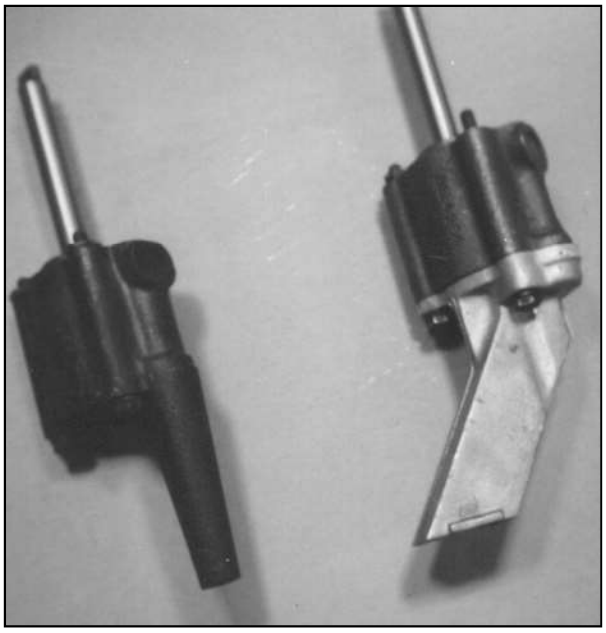
Buyer: Mark_E Cook (mecook@mindspring.com)
Transaction ID: st-ch_3O5gvDFt9mns0fqF1ZEXGlkZ

OIL PUMPS & OIL LINES

The stock Triumph oil pumps have proven to be adequate for the job of racing**.** Check with the factory shop manuals for the end float of the gears. Take this to the minimum clearance recommended.

Make certain to have a good stainless steel screen on the pickup for the oil pump. The screen should be large enough to hold a reasonable amount of debris and still have lots of passage room for oil. The stock pumps might have a screen but in some cases it is terribly small. Just a couple pieces of gasket or silicone or other stuff and you'd be out of business. I figure that 2½" in diameter is a better size for the screen. Form the screen on the end of the pickup like a bulb so that you have lots of area. You can see even on the late stock oil pump in the photo below that the area of the pickup inlet is very small. That is okay for oil but it leaves little allowance for any debris.



Above: The oil pump on the left is the very early GT-6 type; the pump on the right is the early TR-6.

Right: The pump on the far right is the late GT-6 and TR-6. ⟶

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Greg Solow of http://www.gregsolows.com in Santa Cruz, California, has a great reputation for top performing and reliable engines for the TR-4. He does a modification to the oil pump parts that is certainly worth following up on. The stock shaft has slot in the shaft from which the drive power is taken from the camshaft gear. This tang has a habit of breaking off, leaving an engine with no oil pump drive. Greg found that it was the sharp corners and rough surface of the slot that caused most of the problem. Note how he has rounded and smoothed the slot in the left photo above.

After that fix, Greg also makes a modification to the oil pump rotors on the drive shaft. He noted some of the new parts are just a press fit and others have a small pin which holds the lobe to the shaft. The original factory pumps had a pin which was very difficult to remove. The replacement pumps, by some manufacturers do not reach this level of fixing. To remedy the fault in many of the pumps Greg drills out the pin and threads the hole to take a small Allen screw which has Loctite applied and then tightened securely. All good advice.

Check to see that the pump outlet matches exactly to the cylinder block. ***Treat this outlet and passage of the pump like a port of a cylinder head.*** Smooth out the rough spots of the casting and put a smooth finish on the parts. You want the minimum of restriction in the path of the oil to your engine.

There has been no indication that this standard oil pump is not more than adequate for the job of racing. The gears of the pump are generously proportioned.

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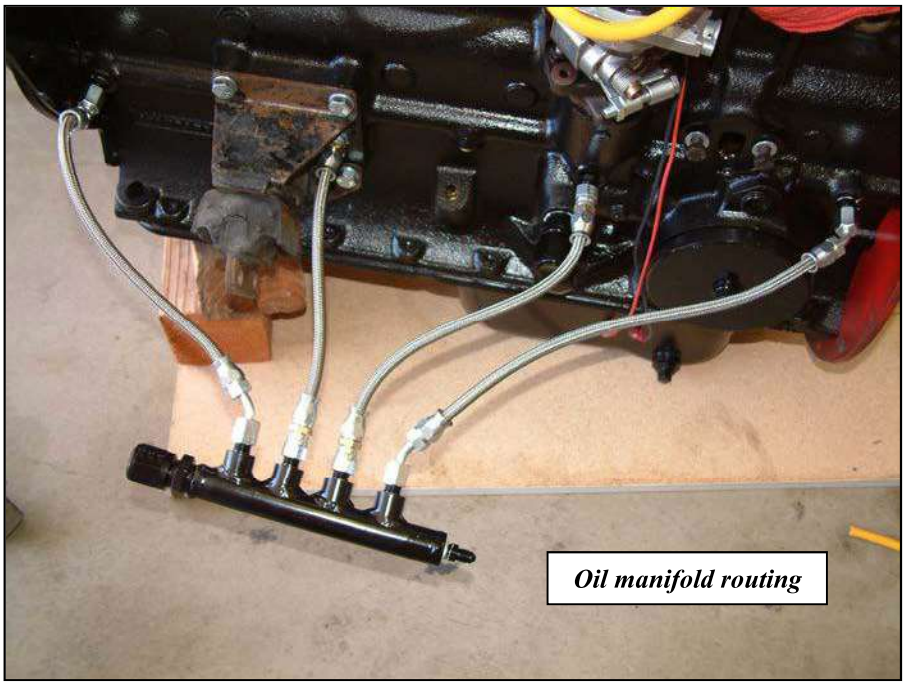
EXTERNAL OIL LINES

While working in the dyno with the MK-4 Spitfire engine we found a real problem with oil pressure. Jim Coan fabricated a device which bolted to the nose of the crankshaft to measure oil pressure in the crankshaft. A hole was drilled through the end of the crankshaft to the oil passages of the crankshaft. After fitting an oil pressure gauge to this device, we were able to see the exact oil pressure on the interior of the crankshaft. Jim found at 5000 RPM the crankshaft had zero pressure, while the dash gauge still registered over 50 pounds pressure. It was astounding information. It accounted for the loss of bearings in rapid order that had occurred in the first engine we modified. When dealing later on with the GT-6 engine we found the same kind of problem... less than adequate oil pressure in the front of the crankshaft at the high end of the stock rev range. The back of the engine was getting plenty of oil but the front bearings were not getting hardly any oil at all. To solve this difficulty we made up a series of exterior oil pressure lines. The lines were made up of dash 4 stainless braided hose and directed the oil from the oil cooler directly to the front of the engine. The routing of the oil was now through the filter from the pump, out to the oil cooler then into the main gallery and through the new exterior lines. After this installation the oil pressure at the front of the crankshaft and the rear of the crankshaft was equal. Plenty of pressure to race.

The case of the GT-6 was even more severe. In this case I stopped all oil from going to the normal opening to the main gallery. With exterior lines I routed ALL THE OIL through to the outside drillings for the main bearings. There are four threaded plugs in these drillings. We replaced the plugs with –4 male adapters for the new exterior lines. The oil filter adapter was changed so that the oil had no return to the main gallery. Now ALL the oil was going first to the main bearing drillings and for the first time the crankshaft was getting sufficient oil for *all* the bearings. Nothing else suffered as the main gallery was still filled with oil and dispersing it to the other orifices, but it was cooler oil and in equal quantity. It was this oiling technique that allowed us to raise the rev limit of the GT-6 engine to 8000 RPM and above.



Oil manifold routing

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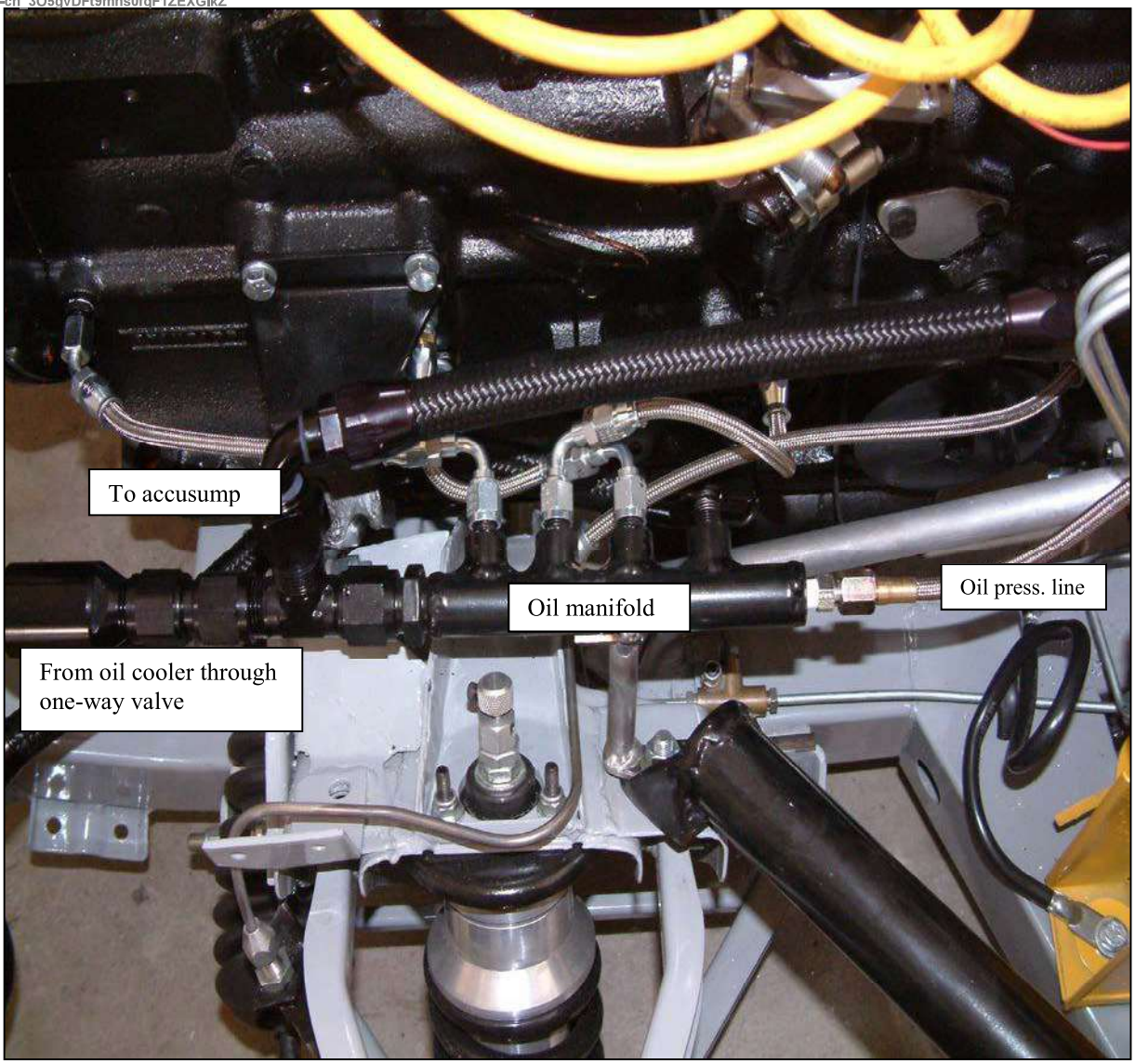

Above: The new cylinder block oiling system where all oil is fed from outside the block.

OIL PANS & OIL TEMPERATURE

There are plenty of drivers and owners who get really excited if their oil temperature goes up to the 200° to 225° range. This is a **normal** range. Oil temperature under 200° will cost you horsepower.

When I raced my TR-3 in the 1950's, we were not allowed oil coolers. I had an oil temp gauge in the cast aluminum sump. After about eight laps the temperature was to the limit of the gauge, 300°. How much hotter, I never knew. I didn't slow down, and I didn't change the rev range. BUT, because I couldn't do anything about this, I did the only thing that saved my sanity. *I removed the gauge*. I couldn't be bothered with a problem I couldn't do anything about. With some fiddling around I did manage to make the sump bigger and reinstalled the gauge. The sump now held almost an additional two quarts of oil. The increase in volume brought the temperature down to the 235° - 250° range. Now that was a bargain.
Since that time I have always been a big fan of oil volume in the engine. My GT-6 engines had an extension on each side that allowed an additional two quarts.

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I used 3" diameter steel tubing cut the length of the deep portion of the pan, cut it in half, lengthwise, added some flat stock to the curved parts, cut out the section of the sump on each side, and covered it with the 3" pipe. Welded this and end caps, *presto*, BIG OIL PAN. The building of a similar oil pan is covered in detail in my 4th book, "Kas Kastner's Triumphs, Race Cars, Street Cars and Special Cars" where Chuck Gee builds a complete GT-6 racer from a junk GT-6 street car.

Above: The completed GT-6 oil pan with splash plate and extensions on the side to increase the capacity of the pan as described in the text.

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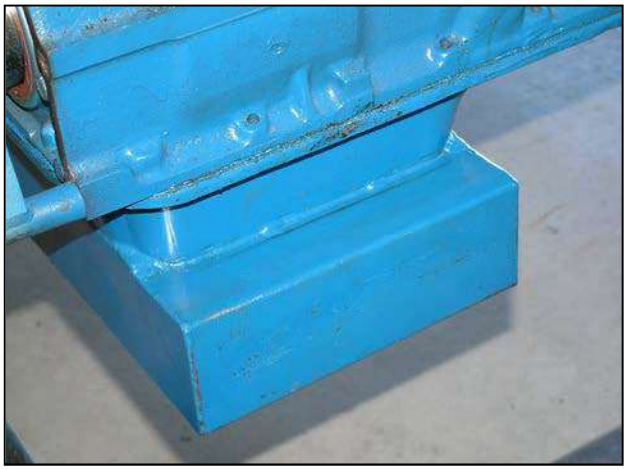
The TR-3 & 4 cast aluminum oil pan above is manufactured by Bastuck in Germany and available through their dealers. This pan has a higher capacity than stock and does help some to stiffen the cylinder block. See the vendor's list in this book for USA dealers.

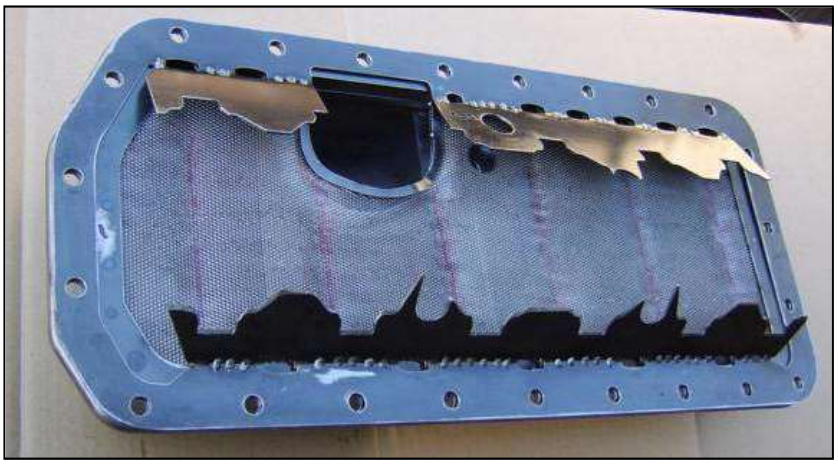


To show you there is more than one way to increase the capacity of the oil pan; Chuck Gee did this extension for his 1500 Spitfire.

←

Paul Hogan has this GT-6 oil pan fitted with the crank scraper system of Ishihara/Johnson.

→



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The regulations all allow an oil cooler now. I've always found that a ten row was big enough to keep the temperature at a proper level. If bigger makes you happy I suppose there is no reason not to, EXCEPT, oil that is too cool will cost you power. Several of the cars I've looked at recently have the oil cooler air inlet set into the shrouding for the water radiator. This is a neat way to do the job. You use the high pressure in that area to push the air through the cooler and make it even more efficient. I wonder, as the regulations allow all this shrouding, is anyone routing the EXIT of the water radiator and the oil cooler to a low pressure area to reduce the overall drag? I would sure look hard at this opportunity.

There is an amazing amount of flying oil inside an engine. Oil is draining back to the pan from all over, the crank is whirling and throwing oil everywhere (hopefully onto the camshaft) pressure from combustion is roaring into the pan past the rings in some amount slight or otherwise. It seems there is a madhouse of an oil storm happening in the block and pan. Throw in acceleration, braking, hard cornering and the oil is even more disturbed. The oil level sloshes up onto the crank and should be controlled. When this happens at high revs, the crankshaft thinks it is turning in Jell-O instead of air and oil.

Making an oil pan with a windage tray and baffles to control this flood of oil is worth the effort. There are lots of ways to do this. Easiest and cheapest is to make up a cover for the top of the oil pan that is slotted for drainage. Add baffles under this windage tray to stop the oil from surging forward and back. About three baffles across the pan will do a good job of this. Have the baffles about ½" clearance from the bottom of the pan so that the oil can drain back easily but not surge out. You can add baffles the length of the oil pan to make even smaller sections to control the oil. The hot tip of course is to make doors in the baffles that can swing forward easily, but do not swing back at all. This traps the oil in the front of the pan and that is where you fit the pickup for the oil pump.

Braking will push the oil forward and even under hard acceleration the oil will remain around the pickup as it can only drain back through the slot at the bottom of the baffle. Obviously you reverse the procedure to trap the oil at the back if that is where your pickup is located.

Fitting the tray as close to the crankshaft throws as possible will help "scrape" the oil from the system and remove a lot of the flying lubricant that is a drag on the whirling engine parts. **Remember to make a hole in the tray for the oil dip stick.**

My last and most powerful engines all had trays that were intricate and very close to the crank throws. The stock GT-6 engine has NONE. What a good thing to do for that engine.

Take a long look at making this fitting. Maybe a winter project. It is a lot of work, but not being competitive is no fun either.