GARDNER

Engine Forum

Autumn 2004 Issue

No.7

Gardner Engine Forum Philosophy

"The aims of the Forum are to promote and foster interest in all Gardner engines"

Subscription

The annual subscription to the forum is £10.00 (This magazine will be published twice a year)

Price of each issue to non-members £2.75

Overseas subscription £18.00

Forum Officers

Chairman:
Colin Paillin
Ivy Cottage, 11 The Green, Hose, Melton Mowbray, Leics. LE14 4JP
(Tel: 01949 869004)

Treasurer:
Mike Short
66 Queen Street, Weedon,
Northants. NN7 4RA

Membership Secretary:
Bob Heath,
Corkers Wood Cottage, Forty Green,
Beaconsfield, Bucks. HP

Secretary / Editor
Lucy Short
66 Queen Street, Weedon,
Northants. NN7 4RA

Contents

Cover Picture

Line up at Walsall 2003

Chairman's Jottings

Welcome to this autumn issue of the GEF newsletter - doesn't time fly.

The Gardner Engine Forum, AGM was held at the beginning of April and I would like to thank those who took the time and trouble to attend. You will see from the listing of Committee Members on the first page of the newsletter that some changes have been made. Our constitution states that committee members are eligible for re-election each year and the Chairman every two years. Our new committee is:

Colin Paillin – Chairman	Bob Heath – Membership Secretary
Lucy Short – Secretary / Editor	Mike Short – Treasurer

Tony Redshaw is no longer our Treasurer. He was one of the three founder members of the Forum and I would like to personally thank him for all the hard work and effort he has put into the Committee and getting the Forum up and running.

John Humble, who stands down as Membership Secretary, suffered a stroke earlier this year. The news is that he is now at home with his family and making good progress - we wish him well.

We have been busy behind the scenes and can announce that the next Gardner Rally will be at Castlefields, Manchester, on the weekend 4th & 5th June 2005. Manchester City Council is very happy for us to be on this important site and are giving us a lot of support. We are delighted to advise that the Forum will provide the necessary financial support for the rally, which will mean FREE entry and FREE rally plaques. Details of an event for the Saturday evening have not yet been finalised. I would like to hope that this will be our biggest rally to date so please make a note in your diary for next year

We are also very grateful to Gardner Parts who once again will be providing their very welcome support.

Regards

Colin Paillin

Chairman
Gardner Engine Forum

Continuing our transcript of:

Diesel Maintenance
T. H. Parkinson, AMIAE

Chapter 3
Engine Maintenance

Assessing Wear Standards; Component Replacement and Repair; Cylinders and Piston Assemblies

Routine adjustments are to some extent governed by three principles:-

1. Period or interval of attention
2. Method of approach
3. Periodic revisions to increase efficiency

1. Certain suggestions have already been made regarding transposing manufacturers' recommendations into suitable time or mileage intervals. Using regular inspection as a basis, followed by attention to filters, tappets, injectors and timing adjustment, cycles are completed up to the need for the first major operation, i.e., removal of cylinder heads for valve and other attention. These cycles of adjustment are termed "Preventative Maintenance" and major repairs are classified as "Corrective Maintenance".

2. The relation of manufacturers' instruction books to this item will be recognised. It is admitted that the amount of information provided by these publications varies. At the same time it is doubtful if any improvement could be suggested on the detail matter contained in the Gardner and Leyland publication in particular. The average fitter or mechanic is usually able to apply the correct sequence of dismantling or assembly after the first example has passed through his hands. With this in mind it seems a reasonable assumption that the engine manufacturers' method of detailing essential adjustments is a sound principle upon which to build.

3. In reviewing any method of improvement to component efficiency or for reducing the time occupied in making necessary adjustments, the importance of service bulletins must be recognised. In the light of service experience a number of engine manufacturers publish either in bulletin form or in their "House Journals" particulars of various component modifications.

These details should be available, and wherever they are applicable some system of introducing them at appropriate repair intervals should be adopted. Any review of methods to reduce adjustment time to the minimum must recognise the influence of the fitter. In preventative maintenance a correct sequence of inspection should be followed. The fitter himself gains under these conditions by some saving of effort. It might appear to be labouring the point, but cases have been known of pit inspection of sump bolts, followed by under-bonnet inspection and a subsequent return to the pit in order to check oil filter connections. Correct sequence should also be followed closely in component erection. A good fitter does not need to keep checking and re-checking his assembly. A correct sequence of procedure allows a single check at each major operation and is progressive. Any feeling of "I wonder if I checked so and so" will neither give peace of mind to the individual nor produce a sound job.

As a practical example of the importance of correct sequence take such a simple item as adjusting the tappets of certain engines during the period when injectors are removed for attention. Some time and effort will be saved by possessing a knowledge of the tappet cycle of the particular engine without resorting to the method of completing the adjustment of each tappet of the individual cylinder and then rotating the crankshaft until the tappets of the next cylinder are down, and so on. The benefits of correct tools and shop-made gadgets are obvious, and whilst these individually are small details, collectively the play their part in getting the best results.

The succeeding pages of this chapter outline certain aspects of component repair work coupled with mileage and time intervals for a specific set of conditions, and the following table relates to passenger transport in town conditions. In order to obtain effective comparison against the varied conditions obtaining, e.g., in haulage work, transposition of the intervals on the lines referred to in the previous chapter is necessary.

Lubricating oil change is carried out at every third inspection period, while the filter attention, injector changes and tappet adjustments are carried out at their appropriate periods while the vehicles are parked during off-drive hours. A complete cycle of 5000 miles includes approximately six inspections. The cycles continue up to each major repair period which are mileage intervals of 15,000. These mileage intervals are progressive up to a final complete unit change or complete overhaul.

Approximate Annual Mileage 38,000 (750 weekly)		
Repair Attention	***Mileage Interval***	***Time Interval***
Inspection	-	Ten days
Fuel Filters	-	Fortnightly
Lubricating oil change and filter	-	Monthly
Tappets	-	Ten days
Injectors (direct injection	2500	Monthly
Injectors (air cell)	5000	Alternate months

	Mileage Interval	***Repair Procedure***
1	15,000	Sump removal/general inspection/fuel pump check
2	30,000	Head removal, valve attention, piston withdrawal
3	45,000	As. No.1
4	60,000	As. No.2
5*	75,000	Engine removal (air cell type)
6	90,000	Direct injection as No.2 and No.4
7*	105,000	Engine removal (direct injection type

* War-time departure. Normal removal intervals were:60,000 air cell type; 80,000-90,000 direct injection

The association of other chassis attention with the foregoing intervals will be seen. When approaching major repair stages, the first of which, so far as the engine is concerned, is cylinder head removal, some method of judging engine condition prior to repair is advisable. This naturally suggests a road test and the additional value of records of fuel and oil performance will be obvious when assessing likely repair requirements in conjunction with the test reports.

Standards of "wear" or, in other words, the limit to which a component may be used before it is repaired or replaced, is a vital subject. The necessary knowledge to assess wear figures, coupled with details of accepted standards, is an important factor in establishing economic repair intervals. Armed with this knowledge the small fleet owner can, in many cases, consider himself in a more favourable position than the larger operator. Wide variations of component life are always evident and undoubtedly the manner in which machines are driven and handled has a marked effect on unit life. Frequent cases of considerable mileage in excess of recognised repair intervals are published. These, generally speaking, are associated with small users and probably the personal contact aspect has some bearing on the results.

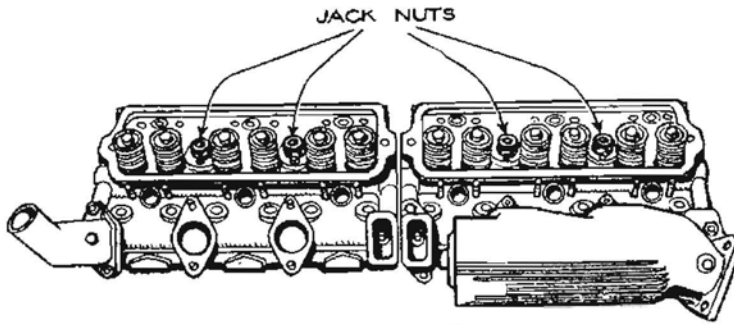
Further, during inspection the small user may, for instance, find that wear on crankshafts is beyond the agreed standard for renewal but his acceptance of the risk in accomplishing a further period of running may be considered to be worthwhile, offsetting any disadvantage of the unit not completing a budgeted unit life. The larger fleets are in a different position. Engine units do not absorb the total repair output and average mileages for component life must be established to assure a continuity of output. Failure of individual units to reach a budgeted mileage may not sound particularly important, but the possibility of failure in this type of work must be considered when planning a unit overhaul period. This, to some extent, influences renewals, since overhauls in this class of work are planned to achieve a given mileage; with this object in view the allowing of certain variations from accepted standards of component wear is important to the larger user and must be based upon accumulated experience.

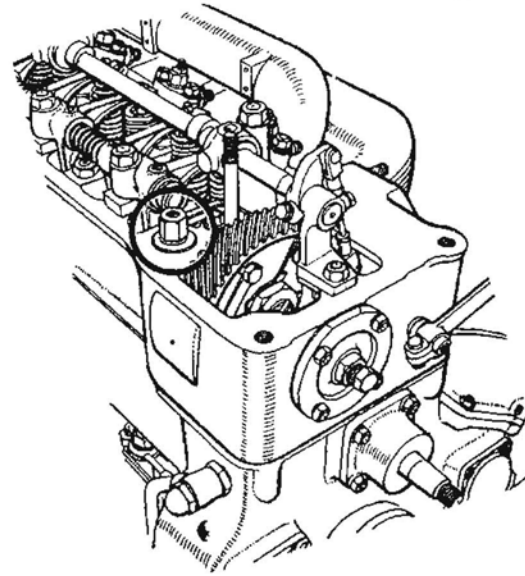
Frequent checks should be taken to assess the possibilities of extending life beyond the recognised wear tolerances, although the average fleet engineer will agree that the wear allowances generally accepted today form a pretty accurate basis for replacement or reconditioning.

The following notes on different repair operations include figures of wear tolerances and represent general practice under normal conditions. Under war-time conditions it is obvious that variations will occur, and it might even follow from the experience thus gained perforce that post-war maintenance will, in many cases, be modified.

CYLINDER HEADS AND VALVES

There is quite a wide divergence in the layout of cylinder heads on the engines in popular use. On AEC, Albion, Crossley and Gardner engines they are divided, while Leyland and Perkins have one-piece heads. AEC, Albion and Perkins engines have a high camshaft in the cylinder block, while Crossley and Gardner engines have the camshaft in the crankcase. The large Leyland engines have an overhead camshaft on the cylinder head, but the Leyland Cub engine has the camshaft in the crankcase. All the engines, except the overhead camshaft Leyland model, have valves operated by push roads and rockers and the heads can be lifted without special reference to the valve timing arrangements.





Jack nuts for raising the cylinder heads are a feature of AEC and Leyland engines. On the AEC, the jack nuts are in the centre of the divided head. The Leyland has a one-piece head and there is a jack nut at each end.

Head removal is a necessary part of overhaul procedure in all cases, but there are certain differences of procedure. In particular, Leyland and AEC engines have "jack nuts" to facilitate lifting and their use should be fully understood. After all the usual components and auxiliaries have been dismantled the cylinder head nuts should all be loosened before the jack nuts are started. Then the whole of the nuts must be completely removed before the two jack nuts are unscrewed, and this latter must be done a little at a time alternately, whereby the cylinder head joint will be separate and the head will be raised. When the head is replaced the procedure is reversed, the head being lowered by lightly screwing down the jack nuts, then the normal nuts are tightened down in the usual rotation, finally tightening the jack nuts.

Gardner engines have no special lifting nuts, but it may be pointed out that although the majority of the nuts are accessible to box spanners, there are some that can be turned only by open-ended spanners operated through openings in the nearside of the cylinder head and covered by aluminium plates.

Another feature peculiar to the Gardner head is the use of rubber rings to seal the water passages from the block. The injector nozzles project below the face of the Gardner head and they must, therefore, be removed, before the heads are lifted to prevent damage which would result if the head is laid on the bench.

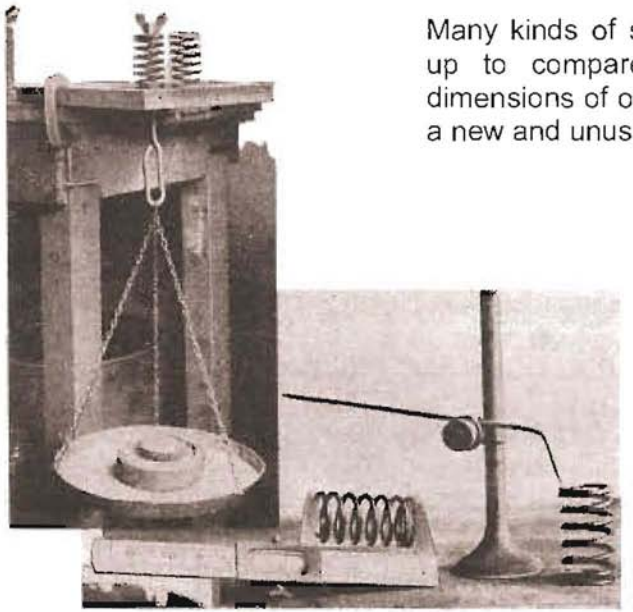
No disturbance of valve timing arises in cylinder head removal on engines with push rod operated valves, but in the single instance of the bit Leyland engine, lifting of the head involves the releasing of the overhead camshaft, and, in consequence, it has to be replaced so that the timing is correctly set. The task is facilitated by the timing plunger under the flywheel housing which locks the engine with No.1 cylinder on top dead centre, when the camshaft gear wheel can be engaged with its driving wheel so that the timing marks coincide. Final check is necessary after the head is thoroughly tightened down and any small re-adjustment necessary may be effected by releasing the screws securing the camshaft wheel to its hub, so a limited angular movement of the wheel in relation to the camshaft.

Removal and replacement of cylinder heads of all engines calls for rather more care and precision, particularly in replacement, than with petrol engines, owing to the very high pressures involved. Cleanliness is of the utmost importance, and there must not be the smallest particle of dirt on the head and block faces, in the stud holes, nor on the studs themselves, particularly at the points where they are screwed into the block. Special care must be taken to ensure that no pieces of foreign matter fall out of the water spaces as the head is lowered; flushing the water passages prior to fitting is desirable. Dirty and greasy hands are not conducive to good results in handling cylinder head gaskets, and although the use of jointing compounds is not generally recommended, a coating of clean engine oil is the practice generally followed; this assists the making of a good joint without involving the necessity for the additional cleaning on subsequent occasions that results from the use of compound. It is important in refitting old gaskets on Leyland heads to check timing gear backlash, as a thin gasket will obviously reduce the clearance.

It is false economy to use doubtful gaskets or seals such as rubber rings and particular care should be exercised in fitting the rubber joint washers associated with certain designs of oil channels from block to head. On divided heads attention should be paid to coupling pipes between the heads to avoid distortion of flanges. Finally, many a good job has been marred by lack of attention to a doubtful water hose. In tightening head nuts a powerful spanner or box key tommy bar of 12 to 14 should be used.

It can be accepted that the limit of life of oil engine valves is controlled by seating condition, stem wear being usually negligible. The use of duplex valve springs is general practice, and this, coupled with certain oil engine characteristics, has increased valve spring life in comparison with petrol units. But in the maintenance of large fleets some method of checking valve springs is desirable since where cylinder heads are treated as units they lose identify in relation to engine mileage.

A check on spring tension with a form of spring press, using a new spring to define the standard, is a satisfactory method, although a simple rig, such as a heavy weight suspended by a ring bolt through the spring and some kind of height gauge, is within the scope even of the one-vehicle operator. It will, of course be recognised that there is little difficulty in spotting a bad spring.



Many kinds of simple rig can be fixed up to compare the resistance and dimensions of old valve springs against a new and unused standard.

The uncompressed length is usually sufficient to warrant rejection without a compression test. Little information is available as to actual life of valve springs, and a principle followed where engines retain their own heads is to replace the springs at each complete overhaul. The method of comparison against the standard of a new spring as outlined above, works on a replacement basis of 10% below standard and is applicable to cylinder heads reconditioned under the unit replacement system.

Make	Type of Spring	Length Uncompressed	Length Compressed	Pressure in lbs
AEC	Outer	3 1/8"	2 5/16"	50
	Inner	3 1/3"	2 1/4"	32
Gardner LW	Outer	2 3/4 "	2 1/8"	40
	Inner	2 13/16 "	2 1/16"	18
Leyland	Outer	3 9/16"	2 5/16"	42
	Inner	2 5/8"	1 7/8"	20
Perkins	Outer	-	1 1/2"	230
	Inner	-	1 3/16"	6.5

Valve face attention varies according to the characteristics of the material. Valve inserts are now general practice and seat reamers and stones are the media for refacing aluminium bronze and cast iron, but Stellite-faced seats require a special set-up calling for plant differing from normal practice. An electric drill mounted on a fixture provides eccentric rotation of the stone allowing point contact for seat grinding; various proprietary equipments are available. Valve guide wear tolerances are not as a rule quoted by manufacturers, and the only figures available generally refer to minimum clearances when fitting replacements, a figure of 0.0006 in. being accepted practice. The difficulty of easy measurement of worn valve guides necessitates the use of some form of plug gauge, although a new valve stem will serve the purpose reasonably well.

CYLINDER BLOCKS AND PISTONS

Withdrawal of pistons at the first 30,000-mile interval is intended primarily for inspection and the freeing, if necessary, of stuck piston rings or to clear the slots or renew the scraper rings on certain types of air cell engines. In the first cycle of 30,000 miles it is unlikely that oversize piston rings will be required to counteract worn ring slots.
Where extended mileage cycles are observed in the case of in situ overhauls it is probable that at 60,000 piston ring groove attention will be

called for. Piston ring gap and slot clearances vary according to design and quality of material, and information must be obtained from the appropriate component suppliers lists. The following table illustrates certain important wear standards.

Piston Ring Groove Clearance		Piston Ring Gap
AEC.....(Top)	0.0035/0.0045	0.012
AEC.....(Others)	0.0015/0.0025	
Crossley	0.001/0.003	0.004/0.006
Gardner	-	0.015
Leyland	0.003/0.005	0.007/0.009
Perkins..(Compression)	0.001/0.002	0.008/0.012
Perkins..(Scraper)	0.002/0.003	

So far as piston condition is concerned, generally speaking apart from the gudgeon pin wear in piston bosses, cylinder bore wear usually dictates piston replacement. Where piston reconditioning is undertaken, clearance standards vary with the design of pistons and details of this class of work are outside the normal scope of this chapter. Gudgeon pin wear and the treatment of piston bearing surfaces is regular shop practice, although possible the methods are not always approved by the manufacturers. Gudgeon pins having interference fits in cold pistons are the general practice, although the fully floating pins of Gardner engines are merely a tight push fit when cold. It is assumed therefore that the practice of heating pistons to the temperature of boiling water for pin removal and fitting is generally understood. The difference between ground and lapped gudgeon pins affects fitting clearances to an appreciable extent quite apart from the results in service, and it should be recognised in repair work that lapped gudgeon pins offer decided advantages over pins finished by grinding only, thus a pin reconditioned by grinding may have a shorter life period than a new lapped replacement.

This chapter will continue in the next issue of the Gardner Engine Forum Newsletter

---

Editor's Note – This extract has been taken directly from the book printed in 1942 and the written word, grammar and punctuation has changed quite significantly over the past 60 years.

"Gardner Snippets" by an ex-employee

Cylinder liners were pressed in and the gauge had to show between three and six tons. If it was less than this, the liner would be pushed out and pushed back in straight away which effectively removed all the machining marks from the surface of the liner and then it would press in between four and six tons.

- 0 -

One morning a call was received from the Customs in Harwich to advise that a batch of pistons had arrived from Taiwan. A sample was obtained and it was an identical replica of the genuine Gardner piston even to incorporating the Gardner logo. Gardner's then took action against the importers, a large Northern enterprise. A court case ensued at the Law Courts in London but the judge said it was only right that people buying a product should be able to buy "pirate parts" if there was a price advantage. Copyright applies to all sorts of items but not apparently to Gardner pistons. This is a case where the law seems to be an ass. It did so happen that these pistons were really quite good!

- 0 -

Before the First World War, alcohol seemed to be popular overseas for fuel, perhaps because in some countries there was no oil refinery and Gardner's had to get a special licence to bring in barrels of test fuel. Once again customs used to make random visits to make sure it was being used for the reason declared.

- 0 -

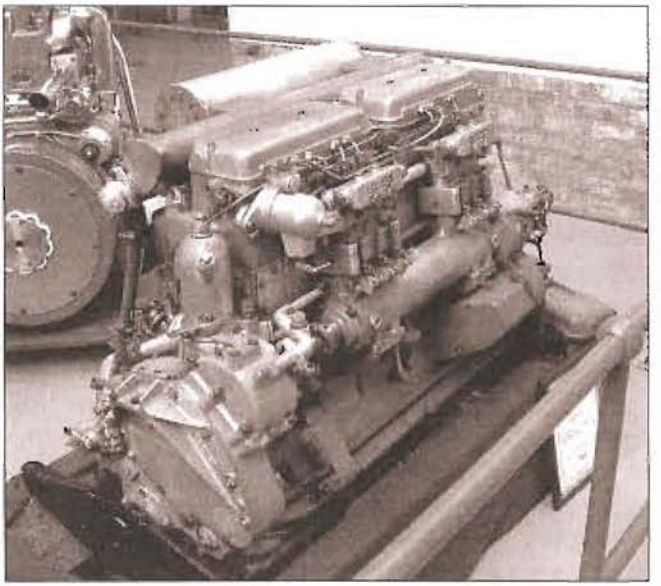
To maintain quality, one engine per month was selected after test by the Test Superintendent and this was taken into the Fitting Shop to be completely stripped down and checked to ascertain the quality. If all was well it was re-assembled, re-tested and despatched.

In the days of white metal bearings, the crank case was put on a special rig and run for ten minutes until the amperage reading fell from eight to three amps. Although there was only 0.0016 ins. in each of the seven main bearings, the crank could be turned with one finger.

Fanfare Finish For The Gardner Exhibition At The Anson Engine Museum, Poynton

Among the famous faces at the museum celebrating the 75th Anniversary Exhibition, were members of the Gardner family, ex-Gardner workers and engine enthusiasts from around the world.

There was also guest appearance from the Lagonda car, which was originally fitted with the much talked about 6LK engine. This engine (which is on display at the museum) was a company secret when built as a prototype in 1934 – it was never put into production and is the only one in existence. For many years engine enthusiasts have spoken about its existence but were never very sure if it was real or just a rumour, as it had never before been on public display. This weekend saw the engine and the car together for the first time in decades.



The Exhibition celebrated the work of the local engineering company L Gardner & Sons of Patricroft. Lawrence Gardner began his engine building business at the age of 28. The first of their L series engines, a 4L2, was shown at Olympia in September 1929. It was to be the saviour of Diesel engined vehicles, which, until its invention, were noisy, smelly and emitted intolerable amounts of smoke. The original 4L2 is on display at the museum.

The museum is built on the site of the old Anson Colliery and is dedicated to the history of the internal combustion engine. The museum is run entirely by volunteers with no government subsidies or grants. Sir Nicholas Winterton, the museum's patron boasts "this museum hosts the largest collection in Britain, and probably in Europe. It is a major tourist attraction for not just the Macclesfield area, but the whole of Cheshire."

The Anson Engine Museum was the brainchild of Les Cawley and Geoff Challinor. They began building the museum in 1986. In 1987 the museum gained charitable status. The two main aims being: -

- To rescue, restore and display a collection of early internal combustion engines with particular emphasis on gas engines made in the Greater Manchester area
- To rescue, preserve and display items illustrative of Poynton's history with particular emphasis on the local coal mining industry

There are currently over 100 engines at The Anson Engine Museum; many impeccably restored to their former glory. Lack of room and resources does mean that many engines and archive documents cannot be displayed.

GEOFF CHALLINOR

Geoff Challinor was born in Goostrey. His father and brother run the building contracting company Challinor & Sons. He was unanimously voted into the Stationary Engine "Hall of Fame" in 1999. He is well known for his knowledge and expertise on stationary engines and is often asked to help and advise other museums on engine and engineering matters. Les Cawley died in July 2002, leaving Geoff to carry on with their dream of establishing the Anson Engine Museum as the premier National engine museum.

GARDNER ENGINES

Though no longer in production, Gardner Parts www.gardnerparts.co.uk and Paul Gardner Engineering www.paulgardner/co/uk maintain, provide parts and remanufacture Gardner engines. A full history of the Gardner family and engineering company is available in the book Gardner-Legendary Engineering Excellence, ISBN 1-902356-10-1.

The Museum will open on Easter Sunday and Monday between10:00hrs to 17:00hrs and will then be open for the season every Friday through Sunday until October.

GUY MOTORS AND GARDNER ENGINES.©
by Robin Hannay

The first Guy chassis were built in 1913 whilst Sydney Guy was still working for the Sunbeam Motor Company of Wolverhampton, makers of high quality cars in those days. He had joined them in 1910 and had greatly increased their output and profits, but when he asked for an increase on the £250. annual salary that he had received since he started, they refused, so he left in May 1914 with the Directors best wishes for the future and £100 bonus.

A plot of land had been purchased off Park Lane in Fallings Park, about 2 miles from the centre of Wolverhampton, on the way to Cannock. Building quickly started and the first chassis left the works in September 1914. When the First World War started, Guy, as they were not an approved supplier to the War Department, could sell their chassis to civilian customers. Most of their machining capacity was devoted to armaments and manufacturing/assembling a 7-cylinder radial 'Dragonfly' engine, which developed 350 bhp in 1917 and a 12 cylinder unit in the following year.

When the War ended, Sydney Guy realised there would be a lot of cheap lorry chassis coming on the market, so decided to diversify into cars. The first result appeared in 1919 and was for the upper end of the market. Whilst the early Guy lorries used proprietary engines, this was a Guy designed and built 4 litre, 20 hp V-8, the first U.K. unit of this type. The chassis also had automatic chassis lubrication as standard. In the following year smaller and less expensive cars were added with 12 hp, and 15.9 hp cylinder engines plus a 16.9 hp version for overseas markets. Sales of commercial and passenger chassis improved and in 1925, the manufacturing of cars was discontinued

Sydney Guy was an innovator. His first commercial chassis had a 4 speed, overdrive gearbox, which included a road speed limiter, something that became law some 70 years later. This restricted the speed in top gear (overdrive) to 30 mph, but did not affect speeds in lower gears. In 1922 he introduced an articulated lorry and also a battery electric 2.5–3 ton refuse collection vehicle. The following year a road-rail tractor was built for export. In 1924 they built the first true passenger chassis with a lower chassis frame, which reduced the height of the floor from the ground. This used a pressed steel chassis frame, down swept between the axles and had pneumatic tyres. Previously all chassis used straight frames for both lorry and passenger use.

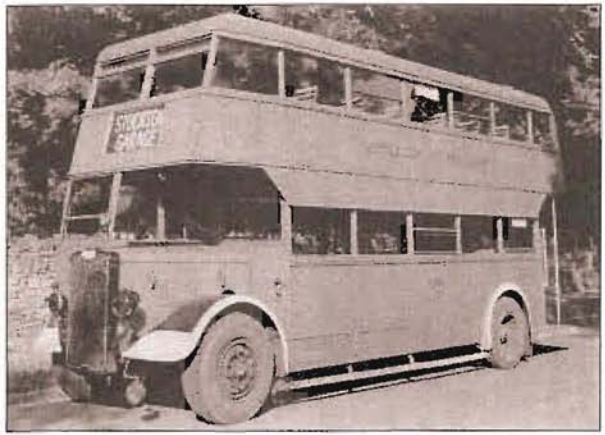
With the development of pneumatic tyres, Guy produced the Worlds first 3-axled motorbus. Morecambe Corporation placed six, 53 seat open top buses on the road on 13th July; the same day as Wolverhampton started using a normal control, top covered example. In December, the Worlds first 3-axled trolleybus with pneumatic tyres was placed in service in Wolverhampton with 16 more following in the next year. Guy became one of the leading makers of these types of buses and the trolleybus models continued to 1939, with two axle versions being added from 1929, as well as single deck models of both types. The demand for 3-axled motorbuses declined about this time.

In 1929, Sydney Guy could see that trade was becoming more competitive and that his customers would be looking to reducing operating costs. At that time there was a vast surplus of fuel oil and it was being sold at about 3p a gallon compared with 10p for petrol. He looked at proprietary engines that were available and bought the first 6LW engine to leave Patricroft in October 1931. This was installed in a 6 ton Warrior lorry chassis for a Manchester area operator but was tested thoroughly before delivery. The gain in mpg impressed him, resulting in the new Gardner LW range being offered as an option in the Warrior, 11-ton Goliath 3-axled lorry chassis and the Invincible double deck and Conquest single deck chassis. The extra cost for the 6LW in place of the Guy 6 cylinder 110 bhp petrol engine was £435.00.

The list prices of the other models with petrol engines were - Warrior (basic price £995.00), the 11-ton payload Goliath 6 wheeler, (£1,460 with petrol engine) and the Conquest single-decker in forward control form at £995 normal control or £965, normal control. The double deck Invincible cost £1,120 plus £5.00 for an electric starter in petrol form or £1,550 with the 6LW. In 1932, the 4 ton, model 'T' was available with the 4LW as an option to the standard 66 bhp, 29.9 hp, 4-cylinder petrol. The price of the forward control model was £730 with the petrol engine or £1,075 with a 4LW.

1933 saw the Conquest and Invincible chassis being replaced by a completely new model – the 'D', named the Arab. This model dispensed with the sub-frame for the engine, clutch and gearbox that had been a feature since the first chassis. It did however keep the gearbox mounted about halfway down the chassis. It was unique amongst similar chassis, at that time, in only having Gardner engines – no petrol alternative was offered.

Sales of the Arab were slow, mainly due to operators, large and small being unsure of this 'new-fangled technology' and in fact A.E.C. and Leyland sold appreciable quantities of petrol engined double-deckers up to the outbreak of World War 2. One other factor affected production of the Arab from 1935.



A typical utility double decker. This is 6LW powered Arab Mk.II chasis with a lowbridge body built in Leeds by Charles H Roe

Guy developed a big export business after the War. Some of the first Arab Mk.III's went to Dar-es-Salaam Motor Transport in 1946 with duple bodies

Introduced in 1950, the Arab Mk.IV featured an enclosed radiator, which was adopted by Birmingham City Transport for their buses bought in the 1950's.

Atlantic Oils of Cape Town, South Africa ran several Guy tankers. The Otter Diesel Mk.II tractor unit is seen alongside an early Invincible Mk.I powered by a 6LW engine, 1955

Guy had been asked to enter a General Service truck, with a good ground clearance, to carry a 15 cwt. payload over unmade roads in the 1935 War Office trials. Their vehicle came through with very high marks and they were awarded a contract for 500 initially. Called the Ant, several repeat contracts over the next 9 years took the total to almost 6,000 vehicles. Shortly afterwards they were asked to design a 4 wheel drive version and also a 3–tonner. The trial vehicles of both models were successful and the 4x4, called the Quad-Ant was used initially as a field artillery tractor for towing a 25 pounder gun and limber Over 5,300 were built with later models being used as General Service vehicles. Military orders eventually were for over 14,000 vehicles and these seriously affected the ability to accept some civilian orders.

Between 1923 Guy and 1942, Guy supplied the War Department with over 1200 special 3-axled chassis in both normal and forward control form, having double drive and a flexible two spring rear bogies. There were also quantities supplied to overseas customers including 123 for use as armoured cars in the Indian Army. This was designed to carry up to 5 tons payload over rough terrain. A variety of bodies were fitted including mobile workshops, radio trucks and searchlights. Also designed for use with searchlights was a 2-axled petrol-electric chassis, based on the 5/6-ton payload Otter that had a generator instead of a gearbox. This provided the current for the searchlight. With the advent of Radar at the beginning of World Ward 2, the need for these chassis disappeared and orders were cancelled. In 1941 there was a severe shortage of buses due to production having been stopped in 1939, and also as petrol was not available for private motoring, more people were using buses. In addition large numbers of people were directed to work in factories, adding further to the need for buses. As a result, Guy Motors were authorised to build 500 double deck bus chassis by the Ministry of Supply. Aluminium could not be used and the specification had to be basic with no alternatives. A new chassis was designed using a 5LW engine and the prototype was running in 6 months after the specification was finalised in September 1941. The completed chassis was about 10 cwt. heavier than the pre-war model and bodies were similarly heavier as steel panels had to be used instead of aluminium. It soon became clear that a more powerful engine was needed for use in hilly areas. An AEC 7.7 litre engine was supplied for installation, but Guy managed to convince the Ministry of Supply that the Gardner 6LW would be a better alternative, and this was accepted. Due to the extra length of the 6LW, a longer frontal structure had to be made which reduced the body length, adding problems with the bodybuilders. After the first batch, the Construction and Use Regulations were amended to allow the complete buses to be up to 26ft. 9 ins. This applied from the 501st chassis and these were called Arab MkII's by the bodybuilders and the previous version, the MkI's.

The concession was rescinded in 1946, but allowed the longer buses to be registered up to the end of April 1947.

Allocation of chassis was controlled by the Ministry of War Transport and the Ministry of Supply; the operator having very little choice. As a result Guy chassis and Gardner engines appeared in fleets that had no previous experience of these items. Engineers soon realised that it was a sound combination, and whilst the constant mesh gearbox took a little of getting used to, they were extremely reliable. London Passenger Transport Board had the largest fleet of 435. Walter Alexander in Scotland, had about 90 they also bought about 200 of the London Transport Guys when they were withdrawn in the early 1950's), Southdown Motor Services, based in Brighton, had 100, Birmingham City Transport, 80, Devon General 26, Midland Red 58, East Kent, 65, Lancashire United Transport, 58, Maidstone and District, 35, Midland General 44, Northern General 32, Potteries Motor Traction, 49, Red and White 27, Ribble 45, Southampton 43, Walsall Corporation 45, West Riding 48, Western S.M.T. 58, Wolverhampton Corporation 24, Yorkshire Traction 20, and Yorkshire Woollen District 36 plus 8 exchanged for Daimler buses with Maidstone and District. Altogether about 2,500 Utility Guys were built.

When operators could choose their own suppliers after the War, many gave Guy orders for both single and double deck chassis. The Utility bodies were constructed mainly, with unseasoned timber and when these needed major attention, the body was usually scrapped and a new body fitted, extending the life of the chassis appreciably. Yorkshire Traction, for instance brought their Guy Arabs into their workshops, starting in 1950 for their first overhaul, when they had covered about 250,000 miles, at the same time as their post-war Leyland's were having their first overhaul at 100,000miles. 12 of the Guys received new bodies after overhaul.

At the end of 1945, the first post war single deck chassis was built. This was an improved version of the Utility double-deckers. Aluminium could again be used in the chassis construction and 0the Gardner engine, reducing the weight appreciably. Due to the severe shortage of all types of vehicles, Guy continued to build the MkII double-decker until the end of 1946, when an improved MkIII replaced it. This had the lowered bonnet and radiator of the single-decker but designed to take either the 5LW or 6LW engine unlike the single-decker, which had different lengths to cater for each engine.

To be continued

Readers' Letters

Dear Sir, 28th March 2004

Gardner Engines, Classic, Vintage Commercial Magazine Issue 04

In the war I worked on Fisher Renwicks Showboats "Pintail" and "Pochard" as a Shunter's Mate loading/unloading. I also belonged to the Fairground Society who had in the magazine they produce, an advert for a "tape" of a Gardner engine, which I sent for, but it was just a fast running engine to me. I was expecting to hear a 6LW ticking over and then slightly revving to produce that never to be forgotten sound. Do you produce a tape such as this, if so could you let me know?

The drivers used to do 1 week of days, 1 week of nights. On Sundays they ran in the daytime to Coleshill and I used, on many Sundays, to go with George Smith. He was such a good mate I really enjoyed it – salt of the earth, a real East Ender - he came from Stepney. Money was very poor £2-10s for 51/2 days. I don't know what the driver got.

I've got the book of Fisher Renwick by Gordon Mustoe and Gardner Engines by Graham Edge. It really is surprising that Graham Edge never mentioned Fisher Renwick yet look how many Scammels we had all with 6LW engines from the 1930s to nationalisation. They had 330 "A" licensed vehicles, 9 freehold depots which included White City Manchester and the land for another depot at Rutherglen.

The mount of money paid by the Government was £1,277,445-0s-5d for lock, stock and barrel. It was a wait of 4 years before fisher Renwick got all its money. Such are the dealing of a Labour Government – now they are doing it again. New Labour / Old Labour – its still communist inspired.

Later I work on maintenance in the Surrey Docks PLA. A small Russian ship used to dock at 3 0'clock every Saturday. Russia did not have to develop a jet engine, we were sending them the Rolls Royce Nene Jet. I say them on the dockside in 1947.

R. D. Brough Membership No. 336

Dear Colin, 6th March 2004

I have just arrived home from New Zealand. Down in South Island we spent a day at Milford Sound. The boat we went on was "Lady Bowen" fitted with two Gardner 8LXB engines No. 234860 and 236988. Please could you find out the history of these engines.

David Reed Membership No. 245

Recent photograph taken on the A-Z run from Salisbury Spring 2004.

Mike Phillips Membership No. 289

BACK COPIES OF

Engine Forum

NEWSLETTERS

£2.75 per issue
incl. postage and packing

or £2.50 per issue
for 4 or more back issues

Please send cheques payable to:
Gardner Engine Forum

to:
Mike Short
66 Queen Street, Weedon, Northants. NN7 4RA
01327 342457