

# DGEng BUGLE NEWS

*Maurice Walker talks again (See previous Bugle number 21) but this time about his time in the RAF. His script was prompted by John Burton's Bugle No: 26*

Following John Burton's text on his early years I offer these reflections on my introduction to the MoD.

As in John's case I served in the RAF for five years although only to the height of Senior Aircraft Man. But the Air Force did teach me the trade of engine mechanic and the principles of aeronautics; this did form the basis of my Engineering career.

On leaving the RAF I ventured into the world of retail business which was a complete failure. Following that venture I gained employment as a mechanic with Field Aircraft services building aero-engines; with Trojans building the Elva courier sports cars and finally in Woolwich in the engine shop of Norton-Villiers (ex AJS) motor cycle manufacturers.

Norton-Villiers was situated opposite the Royal Arsenal and when motor cycle manufacture ended the Royal Arsenal took on many of the redundant staff, me included.

I was interviewed for a position of mechanic-examiner in the oil test laboratory. This was being relocated from RAE Farnborough (It became part of MQAD) and needed a complete complement of staff so I was fortunate in being offered a position. This I achieved after trade test, interviews and a medical. I started on the 29<sup>th</sup> of December 1969. On the 30<sup>th</sup> of December I was struck down with a particularly virulent version of flu. I had no contact in the laboratory and no telephone number and when I returned a week later they all thought I had turned down the job and left; if that had been a commercial enterprise I would have been struck off the pay roll.

The Oil Test Laboratory's purpose was to carry out mechanical testing of lubricants using internal combustion engines hence I was quite at home building engines for test. The lubricants that we were testing or assessing were for Army and Air Force use. I had completed nearly a year as a mechanic-examiner when the new facility was virtually complete and required four extra PTO IV's to oversee the running of the test equipment especially during silent hours. A number of us mechanics applied and I was fortunate to be selected. Now I had a desk in the office a white lab coat and no tools. All of us PTO IV's were given the responsibilities for a number of test rigs. So no longer was I cutting metal but scribbling out designs and overseeing the construction and assembly of a number of these test rigs.

My first real task was the high speed shock test. This test involved a car perched on rollers driven to speed and the clutch dropped onto a dead engine. A series of shocks were applied and the crown

wheel and pinion examined after test for distress. By this means the quality of axle lubricants were assessed. I supervised the securing method for the car on its rollers; after discussion with the shop foreman I proved that my method was correct and not his perception. For the completed test equipment, I designed and had constructed the remote driving controls plus the instrumentation data recording. This piece of equipment I consider my Brunel moment; the Engineer in charge of the laboratory invited a firm of consulting Engineers to inspect it and their view was that they could not produce any equipment that would give better results.

The test engines were all built to laboratory standards and any wear was minimal so accurate measurement was imperative and I was given the responsibility for maintenance of the metrology room. Our measurements were to very close tolerances and to this end the temperature and humidity needed to be kept under control, temperature at a steady 68 degrees F. The mechanics all felt the cold so always turned up the heat; I have to admit that I thought that skilled men should understand the need for temperature control and I shouldn't have to continually remind them. I had the task of reviewing the requirements for instrumentation and ordering any requirement. We needed a set of internal micrometers and my research gave me two suppliers, one British and one Swiss. A couple of telephone calls and I was offered the service to supply. The Swiss could offer some off the shelf immediately and the remainder within three weeks, the British firm could meet our requirements but had a year lead time. One problem, the Swiss articles cost twice as much so those in charge of the budget thought waiting a year was not out of order.

As a PTO IV, as all of us were, responsible for all tests, building, services and staff during silent hours (the staff was one mech-examiner). There could be up to seven tests running each of which had data to be recorded every hour – these engines would be running for 120 to 140 hours non-stop so there was much work to do. Each engine's fuel supply was gravity fed from individual tanks and these were replenished from underground bulk supplies by electric pumps. One of these pumps failed so no fuel could be lifted; there was an emergency electrician on call for the whole site so I duly called his number. I discovered that, apparently, our site was not his responsibility. My mechanic was not permitted to play with electrics and I was most certainly not, wrong union. A hand pump from the equipment available and just about

all the suitable hose available, which we cobbled together with jubilee clips, and by several efforts at hand pumping we managed to save the test.

I was not always successful in overseeing tests during the night. A colleague had been given the task of running a particular test and he was going to be working late to set it up. Being a helpful sort of chap I volunteered to take over. It was a normal test which I had run many times and so I thought would be straight forward and carried on as usual but during the night I read the instructions from the beginning of the schedule and discovered that the test requirement was unusual, my colleague had failed to mention this. First thing I now had to report to the Engineer in charge and admit my mistake. I was told that the test was for special oil of which we only had one sample and it had now been wasted so quite a rollicking. A useful outcome was future special tests were stamped in large red letters – SPECIAL INSTRUCTIONS APPLY.

The shift supervisor on the night shift had responsibility for Saturday overtime. The mechanics were used to knocking off early i.e. not working their full overtime hours on Saturday mornings, shift supervisor would annotate each man's hours in the overtime book. My shift, everyone has gone early and I am left to lock up; I annotated the overtime book with the time they had all left, not the hours they expected. Monday morning I had a deputation from the shop steward and shop committee. I agreed to reinstate their time but on my shift never again did they leave early.

There were amusing incidents, not so at the time but on reflection. My high speed shock car needed a gear-box rebuild. I instructed one of the mech's, and I advised him, as we dismantled the gear box that he should assemble all the gears on their proper shafts so that when we had the replacement parts he would know where they all went on re-assembly. We put everything neatly into a parts tray and covered it to prevent any contamination. It was two or three weeks later when I received the parts, which I duly passed on. About an hour later I ventured out into the shop to discover the mechanic staring hopelessly into his parts tray; he had taken all the gears from the shafts and now was totally lost as to where they went.

My next task was to build the test rig for a Caterpillar engine. Its pistons would be assessed for lacquering, carbon build up and ring sticking; these pistons, when cut down, made very useful ash trays. This engine was a single cylinder two litre diesel, more usually fitted to earth moving equipment. I designed the mounting bed for the engine, had the pressure cylinder made, selected and ordered a gear box to mate starter motor to engine plus all instrumentation. This test required

the engine to be supercharged so a roots blower was bought in and hooked up and after a year the construction was complete. I have to say that the completed structure looked a lot like the Puffing Billy steam loco of yester year.

Now to get it running. With my mechanic we went through the service manual twice adjusting all the elements especially the push-rod to the spill pump which fed the injector. The clearance to the pump was correct checked twice. All systems on, fuel OK and I operate the starting motor; disaster, the push-rod collapsed. I go through the manual again very carefully and everything seems to be in order. I turn to the last page of the manual where it is written the push-rod must be a certain length (why put that on the last page). Everything repaired and set up properly and engine starts all instrumentation giving appropriate readings and I leave the test running to the crew. There is shouting from the test room, my lovely Caterpillar is on fire. I had run the exhaust system through the concrete mounting plinth where the fibre-board formers were still in place and were the source of the fire ignited by exhaust heat.

My first introduction to project meetings emanated from this test. The three Engineers were otherwise engaged so I was instructed to attend the meeting at the Institute of Petroleum in London. Attired in suit with tie I attend, not knowing anything I keep my head down amongst the reps from Texaco, BP, Esso etc. All is going well and I am not involved apart from taking notes when the chairman, after much discussion, says to me, 'If we follow that route will the MoD accept that?' What do I say, me knowing nothing, I mumbled something like 'Possibly.'

The last statement from the meeting, 'See you all next month in Texas.' I escaped as soon as possible.

The test never did run while I was there. I returned some years later and did see it puffing away as I intended.

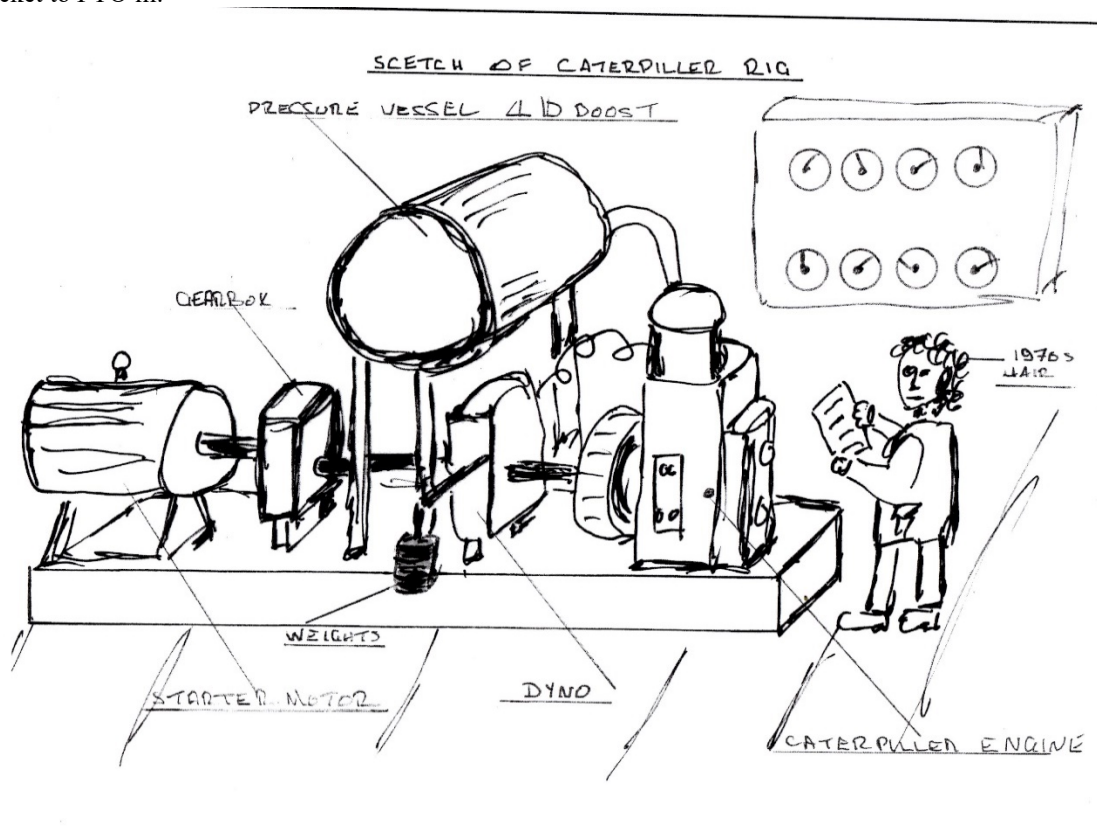
The lab ran two supercharged engines, both fed from external compressors. One of these compressors, the boost was diminishing substantially so was duly stripped and cleaned and we found no damage. This work did not solve the problem so compressor was returned to manufacturer – they machined some parts and sent it back with a statement that there was nothing amiss. Reconnected still low boost; I had the air cleaner removed and started the engine and discovered full boost; the filter was clogged; a thorough cleaning and all was well. Lesson learned check the simple things first.

One other incident I recollect. We had a test for evaluating greases; this involved running two gear wheels with increasing increments of pressure until the lubrication failed. To witness this failure the

supervisor would sit viewing the gears rotating until metal to metal contact resulted in sparking, at that point we stop the test. I was supervising this test; I stood up and moved away from the observation window momentarily and at that moment the gears on test exploded, had I stayed observing I would have received a face full of hot grease and metal and shards of glass. I was a PTO IV for four years in the Mechanical Testing of Lubricants Laboratory and must have impressed the Engineer in charge because I was called for a promotion review and received my ticket to PTO III.

That post I consider the best job of my career and gave me a good knowledge of tribology. It all began with being an engine mechanic in the RAF. Per Ardua ad Astra.

**DGEng BUGLE Issue No: 27**  
**MARCH 2018.**



**Maurice used this diagram in a lecture he gave. A real hands-on Engineer.**