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" A L V I C "

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As 1967 closes, we have come to the end of the Alvis era, with the cessation of production of Alvis cars after 47 years since 1920. To some extent this news spells the eventual death-knell of our Club, for we can no longer cling to the forlorn hope that new Alvises might once again be distributed in Australia to keep Club membership alive.

Nevertheless, the Club has never prospered as well as the last year or two - in fact, since the demise of Devon Motors, for now all Alvis owners must come to us for parts and assistance. Again, the knowledge that new cars will not be seen here has rather strengthened the resolve of many members to restore and cherish the older models, and several painstaking restorations such as the Warriner FWD have appeared to gladden the hearts of all Alvists. With such cars on the road and beautifully maintained, how can the Club die ? This then gives us in the Alvis Car Club an impetus to a mission we have already given great lip-service to (but little else)- that of preserving to the utmost the limited resources and cars we do have. No longer do we hear of 12/50s being gaily wrecked and cannibalised without any thought that yet another restorable unit is being irreparably lost. What we do hear of at odd intervals are broken down, often incomplete, vintage models being hauled from their rusty resting places, stripped down and carefully restored at great expense to running condition. For these older Alvis cars are very rare bodies, and are becoming increasingly desirable and expensive to purchase. The bottom of the sale price circle has been passed and values are again on the up - particularly if one wishes (shudder) to sell to the U.S.A. At the moment, the TA 14 and Three Litre models are still falling in value, and it is possible to buy a good Three Litre for no more than $600, while a good 4.3 recently fetched $ 1400, and a FWD recently fetched what would have been an unheard of price some years ago. Thus, the time to buy the post-war cars is now, while parts are still readily available, restore them painstakingly, and own and drive them when their sale price value has begun to rise, as it must in the next few years.

The picture then looks quite rosy, but there is one great snag - the parts supply cannot get better, and supply must eventually dry up. At present, Alvis Ltd. are maintaining their renowned excellent service, but they are no longer their own bosses, and the word from Leylands can change their policy overnight. Even without this threat, parts for older models have naturally been harder to procure as proprietary fittings and parts are discontinued and the old stocks on various shelves are sold, and the limited second-hand resources of professional and Club wreckers are exhausted. The situation regarding items such as vintage diffs., tyres, wheels, magneto parts, engine and other castings, moulded fittings, radiators and shells, lamps, horn buttons, starter drives and the like is deteriorating, although with perserverances it has been possible to supply needs up to the present time. When the time comes that certain tyre sizes, for instance, are unobtainable at any price, modifications will be forced upon owners, and cut-down wheels and rims will be the only means of preserving the car as a road vehicle. Such modification, often highly undesired by some owners, has already been forced upon them, and some vintage cars now boast alien diffs., carburettors, false radiator shells, modernised ignition systems, regulators, fuse-boxes, wiring fittings, windscreen wipers, flashing turn indicators. Some modifications are highly visible and distasteful, while others are hidden from view or when visible preserve the character of the car's period. Such modifications are highly acceptable, and they often improve the handling or reliability of the cars. Other changes take advantage of modern techniques, materials and fuels. Modest increases in comp. ratio, the use of modern rings and pistons, bearing materials (eg., rubber, nylon, teflon, lubron bushings), modern valve materials, universal joints, oil seals and the like can all improve the car concerned without detracting in any way from its appearance or performance. Interest by the Club Spares Department has been centred lately on the problem of vintage and post-vintage diff. conversions where new parts of suitable ratio are no longer available, manufacture of unobtainable castings and mouldings.

The immediate future augurs well for the Club, and the interest of its members. The days of 'booze and boast' have gone, and members now come to meetings to learn more about Alvises mechanical and social. The events of the last few years has made members realise that they must stick together for mutual benefit. The more distant future, however, is rather more uncertain and the time to prepare for contingencies is now. We must obtain as many new wanted spare parts as we can while supplies are available and as cheap as they will ever be. Good stocks have been built up over the last two years as a glance at the financial statements will show, but when spares must cover such a variety of models, such stocks can only be considered inadequate. We have at present, one spare post-vintage crown wheel & pinion (new) and if 2 Speed Twenties (for example) bust their diffs. we are in trouble, If two Three Litres burn out their bearings of the same size, only one can be supplied, since we can only hold stocks of one set of each size. If yet another Three Litre crankshaft is broken, the owner will have to wait months for a replacement, because we cannot afford to hold one in stock, much as we would like to. Several members want good Three Litre radiator shells, grilles and front bumpers (why do they always hit things front-on ?) yet we cannot supply, other than to send to England for very expensive new parts.

Ultimate Club survival thus depends on our Spares supplies, and although we have our worries, the picture is not impossibly dismal, for virtually any parts, other than tyres, can be made for a price. This is indeed the situation which applies today for FWD owners, and has applied to them for some 20 odd years, and yet these cars still survive. Whether members feel that an old car, now battered and uneconomical, is worthy of spending large amounts of money on, when a modern tinware unit can be purchased for the same price as the restoration, is the vital question now and in the future. Most Club members feel that where this choice arises, a restored Alvis (and we mean fully restored back to new condition) will give probably twice the service of the new modern car, and certainly twice the enjoyment and pride of ownership. To some eyes it will not be as attractive, comfortable or convenient, but one must remember with pride that it represents a high level of automotive achievement at its time of design up to 40 yearsago, and it has that great feature for which Alvis has always been noted, and for which tinware boys pay many hundreds of pounds extra to gain on their cars - individuality. Let the vintage cry still hold - "the Hare leads the Hounds as Master of the King's Highway" !

It is not very useful to classify motor oils by 'grade' (light, medium or heavy oils etc.) since the grade used by one manufacturer bears no correlation to that used by another. Thus one maker's light oil may correspond to the medium oil of another.

Probably the most satisfactory world standard for oil rating is that of the SAE number system, where the numbers relate to the viscosity of the oil, this viscosity being an important criterion for the performance of an engine oil. It must be apprecaited, however, that these numbers are only concerned with viscosity and take no account of quality or other factors (except with numbers above SAE 75 in the gear oil range, which also takes into account consistency or 'channelling').

The present SAE rating represents the third major attempt by the American Society of Automotive Engineers to introduce a unified standard for motor oils. First used in 1911, the SAE ratings took into account viscosity, flash point, pour point, carbon residue and many other factors. The second series, introduced in the mid-1920s, was based on viscosity in ten 'name' stages. This system became meaningless when manufacturers of oils ignored the names or confused such designations as 'heavy light grade' and 'light heavy grade'. The third and present system, started in 1926, numbered viscosity by a number system. This time, mders fell into line, and an acceptable world-wide standard arose. Since that time, the range of SAE numbers has been increased and revised from time to time, but the overall system has remained.

Basically, the viscosity of an oil is a measure of its internal friction or resistance to flow. The 'thicker' the oil, the higher its viscosity, and it has less tendency to flow readily. For the technically minded, absolute viscosity is a function of the shear stress in the liquid measured parallel to the direction of flow, and the rate of change of velocity of flow as the distance from the boundary wall increases.

The viscosity of any fluid varies appreciably with the temperature. As temperature increases, viscosity decreases, and hence the operating temperature of an engine in service determines the required SAE number of the oil to be used. The ideal is an operating temperature viscosity high enough when hot to maintain satisfactory fluid film for lubrication, but low enough to avoid excessive fluid friction. Use of a thick, high SAE number oil will solve the first problem, but be too viscous and cause drag, and inability to form a thin fluid film on bearing surfaces, and will be intolerably thick when cold, so that starting may be greatly impaired.

Gear oils (over SAE 75) are classified similarly with added consistency requirements at low temperatures. Channelling is a property of thick oils and greases causing a parting or channel in the body of the lubricant so that that some of the working surfaces do not contact the lubricant. This is most likely to occur when the oil is thickest (i.e. when cold). The highest temperature at which channelling is permitted to occur under SAE rating for gear oils is below freezing temperature for water, so that it can be assumed that channelling will not occur in the transmission oils while road and water is ice-free, and that for SAE 90 for example, the temperature must drop to -10°F. before channelling occurs.

Engine oils have two main functions to fulfil: the efficient lubrication of all mating surfaces, and the removal of heat from bearings, pistons and other parts. To fulfil these functions oils must operate over a very wide range of conditions, especially that of temperature. In addition, oil may be contaminated from dirt, condensed water, unburnt fuel, oxidation products from combustion, and breakdown of its own structure over a period of time.

"Premium" quality oils are considered to have definite advantages over "Regular" oils, and include reduced friction, improved oiliness, greater resistance to oxidation and acid formation, less sludge formation, and improved anti-wear characteristics. This is achieved by the judicious use of additives to give special properties. "Heavy-duty" oils set an even higher standard with a particular accent on engine cleanliness. "Multigrade" oils are designed to eliminate the need for seasonal changes of oil, or to overcome the problem with high temperature operating extremes with premium or regular oils.

Viscosity

The internal friction of an engine represents work done by the fuel for which the driver obtains no power return. When it is realised that the greater part of the internal friction arises from the viscosity of the oil it will be appreciated that use of a lower SAE number oil will improve power output and miles per gallon of fuel. Tests have shown an improvement in engine efficiency and fuel consumption of from one to four per cent. with a reduction in oil viscosity of 10 SAE numbers. Another advantage of using thinner oils is the increased rate of circulation, which, together with the reduced friction, improves heat dissipation and reduces bearing temperatures. This requires that the oil pump is adequate to the task of maintaining this circulation. In an actual test engine, it was found that a change from SAE 50 to 10W reduced big-end bearing temperature by 20°F for the same running conditions. Better heat transfer and reduced piston deposits are also associated with lower viscosity oils.

Unfortunately, viscosity cannot be lowered below a certain limit, since satisfactory lubrication depends on this property, and the lower the viscosity, the thinner becomes the oil film separating the parts. Thus the low limit on viscosity for a particular engine is determined by the value required to avoid piston scuffing and bearing failure under heavy duty, and also a consideration of the increase in oil consumption associated with lower viscosity.

Additives in premium, heavy-duty, and multigrade oils reduce the possibility of scuffing and breakdown of the oil film under load. However, low viscosity in itself lessens the load-spreading action of the oil film in a bearing and increases the surface fatigue stresses. In modern engines with closer precision tolerances, this is not as significant as in vintage and PVT engines, and thus older engines generally require a higher viscosity oil than modern ones.

It should be remembered that as viscosity decreases with increasing temperature, the critical viscosity is determined by the fully-warmed up conditions, with an appropriate allowance for over-heating from high-speed driving, and other extreme conditions. The ideal lubricant should thus have a sufficiently high viscosity at the running temperature to provide dequate lubrication, and as low as possible a viscosity at starting and during the warming-up period.

The viscosity of an oil at running temperature has a pronounced effect on the mechanical losses in the engine, and consequently on the over-all efficiency. For example, engine friction losses will decrease by 9 % for each 10 SAE numbers reduction in viscosity grade. An improvement of approx. 9 % will therefore be obtained at no load, but as the throttle is opened, the importance of the friction losses becomes less and the gain in fuel consumption becomes correspondingly smaller. At one-eighth throttle, which is the lowest likely road condition, the gain is approx. 6 %, and at full throttle it is only about 1 %.

Another advantage of using thinner oil is the increased rate of circulation which, together with the reduced friction, results in reduced bearing temperatures. On the other hand, increased oil turnover increases oil consumption, and can reduce the oil film on a bearing surface. However, the reduced temperature of the bearing means that the metal is better able to withstand the stresses. In general, an oil of SAE 5W will not give bearing trouble provided the oil pump has adequate capacity, the bearings are in good condition, and the sump-oil temperature is not excessive.

Oil consumption undoubtedly tends to increase as the oil viscosity at the working teperature of the piston rings decreases, but the relationship is not a simple one. Evidence shows that oil consumption is independent of viscosity until a critical value is reachedbbelow which the consumption starts to increase rapidly. In new engines this critical value is outside the working range, so that all grades between 5W and 50 give the same rate of oil consumption. As the condition of the engine deteriorates the critical viscosity moves upwards until there is a continuous decrease in consumption from 5W to 50. As a general guide for average engines, SAE 30,40 and 50 give essentially the same oil consumption, SAE 20 gives 10% increased consumption, SAE 10 gives 40% and SAE 5W gives approx. 80% increased consumption.

The running temperature of the cylinder wall varies in different engines between 260 and 450 degrees F at the top and 200-300 deg. F at the bottom. Thus, oil consumption will tend to be less with thicker oils, and the best oil to use is the oil which will withstand the temperature and give satsifactory oil consumption and yet be the lowest viscosity grading. The table below gives some general recommendations:

Engine Condition	Winter - max temperature 68°F (20°C)	Summer -max temperature 104°F (40°C)	Tropical -max temperature above 104°F (40°C)
New engines	5W	10W	20 or 20W
Engines in average condition	10W	20W or 30	30
Old or worn engines (incl. vintage cars)	20W or 30	30 or 40	40 or 50

Oil consumption

Apart from leakage from various joints and oil seals. oil loss arises from three causes:

a) Volatilization of the oil film left on the cylinder wall during the combustion stroke.

b) Thepumping action of the rings placing oil in the combustion chamber where it is burnt.

c) Seepage down the valve guides into the chamber.

The first of these causes can be disregarded in normal petrol engines, and is only significant with the lowest viscosity grades. The quantity of oil casumed from the other two causes is directly related to the wear that has occurred. Oil consumption of any engine gradually increases during its life, and viscosity can be increased as wear proceeds to keep consumption within reasonable limits. A lighter oil will more easily be pumped into the combustion space by the piston rings and seepage past the valve guides will be high leading to burnt deposits on the undersides of the valve heads. It can also be added incidentally that a light oil will more readily seep past gaskets and oil seals. Use of thicker oils will help reduce all areas of oil loss, and will minimise the effect of dilution by petrol passing the worn piston rings.

Engine cleanliness

Oil has an ability to keep the inside of an engine clean and helps prevent sticking of the piston rings. Internal deposits may arise from the fuel or the oil or a combination of both. The deposits may be hard lacquer-like films on the piston, and similar, though heavier, deposits in the ring grooves; or they may be soft sludges found in the crankcase, rocker boxes and timing cases, particularly on the cooler surfaces. These deposits are highest by excessively hot or cool running.

All oils inhibit deposit formation for a certain length of time, after which they become saturated with deposit-forming material and deposition of sludge and hard deposits around the engine begins. Detergent additives greatly increase the amount of such materials that can be held in the oil and delay the onset of deposition. As the oil circulates through the oil filter, hard deposits are collected by the filter, and the ability of the oil to prevent deposition is increased. Hence, more or bigger capacity filters improve the oil's service life.

The factors involved in designing an oil to give maximum engine cleanliness are:-

1. The stability of the oil itself. Under the high temperatures in the chambers and pistons unstable oils form insoluble resins and gums, which give rise to lacquer and carbon deposits. These deposits are dueto the direct oxidation of the oil andtoochemical reactions which occur between the oil and hot combustion gases.

2. The ability of the oil to prevent the formation of deposits in the combustion chamber, which ifallowed to build up, cause pinking and increase the octane no. requirement of the engine fuel.

3. The ability of the lubricating oil to keep in suspension carbon deposits, lead compounds, and other contaminants which find their way into the oil system, and cause piston ring sticking, sludging, blockages and other troubles.

4. The ability of the oil to prevent the formation of sludge deposits such as occur under low temperature stop-start conditions.

Oil Stability

Oil can deteriorate for any of the following reasons:

1. Contamination by i) Carbon-combustion products.
   ii) Unburnt fuel.
   iii) Lead compounds from the petrol.
   iv) Ash from additives.
   v) Adventitious solid matter (dust etc)

2. The development of corrosive properties to copper-lead bearings.

3. Increase in viscosity due to oxidation.

Contaminant materials such as salts, ash, solids, carbons and the like are normally removed by the engine oil filter. Rapid choking however, cannot be tolerated, and is usually the sign of inferior oil, bad engine condition, or too long an oil change period. Water from condensation, petrol fractions in the fuel are usually dissipated during hot running via the engine breather system, providing this is adequate, and systems actively sucking off crankcase fumes and directing them into the inlet manifold or onto the road are of great help in keeping engines free of these volatile contaminants.

Corrosion of certain bearing materials can be a significant factor in choosing the oil to use, especially with copper-lead bearings. When the oil temperature is high, and there is inadequate cooling, acids are produced in the oil which attack copper-lead bearings. Anti-corrosive properties of the oil depend upon the quality of the base oil used and the presence of anti-oxidant additives, which operate by inhibiting oxidation of the oil or by providing a corrosion-resistant film on the bearing. It can happen, too, that additives added to an oil can directly attack other bearing materials, notably phosphor-bronze bushes, and silver-lined bearings under conditions of high temperature.

Combustion Chamber deposits:

The build-up of chamber deposits raises the octane requirement of the engine and can cause pre-ignition. Experience has shown that careful selection of a basic distillate oil rather than blending light and heavy components to obtain a articulat viscosity does much to reduce combustion deposits. Some additives in detergent oils render the normally-produced ashes friable so that they are continually blown out the exhaust system as a fine powder. Such additives may be added to the oil or to the petrol. During the last war, for instance, the addition of naphthalene flakes (often in the form of moth-balls) was well known for its ability to reduce carbon deposits when added to the petrol tank - it also scoured out the tank and fuel lines, and usually clogged up carburettor jets etc., and needed a good fuel filter at the carburettor intake.

Piston deposits:

The formation of lacquers and carbon clogs the rings, leading to increased blow-by, charring of the oil film and high rates of wear. Carbon deposits may also flake off when they reach a certain thickness, and abrasive wear ensues as these hard chips are ground into metal moving and contacting parts. Deposits inhibit free heat flow from the piston through the cylinders to the water jacketting. This raises the piston temperature and accelerates formation of new deposits.

Low temperature corrosion:

Cold corrosion may be encountered when engines are run at low temperature in cold climatic conditions, and arises from the break-down of certain oil additives in the presence of acidulated water from internal condensation. The trouble can be overcome by keeping engine temperatures as high as possible by using radiator blinds, efficient thermostat and by-pass water systems, and by using lower gears to keep revolutions high. Other factors leading to this corrosion can be poor design of the oil sump and inadequate allowance for crankcase ventilation. If the area of the sump exposed to the icy air stream is large considerable condensation will take place on the walls of the sump and in the breather pipe, most of this water draining into the oil supply.

Sludging:

Sludge results from solid products of combustion, partly-burnt fuel, water, dirt and other contaminants carried to the sump. Water from combustion emulsifies with the break-down products of the oil and in so doing, coagulates the solid contaminants to form a pasty material with the consistency of mayonnaise. From this it follows that elimination of water, contaminants, and oil oxidation and break-down products will also eliminate sludging.

Sludge is nasty stuff for many reasons. Firstly, it makes the engine slimy and dirty and clogs up oilways, ring grooves and oil filters. The blocking of the action of scraper rings causes high oil consumption. Filters choke because the coagulates will not pass through the fine pores, and if the filter is not replaced continually, the filter is by-passed and the solids allowed to circulate freely within the engine. Secondly, it leads to early failure of white-metal bearings. The coagulates of sludge enter the bearing, and, as they come under load, displace the soft bearing metal to form a crater. The solid particles are then flushed from the bearing by the oil flow when load is relieved, but the rim of the crater forms a raised area where load concentrations cause interruption of the oil film leading to excessive heat and accompanying fatigue. Thirdly, corrosion of metal parts and valve spring failures can result from sludging. Sludge adheres to any surface which is not continually wiped by another component; the water in the sludge being directly in contact with the metal and unable to escape and rusting occurs. With valve springs this corrosion takes the form of small pits on the highly stressed surface leading to stress concentrations and fatigue failure.

To overcome sludging, the oil must have adequate dispersant properties, and a built-in stability to prevent oil break-down products which act as the emulsifying agent. In the modern heavy-duty detergent oils the necessary qualities are obtained by carefully blending oils and additives.

Ease of starting:

This depends on many factors including atmospheric temperature, the size and condition of starter and battery, the design, adjustment and age of the engine, the fuel quality and the oil quality and viscosity. It is obvious that the lower the viscosity of the oil the higher will be the speed at which the starter can turn the engine. The lowest temperatures at which a standard SAE 30 oil will permit starting is approx. 25°F. and for a heavy-duty dtergent oil this temperature falls to 0°F. (i.e., below freezing point). In general Australian climatic conditions icy starts are rarely encountered, but with a starting temperature of 30°F, the initial torque required to turn the engine with the heavy-duty oil is under half that of the SAE 30 standard oil and cranking speed attained is about 50% higher. The lower rating multigrade oils are thus of considerable advantage during starting, reducing loads on starters and batteries, increasing cranking speeds, and by lowering frictional losses, reducing the need for choking.

Anti-wear properties:

Reboring is one of the major maintenance costs, and reduction in the rate of wear thus represents an important saving. Wear rate increases with loading and engine speed, and can result from any or all of:

1. Corrosion from acids in oils.
2. Abrasion from foreign matter reaching the engine through the air intake, crankcase breather or in the oil.
3. Oil starvation at start-up.
4. Indirect effects from the presence of deposits - poor heat transference, clogging rings, filters etc.
5. Rupture of the oil film at high temperatures with low viscosity oil.

Sulphur in the petrol (approx 1%) forms sulphur dioxide and trioxide, which, with water, form sulphurous and sulphuric acids. The alkaline character of multigrade additives neutralise these acids, but once the alkaline content has been exhausted the oil becomes acidic and more and more corrosive. Changes at regular intervals are thus required to minimise this action.

The prevention of entry of abrasive material into the engine is mainly one of design and efficient filtration; nevertheless, the increased film strength of additive oils offsets abrasive wear by reducing the tendency of small particles to rupture the oil film. Wear due to sludging and deposit formation can be virtually eliminated by detergent additives and regular oil changes. Oil starvation and oil film rupture are overcome by the viscosity characteristics and film-strength properties of current all-season premium motor oils. These oils maintain good ring action and avoid blow-by, thus largely eliminating wear from this cause.

Experience has shown that the greatest wear occurs when cars are used for short stop-start duties - representative of a large proportion of passenger cars in city areas. Tests show that wear in the first ten minutes of running is between 30 and 40 times as great as after the engine has reached normal operating temperature. This high rate of wear during the first minutes after start-up is not merely due to running with a low water jacket temperature. Initial wear is also largely a result of corrosion which occurs while the engine is shut down overnight. Acidic gases left in the cylinders condenses and the acids formed attack the rings and cylinder walls. During the short period following start-up, both the metal contained in the products of corrosion, and the particles of metal removed by abrasion caused by these corrosion products, are carried down to the sump and thus give an indication of high wear rate, since this is tested by the measurement of the increase in metallic particles lodging in the sump.

GENERAL CONCLUSIONS:

The lowest possible viscosity is required under starting conditions to provide the fastest cranking speed with the minimum drain on the battery, and with minimum need for the choke. Under running conditions, the viscosity is not so critical and the grade chosen for an engine should have the lowest viscosity which gives a reasonable oil consumption and which does not become too thin when high operating temperatures are attained. Where corrodible bearings are used with sump temperatures in excess of 250°F. it is important to select oils carefully using best quality oils and additives.

Detergent and heavy-duty all-season oils are very effective in reducing deposits and wear, resulting in overall economy and ensuring a considerable extension of the time before decarbonisation becomes necessary. It must be pointed out, however, that these qualities are not everlasting, and that regular oil changes as recommended are required. The distance between oil changes will also depend upon the amount of dust in the atmosphere and the degree of filtration of the air-intake and crankcase breather along with the oil filter/s which all determine the amount of dirt and unwanted solids circulating within the engine. The more numerous and efficient the filtration of air, fuel and oil, the longer service any type of oil can supply and the longer lasting the engine.

Applied to Alvis engines, it follows that all such engines with the probable exception of blown FWD, would benefit from detergent heavy-duty oils, but with the vintage models one must be careful to ensure that a sufficiently high level of viscosity can be attained to accomodate the larger working tolerances. A 20/50 oil would thus be required, and it would be unnecessary and unwise to use such oils in the gearbox and diffs. where standard 40 or 50 grade oils are required. Hand in hand with detergent oils is the need for adequate filtration. Alvis engines, with the exception of the Speed models in the 30's are rather weak in this regard, and it is quite astonishing that the Three Litre models before the TC 108G were not fitted with any filtration of the oil or air. It is imperative to fit at least a by-pass oil filter to the Three Litre if detergent oils are to be used. Dispensing with the air silencer which masquerades as an air cleaner, and fitting an adequate capacity modern air cleaner of oil-bath or element type is also highly recommended. The vintage models and post-vintage cars were fitted with gauze mesh filters, and would also benefit from additional modern type element filters of by-pass or full-flow type. Some models can easily and inconspicuously be modified. Air cleaners on early models can be quite a problem, but one should make strenuous efforts to do the best possible in the circumstances.

DAVID HURDEN.

SERVICE DATA SHEET NO. 3L/21

THREE LITRE STEERING IDLER BOX

A modification has been introduced in the steering idler box Part No. C 5870, with the incorporation of an oil seal No. C 7224 at the bottom of the box, and does not involve any alteration in the part number of the box.

In future, the idler box incorporating the oil seal will be supplied as a replacement in all cases.

In addition, we are shortly incorporating an extended oil filler, both for the idler box and the steering box together with a screw adjustment to take up end float in the idler shaft. These parts can be incorporated on cars already in service, and the parts will be supplied from us upon application.

SERVICE DATA SHEET NO. 3L/22

SUMMARY OF SERVICE INFORMATION

From experience gained with Three Litre cars in service during the past three years (1951-4), a number of points have arisen. A summary follows, but we would like to make it clear that the majority of the points come under the heading of rare occurrences. Should they be experienced however, in some instances, location of the trouble may cause some difficulty, and in this respect we hope the summary will be useful.

RADIATOR: Loss of water from the cooling system if there is no sign of external leakage can usually be traced to leakage past the overflow valve. This valve acts in two ways, permitting the escape of water due to expansion, and the entry of air when a depression is caused by the water in the system cooling. This valve consists of four main parts; the body is fixed to the radiator top tank; the valve, the rubber seating and the hexagonal top plug are removable. Removal of the plugpermits the valve to be withdrawn from the housing and exposes the rubber seating ring for the overflow valve. There is a lip on this seating which should be uppermost when the seating is fitted. The return valve is situated inside the main valve and consists of a spring-loaded plunger inside the valve stem. Any leakage due to poor seating of either valve will permit loss of water under running conditions, and where excessive loss beyond normal expansion loss is experienced, the valve should be examined, cleaned and where necessary, replaced. A loss of up to two pints can be expected due to expansion, and should be allowed for by not completely filling the radiator.

WATER PUMP: In addition to the modification in Service Data Sheet No. 3L/13 (May 1965 Alvic) we are now fitting a rubber washer on the pump shaft in front of the bearing to throw off any water which may pass the pump gland and prevent it from entering the bearing. The part number of this thrower is C. 7238.

THERMOSTATS: The standard thermostat opens at 60°C. In cold weather it may be found that this does not provide hot enough water for the heater unit, so an alternative thermostat opening at 75°C. is available.

FRONT ENGINE MOUNTINGS: It has been found that road shocks at the front of the car can be reduced by altering the front engine mountings to a horizontal position. This alteration is now being made in production and can be incorporated on earlier cars, though a welding operation is involved on the front frame cross member. Particulars and parts can be obtained on application. It is advisable to check the rubber engine mountings at regular intervals, as in time the rubber is liable to break away from the metal plate of the mounting. If this occurs, very severe road conditions may cause the engine to move forward and the fan blades may foul the radiator block.

OIL FEED TO VALVE ROCKERS: Oil feed to the rockers is controlled by a restrictor ball fitted inside the centre rocker shaft. When there is pressure in the system, this ball rises onto a seating providing a restricted flow of oil upwards. Sometimes, usually after decarbonising, foreign matter in the sytem can cause the ball to stick, and at the same time cut off the flow of oil past the restrictor. This can usually be remedied by freeing the ball by inserting a wire into the hole exposed by removing the rocker shaft locating screw which is fitted to the top of the centre bracket. Should the trouble persist, a new centre bracket complete should be fitted.

CYLINDER HEAD NUTS: As some difficulty may be experienced in tightening the nuts securing the rocker brackets, it is permissible to reduce the brackets to permit a ring spanner to be used on these nuts.

OIL CONSUMPTION: An engine oil consumption of better than 1,600 miles per gallon is considered to be satisfactory. Genuine cases of excessive consumption are rare, but inaccurate dipstick readings must be watched. (Ref. Data Sheet No. 3L/10). One neoprene faced split collar should be fitted to all valves to prevent oil running down the valve stems (see Service Data Sheet No. 3L/2) and valve guides should be chamfered at an angle of 45° at the top, leaving a flat of 1 mm. width around the inner circumference of the guide.

OIL PRESSURE: A pressure of 25 lbs. per in^2 or more at 40 m.p.h. is considered satisfactory, and a combined zero reading at idling is no cause for concern. Refer to Data Sheet No. 3L/14 re modified oil relief valve. A drop in pressure usually indicates dirt on the relief valve seat or a sticking plunger.

TIMING CHAIN: On occasions, the timing chain tensioner has been known to take up the next tooth on the rack earlier than normal. This produces a tight chain, and at low engine speeds a noise rather like a dry bearing is heard, and seems to be located in the region of the distributor, and can mislead one to think that a fault has developed in the distributor or oil pump drive. In practically every case where this trouble has occurred the noise will disappear after a further 500 miles or so, and no harm will resultapart from slight eccentricity on the tensioner sprocket. Should the noise persist, the timing chain and tensioner unit should be examined and replaced if necessary.

STARTER RING GEARS: To improve the life of the ring gears, these parts are being hardened, which gives much better results, particularly where the starter is frequently used.

VALVE TIMING: The valve timing diagram in the 'Motor Trader' Sheet No. 202 is only correct with valve clearances of .020" cold. This information should be used for timing purposes only - this fact was unfortunately not given in the 'Motor Trader' Sheet.

COMPRESSION RATIO: With the introduction of high octane fuels, the compression ratio can with advantage be raised from 7.1 to 8.1. Without causing engine roughness, greater power and better fuel consumption can be obtained. The 8.1 ratio is achieved by machining 3/32" from the face on an original cylinder head, not previously ground. This alteration should only be made where a fuel of at least 78 octane by the motor method or 84 octane by the research method is available. When surfaces are ground the same quantity must be taken off the bottom of the water inlet pipe which engages in the water pump body, otherwise the head will not seat fully or the water pump pipes or body will be cracked.

S.U. CARBURETTORS: This type of carburettor was introduced early in 1952. It has certain advantages where a high grade fuel is not available, and better slow running can be obtained in heavy traffic. The correct needles for the S.U. units are:

ES for 7.1 comp. ratio engines.
CE for 8.1 comp. ratio engines.

The auxiliary carburettor for cold starting is operated by a thermostatic switch fitted at the rear of the cylinder head, and by a switch on the instrument panel which will over-ride the thermostatic switch only when the temperature is low enough to bring the switch into operation. It is always difficult to design an automatic cold start device which will meet all conditions, and where a case arises that the automatic cut-out causes difficulties, it is suggested that the auxiliary carburettor should be wired direct to the instrument board switch so that the choke is manually operated at all times.

Where the quality of fuel is not good, we sometimes have complaints of running on after the ignition is switched off. This usually indicates that the carburettor adjustment is incorrect, assuming that the engine does not need decarbonising and correct plugs are being used. To avoid this trouble, carburettors should be adjusted to give an even idle on the weakest possible setting. The throttle adjusting screw should be set so that the engine idles just fast enough to avoid stalling. Adjustment should be carried out with the engine thoroughly warmed up after a run on the road.

SPARK PLUGS: The standard plug is Champion L 10. Where 8.1 compression ratio is used, Champion L 10S give satisfactory results, but being a cooler plug, they may tend to oil up in severe traffic conditions.

WHEEL BALANCE: It is essential that wheel and tyre assemblies should be in correct balance, both static and dynamic. Irregularities felt at the steering wheel can in nearly all cases be traced to a badly balanced wheel assembly. Irregular tyre wear will oftenprovide significant clues.

STEERING COLUMN RATTLE: Should a rattle develop in the steering column, there are two possible causes. The stator tube may be rattling against the steering column, in which case the tube should be withdrawn as far as possible and coated with a thick high melting point grease before refitting. If the rattle is caused by slackness of the control head on the stator tube the felt washer fitted between the control and the flange on the stator tube should be replaced by a corrugated brass washer which is available from the Service Dept. This washer should be well greased when fitted.

CLUTCHES: Two types of clutch are fitted to Three Litre. Earlier cars had a plate with an eight spring centre, and present production cars have a plate with six springs. These plates are interchangeable, but if a six spring plate is used to replace an eight spring type, modified toggle arms are required for the clutch assembly to give clearance between the plate centre and the arms. In the Service Department we have used a woven type of lining (Raybestos WR7) on replacement clutch plates. This gives a smoother take-up, but is more expensive than the standard lining. Should clutch 'judder' be experienced on taking up the drive, it may indicate uneven adjustment of the engine steady rods. These rods should be adjusted so that they are both slightly in tension with the engine stationary.

BRAKES: The design of the braking system permits a rather long free movement of the pedal before the brakes operate. No attempts should be made to reduce this free movement by adjusting the clearances between the pedal push rod and the master cylinder piston, for if this clearance is reduced below 1/32" the brakes will not release after application. A micram adjuster for the rear brakes is available for early cars which permits finer adjustment of the shoes (Data Sheet No. 3L/16). The standard brake lining is Mintex M.20 grade linings, which have very good anti-fade properties, but require slightly more pedal pressure at low speeds to obtain equal results.

FRONT SUSPENSION: For average road conditions, we consider the standard front damper to be adequate, but a damper with a heavier setting is made for usage where roads are poor. It is also possible to use a larger heavy-duty damper for severeroad conditions, though this type is more expensive.

REAR SPRINGS: The deflection of the rear spring is limited in the rebound direction by an hydraulic cushion incorporated in the dampers and in the bump direction by rubber buffers on the chassis frame. New cars have a tendency to 'bump' on rebound, particularly in the case of the lighter coupes. This arises from the camber of the new springs, which tends to diminish during the first few weeks of use until the spring settles to its permanent camber about mid-way between the two stops when fully loaded. Under severe road conditions, it may be beneficial to fit an extra leaf between 2 and 3 leaves.

TRANSMISSION KNOCKS: There are 5 causes for this when the car is moved away from rest:

1. There may be play between the splines of the propeller shaft coupling flanges, either at the gearbox or diff. pinion. This can be remedied by fitting copperised splines available from the Service Dept. to either the gearbox or pinion splines as the case may be.

2. There may be wear in the propeller shaft universal joint assemblies, indicating replacement or overhaul.

3. There may be excessive end float in the rear hubs which can be adjusted by removing shims. Correct end-float is .006"-.008", and it must be remembered that theaxle shafts butt on a floating thrust block in the centre of the axle, and each hub bearing takes thrust in one direction only. Knocks are seldom traced to the rear axle, and adjustment is rarely required.

4. Cases have been known where a knock was caused by the front eye of a rear spring fouling the spring bracket. This can be dealt with by cutting away the spring bracket to give clearance.

5. Movement between the main and second leaves of the rear springs can cause a knock from the turn-over of the second leaf contacting the spring eye. If this occurs, the turned-over portion of the second leaf should be cut off.

In the case of 4 and 5 above, the knock could be expected to occur also on cornering or on rough roads.

VARIATION IN MODELS:

The following parts are interchangeable between the TA 21 and TC 21.

Radiator, shell and grille.
Exhaust and inlet manifolds and front exhaust pipes.
Chassis frame.
Petrol tank and petrol gauge tank unit.

The following are not interchangeable between TC 21 and TC 21/100 with wire wheels:

Hubs, brake drums, wheels, wheel nuts.

SERVICE DATA SHEET NO. 3L/25

VALVE CLEARANCE ON ALL THREE LITRES

We recommend that the exhaust valves on all Three Litres (TA - TD 21) be set at .012" with the engine hot. The inlet valve setting remains at .009" with the engine hot.

SERVICE DATA SHEET NO. 3L/50

THREE LITRE ENGINE OILWAYS

For the purpose of drilling the oil feed to the rocker shaft in the cylinder block, the hole into which the offside centre main bearing stud is screwed is drilled right through to the oilway feeding the centre main bearing. Thus, when the stud is fitted a pocket is formed between the end of the stud and the centre main bearing oilway.

It is advisable when carrying out an overhaul on one of these engines, to remove the particular stud when cleaning the oilways and to make sure that foreign matter or debris from a bearing failure has not become trapped in this pocket. It might be possible for such foreign matter trapped here to later escape into the oilway and cause an obstruction to the oil feed both to the rocker shaft and to the centre main bearing.

Service Data Sheets for TD and TE 21

The Data Sheets reprinted above exhaust our supply of Service Sheets from Alvis Ltd. with the exception of a number relating to TD and TE 21 models. As there are only two such cars within the Club, these will not be re-printed, but anyone who wishes to inspect them may do so from the Spares & Service Registrar. Spare Parts Books for these models are also available for members interested in modification of certain parts to later specifications.

SOME SORT OF HOAX ?

IMPOSSIBLE Unless you think of a great vehicle with a great millionaire finish inside and out at the hobos price.

Some people tell us it looks like a pregnant pastie. But frankly, we don't give a damn ! We just get rid of as many as possible (mainly because we have a clever advertising agency.) Sure the engine's very noisy, but we don't care. Once you've bought one, that's your problem.

All in all, it is just a car, that's all. And good enough if you like that sort of thing. And we don't waste time making the car look better, or even drive better. We used to say that we were always making little improvements that don't show. This year we've done something exciting about the ones that do show. Imagine whitewall tyres as standard equipment on the new HoaxWagons. We have them, although the car doesn't run any better for it, it sure improves the appearance, and that wouldn't take much as you all know.

Look at the paint work. Four coats of paint. We need that many to hide the rust. We look into things thoroughly. We fire a gun loaded with ball bearings at samples of baked enamel to tell us which paints can stand up best. We've sure got the problem of ball-bearing damage licked (except in the hubs, which are still tricky).

No radiator to fill up or boil over. Hoaxwagon is air-cooled. But don't go driving into any vacuums though ! And no one can blame us for not fitting a temperature gauge, so when things get too hot, the first you know about it is when the engine melts all over the road.

As in all HoaxWagons there are fewer things to go wrong. Only the barest essentials are fitted. From the driver's seat, everything you need can be seen. There's now a fuel gauge to tell you how slowly the petrol is leaking away, a speedometer to tell you how fast you're going, (although this is a luxury as the engine noise tells you this), and a mileometer clocking every mile up to 99,999 miles. After that you need a new set of instruments to start all over again. Don't let anyone kid you that you need more - ammeters, oil gauges, temperature gauges are really a nuisance because they give you warning that things are beginning to go wrong, and this only creates needless worry.

Some door windows don't wind down. Ours do. Winding them up again is the hard bit, but as you have heard HoaxWagons are almost airtight. It helps to wind a window down before you close the door.

There's a built-in heating system too - there has to be with such a lot of heat in the back. The heater has six outlets - two for the windscreen. The others heat the oil, the battery, the brake fluid and the accessory chaff-cutter in the back.

What's the secret behind all this ? Hoodwinking, we call it.

Little things mean a lot to HoaxWagon. And to the people who buy HoaxWagon too. Very little taste is needed either.

Who needs a beetle-back, when you can have a beetle? They're much the same in performance, but the other is forty years old, so really !