

# Flexi Flyer: T-500 Vintage Roadracer Project - text by Kris Bernstein

Note: this article was 1st published in the mid 1990s

Applying state of the art technology to new equipment results in varying degrees of improvement. Applying similar technology to old equipment gives it a new lease on life. Such is the case in preparing a vintage roadracer, as in this example the Suzuki T-500 Titan.

Whether your tastes are British, Italian, American or Japanese, vintage roadracing offers the chance to return to those thrilling days of yesteryear for far less than the cost of say a Superbike effort. Plus you will probably see some old friends from your high-school or college days who are vintage racing also.

So given your kids and mortgage are covered, and that your wife and boss will never forgive you - let's go vintage roadracing...!

The factory T-500 racers of 1968, or XR-OS's as they were referred to by Suzuki, were little more than hyper-steroid versions of the street bike. Given the reliable-as-a-stone nature of its design, the T-500 leads itself quite readily to knee dragging motorsport. Its advantage in vintage roadracing is an abundance of old parts being available and an abundance of horsepower should you desire to get serious.

Getting Started Step number one is to find out who your local vintage roadracing is governed by WERA, AHRMA, FIM or whomever. Get their rule book and memorize it. Pay particular attention to rules that will affect your bike, the group it will race in, and its degree of "legal" preparation. Flat-slide carbs, turbocharging, ana fat, slick tires are not particularly in keeping with vintage motorsport. So before you waste a lot of money on illegal parts, do some homework. If possible, start with a fresh, race prepared bike. If you can find one, it will save you a good bit of money. If you must torture yourself and start from scratch, so be it. Moderately priced bikes are available in any metropolitan newspaper or wrecking yard. But be aware it may take two or three junkers to make one pristine racebike.



After you have acquired a good used T-500, strip it to the bare frame keeping the motor whole. Seeley, Harris or Suzuki "Works" frames may be available but be forewarned, if you bend them up they are nearly irreplaceable. So unless you are going to build a museum display piece, don't race with irreplaceable parts unless you don't mind the possibility of breaking them.

Check to be sure your race frame is neither bent nor rusty. If it is in good shape, flame cut or grind off all unnecessary brackets being careful not to get into structural metal. Sandblast the entire frame and crack test all welds and suspect areas.

Locate a stock '72 GT-750 front end. The four shoe front brake is nearly as good as the irreplaceable Fontana or Ceriani items. When you consider it was made to slow down a 600 lb road bike, your two hundred and seventy-five pound racer will be no problem. If you have lots of money the 230mm magnesium Ceriani four shoe replica brakes and forks are available. These are the same type as used on the factory bikes, but for the purchase price, a second mortgage will be in order. Not to mention your first born male child will be needed for a deposit...

AHRMA allows disc brakes and they do not stop better. Locate a late ('74-'77) GT-750 front end if you prefer. Whatever front end you use, rebuild it as necessary so you can trust it at 150 mph.

If you use late model triple clamps, which are narrower than the '72-'73 items, the Telefix fork brace will bolt up in two minutes and stiffen the rather spindly 35mm tubes. A ~5mm steering damper bracket needs to go on the right side tube. I prefer the rightside as your left hand should always be on the clutch lever anyway.

J.C. Whitney (yes, they are still in business) has GT-750 tapered roller bearing steering head replacement sets. While you're at it, get a couple of T-500 gasket sets. Tap out the old ball bearing races and replace them with the tapered races (Don't mix the bearings and races as they are matched sets!).

Use the stock rear brake and drill the side cover full of holes to make it look more racy. (You never use it anyway). Bead blast the front and rear hubs, side covers and replace all bearings and parts as needed. Send the hubs to Buccannans' Frame Shop, in Los Angeles, for new aluminum rims, stainless steel spokes and nipples. You may be able to get the work done and similar parts locally but be forewarned: Nobody does it better than Buccannans'.

A WM-3 and WM-5 are fine for the front and rear respectively. DID and Sun rims are fine but Akronts look neat with their valanced edges. You can go wider in the front but it will slow steering response.



Modern sport tires would be killed for twenty years ago. Whether you use Avons, Dunlop, Metzeler, Michelin or Yokohama is up to you, they are all great tires. A tall sidewall will give much needed ground clearance. I use 100:90 X18 front and 120:90 X18 rear Metzeler, which work well and just clear the chain with a couple of sprocket washers stuck behind the drive sprocket. While on the subject Of drive chains, don't use an "O" ring chain, as they are for road bikes, not racers.

Weld one inch cromoly tubes from the swing arm plate to the upper frame rail cross tube. Weld a threaded bracket on the right side steering head gusset for your damper. The old Kawasaki type dampers work fine and cost a bunch less than the trick hyper alloy type.

The swing arm can be replaced with a three to four-inch shorter than stock JMC aluminum box section arm from England. If they are too expensive, the stock arm can be shortened by milling the adjustment slots forward to the arm tubing, cutting off the adjustment plates, and re-welding them in the more forward position. The stock arm can then be braced using 1/2" chrome-moly tubing. Either way works fine, but you pay a weight penalty if you use the stock arm.

A brief note on welding. Never use arc welding on a real race vehicle. Stick welding is for farm equipment and stock cars. If you don't have a tig welder or access to one, farm out the work! Again, you must trust it at 150 mph, so do the job right.

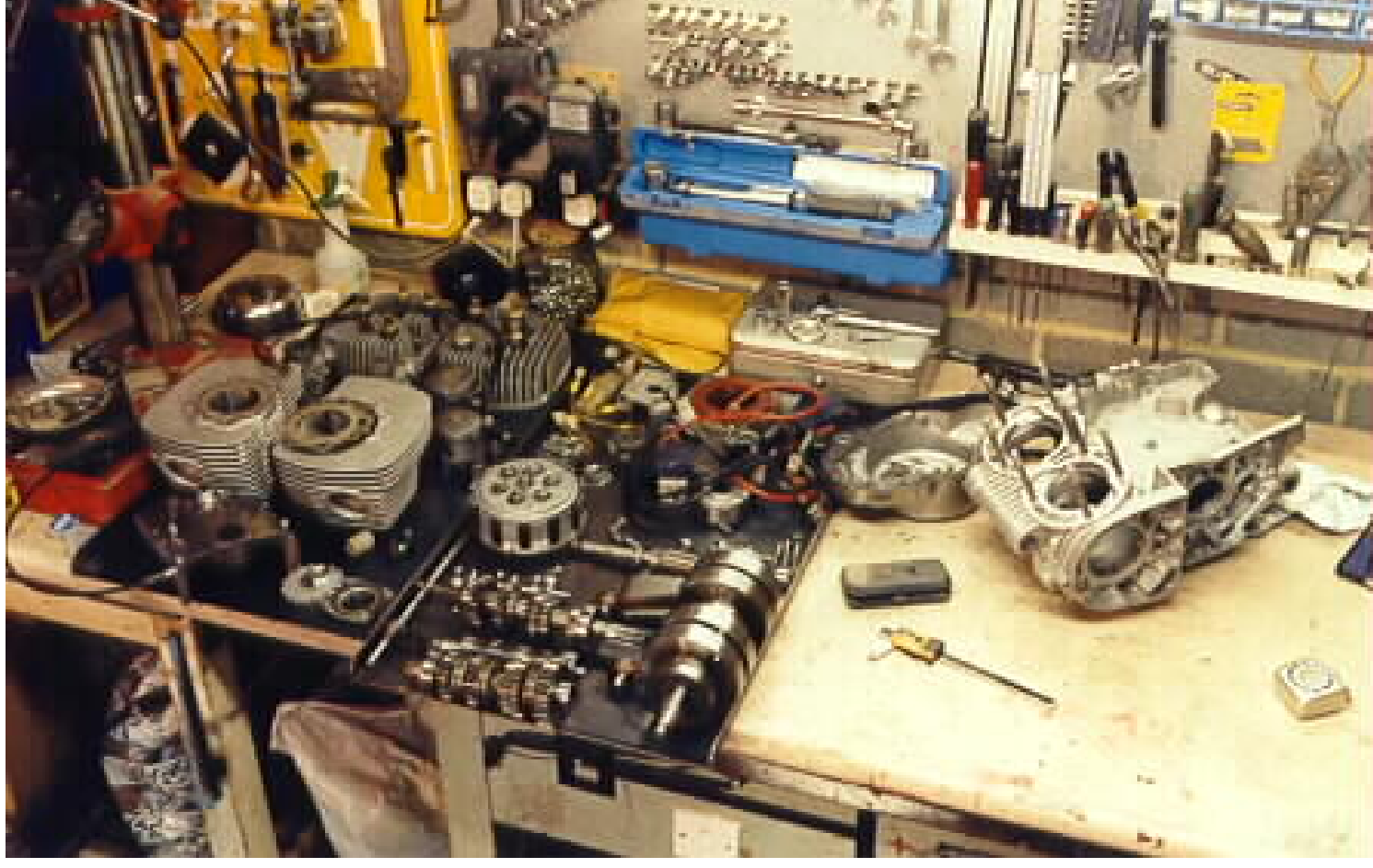
After your rolling chassis is complete, fit whatever seat, tank, and fairing you intend to use. Be forewarned, the carbon fibre TZ parts look neat but may not be legal. Stick to period pieces. The stock tank works just fine but try to locate a race-seat to lean against as the bike's acceleration tries to push you off the back.

I use the CR-750 Honda Roadrace fairing available from National Fiberglass in Ohio. It is an easy fit and its full bubble keeps the wind off you at high speeds.

After the rolling chassis is complete, disassemble everything and run it to the paint shop. Powder coated frames and Imron accessories are nice, but plain vanilla enamel is very sturdy and easy to fix later.

The Motor The heart of the T-500 is its outstanding motor. Easy to work on and competitive in stock trim, it is a real jewel. Other than carbs, expansion boxes and ignition, make no other modifications to the motor for your first few races. No other bike, none whatsoever in your class, should be able to get you from a standing start: the stock T-500 has so much torque just rev it up, dump the clutch and shift as needed. It is a guaranteed launch everytime, so run it stock for awhile before you go for more power.

Ignition The GT-500 "pointless" magneto is maintenance free and requires no battery but T-500 cranks won't fit it. Also its heavy magnet is hard on the crank. I have known at least one which broke off the crank nose due to high speed vibration. The alternator and points ignition can be run "total loss" by throwing away the alternator and changing batteries between races and practice sessions. The stock points can be replaced with "Dayna S" pick ups and coils, or the Boyer Bransdon unit which is an easy bolt up. All the above will provide spark but are basically junk which depend on a heavy battery for life.



I would highly recommend the Femsa or Motoplat transistorized magneto. No batteries to play with, no points to wear out, just push and go. The German Krober unit is very good but hard to get parts for. Also worthy of note, if you use the Motoplat get their tachometer while you're at it. The stock cable driven tach is slow and inaccurate. Besides it needs the oil pump to drive it, which is also a part of the motor which should be discarded.

Crankshaft The stock T-500 crankshaft is as heavy as a house but trouble free. After pressing it apart, do a complete race prep including new outer main bearings, rods, rod pins, big and small end bearings, etc. Weld the center crank pin and rod pins to curtail crank twist and fill up the balance holes in the wheels with cork and epoxy to raise primary compression.

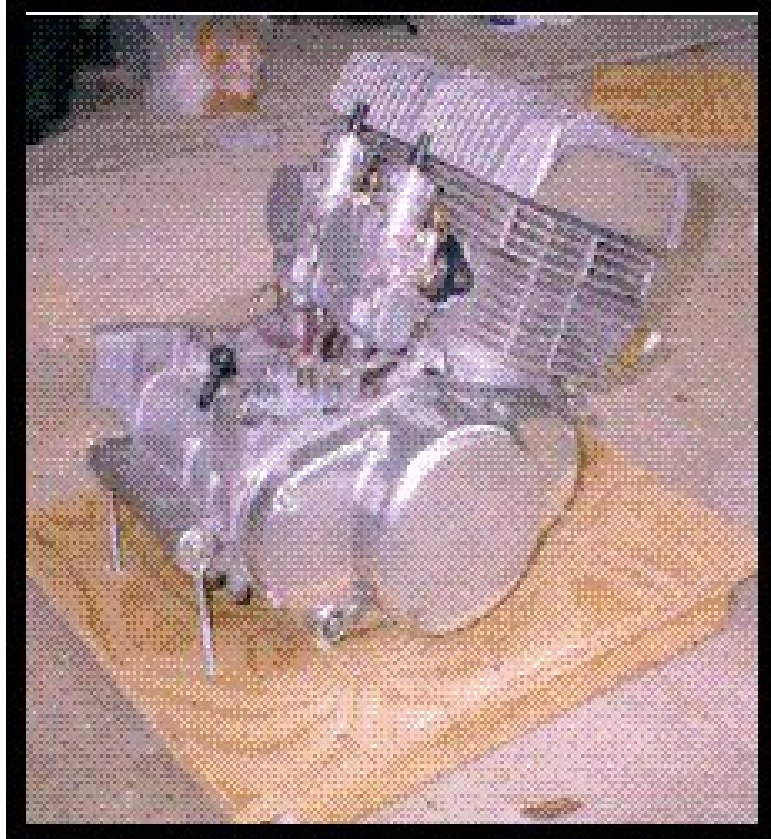
When you are ready to start building additional horsepower into your motor, throw away the oil slinger plates on the outer crank main bearings. Drill 5/32" holes in the outer transfer channels to the oil feed holes in the outer crank bearings. Be sure to chamfer the holes in the transfer channels to help feed them oil/gas mix.

As the center main bearing is fed oil from the transmission you can now weld up, or plug with alien set screws, the four oil pump feed holes and pumpshaft hole in the trans case. If you are not an expert, world class crank builder, you would do well to call Bratton Sports Racing in Placerville, California. No one does crankwork better than Jeff Bratton.

Now simply throw away all the oil pump hardware that is causing frictional losses in your motor and run a 20:1 premix of Castrol R30 and Cam II 109. Synthetic oils are fine but they don't smell nearly as good as R-30. Anyway, it's up to you, but use Golden Spectre two stroke trans oil, your gears will thank you.

Cylinder Porting It is quite easy to double the 47BHP the stock motor makes. But the price you pay is shortened service life of motor parts and ridability. You can use a "peaky" motor at Brainerd or Road America, but short tracks such as Loudon, St. Lewis or Daytona (Vintage Circuit), will get you better lap times if you build your motors far away from the outer edge of reason. The alarming horsepower two stroke motors make comes mostly from the right primary and secondary compression, port timing and expansion boxes. Be forewarned: build up to the maximum performance edge a step-at-a-time, because you may not like what you have to ride in the end, or you may overbuild and lose power. Both are distinct possibilities.

Most of the old "go fast" books will tell you to shave .060 inch from the stock heads, raise the exhaust port 5.0 mm and lower the intake 5.0 mm.



The result is a peakier motor with much more power, when combined with good carburation and expansion boxes. Where you go from there should be dictated by rider ability and usable horsepower at your home track. We'll get back to more horsepower later...

The Transmission The transmission of the T-500 is unique to itself and therefore does not make alternate ratios an easy possibility. I've been told the T-350 six speed clusters can be adopted and some factory six speeds or Barton close ratio five speeds may be out there. But don't get your hopes up. Thankfully, the motor can be over-reved to compensate for inadequate ratios, so the best thing to do is build up the stock box.

The first step in a T-500 tranny prep is to purchase a new input shaft and fifth output gear. The fifth output is a sloppy fit from its inherent design. It tends to cock on the output shaft and wear its gear faces. Consequently it wears the fifth input gear faces. As all the input gears are fixed to the input shaft, the entire piece must be replaced.

When you receive your new tranny parts have the side of the fifth output gear welded and faced to allow minimum lateral movement. With that work complete check all other parts on the clusters for wear and replace as necessary. Undercut engagement dogs, so it will not tend to hop out of gear when you are leaned over at 90 mph. That's a guaranteed bad day. With all machine work completed Kal Guard Moly Coat the input shaft and output gears. As the stock gears tend to get cancer on their faces, chromemoly tends to bed into these surfaces and prolong service.

A second detent washer on the plug for the shift drum will ease shifting immeasurably. Also use RM-250 '76-'77 aluminum clutch-spacer plates, to save reciprocating weight and GT-750 or Barnett HD clutch springs. Turn a GT-750 or similar shift lever 180 degrees to get the business end of gear selection back to your rear set foot pegs.

Don't forget to safety wire the pinch bolt as it is difficult to shift when the lever falls off during a race. For that matter it never hurts to mention to safety wire everything you do not want to fall off the bike. Not only for your safety but consider the guy behind YOU who gets a 10mm bolt in the face shield at 150 mph.

Something to think about...

Carburation The round slide Mikuni is the greatest invention since the dawn of time. It is simple, easy to tune and infinitely adjustable over a wide range for all metering systems. Yes you must adjust jetting for given moment during a race weekend but even a little rich is o.k. as the carb and motor are rather forgiving. This is not so for a mixture that is a little lean, as the piston will stick and if you're not ultra quick to grab the clutch, it will spit you off in an instant. I have tested this theory personally and trust me it hurts!

The 32 to 38mm Mikuni or Lectron work fine, however, the Lectron may be illegal in some classes. Stock to rather mildly tuned motors like small carbs as throttle response is improved. The male ego cries out for large slide openings. The 36-38mm carbs will help peak horsepower a little. Mostly they help in being able to over-rev the motor to compensate for inadequate gearing.

Carb Adjustments - 32 to 38 mm Mikuni, Main Jet 250-330 Lg.Hex, Pilot Jet 45, Needle Jet 42, Needle 5F 16-3 (sm. body carb.) Cutaway 2.0, Air Jet None, Air Screw 1 1/4 - 1 1/2 Turns, Lectron 4-1 Needle-set @ 44mm.

The pipes are the single most important element to fine tuning any two-stroke project, be it a chain saw or antique roadracer. The best TR-500 and TR-750 Kits come from Swarbrick Racing in England. Their hand formed tapered header pipes and thin-wall cones are exactly as the works pipes were twenty-two years ago. Avoid Allspeed, Bassoni and other over-the-counter street pipes, as they are compromise built and can ruin an otherwise race prepped motor. For longer tracks, a steeper converging cone(s) and shorter header pipe will help top end. However, the basic TR-500 design is rather forgiving. AHRMA will require silencers of any idiotic type. WERA does not require them, so run the stingers only. Don't forget to read A. Graham Bells book on two-stroke tuning. His chapter on expansion boxes is very informative.

Gearing You are pretty much stuck with the wide internal ratios, but not so for overall gearing. A glorified go-cart track such as Loudon will require 13/33. If you come onto the front straight hard, you may get fifth gear. For long tracks such as Brainerd try 16/33, Each track will be different, but keep in mind small changes in overall gearing, make for big differences in how you will set up for the most important turns on a given track.

Godzilla Race Prep.

Unusable horsepower can be wrrenched from the T-500 motor by shaving the crank wheels down, installing crank case stuffers and using the factory "T" port barrels. The ultra-high primary compression pushes more change through the transfers. This is what Ron Grant did as a factory rider back in '68-'73. The result is a 900 rpm powerband and a bike that was demonstrative to the point of being almost unridable, according to Ron, even with a close ratio gearbox.



Light-weight crank and stuffers

A method that provides very good power, with a wider powerband, is to lighten the crankwheels by cross drilling and pressing up the shorter (6.0 mm) GT-750 rod. Over five pounds can be taken out of the wheels, and the holes can be stuffed with cork and epoxy to raise primary compression. The engine case is shaved 4.0 mm and the top of the Cylinder 2.0 mm. This puts everything, as far as stroke, back in line. By using the late model GT-750 rod, the thrust washers are relocated to the piston pin so the big end bearings get a good oil/as bath, as they are free to move about. By bringing the porting to TR-750 specs and fabricating squish band heads with centrally located spark plug, the secondary compression is good for 7.3 to 7.5:1.

Mill the intake side of the cylinder parallel to the bore and install 38 mm carb rubbers (Mikuni P/N 002-054). This will incline the intake angle for a straighter shot to the crank case

. This latter method provides a motor that revs about as quick as a TZ and provides a power band far more forgiving than the stuffer method.

Good luck and keep it on the tires! If you find yourself getting bored with 90 horsepower and 150 mph, move up to a GT-750 based racer good for 145+ horsepower and 175 mph. And they are vintage legal too

## ! HELPFUL SOURCES

Western European Roadracers' Association, A-5 150 Spanish Wells  
, P.O. Box 12960, Hilton Head Island, SC. 29926

American Historic Motorcycle Association, P.O. Box 246  
Gifford, IL 61847

Performance hnding in Theory and Practice: Two  
Strokes, by A. Graham Bell, Haynes Publications, Inc., 861 Lawrence Drive, Newbury Park, CA.

91320 Swarbrick Racing, The Forge, Garstang Road, Brock Nr. Preston,  
Lanes. PR3-ORD

Boyer Bransdon Electronics, Ltd., Dept. (MCS) Frindsbury  
House, Cox Lane, Detling, Maidstone, Kent ME14-3HE, U.K

Bratton Sports Racing, 6560 Skyview Lane, Placerville, CA.  
95667 National Fiberglass, 517 Benson Street, Akron, OH.  
44311

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JMC Engineering, 1 Lodge Works, Birchill Road, Kirkby  
Mersyside, L33 7TD