

# THE ENGINE REBUILDER

Serving the interests of engine machinists and rebuilders

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Both engine rebuilding and engine remanufacturing require high levels of experience, knowledge and skill but each has its place in the market. In some cases a remanufactured engine is the most cost effective solution whilst in others a rebuilt one may be the only possible solution. What no one should have any doubt about though is that 'engine remanufacture' is not simply a modern alternative term to 'engine rebuilding or refurbishment'. Any such lingering doubts are soon dispelled by studying today's modern activities of Ivor Searle Limited (which can be seen in a four minute clip on YouTube).

Thanks to kindness of David Eszenyi, their Commercial Director, The Engine Rebuilder has been able to see at first hand the workings of this company which having been started by their father seventy years ago was then built up by (the late) Michael Searle and his brother Colin who has continued to develop it into a leading remanufacturer. He has established its leadership position by constantly pioneering initiatives which make the Company - and the industry - what it is today. A visit to their extensive facility at Soham in Cambridgeshire was expected to be interesting - and so it proved - but what had not been anticipated was the many aspects which contribute to this. An ethos pervades the entire Company with everyone understanding that whilst engineering standards are vital to success, equally important are customer service ones.

There is an innate understanding that when a modern customer requires a replacement engine it is a "distress purchase": the customer has not chosen to be in that situation. In most cases the (ultimate) customer's vehicle is a daily necessity so every day without it

causes disruption, additional cost and aggravation. So the first solution is to get the replacement unit to them as quickly as possible: stock items ordered before 15.30 will be delivered on the UK mainland the next day.



*Part of the stock of remanufactured engines, wrapped and protected in their individual stillages*

The customer will also know that some serious cost will be involved .... but even more they fear the unknown with a final figure being open ended. Ivor Searle remove that by quoting a unit price inclusive of delivery charges: the price quoted is the price which will be charged - there are no hidden extras making it so much easier for factors, fleet and individual customers. The price is broadly irrespective of the state of the returned unit: only if it is found that a major component required for core stock which had been said to be sound but in fact is returned irreparably damaged

(such as the cylinder block having been punctured), while the conditions have been broken and the quoted deposit price cannot then be held, this will result in a proportion of the deposit being withheld.

Colin Searle was instrumental along with others in establishing the British Standard for automotive engine remanufacture and served on the BSI Technical Committee chaired by Adrian Wilkes of Gosney's Engineering which resulted in the publication of BS AU 257 Code of Practice. All remanufactured engines produced by members of the Federation of Engine Remanufacturers must comply with this.

Not surprisingly all the activities at Ivor Searle's Soham plant conform to that Standard but furthermore the company's quality procedures are certified to ISO 9001. But that is only part of the story for in addition they continue to invest in

constantly acquiring detailed knowledge to add to their own comprehensive experience as it is upon this complete knowledge base (which is far beyond anything available "off the peg") that their own detailed specifications and working practices are prepared.

A clear example of how such additional experience-based knowledge is applied was found in the engine dismantling area where a crankshaft was noted in the scrap bin. Such a component is not normally scrapped in a remanufactured engine. However one journal on this example could immediately be seen to be severely scored. It was explained that the dimensions would have been checked, and in some cases even if within o.e. dimensions it may not have been within those of Ivor Searle's own specification. The deciding factor is not simply whether oversize bearings may be available but if in their own experience

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The Federation of Engine Remanufacturers (FER) is the UK's only corporate body representing the interests of the engine re-manufacturing fraternity,

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the reduction in crankshaft diameter resulting from regrinding it to remove all scoring would make the journal weaker than they find acceptable. To avoid any such eventuality there are some cases where the company specifies a tighter tolerance in order to eliminate that risk completely.

The key point is that by doing so, the risk is thereby removed in all such cases: individual judgement in individual cases is eliminated. The decision has been made previously in preparing their specification: subsequently all that is required is a standard check against that specification. If non-compliant and outside tolerance, units are instantly rejected without any further examination or judgement.

These are the details which make an Ivor Searle remanufactured unit different.

It is essential that adequate stocks of all core components for the range of remanufactured engines offered are maintained at all times. A very close eye is kept on this aspect using highly sophisticated software in which the Company has invested substantially. And that investment has not been purely financial for it has been created for their own production processes and enables components to be tracked at all stages. They have also invested in time and applying their experience for their system shows stock levels of components under their own codes which really “drill down” into model variants. Stock levels of components can be identified at each stage of the process – returns received; stripped and cleaned; re-machined .... and so on, and the information is “live” with in-put from the key areas.

David does admit that from time to time stocks of some core components can get unacceptably low, for instance if a

common weakness comes to light when engines (particularly in fleets of LGVs for example) are all at the same critical mileage. Detailed knowledge is key and constant attention is paid to maintaining this.

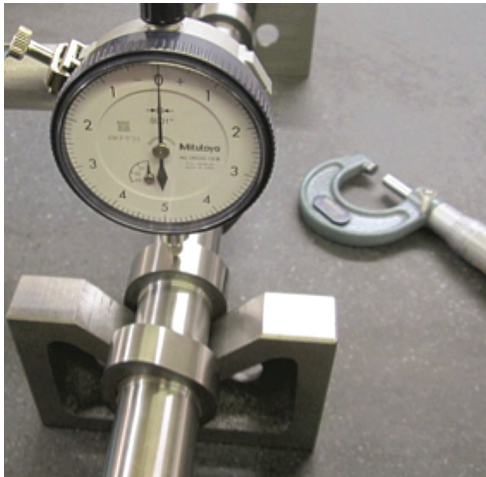
Sometimes the solution to a specific issue is only determined after acquiring examples of the engine in question and undertaking their own detailed examination. To this end one area is specifically dedicated to development. Here new variants or completely new models are examined and in cases where, as mentioned above, there are signs that a particular issue may be becoming prevalent, examples of the engine in question may be examined with a view to amending the specification for their own remanufactured products.

Some proprietary search systems have been found to be too “coarse” in identifying sufficient detail about a precise engine variations, particularly in those cases where more than a single o.e.m. uses what at first sight appears to be the same engine. Seemingly innocuous variations can be encountered and mean that core stock supposedly of one type is actually unsuitable for use in remanufacturing that engine. These variations can include, for instance, an oil dipstick located on one side of a block in one manufacturer’s application and yet when what was thought to be the same engine but from another o.e.m.’s application the dipstick is in reality on the other side (and consequently may be inaccessible when the engine has been fitted in that make of vehicle).

The process starts with used engines arriving at Soham. These provide the ‘core’ components which feed into the remanufacturing process. Each immediately undergoes a visual

inspection (especially if being returned as part of an order for a remanufactured engine which will already have been supplied). Having been identified each is given a unique Ivor Searle reference before being stripped down.

On average around 85% of the original components are used in a remanufactured engine, each of which receives a high-pressure wash in hot water with a mildly caustic detergent. Those not required are placed in the appropriate scrap bin: extremely little is wasted – this is a highly ‘green’ industry. After cleaning, components are again visually inspected and in the case of cylinder heads are pressure tested in hot water to detect any leaks and enable those with visually indiscernible fractures or flaws to be eliminated before any further work is done on them. Satisfactory heads are then blasted with crushed olive stones: this is done by hand in a blast cabinet on an individual unit to enable adequate attention to be given across the wide variety of configurations - which would not be possible if done robotically or several at one time. With larger or more



*Numerous inspection and measuring operations are undertaken throughout the remanufacturing process*

intricate head designs this can take 20 minutes.

At this stage major components are each processed within specialized areas equipped with the appropriate machinery and equipment: these include dedicated areas for cylinder heads, another for crankshafts and camshafts, and another for cylinder blocks.

Components are worked on in (small) batches to minimize setting up and down time. Two Serdi machines in the cylinder head shop are used to re-cut valve seats and the faces of all heads are skimmed. Regrinding is carried out on cranks and cams as required and blocks are also skimmed. Taps are run through threads to clear them and reform profiles: where necessary Helicoils will be inserted. Finally when looking virtually like new again, but more importantly returned to spec with specified key parameters, operations and inspections all recorded, each item is put in stock suitably wrapped, protected and identified: that fact is entered on the central computer direct from the workshop.

The process continues with new items (gaskets, pistons & rings, drive chains or belts, some fasteners etc) together with remanufactured components for each engine being drawn from stock and issued to the assembly area in an individual trolley. All materials are to the Company’s specification which in every case either meets or exceeds BSAU257. Up to four sets for the same type of engine are then issued to a workstation, the centre of which is a capstan to hold four engines, each of which can be moved in various planes. Details of the specification for that type of engine together with required inspections to be signed off (there are more than fifty inspection checks during an engine’s





*Note the overhead tracking which takes remanufactured engines from the individual workstations (left) to the remaining operations and final stock*

complete remanufacturing and assembly process) are on-screen for the assembler at the workstation.

Once mounted on the workstation's capstan, an engine will never again touch the ground whilst at the factory. Upon completion, the assembled engine is lifted straight onto an overhead track which takes it to a testing booth. Here it is linked to inputs and outlets for each of the essential fluids and then run up: key results are recorded. After a satisfactory test run the overhead track is again used and takes it to the paint shop where it is masked and sprayed before finally being bagged, with relevant paperwork (including pre-installation guidelines and instructions specific to that engine model) enclosed before then being sealed and placed in a specially designed metal transport frame. As well as protecting the engine this enables them to be stacked in stock, mechanically handled and transported safely. No sooner are they in central stock at Soham than the computer will record them as being so and accordingly

they are instantly available for dispatch – possibly even that same afternoon.

One specialist workshop is dedicated solely to rebuilding engines. In a small number of cases individual rebuilds on a customer's own engine is undertaken where this is the only viable course of action for an engine of that type. Such work is still undertaken in compliance with ISO9001 and the Company's quality assurance system.

Having been founded by Colin's father as The Wicken Crankshaft and Bearing Company, the name was changed in 1977 to Ivor Searle Limited, and was invariably referred to as Ivor Searle engines. However, in 2012 further major expansion began with a new building constructed behind the existing one which had already been extended at both ends, and had a mezzanine floor added. Upon completion, the production area at Soham totalled more than 70,000 square feet and the number of employees topped one hundred. The workforce includes a small number of apprentices taken on each year.



David Eszenyi, Commercial Director

At the time that work on this new building began David Eszenyi joined the company from Banbury based race competition preparation specialists Prodrive. He naturally focusses on the factor, fleet & European sector from which the majority of their business is derived and works closely with Colin Searle who remains very involved with the business which remains a family one and which has been his life. It is good to see that both his son and daughter are making it an important part of their lives and are now taking leading roles within the company.

The new building however was not for the remanufacture of engines but for that of two new product lines, namely turbochargers and gearboxes. The Company has already become a major supplier of these remanufactured items to the UK and Western Europe, as with engines. Precisely the same principles as

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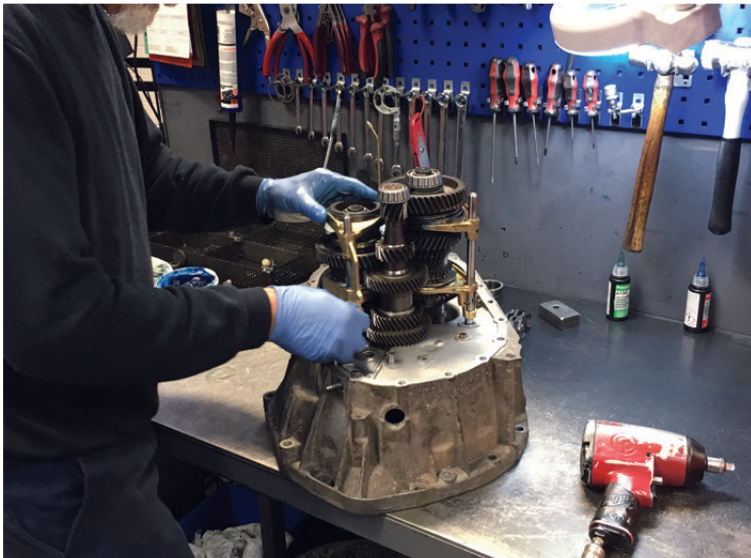


*The new gearbox & turbocharger building can be seen on the right; there is a further building out of picture on the left of the road.*

have proved so successful with engines are followed in remanufacturing these other products which also come with pre-installation instructions, warranty (two years in the case of turbos) and each has been run and tested.

But recent major investment has not been confined to building. Substantial investment has been made in time,

technology and money which has resulted in Ivor Searle being the first Company in its sector to introduce an electronic catalogue. This is no mean achievement in itself but when one considers the range of remanufactured products and the variants covered plus the pace at which details change, it is truly a considerable achievement.



*A gearbox in the latter stages of remanufacture*



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But the investment is rapidly proving to have been worthwhile for again it is linked to the Company's philosophy of providing the ultimate customer experience available in this field. The ability of customers of all types to be able to see what items are available and at what cost is, not surprisingly, proving popular across all sectors.

Why? It all goes back to where this family business started: customer satisfaction makes business so much easier, enjoyable and rewarding. Satisfied customers are a Company's best advertisement ...

As well as a Company which remains true to its founding principle of understanding customers' requirements in order to provide satisfaction through excellent service, Ivor Searle Limited is today far from being just 'that Company that remanufactures engines'.

Today it is one of the UK's leading remanufacturers of automotive products. Even more than that, Ivor Searle is a leading remanufacturer..... full stop!

*With our thanks to all at Ivor Searle Limited and David Eszenyi in particular for his time in discussing and providing a fascinating insight into this remarkable operation.*

For further information go to:

[www.ivorsearle.co.uk](http://www.ivorsearle.co.uk)

(where you can also see that fascinating YouTube clip).