

## SO YOU HAVE BOUGHT A TRACTION

by

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The following article's purpose is to inform traction owners both old and new to the best ways of keeping their cars in the best condition, settings and adjustments, treatment of oil leaks, etc.

Your first requirement is to obtain a workshop manual, this contains the many settings required to have your car performing at its best. So let us start with the engine.

**Engine:** A simple 1911cc pushrod overhead valve engine with a cast iron cylinder head, fairly basic except you must remember it rotates clockwise from the flywheel end, this is important. Some engines can have split skirt pistons, if they have, the solid side of the piston is what is known as the thrust side and must face away from the camshaft, similarly some pistons supplied by the club spares have offset gudgeon pins, i.e. the gudgeon pin is not in the centre of the piston but is offset slightly to one side, these are usually marked with an arrow on the crown or top of the piston, this arrow does not point to the front or rear of the engine but is an indicator to the direction of rotation and should face the camshaft in a traction engine. The timing chain is another part that is influenced by rotation. The joining link clip should be fitted with the closed end toward the direction of rotation, so when you are looking at the timing chain end the crankshaft and camshaft turn in an anti-clockwise direction. Another popular adaption is to use con-rods from a later ID engine, these allow you to use more modern thin wall bearings as opposed to the poured white metal bearings. The bearing caps on these are offset, so when fitting these types of con-rods the high side of the rod must face the camshaft. Another often overlooked item is in the cylinder head. It is fitted with a water distribution tube that sends water to cool the exhaust valve seats and it is only visible once the water pump adaptor plate has been removed from the cylinder head. Club spares can supply new stainless steel tubes if they need to be replaced.

**Oil leaks:** All older engines leak oil to a degree, this can be minimized. Principal leaks due to poor maintenance are points like rocker cover gasket, head gasket or the many plates covering openings on the crankcase or the fuel pump. Leaks from these places can be corrected either by replacement of gaskets or in some cases merely tightening or re-tensioning the cylinder head. The two principal areas traction engines leak by design is from the rear main bearing and the camshaft drive that connects to the auxiliary shaft that drive the fan belt pulley. The rear main bearing has what is referred to as an oil slinger, these were somewhat effective when new but still allowed some oil to pass. The club now has stocks of rope type rear main seals, part/no 457352E that when fitted correctly can eliminate the leak from this area. This is the same as the style pictured in the workshop manual but was never incorporated into production. The leak from the camshaft drive can be eliminated by machining the shoulder of the bush, part/no 451715 sufficiently to fit a spark plug tube seal from a later Citroen DS engine, part/no DX112-91 giving it approximately 1mm crush for sealing. Application of sealing compound around this area is mandatory. When treating oil leaks always check that drain tubes where fitted are clear, there is a drain hole at the end of the camshaft in the engine block and the rear main bearing cap is fitted with a drain tube long enough to drain any oil into the sump. It is important that this tube is present and clean. (It has been known to have been left out after removal for cleaning)

**Engine suspension:** The traction engine is suspended on coil springs for smoothness, the mount that is most crucial is the front engine mount, this locates the engine, it is vital that this mounting is in good condition and that the plate it is mounted in is tight where it is bolted into the front cradle. This can be the cause of clutch shudder if this mount is defective. Engine height is adjustable on the side mountings, this should be carried out as per the manual with the rear mounting case removed from the firewall. After completing the height adjustment re-fit the rear mounting case in the firewall as per the instructions.

**Engine performance:** Engine performance can be dramatically lifted by increasing the compression ratio of the engine. The standard traction engine started life with a compression ratio of 6.5:1, it could run on power kerosene! The standard height of the cylinder head is 85mm, I reduced this to 83mm, resulting in a compression ratio of 8.5:1. I also had the camshaft ground to a Wade 793C grind, this can now be replicated by Clive Cams, phone (03)97585977 in Ferntree Gully, Victoria. Matched the ports on the manifold and most importantly had the engine balanced. The other modification was lightening the flywheel, to do this merely remove the part of the flywheel that sticks out the front, I have forgotten the weight reduction but it is considerable (a diagram of this is on the website). This resulted in a much more powerful and smoother engine with the ability to accelerate up hills, yet retain good fuel economy. A later addition has been twin S.U. carburettors giving even more power. Another point well worth considering is to fit an electronic distributor to these cars. 123 Ignition kits are obtainable from club member, Ted Cross (who is the importer), other ignition kits are available from other sources, this is not a paid advertisement but is here to let people know what is available. An electronic ignition system makes the old mechanical distributor so obsolete it is laughable. Starting, performance and reliability are all enhanced by one of these units. One problem you may encounter with a Slough built traction is that initially it was set up with a positive earth electrical system (most of these have possibly already been changed), modern electronic units will only work with negative earth systems. This can usually be

remedied quite simply, you need to reverse the battery connection on the car, i.e. negative terminal to earth and positive terminal to the starter solenoid, reverse the wiring on the ammeter, otherwise you will record a discharge when the generator is charging, before starting the car, take a small jumper lead from the now positive terminal on the starter solenoid and strike an arc on the generator body to polarize the generator, you then start the car, generator should charge and the ammeter will record a positive reading. If in doubt, consult an auto electrician, the car needs to be wired negative earth before any electronic component, LED lamps or even a modern car radio can be fitted as these will not work on a positive earth circuit.

**Exhaust manifold cracking:** Exhaust manifolds are prone to cracking from heat stress, this can be overcome by having the manifold and the exhaust down pipe sent to Jet Hot Coatings in Castlemaine (or similar companies around Australia) for ceramic coating, this will not only extend the life of the manifold but dramatically reduce under hood temperatures by removing the heat, hence the reason to include the exhaust down pipe.

**Timing chain:** The timing chain was never fitted with any means of tensioning, this causes a rattle when worn, a timing chain tensioner, part/no 461256S is available from club spares and this keeps tension on the chain throughout its life and prevents rattling.

**Cooling System:** The cooling system in a traction is quite straight forward, apart from the distribution tube in the cylinder head (as covered in the Engine paragraph). There is no thermostat fitted in these systems so they do not warm up as quickly as more modern vehicles. A temperature gauge can be fitted with the sender unit usually located to read temperatures of the coolant as it leaves the engine, I have fitted mine to the lower plate of the top tank, in line with the radiator hose. I have assisted many traction owners overcome cooling problems, even after their radiators have been supposedly cleaned by radiator specialists. In most of these cases a new radiator, once again available through club spares was the answer, beware of recored radiators as they need to retain the original capacity of coolant. Early water pumps had a gland packing for a seal, all gland packings require some leakage to lubricate the seal and lengthen their life, fortunately, most of these early pumps have been replaced by the later type that use a conventional seal, parts for which are available through club spares. A leaking water pump can cause problems as it is situated above the clutch, any water leaking into this area can cause the clutch to stick if left idle for long periods. I have stayed away from naming coolants for tractions, there are articles on our website relating to this that can be accessed. Remember people like Tectaloy and Nulon, who are named in these articles do change the names of their products at times, so checking current products is vital. As always, if in doubt ask!

**Clutch:** Much has been written about traction clutches, the main thing to remember is that Citroen, although they used standard Borg and Beck clutches did not use the standard Borg and Beck settings. This is the reason that when you send your pressure plate to a clutch specialist for reconditioning it will not work correctly, as he will have set it to the standard settings. The club has two excellent articles detailing how to set up the clutch on the website, one is written by Gerry Propsting and the other by Jack Weaver. If you follow these instructions you should end up with a light, easy to use clutch mechanism. Other factors that involve the clutch, causing it to shudder are, engine mounts

(as explained earlier) and a loose suspension cradle, this is attached to the car by four large bolts, the nuts are easily accessible from the front of the car, the lower two are just above the silent blocs on the front suspension. These four nuts should be dead tight using a ¾" drive socket or similar, no specific tension is given for these nuts in the manual. Some owners have fitted a diaphragm type pressure plate to their cars, the details of which are on the website or a kit can be obtained through club spares. In my opinion a properly adjusted standard clutch is adequate.

**Gearbox:** This is another part of the traction that has received a lot of comments, originally the traction was to have been fitted with an automatic gearbox but engineering and lubrication limitations of the day made this impractical, so a 3 speed manual gearbox was hastily designed and fitted. One of the big problems with this transmission is the manner in which the crown wheel and differential assembly is mounted, i.e. on four unsupported studs that are screwed into the aluminum gearbox housing. Available at club spares is a strengthening plate we called "The Jack Weaver Plate" named after one of our life members. This plate slips over the four studs making a boxlike structure and effectively stopping the four studs holding the crown wheel assembly from spreading, (fitting instructions come with the plate). The other area of trouble is the 2<sup>nd</sup> gear, originally, this gear is supported on two short bushes with a space between to allow oil flow, unfortunately the bushes tended to drift together, eventually cutting off the oil flow and shortening the bearing length, allowing the gear to tilt on its axis and fail. The cure is to fit a one-piece bush, suitably drilled to allow oil circulation. We have some members in the club with the expertise to carry out this important work, so please enquire.

**Gearbox oil leaks:** The main source of oil leaks are from the output shaft seals, replacement seals are available from club spares. However, it is quite useless fitting new seals to a grooved or worn surface, new output flanges are available or the surface can be restored using a "Speedie Sleeve". Another factor causing leaks at the output shaft can be endfloat of the shaft, this should be minimal. If the endfloat is excessive the only way to remedy this is to remove the transmission assembly, dismantle the differential and fit new thrust washers to the differential gears. Oil will also leak between the output shaft splines and the output shaft flange, so some sealant behind the large flat washer under the retaining nut will usually stop this. Oil can leak from the input shaft housing, through which the clutch shaft runs, there is a modification on the club website on how to machine this and fit a seal inside the housing. This is important as oil from this area tends to contaminate the clutch.

**Brakes:** The brakes fitted to a traction are common Lockheed design and are quite effective if adjusted correctly. This design has an adjustable anchor on each brake shoe and therefore requires the use of a brake centering tool, which can be rented from club spares. Once the shoes are centralized normal brake adjustment is achieved with snail cam adjusters. A vacuum booster can be fitted to reduce pedal effort but remember a booster will not make a badly adjusted braking system work any better, it just reduces pedal pressure.

**Driveshafts:** These were originally fitted with "Hookes" type universal joints. The trend today is to replace these with modern constant velocity joints for both the outer and inner joints. The club has been working with a driveline specialist who can carry out this work, the club has been using this company for many years now and his work is excellent. If this modification is carried out the turning

circle of the car can be reduced quite a bit with some adjustment. (the original turning circle is 41feet)  
The other crucial part of the driveshaft is the taper and keyway that attaches to the brake drum, a good fit here is vital, the retaining nut should be tensioned to 216 ft/lbs. It is always a good idea to remove the hubcaps of these cars to check these areas. If there is any looseness between the shaft and brake drum, there may be evidence of rust appearing from behind the nut, a sure sign of movement.

**Suspension:** The suspension is all torsion bar on all wheels, each of these are adjustable. The workshop manual goes to great length on checking the weight distribution, this is vital to good handling. The club website has an article dealing with this topic showing how it can be achieved with two bathroom scales and some suitable timber. The importance of this cannot be stressed too highly. We have seen cars with up to 100kgs difference in loading on the front wheels which can make them hard to corner in one direction and causes wheel spin on the lightly loaded wheel. Driving such cars is extremely unpleasant. Wheel alignment on these vehicles is carried out in the conventional manner, while the camber is non-adjustable, the caster certainly is as well as the toe in/toe out. This needs to be carried out by a qualified front end mechanic.

**Summary:** I have stayed away from body and accessory repairs as these are fairly straightforward and focused on the parts of tractions that cause either the most concern or have the greatest effect on the enjoyment that can be derived from owning one of these delightful cars. The aim of this article is to highlight these problems and how to eliminate them. The club runs a very complete spare parts service and years of expertise is available to all new members. Our wish is to see these examples of Citroen engineering on the road for many years to come.