha themselves do not build their engines this way is a bit of a mystery. Perhaps it is a legacy of the twin's air cooled origins. In an air-cooled engine the exhaust port would run far too hot protected as it would be from the air flow by the cylinder itself.

The cylinder reversal is the only obvious difference between this and the standard Yamaha but there is a wealth of detailed work within the cylinder and head that add to the speed of the engine. Although I rode the high revving ultimate

speed version he also has more tractable set-ups for tighter circuits and wet weather.

The machine is still in a state of constant evolution and Tommy invited me to try the machine again after the next major modifications. A week later Tommy and Dudley arrived at Brands with a converted swing arm and all the frame lugs for a cantilever conversion.

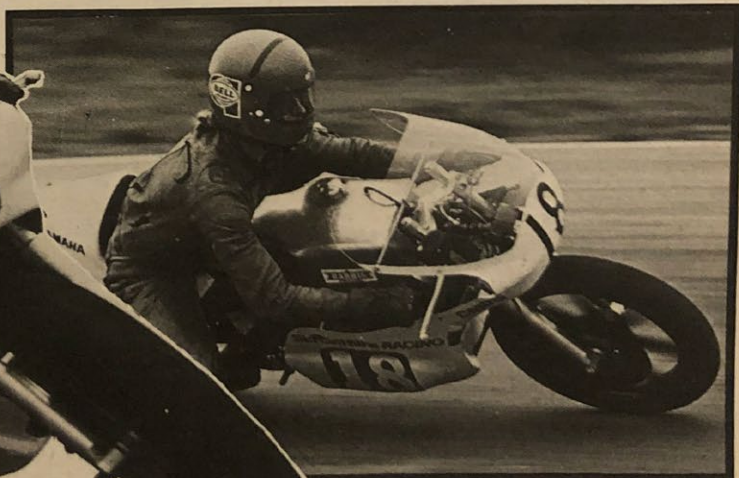
The suggestion to try a single De-Carbon unit came from Harris Performance products who have been helping the two South Africans with materials and facilities. Lester Harris converted the swing arm and was on hand to give advice as to the initial settings for the suspension unit. With eager interests I set out for my first impression of the revised machine. Immediately the difference in suspension is obvious.

Instead of a harsh uncompromising passage across ripples and bumps the suspension is supple enough to follow the contours and protect your posterior. I felt much more at home on the machine than I had with the previous twin S & W units and much more confidence of the rear wheel's ability to remain in contact with the road.

On returning to the pits I stated my preference for the new arrangement with the reservation that Dudley may regret the possible loss of feel. Such fears were soon dispelled as Dudley took the machine out and began lapping quickly, almost a second faster than he had been doing previously.

Amazed at their good fortune in starting with a spring rate and damper setting that were so usable straight away Lester, Dudley and Tom began to discuss other possibilities and the other advantages of the system — even straighter exhaust pipes, a stronger swing arm etc.

And so it goes on: build, test, modify, alter, race — a never-ending sequence and, until the opposition stops improving, it will always be so.



Above: Dudley Cramond achieved a certain amount of notoriety in 1978 for his forceful riding displays but it certainly helped to bring him to the attention of the public.

Left: Peter Clifford puts the TC Yamaha through its paces at Snetterton.