

CIRCUIT

October 50p
NOVEMBER



BY YAMAHA FOR ALL MOTOR CYCLISTS

**EXCLUSIVE
FIRST IN-
DEPTH
FEATURE ON
YAMAHA'S
NEW
VEE-
TWIN**



Getting sideways with KENNY ROBERTS !



NEW SUPERIOR SUPERSHAFT

We proved it once with the inspired XS750 and we'll prove it again with the advanced XS850. A machine with a different feel and unique exhaust note that only a "triple" can provide. A traditional shaftdrive sports tourer painstakingly developed to bring you more motorcycle.

More torque, more handling, more machine for your money. Look at the facts for yourself and then visit your Yamaha dealer. 4 stroke, DOHC 3 cylinder engine
Max horse power:
79 h.p. at 8,500 rev/min
Max torque:
69.8 Nm at 7,500 rev/min

Final transmission: Shaft drive
Fuel tank capacity: 24 litres
Plus 200 m.m. halogen headlight

XS850





CIRCUIT

CIRCUIT
MAGAZINE
by YAMAHA

for all motorcyclists

When Yamaha pulled the wraps off their new European range at the recent Cologne Motorcycle Show, even their competitors were rocked back on their heels.

While everyone else was simply offering modified or re-styled versions of their existing models, Yamaha dramatically broke totally new ground for a major manufacturer by unveiling two big-capacity vee-twin sportsters!

The questions must be asked ... Why, in this technological age, should Yamaha feel it necessary to take what would seem to be a pace backwards?

In fact, the opposite is true. High manufacturing costs, soaring fuel prices, a tightening economy in the face of worldwide inflation. All these things are combining to mean that we are in grave danger of being strangled by our own technology. Not everyone can pay the price for the technical ultimate.

For those who can, Yamaha still offer their superbly-engineered multi-cylinder supersports bikes. But now they offer an alternative which can deliver all of the performance and power at a more easily-affordable level ... both in terms of purchase price and running costs.

The new vee-twins from Yamaha are one pace behind the multis in terms of technology but ten paces ahead when it comes to keeping in step with our changing times.

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Riding a Moped doesn't have to be dull.

XV750 SPECIAL



THE YAMAHA VEE-TWINS Machines of character

The new Vee-twins from Yamaha for 1981 are a sincere attempt by the company to produce machines in keeping with the social conditions likely to prevail throughout the next decade.

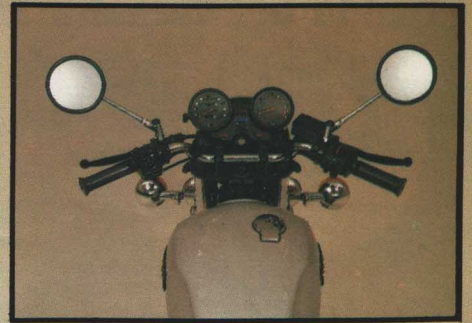
It is felt that, while motorcyclists will always require exciting and sporting machines, they will perhaps have to compromise in terms of purchase price, running costs and fuel economy.

The new 1000cc TR1 and XV750 "Special" Vee-twins are intended, therefore, to offer the consumer an economical - but still exciting - alternative to existing more complicated and expensive multi-cylinder machines. Both machines feature a 72° in-line Vee-twin power unit with monoshock chassis and suspension that is adjustable via a dial on the exterior of the motorcycle.

The TR1 has a unique, fully-enclosed chain final drive, while the XV750 "Special" - flagship of Yamaha's US Custom styled "Special" range - is shaft driven.

And, as Yamaha stress, these machines are intended as economical alternatives to existing multi-cylinder machines and NOT as replacements for them.

YAMAHA TR1



Inside the Yamaha TR1





M. Onchi

To get an idea of Yamaha's philosophy for the "motorcycles of the eighties" we can do no better than quote Paul Butler, European Director of Product Development for Yamaha. As the new machines were unveiled at the recent Cologne Motorcycle Show he commented ... "Development has been going on for some time on Yamaha's commitment to a lighter, leaner, more economical motorcycle for the eighties. Innovative machines with unique character and a flexibility of use hitherto unavailable.

"Motorcycles that are different enough not to be labelled as 'super sport' or 'touring' or 'custom' but having the basic qualities to deliver whatever the rider may demand of them."

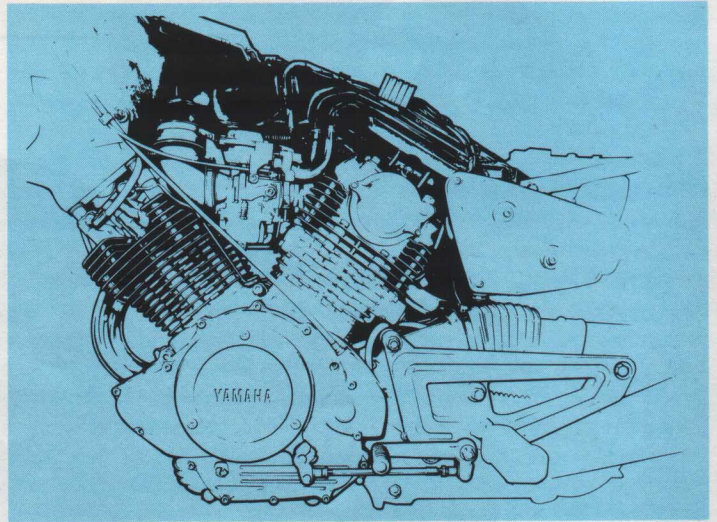
Vee-twin Technical Data:

The TR1 and XV750 Yamahas employ a single overhead-camshaft, vee-configuration engine, with the connecting rods set at an angle of 75 degrees. An alternate firing pattern produces a smooth performance and eliminates the need for balancing devices.

The engine is only 15 inches across at its widest point and lends its front cylinder as an integral part of the frame. To minimise mechanical noise, special no-chatter gears are used in the valve train.

Ignition is by capacitor discharge (CDI) assisted by an electronic advance mechanism to ensure a strong and constant spark. Carburetion is by two constant velocity units.

The engine and transmission unit is suspended from the spine of a pressed-steel monocoque frame. The triangulated rear sub-frame is sprung by Yamaha's unique monoshock system, featuring an adjustable De Carbon shock absorber unit.



YAMAHA TR1

Engine

Type of engine	4-stroke, SOHC, 2 valve
Cylinder arrangement	V-twin cylinder
Displacement	981 cm ³
Bore & stroke	95mm x 69.2mm
Compression ratio	8.3 : 1
Max. horsepower	70hp (6.500rpm)
Max. horsepower	51.5 kW (6.500rpm)
Max. torque	8.28 kg-m (5.500rpm)
Max. torque	81.2 Nm (5.500rpm)
Lubrication system	Wet sump
Starting system	Electric
Ignition system	Transistor
Fuel tank	19 l
Engine oil	3.6 l
Transmission	5 speed

Dimensions

Overall length	2265mm
Overall width	730mm
Overall height	1170mm
Seat height	770mm
Wheelbase	1540mm
Min. ground clearance	140mm
Dry weight	220 kg
Tyre front	3.25-H19-4
Tyre rear	120/90-18-65H
Brake front	Double disc
Brake rear	Drum

YAMAHA XV750 SPECIAL

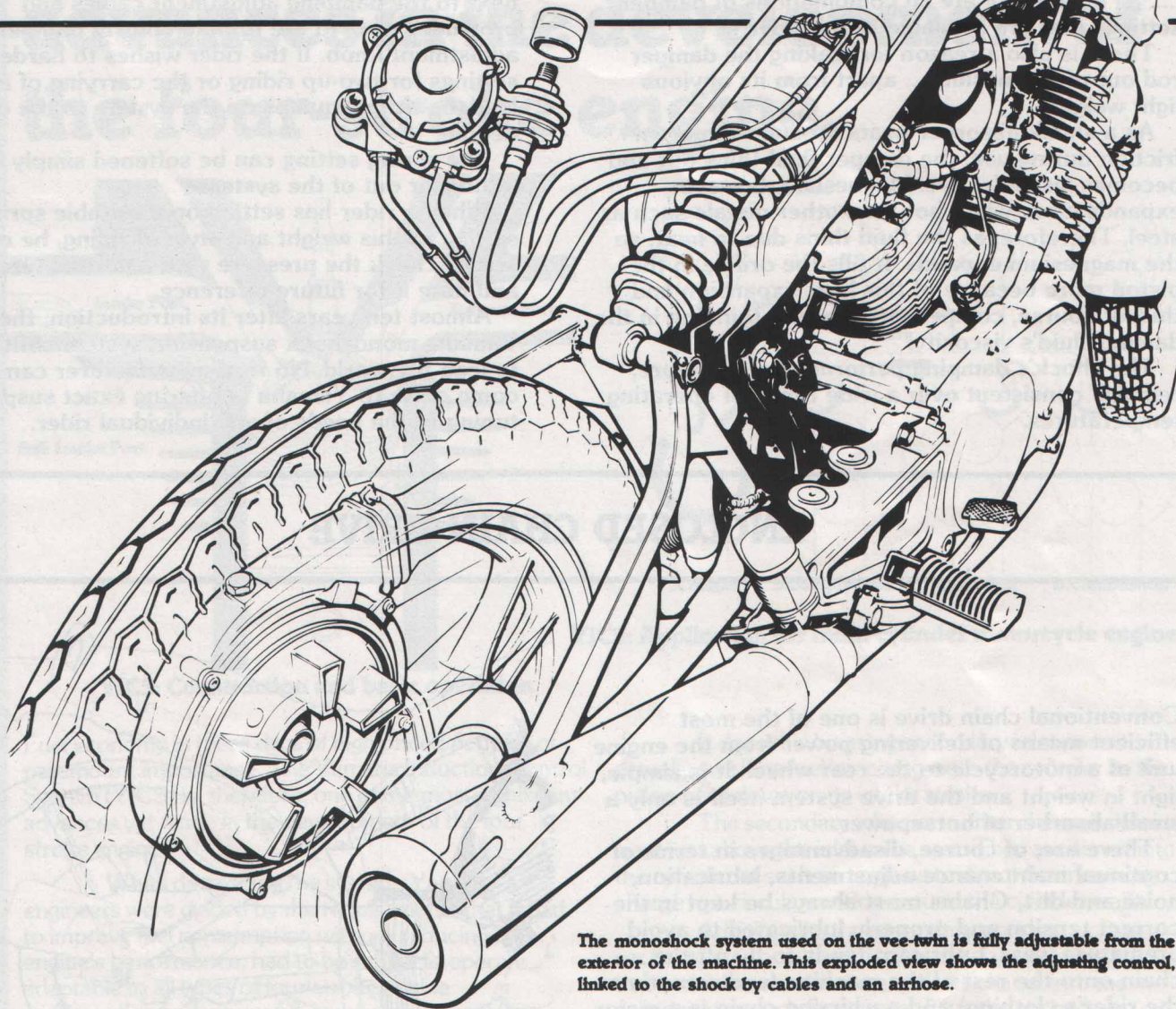
Engine

Type of engine	4-stroke, SOHC, 2 valve
Cylinder arrangement	V-twin cylinder
Displacement	748cm ³
Bore & stroke	83mm x 69.2mm
Compression ratio	8.7 : 1
Max. horsepower	60.9 hp (7.000rpm)
Max. horsepower	44.8 kW (7.000rpm)
Max. torque	6.6 kg-m (6.000rpm)
Max. torque	65.4 Nm (6.000rpm)
Lubrication system	Wet sump
Starting system	Electric
Ignition system	Transistor
Fuel tank	12 l
Engine oil	3.6 l
Transmission	5 speed

Dimensions

Overall length	2230mm
Overall width	840mm
Overall height	1210mm
Seat height	745mm
Wheelbase	1520mm
Min. ground clearance	145mm
Dry weight	212 kg
Tyre front	3.50-H19-4PR
Tyre rear	130/90-16-67H
Brake front	Single disc
Brake rear	Drum

ADJUSTABLE MONOSHOCK SUSPENSION



The monoshock system used on the vee-twin is fully adjustable from the exterior of the machine. This exploded view shows the adjusting control, linked to the shock by cables and an air hose.

Yamaha's monoshock suspension was introduced on its motocrossers in 1972 and was the significant factor in helping Hakan Andersson to the World 250cc Championship that year.

Since then the monoshock system has been adapted for enduro machines, small and medium capacity street bikes and has captured further world titles in motocross and even several classes of road racing - right up to the near 200mph 750cc and 500cc categories.

Now Yamaha have taken the monoshock concept into the heavyweight road bike bracket with its introduction on their new 1000cc and 750cc vee-twins.

The monoshock system on the vee-twins differs only slightly from the basic layout that has served Yamaha so well for almost a decade.

Due to the engine configuration, the shock absorber does not link the rear swinging sub-frame direct to the steering head. Instead a short unit joins the sub frame to the midpoint of the top section of the monococque chassis.

Tuning the monoshock suspension on the vee-twin could not be simpler, thanks to another Yamaha innovation.....remote control suspension adjustment.

Damping can be adjusted by a knob located below the seat on the right hand side of the machine. Cables connect this adjuster to a damping adjuster wheel on the top of the monoshock unit. This wheel is, in turn, connected to a tapered magnesium damper rod down the centre of the shock. Turning the wheel moves the tapered rod in or out of an orifice in the shock's damping piston to restrict the flow of damping fluid through the shock as required.

The smaller the orifice, the harder it is for the fluid to move through and the harder the suspension damping becomes and vice versa, of course.

The adjuster knob on the outside of the machine allows six different settings literally at the rider's fingertips. Taking things a stage further, the rider

can re-position the remote control cables into alternative positions on the damping-adjuster wheel. This gives several other six position settings all in all there are 20 combinations of damper settings that are available to the rider!

There is also a reason for making the damper rod out of magnesium.... apart from its obvious light weight.

As a shock absorber heats up due to internal friction during use, the damper fluid thins out and becomes less effective. Magnesium, however, expands more when hot than other metals such as steel. Therefore, as the fluid thins due to heat, so the magnesium expands. It fills the orifice in the piston more because of this heat expansion and this, of course, compensates for the thinning in the damper fluid's viscosity!

The shock's damping performance, therefore, remains consistent over a wide range of operating temperatures.

The air spring that is an addition to the Yamaha monoshock system this year is also fully adjustable from the outside of the machine. An air hose runs next to the damping adjustment cables and protrudes next to the remote control damper adjustment knob. If the rider wishes to harden the settings for two-up riding or the carrying of a heavy load, he simply pumps up the system to the desired degree.

The spring setting can be softened simply by letting air out of the system.

When a rider has settled on a suitable spring setting for his weight and style of riding, he can simply check the pressure with a normal tyre gauge and note it for future reference.

Almost ten years after its introduction, the Yamaha monoshock suspension system continues to lead the world. No rival manufacturer can even come close to Yamaha in offering exact suspension tuning to the needs of any individual rider.

ENCLOSED CHAIN DRIVE

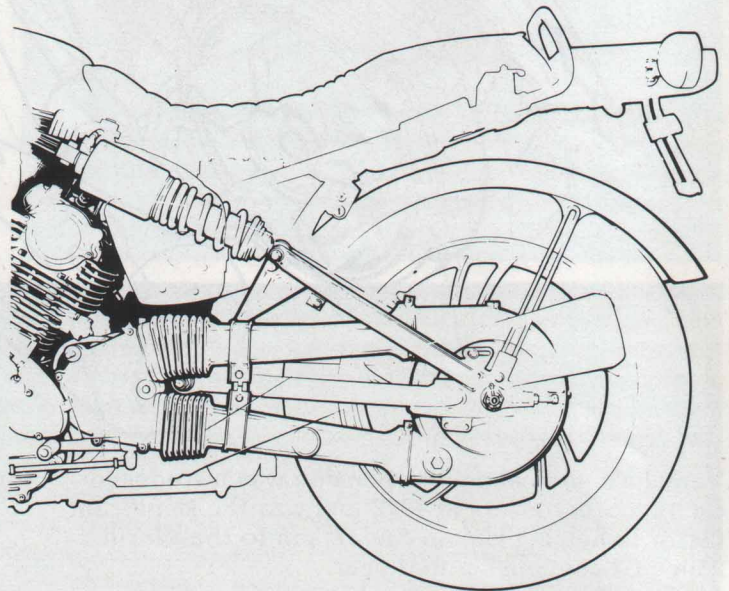
Conventional chain drive is one of the most efficient means of delivering power from the engine unit of a motorcycle to the rear wheel. It is simple, light in weight and the drive system itself is only a small absorber of horsepower.

There are, of course, disadvantages in terms of continual maintenance adjustments, lubrication, noise and dirt. Chains must always be kept in the correct tension and properly lubricated to avoid premature wear. Lubricant tends to fly off the chain onto the rest of the machine (and sometimes the rider's clothing) and a whirring chain is a major noise source.

Yamaha's enclosed drive chain goes about as far as is possible in eliminating these disadvantages of the drive chain, while still retaining all of the advantages.

Aluminium cases surround both the engine and final drive sprockets and these are connected by stiff rubber tubes which totally enclose the top and bottom runs of the drive chain. The tubes have flexible bellows at the drive-sprocket end so that they flex with swinging arm movement. They are made of a special compound rubber which resists the wearing potential of the chain rollers and the tube internals are designed in such a way as to actually act as a chain guide. Lateral movement of the chain (a major factor in chain wear) is restricted by the tubes themselves.

One litre of lithium grease is contained within the enclosure which means that the chain has its own supply of lubricant always available. As the chain moves around, so the grease heats up, becomes liquid and penetrates the rollers.



Side view showing chain enclosure and the short shock absorber unit.

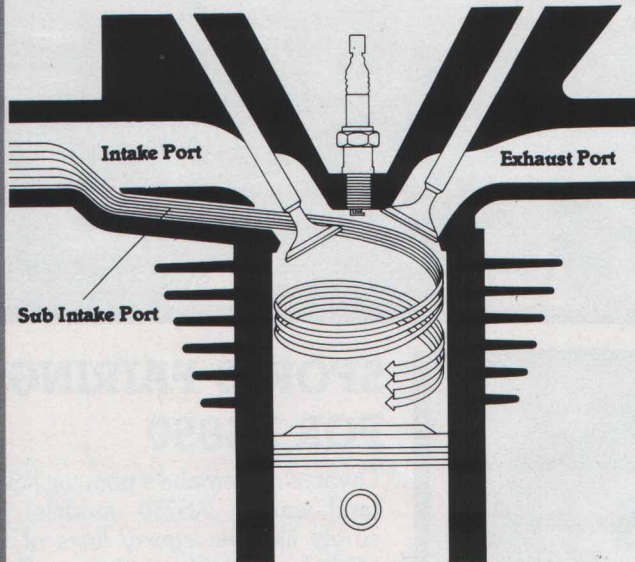
Dirt cannot reach the chain because of the enclosure and noise is, of course, drastically reduced.

Chain life is longer because of the protection from dirt, the constant lubrication and the restriction on lateral movement.

The rest of the machine and the rider's clothes stay clean and the noise is cut by more than half.

With one single design advance, Yamaha engineers have eliminated just about every criticism of the undeniably efficient drive chain.

One of the most significant advances in the development of the four-stroke engine.



YICS: Construction and basic operation

Fuel economy in these days of high priced petrol is of paramount importance. The Yamaha Induction Control System (YICS) is, therefore, one of the most significant advances yet made in the development of the four stroke engine.

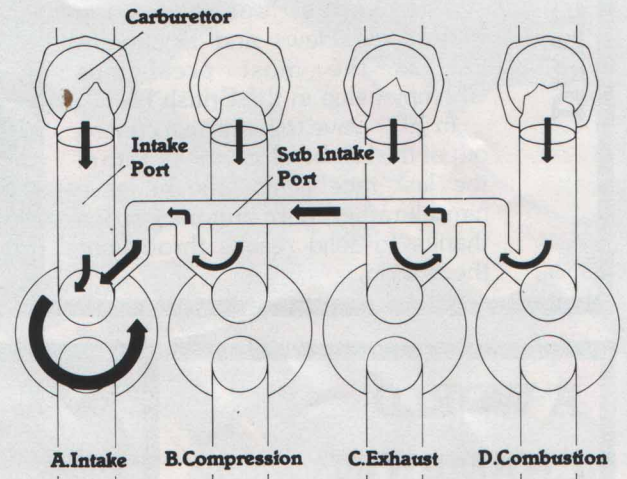
When developing the system, Yamaha engineers were guided by the requirements that it had to improve fuel consumption without reducing the engine's performance, had to be simple to operate, adaptable to all types of four stroke engine configuration and, above all, inexpensive to manufacture and maintain.

Yamaha's research department went right to the root of the fuel consumption problem, asking the question does the four stroke engine efficiently burn all its fuel charge and, if not, how can any wastage be eliminated?

Their research revealed that conventional four stroke engines do actually waste a large percentage of their precious fuel during the intake and combustion processes.

When an engine takes in a fresh charge of fuel/air mixture for combustion, the normal design of inlet port does not distribute that charge equally around the combustion chamber. Some areas of the chamber are totally starved of fuel while others have so much that it cannot all be burned before the piston descends on its power stroke.

What YICS achieves is total filling of the combustion chamber with the fuel/air mixture and total combustion of that mixture to generate more energy as the piston begins its downward stroke.



YICS: Application for multi-cylinder motorcycle engine.

It does this by using secondary inlet ports to actually swirl the fuel/air charge into the cylinder as the piston goes down on its intake stroke.

The secondary inlet ports enter the main intake tract just above the inlet valve seat. They are aimed into the cylinder at such an angle as to direct the incoming charge in a circular motion around the cylinder walls.

Additionally, the secondary port has a cross-sectional area only one-quarter the size of the main tract, which means that it expels its charge into the cylinder at a much faster rate. Thus the secondary charge also accelerates the main body of the fuel/air mixture into the same swirling, circular motion.

This motion continues as the rising piston compresses the fuel/air mix into the combustion chamber. The swirling gases totally fill the chamber and it is this controlled turbulence during the combustion process which guarantees the total burning of the fuel/air charge. Combustion of the charge releases the energy which speeds the piston down on its power stroke.

The Yamaha Induction Control System is achieved by a simple drilling operation in the cylinder head castings. On multi-cylinder engines the secondary ports are inter-connected so that when one cylinder is on its intake stroke it draws a fast-moving charge of extra fuel from the other carburetors.

Because the YICS is simply an extra "hole" in the cylinder head castings it is totally maintenance-free. Tests have proved that this simple innovation results in an approximate 10% saving in fuel consumption!
Truly "Something for Nothing" - courtesy of the Yamaha Research Department.

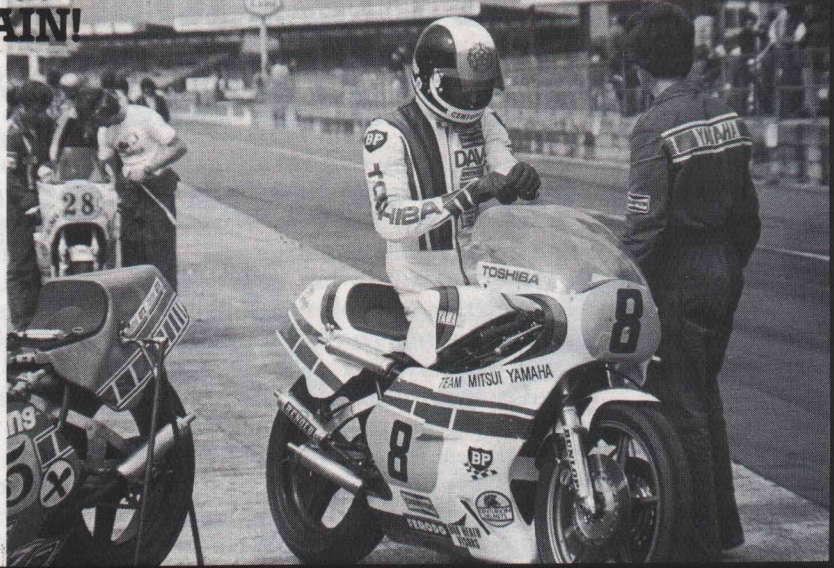
DAVE POTTER -

SUPERBIKE CHAMP AGAIN!

Dave Potter, leader of the Mitsui-Yamaha (UK) road race teams, retained his title of British Superbike Champion when he took an unchallenged win in the penultimate round of the series at Mallory Park on September 20th.

The series, sponsored by Motorcycle News and Duckhams Oil, is the most prestigious Championship in the British Isles.

In 1979 Dave took the title coming out of the last bend, on the last lap of the last race! This time he gave himself rather more breathing space thanks to solid results throughout the season.



A WORLD CHAMPION IS KILLED

Death in any sport is always tragic. Even more so when it comes to a man at the very peak of his sport and a man as totally likeable as Frenchman, Patrick Pons. World F750 Champion last year, Patrick was sadly killed in a crash at the British Grand Prix. From his many fans and friends in the British Isles ... au revoir, Patrick.



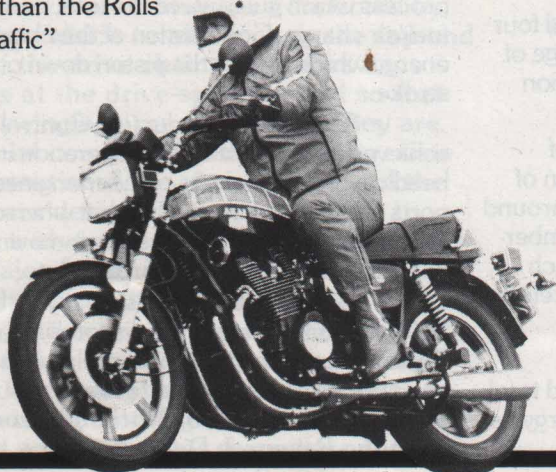
SPORTS FAIRING FOR XS850

Owners of Yamaha's popular XS850 (and earlier XS750 models) will surely like the sporty lines of this neat head fairing which will be available from Yamaha dealers shortly.

SHEENE'S STREET MACHINE

If you see a sleek black and red Yamaha XS1100 being ridden around the Surrey highways with a certain amount of style it'll be "Number 7" himself. Mitsui (UK) recently presented Barry with an XS1100 painted in the colours of his sponsors, Akai & Texaco.

"Much better than the Rolls through the traffic" says Barry!



For success in "Schoolboy Sport" YAMAHA'S MINI-MOTOCROSSERS

Schoolboy motocross is something more these days than a bunch of kids having fun in a field on old cut-down bikes. The fun's still there but the whole business is a lot more competitive. It's a section of motorcycle sport that breeds champions like 1979 World 500cc title winner Graham Noyce and top 250cc contender, Neil Hudson. Just like any other form of racing, a competitive machine is essential and Yamaha provide a range of machines that will allow any young hopeful to develop his racing skills to fine

pitch before moving on to the Senior ranks. The Yamaha YZ80 and YZ100 are, in fact, accepted even by their rivals as two of the finest Junior class motocrossers ever produced.

Not that Yamaha have forgotten the fun aspect. The PW50 and YZ50 will give any child countless hours of enjoyment while providing a solid groundwork of motorcycling knowledge into the bargain. In addition, the Yamaha YZ50 can provide a first-class introduction to the world of motorcycle sport.



YAMAHA YZ50

Thanks to riders who were in the "schoolboy" ranks just a few years ago, Britain now has several honest-to-goodness World Championship contenders in the toughest classes of motocross. Indeed, former schoolboy star, Graham Noyce, brought Britain its first World title in over 15 years when he won the 1979 500cc Championship.

Starting early in motocross racing is almost

imperative if you are going to make the top these days and a good place to start is with Yamaha's YZ50.

Featuring the same monoshock suspension as its GP-winning bigger brothers, the YZ50 is a true mini-motocrosser **not** simply a disguised minibike. However, the easy-to-handle power of its 50cc engine makes it a simple proposition even for the complete novice. For any aspiring motocross racer, the YZ50 is the ideal start to a competition career.

YAMAHA YZ100

One of the most consistently successful racers in its particular class of "schoolboy" racing, the Yamaha YZ100 continues into 1981 with only detail modifications ... testimony to the continued winning potential of the model.

Only modifications are to the chassis, where a new shock absorber rear wheel travel from 198mm to 200mm and a changed spring and damper combination in the front forks gives even more stability at the front end.

New design alloy rims are stronger than previous models ... and lighter as well! Front and rear wheels are shod with new pattern tyres for better all-round traction.

Chain tension for 1981 is controlled by a new plastic-block tensioner as used on the YZ250 and YZ465 big-class racers.

YZ100 Technical Report:

The little YZ100 powerhouse puts out a staggering 22hp (16.2Kw) at a howling 11,500rpm ... a figure which would have comfortably powered a 125cc Grand Prix winner just a few seasons ago! Torque is an impressive 1.40 Kg-M (13.7Nm) and evidence of the wide power band of the YZ100 is that this torque figure is developed a full 2,000rpm down the rev-range, at 9,500rpm.

Torque Induction spreads the usable power even further while a six-speed gearbox makes the rider's task simple ... always a correct gear for the situation encountered. A multi-plate oilbath clutch completes the transmission department, picking up drive from the crankshaft via a train of gears.

Engine dimensions are "square", with a 50 x 50mm bore and stroke giving an actual capacity of 98cc. Compression ratio is 8.4:1 with the engine breathing through a 30mm competition Mikuni carburetor and fired by CDI ignition.



YZ100 Dimensions:

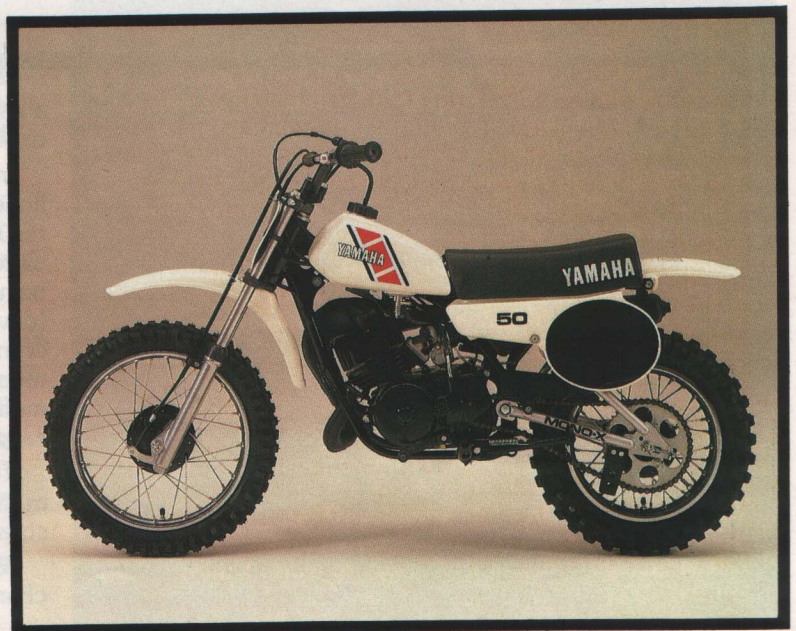
The YZ100 is very definitely a full-sized motorcycle ... very little smaller than the GP-replica YZ125. Weight is kept down to 84kg despite superb ground clearance of 310mm and a wheelbase of 1375mm. Seat height is kept as low as possible, bearing in mind that YZ100 riders will still be growing boys or girls! It checks out at 860mm with handlebar to ground height of 1165mm. Bars are 890mm wide and the bike is 2060mm in length. Wheel sizes are 3.00 x 21 front and 4.10 x 18 rear ... both shod with four-ply tyres.

YZ50 Technical Report:

The 49cc YZ50 engine shares the same Torque Induction, single cylinder basis as its bigger brother, the full-race YZ80. Being designed for a milder form of riding, however, the little power unit puts out a manageable 9bhp. Bore and stroke are almost "square" at 40mm x 39.7mm. Even though the YZ50 is not such a firebreather as the YZ80, there are no compromises in the suspension department. It features a competition monoshock chassis with rear travel of 100mm allied to front fork movement of 110mm.

YZ50 Dimensions:

A 2.50 x 14 front wheel, along with a 3.00 x 12 at the rear, keeps the YZ50 low to the ground ... an important feature for its younger riders. Seat height is kept down to 625mm while still allowing 195mm of ground clearance. Wheelbase is 1030mm within a compact 1510mm overall length. Height to the handlebars is 845mm and the bars themselves are 740mm wide for plenty of control. Weight is a completely manageable 52kg.





YAMAHA YZ80

Yamaha's YZ80 mini-motocrosser is one of the most updated bikes in the 1981 off-road competition range. Which must surely make it a potential champion on the "schoolboy" circuits, as the previous model had already established itself as one of the toughest little racers in the class.

For 1981 there are major changes in both engine and chassis departments ... all with better performance or handling in mind. Gone are the days when "minibikes" were simply kids' playthings. Now under-100cc bikes are fully-fledged racers in their own right, with performance enough to impress more than just the occasional grown-up!

The performance is combined with topline braking and handling that make the Yamaha mini-motocrossers

a safe proposition for the schoolboy racer as well as an exciting one!

In the engine department, the YZ80 features a radial-finned cylinder head instead of the old vertical fins. This results in much better cylinder head cooling due to better airflow and the reduced likelihood of cooling fin area being restricted by clogging mud. A shorter cylinder skirt (down from 22mm to 9mm) plus a re-designed piston and crankshaft allows new engine porting that produces a much wider spread of power. There's a new, compact muffler and a bigger-capacity air cleaner that features an easy-to-remove element for maintenance purposes.

Transmission is improved by a new, slicker change mechanism for the six-speed gearbox, plus a strengthened clutch release mechanism.

Moving on to the chassis department we find radical changes that make the YZ80 without doubt one of the

best handling off-road motorcycles regardless of class!

The old cradle frame has gone and in its place we find the full-loop replaced by a lighter, but just as rigid, semi-cradle layout that is a scaled-down replica of the chassis used on Yamaha's Grand Prix winners in the bigger classes.

A sturdy, large-diameter single front downtube parts into a double cradle under the engine. The double cradle carries on to provide a rigid sub-frame pivot and then on up to the single top tube. Rear engine-mounting bolt and sub-frame pivot are one and the same, which means more constant chain tension thanks to the reduction in distance between drive sprocket and sub-frame pivot point. Suspension is, of course, by Yamaha's famous and highly-successful monoshock system. Featured for 1981 is a new shock absorber unit with separate gas cell (again a development from the big GP racers) plus a longer rear sub-frame. This extension from 384mm to 430mm means two things. First of all it helps increase rear wheel travel from 180 to 215mm and secondly it results in slower suspension movement under such conditions as a closely-spaced series of bumps and dips. Front wheel travel is also increased, from 170mm to 205mm.

New pattern tyres are fitted on aluminium rims, with rear tyre size going up from 3.60 x 14 to 4.10 x 14 to cope with the little powerhouse's 17bhp!

Finally, riders will appreciate the new combination of shorter gas tank and longer seat which allows more freedom to change body weight position as the conditions dictate. The young rider can now slide right up over the engine unit in tight turns or get his weight way back over the rear wheel spindle while flying down the straights.

YZ80 Technical Report:

The single cylinder YZ80 two-stroke motor actually displaces 79cc by virtue of its 49 x 42mm bore and stroke. Compression ratio is 7.1:1 which assists in the little bike's amazing 17bhp (12.5Kw) at a screaming 11,500rpm. Maximum torque is developed only 500rpm down the rev range and is quoted at 1.06Kg-m (10.4Nm). Even with the maximum torque being developed at so high an rpm figure, the YZ80 is no narrow-power-band, difficult-to-ride freak. The same reed valve Torque Induction which spreads the power band of all Yamaha two-stroke competition bikes means that the YZ80 has plenty of low-down pulling power as well as top-end performance.

Keeping the YZ80 on its power band is aided by the six speed gearbox while capacitor discharge transistor ignition (CDI) delivers a precisely-timed hot spark even at the optimum end of the five-figure rev range.

YZ80 Dimensions:

Overall length of the YZ80 is 1770mm with a wheelbase of 1205mm. Seat height is a comfortable 760mm with overall height (at the handlebars) being 1010mm. The bars are 765mm wide. Ground clearance is 255mm with a 2.75 x 17 front tyre and a 4.10 x 14 rear. Both wheels are shod with tough four-ply competition tyres.

The compact little YZ80 weighs in at 60kg, presenting no problems in this regard for the youthful racer.

YAMAHA PW50

a "mini-mini" to develop a youngster's skills



What better introduction to off-road motorcycling for the cute kid in your family than the (dare we say it?) possibly even-cuter Yamaha PW50! Styled like no other "mini-mini" on the market, the PW50's looks alone are enough to make even the most apprehensive mother say "yes" to her fond offspring's pleas for a "motorbike".

Not that mother need be apprehensive about the PW50. Its 50cc engine puts out only 2 1/2 bhp and this, combined with a fully automatic transmission, means easy riding at bicycle-type speeds.

More and more parents are realising that allowing a child to start motorcycling at a young age means that he, or she, will be a much safer, more capable and responsible rider later on.

The PW50 is designed to introduce a child to motorcycling in as much safety as possible. It only weighs 36.5kg and, with its little 2.50 x 10 inch wheels, is slung low to the ground. Seat height, in fact, is a mere 480mm. Drum brakes are well-matched to the size and speed capabilities of the little bike. A miniature enclosed drive shaft rather than exposed chain is another important safety feature.

On the engine aspect, parents will note that it is a reassuringly low-revving unit ... developing its maximum 2.7bhp at only 5500rpm. Dad will also appreciate the Autolube automatic oiling system ... no messy pre-mixing of petrol and oil.

All things considered, the PW50 is the perfect way to instil some riding skills and responsibilities into your child. Statistics prove that riding instruction prior to taking to the roads cuts down the motorcycle accident rate. Developing skills at an early age is a definite safety factor if you feel that your child may want to turn to more serious motorcycling in the future.



**YAMAHA YZ125 -
A GRAND PRIX REPLIC!**

Biggest news for motocross fans in Yamaha's 1981 range is the advent of a liquid-cooled version of the already highly-successful YZ125. This gives the private rider what is virtually a carbon-copy of the machine which has been winning Grand Prix events for Yamaha in the 125cc class for the past three seasons. All of that Grand Prix development has gone into the new production YZ125 to make it an odds-on winner in the right privateer's hands. It's a bike capable of making an average rider into a potential winner as well as moving the above-average private rider further up the Championship ladder.

Liquid-cooling is only one of the changes that have been made to the YZ125 for 1981. There are numerous other updates of both engine and chassis components, all made as the result of experience on the toughest test-bench of them all... the World Championship racetracks.



The new liquid-cooled cylinder has altered port shapes and timing. These take advantage of the better cooling to give an appreciable increase in performance. The volume and shape of the exhaust system is also changed for added power. The new YZ125 (22.1Kw) at 10,500rpm from its 123cc power unit with the single cylinder two-stroke having a bore and stroke of 56mm and 50mm and a compression ratio of 8.1:1.

The YZ motor has quite a narrow power band, with its maximum torque of 2.07 Kg-m (20.3Nm) being developed at 10,250rpm. This, however, doesn't make it a difficult beast to ride, thanks to the smooth low-down carburation provided by Yamaha's reed valve Torque Induction and the precise ignition timing of the CDI unit. Additionally, the rider can match rpm to ground speed through a choice of six close-spaced gearbox ratios. A bigger clutch handles the extra horsepower of the new YZ125. Also made stronger to cope with the added power for 1981 is the crankshaft assembly.

There's plenty of toughening up in the chassis department as well. Starting at the front end, there is an increase in the diameter of the front fork tubes ... from 36mm to 38mm.

Front brake is now operated by the same eccentric cam system used on the YZ250 models and a new design of handlebar is fitted.

The frame is entirely new and is cunningly utilised as part of the liquid-cooling system (see accompanying feature).

Rear sub-frame is lengthened by 25mm to better handle the rearward weight transfer under acceleration and the YZ125 now uses the same remote gas cell shock absorber fitted to the heftier YZ250 and YZ465 racers. Rear wheel travel is increased to 300mm as a result of these changes. This will give the rider freedom to hit bumps at much greater speed so the Yamaha engineers have toughened up the rear wheel by means of a strengthened hub flange and larger spokes.

Yamaha YZ125 Dimensions:

The 1981 YZ125 is almost equal in physical size to its bigger brothers ... though, of course, it still weighs appreciably less. Total dry weight is 89kg as compared to the 99kg of the YZ250 and 104kg of the YZ465.

However, in such important areas as ground clearance the YZ125 has even more room to spare than the 320mm of the big bikes. On the YZ125, the clearance is an amazing 345mm!

Tyre sizes are 3.00 x 21 inch at the front and 4.00 x 18 rear, contributing towards an overall height of 1250mm. Seat height is still a sensible 945mm despite the massive ground clearance. Handlebar width is 880mm with overall length checking out at 2140mm and wheelbase at 1450mm.

The fuel tank holds 6.5 litres of the 16:1 petrol mix ... more than enough for even a 45-minute Grand Prix moto.

LIQUID COOLING THE YAMAHA

Maintaining high power output from a high-revving, small capacity racing engine is made much easier if the engine can be kept as cool as possible when it is being used at racing speeds.

Road racing has proved that liquid-cooling is the answer and, for some years, Yamaha has also been using this system on their small-class factory team motocross racers.

Now Yamaha's customers can reap the benefit of racing development. The production version of the YZ125 motocrosser is now liquid cooledjust like its Grand Prix-winning factory-team counterpart.

A special water jacket surrounds the cylinder and the head and the coolant is circulated by a pump on the lefthand side of the crankcase. Geared down from the crankshaft to run about two-thirds engine speed, this pump draws coolant from a radiator that is mounted ahead of the front fork triple clamps. A special cowling around the radiator facilitates mounting of the front racing number plate and also allows air across the front of the radiator.

Mounting the radiator in this position allows it the maximum amount of cooling air and also protects it from flying stones and other hazards of the motocross track such as a thick coating of mud.

Yamaha's engineers have connected radiator and engine in an incredibly inventive and effective manner. They have utilised the front fork clamps, the frame's steering head and its front downtube as actual carriers of the cooling liquid.

Cool liquid from the radiator runs down into the lower triple clamp, then via short hose into the steering head and down through the front frame tube. Another short hose then carries it from the bottom of the down tube to the coolant pump.

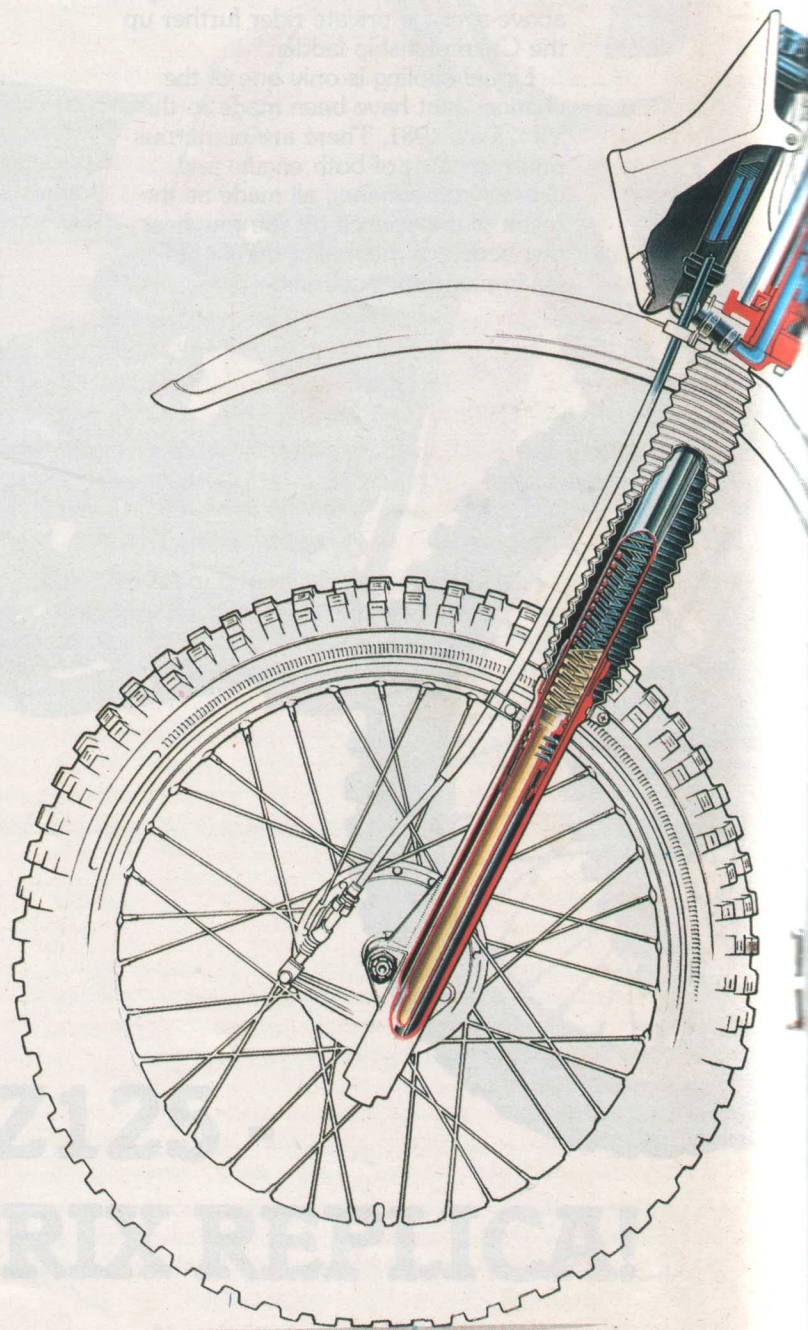
The coolant is then circulated around the engine and, as it heats up, is returned to the cooling radiator via a rubber hose that connects the cylinder head with the steering stem of the front forks. From the stem it runs through the top triple clamp and into the top of the radiator!

The heated coolant then runs down through the radiator, is cooled in the process and the whole cycle begins again.

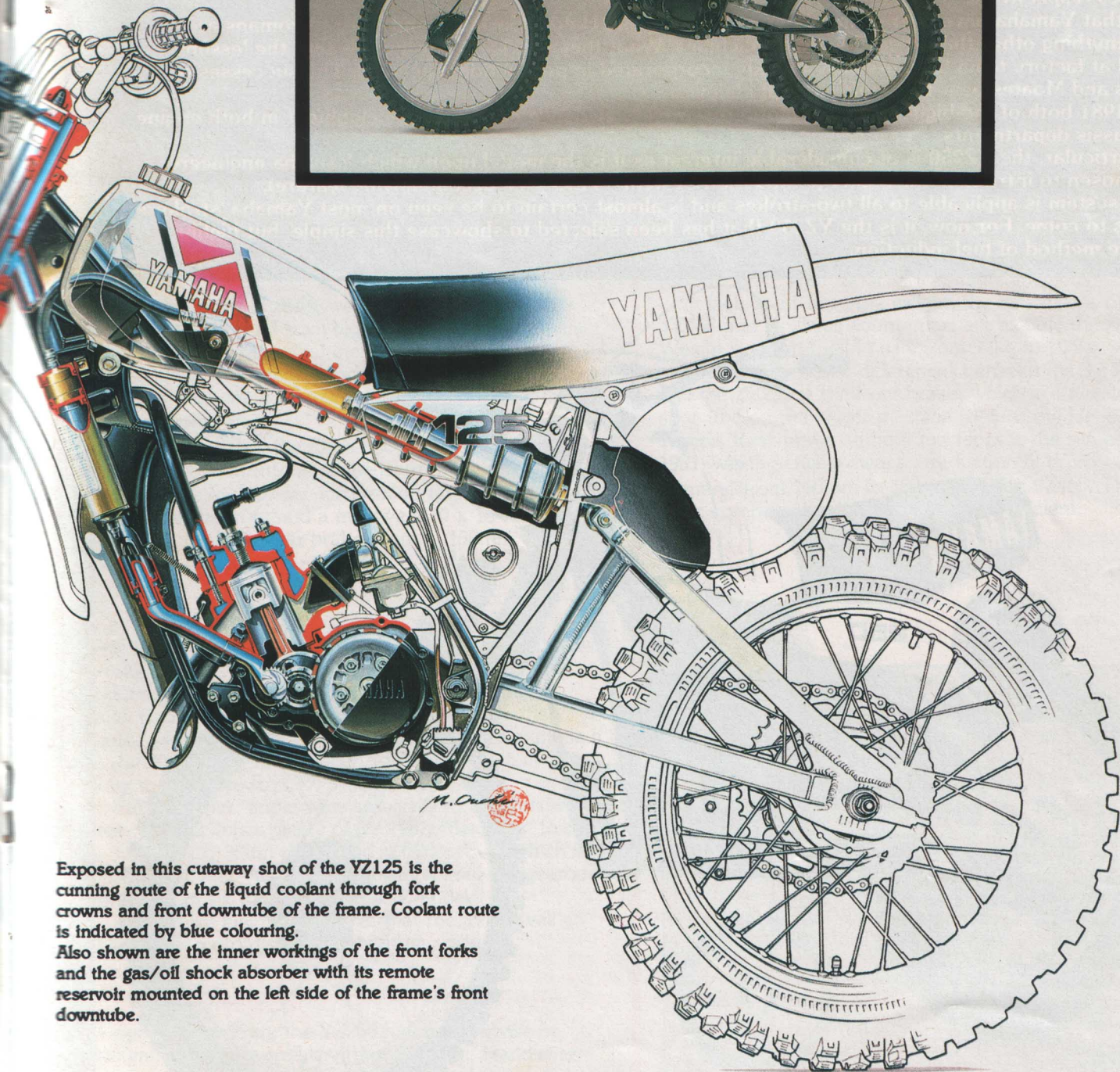
By this clever piece of engineering, Yamaha have reduced the number of bulky external parts, saved weight by doing so and also reduced the chances of breakdown due to such things as split hoses and the like. All of the hoses in the Yamaha system are short and flexible and are less likely to split or become detached than the lengthy exterior piping used by other manufacturers.

The advantages of liquid cooling for racing engines have long been obvious but actually incorporating the usually-bulky systems on to a lightweight motocrosser has slowed development somewhat in this area.

Yamaha's solution to the problem has delivered the advantages of liquid cooling while keeping the YZ125 as compact as any air-cooled racer.



YZ125



Exposed in this cutaway shot of the YZ125 is the cunning route of the liquid coolant through fork crowns and front downtube of the frame. Coolant route is indicated by blue colouring. Also shown are the inner workings of the front forks and the gas/oil shock absorber with its remote reservoir mounted on the left side of the frame's front downtube.

- you too, can own a Grand Prix winner

YAMAHA YZ250 & YZ465

Despite many claims to the contrary, there is all-too-often a big, big difference between production "replicas" of Grand Prix machines and the actual factory racers themselves. The only way any factory can legitimately claim that their 'over-the-counter' machines are truly on a par with the works bikes is to actually score Grand Prix successes with customer-owned bikes.

During 1980, Yamaha did just that in both 250 and 500cc Championship categories with Belgian, Jean-Paul Mingels and American, Marty Moates scoring Grand Prix wins with production YZ250 and YZ465 machines respectively.

Not that Yamaha have ever claimed that superstars like Hakan Carlqvist and Andre Vromans are riding anything other than special factory machines. What they do claim, however, is that the lessons learned at factory team level are very quickly incorporated in production machines. The successes of Mingels and Moates bear testimony to that claim.

For 1981 both of the bigger Yamaha motocross racers evidence continued development in both engine and chassis departments.

In particular, the YZ250 is of considerable interest as it is the model upon which Yamaha engineers have chosen to introduce their Energy Induction System - YEIS (See accompanying feature).

This system is applicable to all two-strokes and is almost certain to be seen on most Yamaha 'stokers' in years to come. For now, it is the YZ250 that has been selected to showcase this simple, but highly effective method of fuel induction.



YAMAHA YZ250

Although the YZ250 does not differ visibly in any radical way from its 1980 predecessor, the new machine does, in fact, have a number of very significant changes to both engine and chassis.

Dealing first with the power unit, the obvious important item is the YEIS system or "Power Box" as the engineers have nicknamed it. It derives this title from the fact that a separate fuel reservoir (box) is mounted above the carburetor and linked direct to the inlet port. Operation of the YEIS is described in the accompanying feature.

A new design air cleaner gives more capacity and easier maintenance while there is a new exhaust system to complement changes in scavenge port timing designed at spreading the power band.

In fact, the new YZ250 has such a wide, useable spread of power that Yamaha have been able to simplify the rider's job by dispensing with one of the speeds in the gearbox. The new YZ250 has a five-speed box instead of six. And, because horsepower is up, the clutch has been strengthened by the addition of an extra friction disc and another pressure plate. Finally, there's a new design of shift lever copied from the factory machines.

Turning to the chassis, we find a new lightweight frame unit fabricated from high tensile steel plate, plus a longer rear sub-frame that increases rear wheel travel from 300mm to 310mm. A new shock absorber allows 30 stages of damping adjustment ... eight more than the 1980 version!

At the front end, the forks have been strengthened by the increase in fork tube diameter from 38mm to 43mm.

New pattern, four-ply competition tyres are fitted ... 3.0 x 21 at the front and a massive 5.10 x 18 rear. Up in size, also, goes the rear brake drum ... 150mm in 1981 instead of 130mm.

YZ250 Technical Report:

The 1981 version of the 246cc single cylinder YZ250 two-stroke puts out 41hp (30.2Kw) at 8,000rpm. Torque Induction reed valves and the new Yamaha Energy Induction system feed the 16:1 petrol mix into the motor where an 8.1:1 compression ratio helps explode it in the 70mm x 64mm cylinder. Ignition of the fuel charge is by the well-proven CDI system.

Pulling power, and a wide spread of it, is something that the YZ250 has plenty of for 1981. Maximum torque is 3.8Kg-m (37.3Nm) developed at 7000rpm ... which is one reason why Yamaha have been able to cut gearbox speeds from six to five for the new model.

A nine litre fuel tank ensures that the YZ250 will go the full GP moto distance without any qualms.

YZ250 Dimensions:

Weighing in at 99kg, the YZ250 has a wheelbase of 1480mm and an overall length of 2175mm. Handlebar width is 880mm and distance from ground to handlebar tips is 1220mm. Seat height is 950mm with no less than 320mm of ground clearance.

YAMAHA YZ465

The only non-factory machine to win a Grand Prix motocross this year was the production YZ465 which Marty Moates took to victory in the United States 500cc Grand Prix, before his hometown crowd at Carlsbad Raceway, near San Diego, California.

Proof that the YZ465 is the most competitive bike that a privateer can buy ... and for 1981 it will be even more competitive!

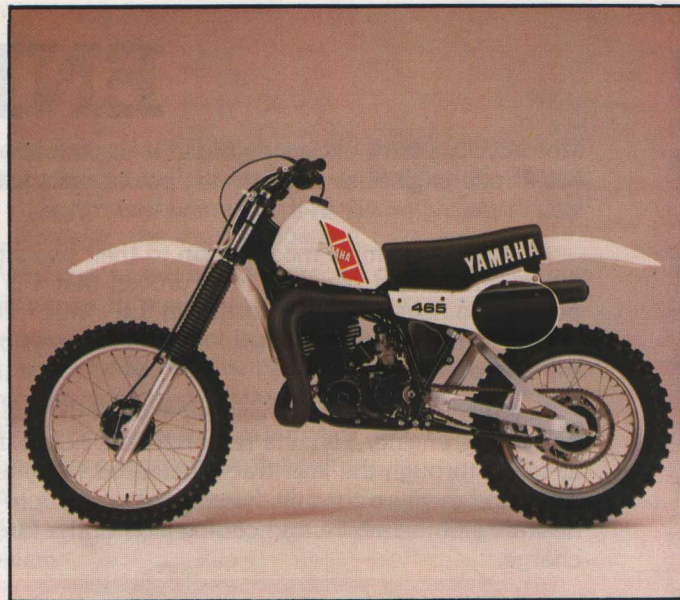
There aren't many changes to the YZ465 engine but a combination of new, large-capacity air cleaner, revised scavenge port outline and new design exhaust system have meant even more torque for the lusty 85 x 82mm two-stroke.

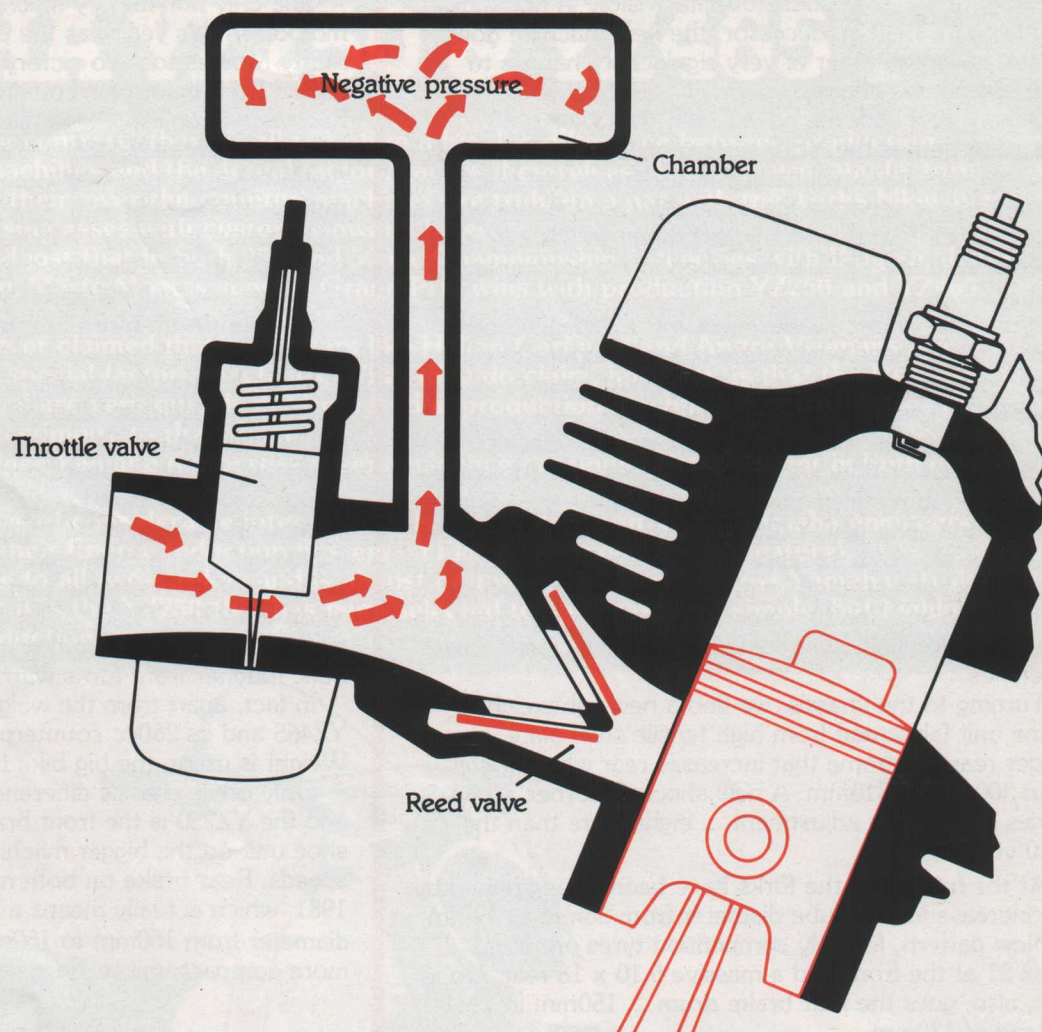
While horsepower remains the same as 1980 at a more-than-adequate 52hp (38.2Kw), torque is increased from 5.65Kg-m (55.4Nm) to 5.75Kg-m (56.5Nm). Maximum power is developed at 7000rpm and maximum torque a full 1000rpm lower!

As with its smaller brother, the YZ250, a new lightweight frame from high tensile steel plate houses the YZ465 motor. The same remote-cell gas/spring damper as on the 250 is fitted to the 465 - again offering 30 adjustment points! Also common to both bikes are the new, tougher front forks with 43mm stanchions.

In fact, apart from the weight, the dimensions of the YZ465 and its 250cc counterpart are exactly the same. Weight is up on the big bike from 99kg to 104kg.

Only other chassis differences between the YZ465 and the YZ250 is the front brake, which is a twin-leading shoe unit on the bigger machine to curb the higher speeds. Rear brake on both machines is the same for 1981, which actually means a reduction of drum diameter from 160mm to 150mm for the YZ465. The more compact unit is, however, more efficient.





YZ250 SELECTED ENERGY INDUCTION

Motorcyclists have always regarded high performance two-stroke engines as high-revving power units with a lack of pulling power in the low and mid-range.

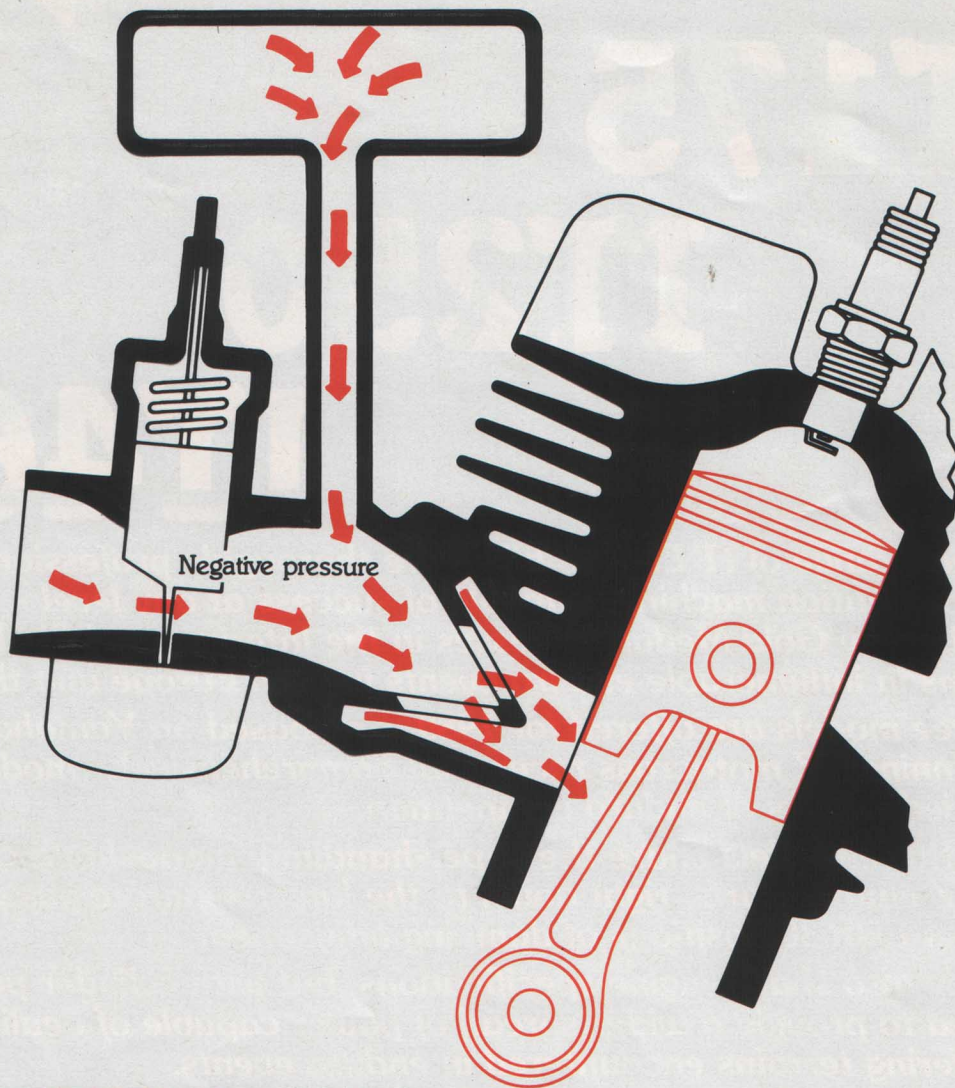
Now, with a simple modification to their two-stroke induction systems, Yamaha have proved that it is possible to have a smooth torque in the lower rpm range without sacrificing anything at all in terms of top-end power.

In studying the intake characteristics of the typical two-stroke engine, Yamaha research staff noted that airspeed through the inlet tract fluctuated wildly at small and medium throttle openings, causing hesitancy in the intake and combustion of the fuel/air charge.

For example, when the reed valve on Yamaha's Torque Induction system is open, air flows quickly through and into the engine. When the valve is closed, that flow of air and fuel comes to a virtual halt ... a process which is repeated on every single stroke of the engine.

The aim of Yamaha's Energy Induction system is to maintain a constant airflow at low throttle openings, the same constant airflow that the engine gets when the throttle is wide open.

Yamaha engineers have achieved this in a devastatingly simple fashion. An external reservoir is connected to the inlet tract by a hose which enters the tract between the carburetor and reed valve block.



FOR YAMAHA SYSTEM DEBUT

The system utilizes the vacuum effect of crankcase pressure to control delivery of fuel from the reservoir into the engine. When the motor is on its intake stroke, the reed valves open and crankcase vacuum draws the incoming fuel/air charge straight past the mouth of the YEIS hose and into the engine.

When the reed valves close, that vacuum is replaced by a vacuum actually in the intake manifold. This sucks a fuel/air charge from the carburetor and it has nowhere to go except up into the YEIS chamber.

As the intake stroke begins again, the fuel/air charge is drawn down from the chamber and supplements the main charge on its way from the carburetor to the engine. In effect, the additional

head of fuel in the YEIS chamber comes down the hose and virtually "pushes" the regular fuel/air charge into the engine, thus maintaining a steady velocity of fuel, whatever the throttle opening.

What this allows is more precise carburetor jetting to give smooth power throughout the rpm range.

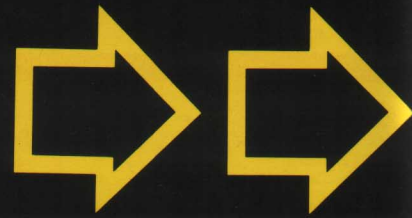
It also proves better acceleration in the mid-range and, as an added bonus, better fuel consumption due to more precise carburation.

The lack of moving parts mean that there are no maintenance worries for the owner.

Another case of Yamaha's continuing research providing a simple solution to a hitherto difficult problem.

YAMAHA Gold Medal

Enduro Bikes



IT175

IT250

IT465

Yamaha's range of IT Enduro bikes are thoroughly professional off-road competition machines capable of success at any level - a claim backed up by Gold Medal successes in the International Six Days Trial and wins in innumerable enduro events in both Europe and the USA.

Three models are offered for 1980 ... all based on Yamaha's Grand Prix-winning YZ motocross racers but comprehensively modified for the added rigours of enduro competition.

All three models share the super-handling, monoshock chassis of their YZ counterparts, right down to the latest separate gas cell shock absorber with 30 positions of damping adjustment.

They also share engine specifications, but with cylinder porting modified to provide a wider spread of power capable of dealing with the differing terrains encountered in enduro events.

The IT175 is basically similar to the air-cooled YZ125 motocross machines sold up until this year.

It's light weight coupled with the power and added torque of the bigger 175cc motor make it an especially good contender in enduros where the going is tight and tricky.

All three machines feature full lighting equipment, flexible mudguards, a sumpguard to protect the underside of the engine from rocks and tree roots, hand protectors guarding the rider against tree branches intruding on narrow trails, quickly detachable wheels, easy-to-remove high level air filter, deep-cushion seat and a large capacity petrol tank specially designed so that the rider can still keep his knees tight to the centreline of the bike.

In short, the IT Yamahas have all the ingredients necessary for enduro success ... and have proved it by 'clean sheet' efforts in the toughest one of them all, the ISDT - so rightly known as the "Olympics of motorcycling".



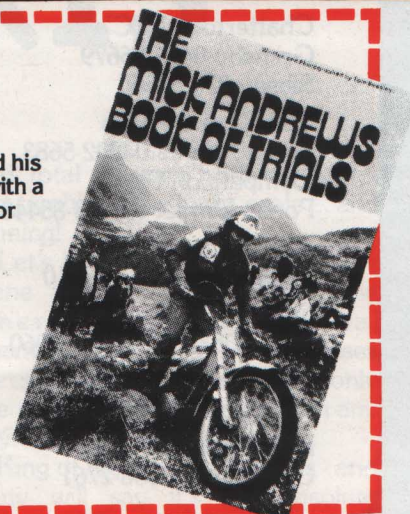


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**Getting
sideways
with**

KENNY ROBERTS

So Kenny Roberts has clinched his third World 500cc Championship in just three years on the European Grand Prix road race circuits ...

So we're getting kind of bored writing about how "King Kenny" rocketed away to another title and we're willing to bet that you're probably bored reading about it ...

So we'll assume that everyone knows that Kenny Roberts can ride a road race bike and we'll give you a look at the other talents of 'KR' ...

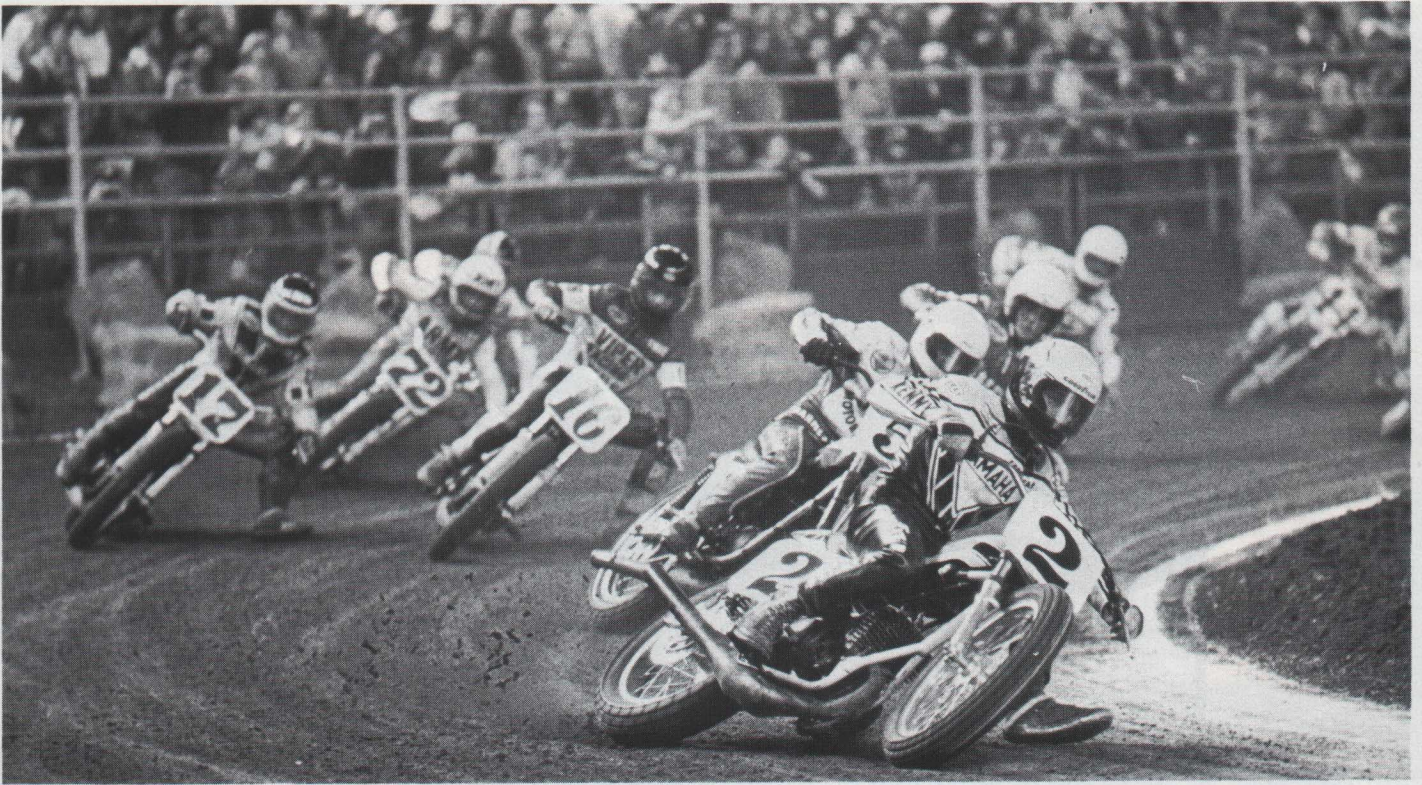
Most people in Europe also know that Kenny was one hell of a dirt track rider in his early days on the American Grand National Championship trail but unless you know exactly what is involved on the American Championship scene you've no idea just how incredibly good he was. Cancel that was ...

Kenny Roberts still IS one hell of a dirt track racer. He proved that earlier this year by re-appearing at a US Championship race after a two

year total absence from the rough and tumble of the loose ovals ... and winning!

Let's back-track a bit and set the scene for you by describing the American Grand National Championship circuit. It comprises five separate forms of racing, only one of which (road racing) is in any way familiar to European fans.

King of the dirt track events - and many will say it's the absolute pinnacle of motorcycle sport - is "the



February 1980: Back to the rough and tumble of short-track racing.

mile". Twenty five guys on 750cc racers, slipstreaming at 130mph on the straights and posting lap averages of over 100mph for race distances of anything up to 50 miles!

Kenny Roberts won three mile-track Nationals during his career. One was in 1975 and is still the most talked-about dirt race in history.

At that time Yamaha were still continuing the unequal struggle against Harley Davidson ... trying to match a bored-out, overstressed, parallel twin, converted street bike with a 750cc vee-twin that was pure racer from the drawing board up.

Kenny had been Grand National Champion in both 1973 and 1974 and the time was August 1975. Time for desperation tactics in a year where the lack of road races and the superiority of the HD dirt bikes had put Kenny's coveted "Number One" plate in jeopardy.

The "win or bust" solution that Yamaha came up with was a 100hp Yamaha TZ700 four cylinder road race engine jammed into a dirt-track chassis ...!

We've never seen the 1975 Indianapolis Mile, summed up better than by this recent piece by Dave Despain in the American Motorcyclist Association's magazine. We quote ...

"The shriek of that awesome, four-cylinder powerplant down the Indy backchute was as mind-bending as the machine was fast, but Lord help anybody who tried to ride it through corners. Lean it over and things would drag. Try to steer with the throttle and the rear tyre would light up like a dragster slick. Keep it between the fences and you were damned lucky.

Desperate for points and far behind the field as the leaders streaked away, Roberts searched for a means of taming the monster, leashing all that horsepower and somehow transferring it into quick lap times. The key was raw courage. In the end, Kenny simply gave the beast its head and held on, trusting his instincts, skill and luck to keep him alive. He hurtled into the turns at 130 miles-per-hour and knocked the edges off the haybales in a classic struggle to get his machine turned while keeping it upright. Always the throttle was turned on, the engine emitting that eerie shriek.

Having found his answers, Roberts swept by the rest of the

field like they were tied to a post, but the white flag for the last lap caught him 100 yards short of leaders Jay Springsteen and Corky Keener. Half that margin melted away on the backstretch, most of the rest of it through turn three.

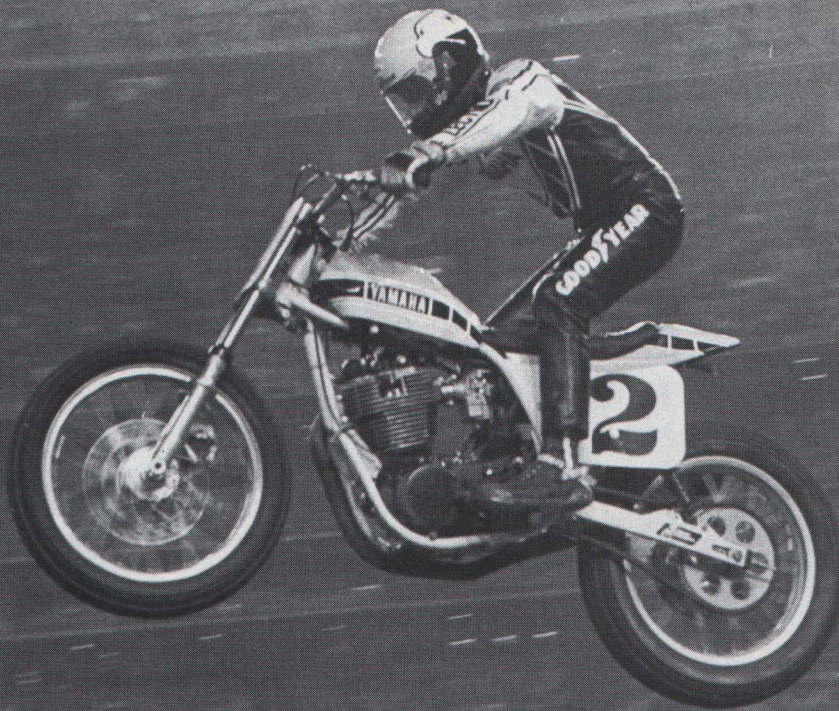
"I heard that screamin' "son of a bitch" comin' and I knew there was nothing we could do," Keener recalled later. Roberts was running at least 20 miles an hour faster than the lead duos as he swept by at the line to win by half a foot.

"They don't pay me enough to ride that thing", Kenny said later. And the AMA agreed that such equipment did not belong in the hands of mortals, so it banned the bike (along with all other multis) as a potentially lethal weapon."

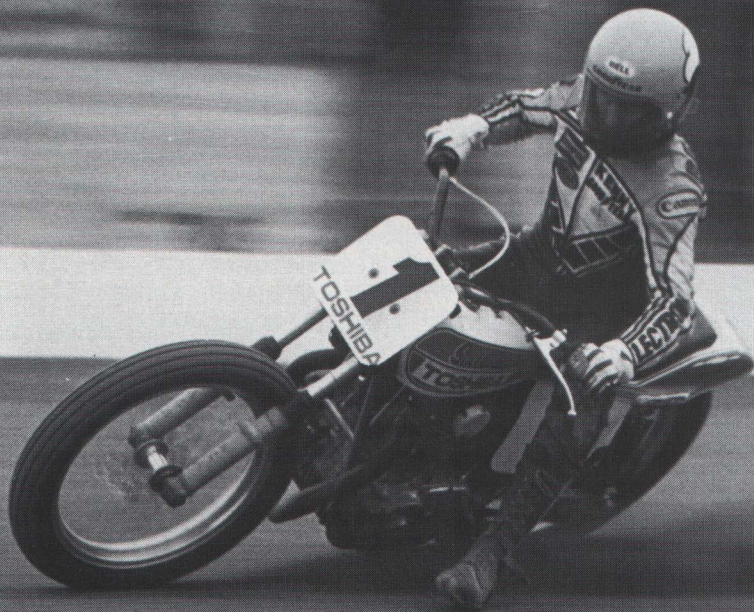
That, ladies and gentlemen, sums up Kenny Roberts on "the mile"!

Only slightly down the scale of things on the "National circuit" comes the "half-miles". Tighter tracks than the mile, more elbow-banging, more front wheels run over outstretched left feet ... and still 90mph speeds!

Kenny showed the British public at least a glimpse of his half-mile skill



February 1980: Just like he'd never been away. Roberts wins the Houston TT.



September 1980: A return to the half-mile at Haldon in England

when he rode at Haldon, Devon late in 1979 on a dirt "long track" that was little more than two long straights joined by two hairpin bends.

Eight thousand people journeyed to Devon during a petrol crisis, in rain and fog at the end of September and spent the day perched on a hilltop to watch "King Kenny" getting it sideways. They weren't disappointed but Kenny was.

"I'm having to drop down to second gear on these corners" he said. "We stay in fifth on the real ovals back home!"

On the "real" half-miles, Kenny won four Championship events and countless non-Championship races.

The smallest form of oval track racing is the "short track". Anything under a quarter of a mile qualifies and bikes are limited to 250cc. This is real push and shove racing with lots of physical contact and riders heading for the haybales after a bit of not-so-gentle persuasion from hard-charging rivals.

Mr Roberts won six of these at National Championship level and, again, innumerable non-title rivals.

Some measure of his ability came at the Houston Astrodome in February this year when he placed third after a dash to the flag in which a fairly small blanket could easily have covered the first three men. Not bad after two years away in the comparatively-relaxed world of Grand Prix road racing!

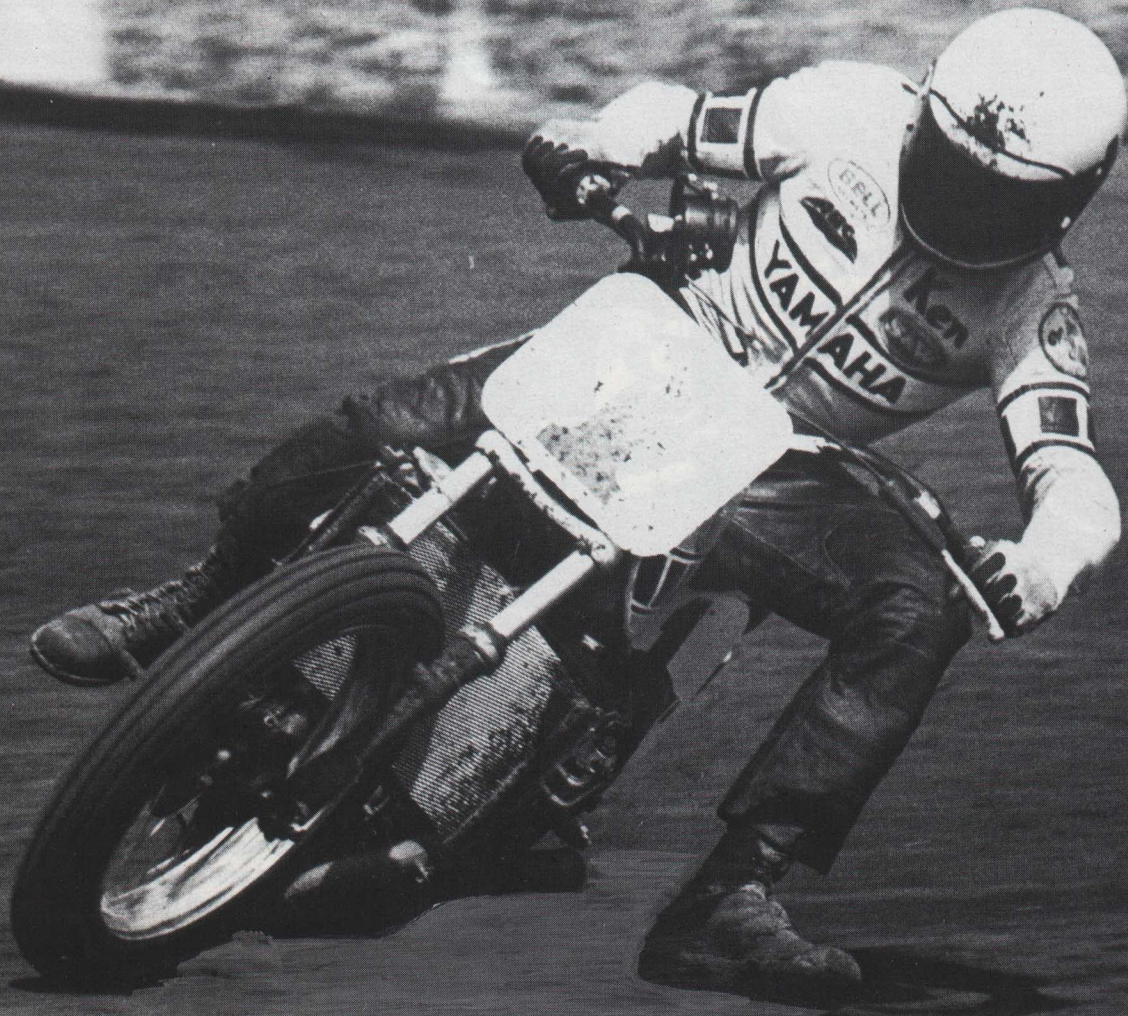
The final type of American dirt-track event is the curiously-named TT Steeplechase. It's a kind of combination motocross and speedway. The track features huge jumps and differing-radius right and lefthand turns but is graded smooth.

Kenny won a whole lot of TT races at non-Championship level but just two "Nationals". One of these, however, was probably the most amazing race of his amazing career.

It was February, 1980. Roberts had been away for two solid years on the GP road race trail (winning two World Championships in the process). In all that time he had never got dirt track racing out of his system.

"There's no feeling in the world like getting it sideways on the dirt tracks" he told the press just before his British "demonstration" race at Haldon.

So there he was on a Friday night in February, under the roof of



August 1975: Taming the "beast". The awesome TZ700 dirt-tracker.

Houston's giant Astrodome (like a covered-in Wembley Stadium!). Beneath him thumped a 500cc Yamaha four-stroke single and around him roared the 750cc engines of the new stars who had taken over the US scene during his absence.

"I drove a thousand miles here to see Roberts on the dirt again" said one fan in the ticket line. He was well rewarded.

None of the old magic had faded. Roberts told the press at Houston that he figured he had a good chance of making the top three.

"The only mistake Kenny made all weekend was underestimating his own potential" said the AMA's Dave Despain.

The start flag dropped and Kenny promptly roared off to win, thus equalling the 28 National victories of another American legend, Bart

Markel.

He had been helped to this point by 13 road race National wins and when he made that fourteen at Laguna Seca, California, in August 1980, Kenny had written another page in the record books. He had become the most successful American Championship racer of all time, with 29 victories to his credit.

As well as holding the all-time US National win record, Kenny also did something else which no other American racer has ever matched. He won one of each type of National event during the space of a single season! Only one other rider, that superb all-rounder, Dick Mann, had ever won one of each before - even during his entire career. Kenny did the "Grand Slam" in 1975!

Add all this to the three World 500cc Championships that KR won

in just three Grand Prix seasons and you'll see why any sane man must rate Roberts as the greatest all-round bike racer that ever put on a pair of leathers.

Should anyone be short-sighted enough to doubt that, let them hear this quote from another of the best all-rounders ever ...

After witnessing Roberts' win in the 1980 Astrodome TT, another American superstar well-known to British fans, by the name of Gary Nixon, was heard to say to Dick Mann.

"You know, if we had good equipment and a couple of months to get in shape, we could still go out and beat those kids".

"Sure thing, Nixon" replied Mann. "And if I had your eyesight and Bart Markel's guts, I could have been Kenny Roberts!"

LIGHT, LEAN AND FAST



a new breed of middleweight from Yamaha

It was Yamaha's XJ650 which last year began a British biking revolution against overpowered superbikes. Though the big, heavyweight multis definitely still have a place in the motorcycling scheme of things, more and more riders show themselves willing to sacrifice outright power and long-distance cruising ability in return for a nimble-handling machine with the type of acceleration that comes with light overall weight.

After all, few motorcycles spend most of their time burning up hundreds of miles of motorway ... especially in a country like England which still has a superfluity of roads to delight the bend-swinging biker.

This year Yamaha has extended the XJ650 concept even further down into the middleweight bracket with the announcement of their XJ550 four-cylinder sportster for 1981.

The new bike follows the XJ650 concept but comes in an even more compact package. It weighs in at only 186kg and has a 1415mm wheelbase. Overall length is 2140mm, handlebars are tucked in at a narrow 730mm and overall height of the bike 1145mm. Seat height is a comfortable 790mm and the ground clearance of 155mm combines with the narrow four cylinder power unit to allow the bike to be heeled over at road racer angles in the turns. As on the XJ650, the electrical components usually driven off the crankshaft ends are tucked behind the XJ550 cylinders and gear-driven from the shaft. This keeps the engine width down to the absolute minimum at the lower end, which translates to more ground clearance when cornering.

The twin-cam four displaces 528cc from its 57 x 51.8mm cylinders and, aided by a 9.5 : 1 compression ratio, puts out 56hp at 9500rpm.

The combination of this power and the light overall weight of the XJ550 results in performance on a par with machines half as big again.

In fact, on twisting roads, machines of twice the size would find it difficult to best the compact XJ550 from point to point.

Sixteen litres of fuel plus the extended fuel consumption of the efficient two-valve per cylinder engine give the XJ550 a useful touring range between fill-ups. Its fuel efficiency is aided by the fact that this is the machine upon which Yamaha have chosen to introduce their YCIS "Induction Control" system which results in a 10 per cent decrease in fuel consumption! (See Page Nine feature).

There's an electric starter, maintenance-free transistor ignition and three litres of oil carried in an integral wet sump.

In the transmission department, the XJ550 departs from the specification of its bigger 650cc brother by featuring chain instead of shaft final drive from the six-speed gearbox.

The taut-handling cradle frame and Yamaha's patented Teflon-bushed, smooth-acting front forks are complemented by the rigid and super-stylish "Italic" cast wheels. Rear brake is a drum, built in unit with the wheel, and this, is added to twin discs at the front to provide braking power in keeping with the XJ550's sporting performance.

To the motorcyclist who responds more to overall high performance than just straight-line speed, who prefers cornering ability to cruising and who likes to keep at least some check on his petrol bills, the XJ range from Yamaha is a prayer answered.

THE SCOTTISH



LION - JOCK TAYLOR World Champion

Scotland can boast two of the most incomparable driving talents of all time, Jim Clark and Jackie Stewart, amongst its ranks of sporting champions. Success on two wheels, however, has been limited with only Fergus Anderson taking world titles in the early 50s. Scotland can now boast a three wheel world champion — 26-year old Jock Taylor from the East Lothian town of Pencaitland, near Edinburgh.

Aided by baby-faced 23 year old Swede, Benga Johansson, Jock drove his Yamaha 750-powered, Windle chassis outfit to four Grand Prix wins during the 1980 season and snapped up the World Sidecar Championship in the process.

Now sponsored by Fowlers of Bristol, Jock had plenty of support for his World Championship bid. Racing boss of Fowlers, Dennis Trollope, built up no less than 15 superb Yamaha 500 engines for the Grand Prix season, plus a further selection of 750cc motors for other Internationals! There was plenty of financial backing as well so all Jock had to do was supply his particular brand of hard-charging riding talent.

It wasn't always like that, however. Jock earned his spurs the way that just about every British racer has to. Struggling in club events with no financial backing at all. Making do with worn tyres, tired engines and penny-pinching even to put petrol in the transporter.

Well-known British race commentator, Fred Clarke, for example, remembers Jock in the early days.

"He used to come down to do the North Gloucester club meetings at Gaydon in Warwickshire" says Fred "as he had a sponsor from that area who liked to see him perform near his home.

"Jock had an old bus for a transporter and it used to roll up at the track and disgorge a whole bunch of Scots fans. I thought he must have a really loyal fan club. When I found out that the whole group were clubbing together to help Jock pay for the petrol then I **knew** he had a really loyal fan club!"

Jock actually began racing in 1975 with an ex-Mac Hobson BSA twin. In the space of two years he had switched to Yamaha and started to make his mark on the British scene, with his most significant performance





being the setting of the Ulster Grand Prix lap record at over 105mph.

In that same year he won the Scottish Championship and, in the larger sphere of British Championship racing was second in the title chase with another young Scot, Lewis Ward, in the chair. Biggest win for the pair was in the British Championship qualifier at Oulton Park.

It was efforts like this that brought him to the attention of his current sponsors, Fowlers of Bristol and in 1978 they backed him for his first attempt at the World Championship series. For a first-timer on the Championship trail, Jock performed creditably well. Lewis Ward was still in the chair but decided part-way through the season that he didn't enjoy the travelling entailed. When Lewis stepped down, his place in the chair was taken by another young Scotsman, James O'Neill.

The help from Fowlers was enabling Jock to concentrate on the riding aspect of the job and a third place before the delighted home fans at the British Grand Prix, plus a fourth in Czechoslovakia, sixth in Belgium, seventh in France and eighth in Italy, put him in seventh spot on the World rankings in his first GP season.

Highlight of the 1978 season, however, was at the Isle of Man where, with the experienced Kenny Arthur deputising in the chair, Jock finished second and third in the two legs of the sidecar race and so took the Sidecar TT win overall. In the process he whistled the three-wheeler round at a record 101.22mph ... a speed that many solo riders would be ecstatic at attaining.

Jock started the 1979 season with James O'Neill still in the passenger's slot but, midway through the year, James decided to quit at very short notice. So short, in fact, that Jock didn't find out until he was waiting passengerless at Snetterton ready to practice for the Race of the Aces.

Jock appealed for a passenger over the paddock PA system and along to the Fowlers transporter came a young Swedish solo class rider by the name of Benga Johannsson. In the previous year Benga had showed some promise in the 125cc category, with a ninth place in the British GP being his best effort.

The decision to help out Jock, however, was to change the young Swede's life. All thoughts of a solo career were forgotten and a World Championship pairing was born.

The combination of Taylor and Johannsson clicked right away and a fairy-tale quality was added to their story when Jock won his first Grand Prix. Appropriately, it was before Benga's home fans in Sweden!

A second place at Silverstone for the British GP plus a third in Holland, helped Jock further up the Championship ladder to fifth place. The stage was now set for an all-out assault in 1980.



Jock Taylor (left) and Benga Johannsson

Winning rides at the Dutch TT, Belgian and Finnish Grands Prix, plus a second spot in France and third in Yugoslavia meant that Jock was poised to take the title by the time he appeared before the British fans at Silverstone in August. His rivals for the title were reigning Champion, Rolf Biland of Switzerland and Frenchman, Alain Michel.

Before the start of the season, Jock had turned down a chance to ride for ex-Champion and engine wizard, Helmut Fath. Michel had taken the ride instead and now both were in contention for the title. Taylor's loyalty to Dennis Trollope's prowess as an engine-builder and to Fowlers was now about to be put to the test.

Right at the start of the race the odds turned dramatically in Jock's favour. Both Biland and Michel hit trouble on the warming up lap ... all Jock had to do from that point on was to finish in the top three.

But even that wasn't as easy as it sounds. After a crowd-pleasing initial dice with fellow Briton, Derek Jones, Jock's rear tyre punctured and began slowly deflating as the laps wore on. Letting Jones go ahead to win, Jock nursed the ill-handling machine to a second place finish and the World title!

A couple of weeks later he emphasised his right to the Championship by winning the West German Grand Prix.

It was a fitting climax to a season which had seen him dominate international-class British events with efforts like winning all of the sidecar events during the Transatlantic Trophy Series, winning Donington's "Sidecar World Trophy", taking the overall victory in the Isle of Man Sidecar TT and posting an incredible new lap record of 106.08mph in the process!

With success like this, does Jock have any ambitions left to satisfy? Well, obviously he'd like to win the World Championship again but he has another burning desire and that is to prove that sidecars can go quicker than solos on a major racetrack. At the Mallory Park Race of the Year in September he came one step closer to doing just that. He set a new sidecar lap record at 100mph exactly. More important, that was precisely the same speed posted by Kenny Roberts who set the fastest solo lap of the day! Of course, Kenny's outright circuit record is still fractionally quicker but the writing is on the wall ... **"this record reserved for Jock Taylor!"**

THE RD WATERPUMPERS



- STILL SENSATIONAL!

Even a year after their introduction, the liquid-cooled RD middleweight "supersportsters" are still turning heads every time they pass by.

To guarantee that the heads keep turning throughout 1981, Yamaha have done a couple of things to both the RD250 and 350.

First of all, there's a slick black and red paint job which will have a particular appeal for the British fans as it links with the colour scheme chosen by superstar Barry Sheene for his Akai/Texaco Yamahas.

Even more dramatic is the new combination of head fairing and lower-engine cowling designed by leading British stylist, John Mockett, for Yamaha's European accessory division.

In designing these eye-catching additions to an already-spectacular machine, John reasoned that the biggest appeal of the RD lies in its liquid-cooling ... just like the Yamaha lightweight road racers. If you've got a liquid-cooled bike, then you want to advertise that fact, not cloak it under a complete fairing, thought Mockett. He came

up, therefore, with the head-fairing/engine cowl combination which leaves the radiator exposed and is, in fact, even more attention-grabbing than any fairing could have hoped to be.

Streamlining the lower end of the machine removes one of the greatest sources of turbulence on any motorcycle, while the head fairing deflects the wind around the rider. All of the advantages of a fairing while still allowing people to see the technology of the RD Yamaha at it's eye-catching best.



SNAPPY

Life needn't
when the law says
a "fifty" ...



Life can be pretty frustrating for the sixteen year old bike rider. Particularly if you're one of those young hyper-enthusiasts who've avidly read every motorcycle magazine you can lay your hands on ever since you can remember and now, when you're finally able to ride a bike, the law says "it's a moped or nothing!"

There are, however, a couple of compensating factors to stop you having a nervous breakdown before your seventeenth birthday.

First of all, the law's a pretty sensible one. If you get that rather dangerous blend of inexperience and youthful over-exuberance out of the way on a moped, then you're much more likely to enjoy a lot more motorcycling in your lifetime.

Secondly, companies like Yamaha are



SIXTEENERS

be dull, even you have to ride

these days making some pretty snappy mopeds for the sixteen year old motorcyclists.

In fact, the bikes we are talking about right now - the 1981 Yamaha RD50, DT50 and FS1 Special - don't deserve to be termed mopeds. They are 50cc motorcycles in their own right ... so let's drop the "moped" tag right now.

The three new bikes in the 50cc class from Yamaha cover the whole spectrum of motorcycling choice - road race style sportster, enduro or laid-back US Custom.

The RD50 and DT50 share the same basic engine and chassis unit. The motor is the neat little reed-valve two-stroke with five speed gearbox that has been proven in previous RD & DT ultra-lightweights but for 1981 it is housed in a superb little monoshock chassis.

The disc-braked RD is for the street rider and young road race enthusiast while the DT features more fork travel, a bigger front wheel, enduro tyres and off-road styling. It's a great little street machine and is also capable of taking to the trails!

With Yamaha's US Custom-styled range of "Specials" setting the bike world ablaze from 750 down to 250cc, it's not surprising that Yamaha have given the ultra-lightweight "sixteeners" the same treatment. Basis of a wild-looking 50cc "street cruiser" is the rotary valve four-speed FS1E engine. That same motor which started literally thousands of youngsters on a motorcycling career and whose model designation was affectionately corrupted to "Fizzy"!

The forward-inclined engine lends itself well to the 'get up and go' US Custom look and the use of the long-established FS1E as the base for the new bike means that the price will be a very attractive one.

So ... instead of spending your sixteenth year bemoaning the fact that you are "forced to ride a moped", check out one of the new Yamaha lightweights and start enjoying yourself!



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