NEWSLETTER June/July 2020

Hello everyone. I have to start by saying how shocked we all were on hearing that Chris Irvine had died. Due to circumstances, only family attended the funeral, but PEEMS went to Scarborough Crematorium and proudly acknowledged the cortege on its arrival. Lisa his widow passed on her thanks to the Club for attending.
Our condolences go to Chris and Lisa's family.

Club News

Hopefully there is light at the end of the tunnel regards the C-19, but not much Club activity to report yet.

We have had a couple of successful social *Zoom* meetings. It requires a bit of discipline to not all talk at once, but it felt good to talk to, and see a good turnout. One thing that struck a chord was how lonely some had felt during the lockdown, while others enjoyed not getting disturbed.

I hope it will get easier now for those who have been in isolation, but if anyone is still feeling uncomfortable with the situation, please call someone and have a chat /moan. Me or anyone will have time to listen. One point apparent on *Zoom* was the social contact we are missing.

It is cold and wet today, but I have an idea to have a *'Summer Social Get-Together'*, depending on how things go with C-19 in the next month. How about a lunchtime sandwich somewhere outside? It is likely we will all have to travel to a suitable venue but why not for a one-off meet? I don't know what car share regulations will be but I would be able to squeeze a couple of passengers in my car, or one on the back of the BSA!

<< Stop Press >>, Mike has kindly offered us use of his lawn for a possible venue. Today the 30th June, we had another Zoom hook up. It took the form of a *'Bring 'n Brag'* and once again was a success. We should all be conversant with *Zoom* by the time things get back to normal!!!

Club Subscription

The committee have had an informal chat about next year's Club subscription, and subject to agreement, it is proposed to carry over the subs to next year (2021). Overheads will still have to be met from Club savings. and if anyone would like to make a donation it will be most welcome.

Workshop

The workshop will hopefully be open again in the near future if anyone wants to use it. The committee are agreeing a *'Covid-19 Safe Protocol'* at the moment.

I hope you find the articles for the newsletter as interesting as the previous ones, my thanks to all contributors. If you would like to comment or submit anything for the next publication, please feel free to do so.

Kind Regards

Jonathan Milner

BRENDA 4 ~ A 24 cc Overhead Cam Flat 4 IC Engine

Hi, I am Brian Rees, Mike Sayers' friend from Surrey, and some of you do not know me, or about the four-year fabrication of *BRENDA 4*. I have been a PEEMS member for a long time.

BRENDA 4 is all machined from solid material mostly on a *Sherline* table top lathe and milling machine. In the past eighteen months the lathe has been replaced by the *SIEG 2 Axminster* lathe purchased from the PEEMS Workshop.

The *Craftsman Of The Year* trophy was awarded to this model by the *Sutton Model Engineering Club* in May 2019.

Spec:

Freelance 24 cc Overhead cam flat 4 IC engine with gear driven camshafts. 2019

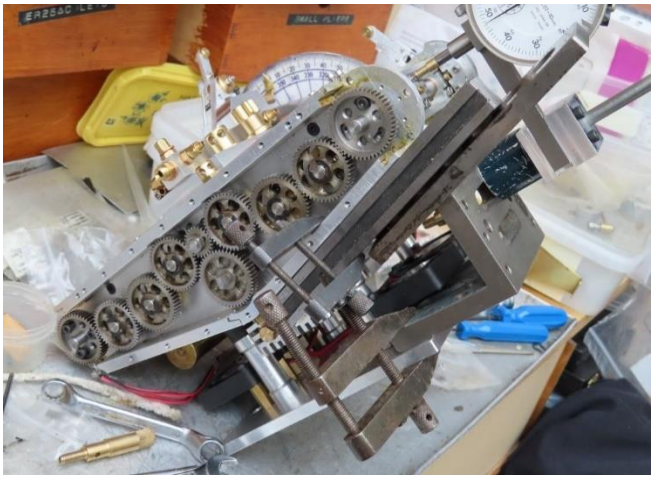
Bore: 22mm, Stroke: 17mm, Compression Ratio: 8 to 1.

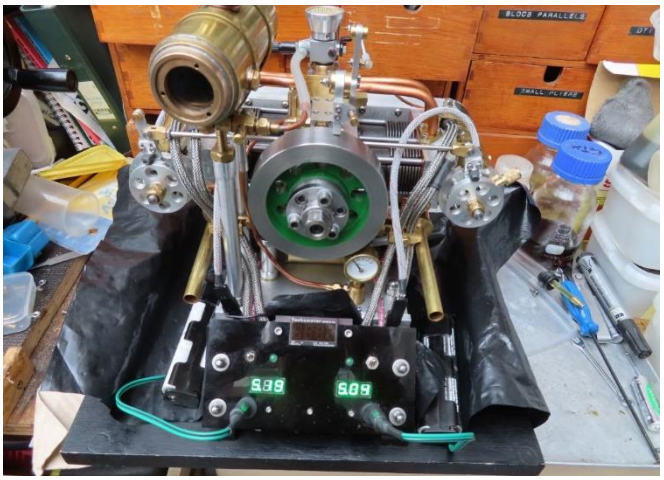
Fuel: Methanol.

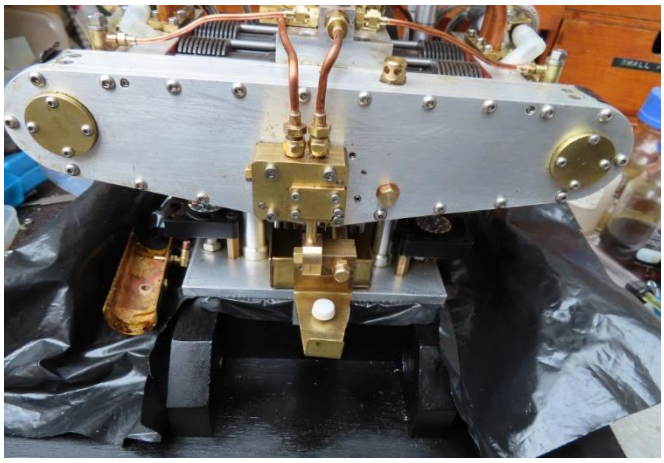
Overall size: 200mm long, 250mm wide, 220mm height.

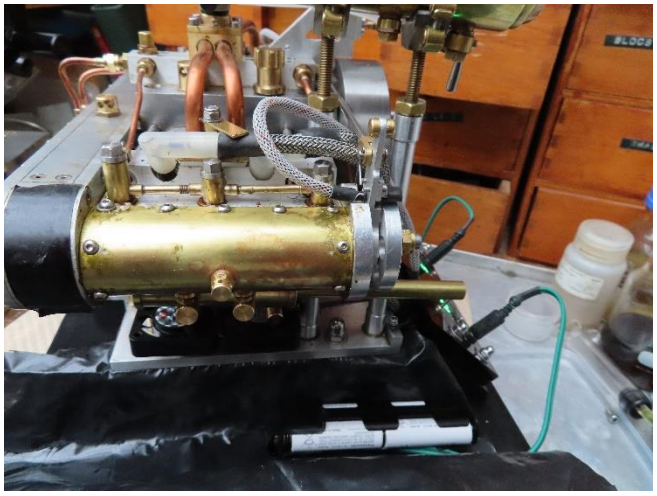
The crankshaft, timing gears and camshafts were all machined on the *Sherline* milling machine.

The following six photographs are of the completed model and include a side view showing the camshaft and one showing the cam gear train.









My Greenhouse Door – The tale of a 5 minute job.....

What has a greenhouse to do with engineering you may ask? Well, in relating this tale I once again seek to pick the brains of the membership to better understand an engineering problem.

The other morning whilst enjoying my breakfast rusk and reading over my job-sheet for the day ahead, I noticed the dreaded words, ‘’*greenhouse door needs fixing”.* My heart sank having read those words because, I think it’s fair to say, that I have enjoyed a cool relationship with the greenhouse from the time I put it up about 4 years ago. The construction, whilst admirable for its intended purpose and manufactured by one of the well-known brands, does in my opinion suffer from one or two design weaknesses.

The first of these are the fixings that are used in great numbers throughout. These are square headed short bolts with nuts, which when the mood takes them, will without warning, shear-off whilst being tightened. Not a problem you may first think, but this is not so, for in several locations the head of the bolt is held captive within the main frame of the skeleton. This means that should a bolt break in one of these locations, there is no way of fitting a replacement.

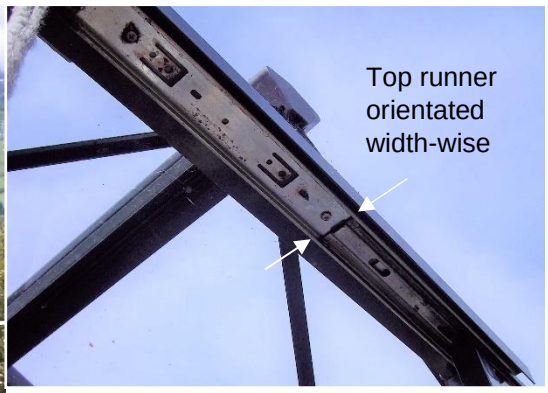
The second weakness, which in my opinion is the more serious (and the point of this story), is the way the door is suspended. In the original design there was a top suspension using nylon(?) wheels working in a channel, and a similar arrangement was used on the bottom bearing on the ground (or maybe in a bottom channel across the door threshold).

The updated design has sought to remove the channel brace across the doorway at ground level and both top and bottom suspensions are now provided by what I would call “filing cabinet type drawer runners”. These are the type that are in three parts, with linear ball races, which allow the three parts to slide within each other. Both upper and lower fixings are now on the front of the structure which avoids anything being attached directly to the ground.

Now I am not an engineer by training, but would guess these slides are designed to work (for example on a filing cabinet or kitchen draw ~ see the photos on the next page) in what I would call ‘shear’, that is to say the weight is placed vertically pressing down on the ball runners edge-wise. The way the slides have been employed on the new door design is at 90° to this i.e. width-wise (see top runner detail below).

I will say in defence of the design, that thought has been given to this obvious weakness by fitting them in such a way that allows at least one of them to be closed whether the door is open or shut. This means that when the door is shut, the three parts are all enclosed together whilst the bottom one is fully extended and vice-versa when the door is open.

‘The Job’



Detail Of The Top Runner ‘In-Situ’

So, looking at the job, it appeared that the door had lost two of its screws holding the slide to top of the door. This had allowed the door to drop sufficiently to then foul the lower sill as it opened. Upon trying to slide the door shut, it came to a stop with a 6'' gap in the doorway. In trying to release the door from its runners (provision is made for two of the three parts to slide apart), I found the top runner would not release and the slides extended so far, then jammed – in either direction.

With no other choice, I detached the whole door and complete ''slides pack'' from the front of the greenhouse, and removed the slides from the top of the door. What I found was that the top plate of the top slide pack would only move through half of its travel before jamming fast.

Having carefully taken the whole pack apart, (being aware that the linear ball race cage, unlike a circular ball race, releases the balls once the cage is out), I found the plate that screws to the top of the door was slightly bent. I thought '*great this is obviously what's wrong",* so proceeded to straighten it. Then, having pushed it back into the housing with a little *ASP* grease applied, I was disappointed to find it hadn't cured the problem.

After that I thought the ball race cage itself might also be slightly bent or worn (as it is rather crudely made). After removing the cage and visually checking it, I put it back (having put all 40 ball bearings in by hand) and turned it through 180° in a hope that if worn, it may have improved the situation and would now allow the re-assembled slide to work normally. You've guessed it, no, it made no discernible difference at all!

Same type of runner as used normally in shear loading (i.e. kitchen cupboard) with loading on bearings edgewise.

Where to go from here? I looked very closely at each part and could see no good reason for the jamming. I therefore decided something more unorthodox should be tried. I found that by tapping the end of the top slide with a soft mallet, I could 'push' it past the sticking point, to the closed position. This put it where it needed to be.

Having done this, I found that by pulling the slides apart, as they would be in normal operation, they would now traverse the full length required, but they still wouldn't go beyond the full traverse point and release the slide out of the pack completely. This at least meant that if the door with both slides attached could be re-affixed to the front of the greenhouse (which it could), the door would now operate correctly. I settled on this as a compromise. The alternative was to admit defeat (which doesn't come easy to a model engineer), and purchase a new slide which in my view was unnecessary. It also meant I could tick this job off the list, Yippee!

I offer my tale then in the hope others will now be aware that such things can happen and be prepared. However, what do you think was (is) the problem?

My own view, (putting aside the fact that I am sure this type of runner is not ideally suited to this application), is that the slides are designed to operate assuming that everything is plumb, that is straight, and that the ball bearings are working in two parallel tracks simultaneously. If these tracks are misaligned because of wear or damage, then the balls may jam whilst running, and act as a locking device. As one is pushed up the other may be pushed down particularly if the weight is being born in the wrong plane (90° out). – What do you think?

Colin Bainbridge

The *Doxford* Marine Diesel Engine And Other Seafaring Tales.

On September the 10th last year PEEMS organised a trip to the *Anson Engine Museum* at Poynton near Stockport, Cheshire. This museum houses an array of steam and internal combustion engines going back to the early days of the industrial revolution. All in all this was a great day out and a fabulous trip. A full write up is available in the September PEEMS newsletter:

https://bisarchtest.files.wordpress.com/2019/09/september-2019-newsletter-1-3.pdf

What I didn't expect when I signed up for the trip was that I would be reacquainted with a *Doxford* marine engine I had worked and trained on some 45 years earlier. Let me explain how that came to be. It's a bit of a tale so bear with me.

Like Jonathan, my first career was as an engineer in the Merchant Navy. Up until the 1960s the traditional way to become a seagoing engineer was to complete an apprenticeship in a heavy engineering environment often, but not always, in a shipyard. Many came from railway locomotive building (e.g. Doncaster Plant Works) and one or two managed to persuade the Board of Trade that their time in a sewing machine factory counted as "heavy fitting"- the prerequisite to be signed on as a first trip junior engineer. Anyway, with the full employment of the late 1950's and early 1960's ("You've never had it so good "– remember?) shore based industries were complaining bitterly about the loss of many of their newly trained journeymen and shipping companies were obliged to start their own training scheme.

The new training program, implemented and overseen by the *Merchant Navy Training Board*, mirrored that for Deck apprentices. The Deck branch of the service provides a career path to Master (via 3rd Mate, 2nd Mate and 1st Mate and so on). For some time Deck Apprentices had been referred to as Deck Cadets and so it was that, in a similar way, the new Merchant Navy Engineer apprentices were styled Engineer Cadets. And that's what I officially became on September 13th 1971 when I signed up with the *British India Steam Navigation Company* (BI) and started a four-year engineering cadetship. In those days the cadetship comprised three phases. Phase 1 was shore based and in my case was at *Hull College of Technology*. This comprised a two-year program of basic workshop training (starting with the obligatory "file and scrape this rough block of steel flat to within 2 thou") interlaced with a theoretical course leading to the *Marine Engineer Technicians Certificate*. The long summer college holiday was not free time but mostly spent on "vacation training" making and testing, for example, foot pumps and machine vices. Also included was a significant component of electrical work and I recall making off many connections using mineral insulated cable.

After two great years in Hull came Phase 2 – a year at sea. My first ship was *MV Merkara*, a photo of which is shown below.

MV Merkara - Photo: Paul Strathdee

I joined in Cochin after a four-day adventure involving flying to Karachi and getting to the docks *just* in time to watch the ship let go and sail south without me. Three days later I was able to join my ship in the south Indian port.

Merkara was a relatively new general cargo ship, delivered in 1971 from *Swan Hunters* on the Tyne. At 11143 gross tons and with a contracted speed of 19 kts, *Merkara's* main engine was a 6 cylinder *Sulzer* RND90 (900mm diameter x 1550mm stroke) - but this is about *Doxfords* so I'll offer no further details other than this was a conventional one piston per cylinder, 2 stroke diesel with loop flow scavenging – in other words no exhaust valve or

other visibly moving parts on the cylinder head. After four months adapting to life at sea I transferred, in Bombay, to the *MV Tairea* – see photo below.

MV Tairea - Photo: Trevor Jones

MV Tairea, also a general cargo ship, was a bit smaller and slower than *Merkara*, 8199 gross tons and with a 15.5 knot contracted speed. *Tairea* was built at *John Brown's* yard on the Clyde in 1956 (and named *Aradina* at the time) so it was not new when I joined! It was on *Tairea* that I had my first encounter with a *Doxford* opposed piston two stroke diesel engine.

The Doxford is characterised by having two pistons in a single cylinder with a combustion chamber more or less in the middle section of the cylinder. Ports in the upper part of the liner provided a route for exhaust gasses with similar ports in the lower cylinder for air intake or scavenge air. The gas flow was therefore bottom to top with some swirling encouraged by the shape of the ports. This was referred to as '*Uniflow Scavenging'*. The upper piston, sometimes referred to as the exhaust piston, is connected to the crank via two sets – one each side (fore and aft that is) - of piston rods and crossheads. The bottom piston is connected to the crankshaft by the main piston rod and crosshead. The crankshaft therefore has three throws between main bearings, two for the upper piston, each side of the main crank – but 180° apart from it. The lower stroke was quite a lot longer than its upper counterpart, so the combustion chamber was nearer the top than the centre. Supercharging – or providing a positive air pressure in the air inlet scavenge space - was provided by a double acting flat plate air pump driven by a linkage to one of the crossheads.

The particular engine on *Tairea* was a 6 cylinder "LBD" engine with bore 750mm and stroke 2500mm (if I recall correctly). The LBD acronym expands to Long, Balanced Diaphragm. Long referring to the long stroke, Balanced meaning inherently balanced in operation and, most recent development (in the 1950's), a Diaphragm separating the under piston space from the crankcase. This latter development was a consequence of the adoption of cheap heavy fuel oil with a high (3% +) sulphur content. The products of combustion have high acidity and not only directly attack the bearing and other metal surfaces but contaminate the lubricating oil in the crankcase such that bugs and bacteria can thrive causing even greater long-term degradation. Each cylinder required three penetrations through the diaphragm, two for the piston rods for the upper piston and one for the bottom piston rod. Glands and stuffing boxes galore.

My first memories of the *Doxford* were in port the day I joined *Tairea* when, thrown in at the deep end, I assisted in "doing a unit" – in other words removing the pistons from a cylinder, cleaning everything up, changing the rings and measuring the liner wear with a very large micrometer and then putting it all back together again – with newly serviced fuel and air start valves. This maintenance action was typically performed every 10,000 hours of running time with each cylinder (unit) staggered so as they did not all need doing at once. The newer *Merkara* had pneumatic and hydraulic spanners to help with the large nuts and bolts of its engine. With the older *Tairea* however it was spanners that took three of us to lift and a strong chap swinging a 14 lb hammer in the confines of a hot, sweaty, oily crankcase to undo and flog up the various fixings. Whilst at sea however the *Doxford* ran smoothly with its balanced arrangement. None of the vibration associated with the *Sulzer* – moreover the action of the top pistons, all bobbing up and down was mesmerising. Quite a difference from the less entertaining *Sulzer* top end.

A photo of the sketch in my engineering journal of the time is presented below, followed by a diagram from the contemporary authority on the subject, *Southerns Marine Diesel Oil Engines* – 10th Edition.
This latter photo shows rather more detail than my drawing – and this includes the scavenge pump, one per engine.

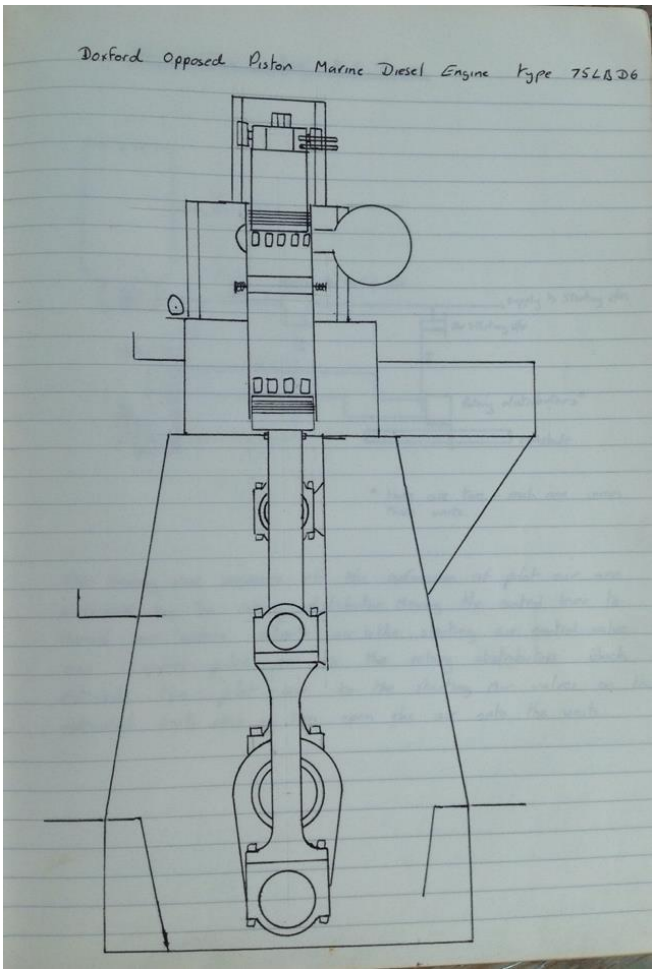
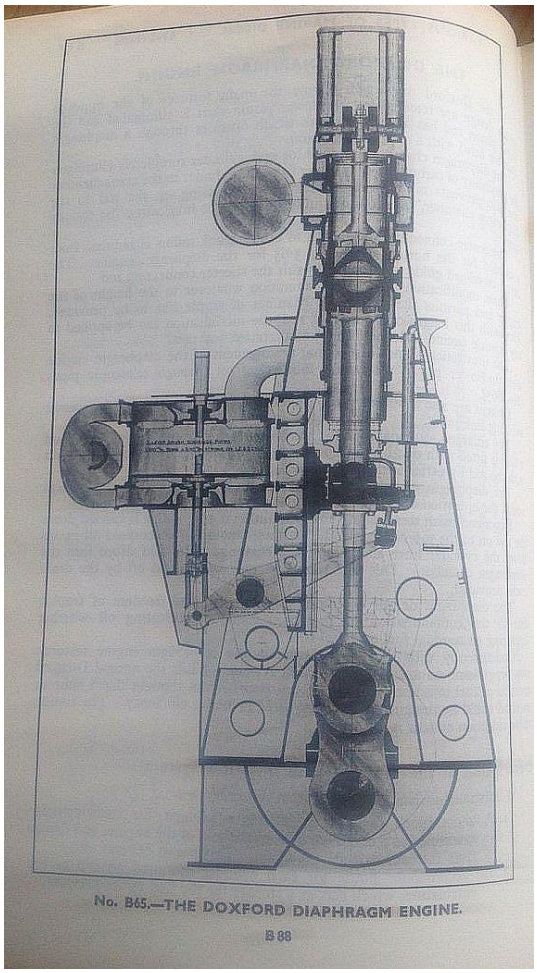


Photo: David Proctor



From *Southerns Marine Diesel Oil Engines* – 10th Edition

After arriving in *Avonmouth* I paid off and went home for a couple of weeks leave before joining *MV Strathbrora* in Bahrain. *Starthbrora* was a 12539 ton fast cargo vessel, built in 1967 in Japan, with a 20,700 bhp 9-cylinder *VT2BF B&W* engine giving a design speed of 21 knots. I spent six months on *Strathbrora* operating a liner service between Japan and the Persian Gulf - with much of that being out in the sun looking after the 6 hydraulic cranes which created more work on the ship than any other single item. I also undertook my first dry-docking – in Japan.

MV Strathbrora – Photo: Malcome Cranfield

Of course, there was the usual routine main engine work and the single poppet valve design of the *B&W* was different again to either *Merkara's Sulzer* or *Tairea's Doxford*. I was getting some varied experiences in my Phase 2!

After *Strathbrora* I had a months leave before my final, short, trip as a cadet on *MV Floristan*.

MV Floristan – Photo: Harold Appleyard

Floristan was completed in 1965 by *John Readheads* of, appropriately as it turns out, South Shields. Another general cargo ship, she was 9296 gross tons and had a contract speed of 17 knots.

I joined in Leith in July 1974 paying off six weeks later in Hull, in time to start Phase 3, the final phase, of my formal training. *Floristan* was equipped with a 10000 bhp 6-cylinder *Doxford* (670mm stroke x 2100mm bore) but this was a 'P' type, a more recent design than the older LBD of *Tairea*. The 'P', by the way, being for Percy Jackson, *Doxford's* then chief designer. Similar in principle to the LBD but the two major differences I remember are:

a) the cylinder liner was in two pieces either side of a central combustion belt rather than the single 'tube' of the LBD and,

b) the adoption of turbochargers rather than crosshead driven scavenge pumps of its predecessor.

The multi piece liner had the effect of allowing a lower headroom in the engine room as it was necessary to allow space for removal of the liner and this was normally the tallest object that could reasonably be changed by ships staff using the engine room crane. The disadvantage of the multi piece liner was that cooling water seals at the combustion belt sometimes failed thus requiring removal and reseating of the liner parts – never had to do this myself but I was informed this is a "pig of a job".

Looking back, it's interesting to compare the higher power/cylinder of the 'P' type compared to the seemingly larger LBD. I suppose this was due to the higher scavenge pressure from the two exhaust gas turbochargers.

August 1974 and I started Phase 3 at *South Shields Marine and Technical College*. Like Phase 1 this comprised a structured mix of theory and practical training with the practical element mostly comprising dismantling and rebuilding and becoming familiar with various pumps, engines, steering gears and the like. However, the plumb project was to set up and run the single cylinder *Doxford* prototype/test bed. This had been donated to the college several years earlier by the nearby *Doxford* works for the training of marine engineers. If I recall correctly, the engine was more or less in running order when our group got to it, but that due to the new Health and Safety rules, new guards were needed over some of the moving parts. Making and fitting these was the work that I remember most clearly. I also remember that when it was completed, most of us got a chance to start the engine – which blew smoke rings out of a sort of funnel on the side of the building. During my time at South Shields we were treated to a visit to the nearby *Doxford* factory at Pallion on the banks of the River Wear. My abiding memory is of the sheer size of the machine tools – and watching a crankshaft being built up by heat shrinking the webs onto the journals by a massive necklace of gas jets in a pit. Little did I think, when I left *South Shields Marine and Technical College* for the final time in July 1975, that I would see the engine again.

The single cylinder South Shields *Doxford* was not the last *Doxford* I encountered. My first ship as a newly minted junior engineer, having formally completed my cadetship, was the *MV Otaio* – propelled by twin *Doxfords*. Perversely I had little to do with them as I was tasked as "3rd Freezer" doing nights looking after the fridge plant.

Sadly, due to a combination of commercial, political and technical reasons, *Doxford's* went out of business. Despite several attempts to revamp the engine (Google "J type" and "Seahorse"), the company ceased making engines in 1980. Some pundits suggest that they simply went out of fashion. Today the site of the Pallion shipyard works is next to a new bridge over the River Wear – and some of the old engine fabrication site now houses a printworks.

Fast forward 45 years to September 2019, and imagine my surprise when I discovered that the South Shields Single Cylinder *Doxford* I had spent so much time on during the winter and spring of 1974/5, forlornly rusting in pieces at the *Anson Engine Museum*. Some (rather sad) photos of that day are presented below.

Doxford 3 throw crankshaft – Photo: David Proctor

Doxford control stand – minus fuel pressure wheel!
Photo: David Proctor

Entablature – Photo: David Proctor

Bedplate – Photo: David Proctor

Lower cylinder liner – Photo: David Proctor

There is a plan to restore it - I wish them luck - and if I lived closer would happily volunteer to help out. Those interested can see more at http://www.enginemuseum.org/doxford.html.

A video of a model *LB Doxford* (predecessor to the *LBD* on *Tairea*) is available at:

https://www.youtube.com/watch?time_continue=92&v=sWjMBSnq2es&feature=emb_title

I wish I had the knowledge, skill and time to make something of similar complexity and quality!

Postscript:

Merkara was sold on and ultimately scrapped in 1987 (17 years service).

Tairea was sold on and ultimately scrapped in 1979 (23 years service).

Strathbrora was sold on and ultimately scrapped in 1986 (21 years service).

Floristan was sold on and ultimately scrapped in 1983 following an engine room fire (18 years service).

David Proctor

Did anyone actually know what was going on?

I read with interest about the 1956 Suez Crisis in the 18th June edition of *Model Engineer* and here is what happened to me:

I was one of those who got recalled, as I had been in Egypt before. I joined the army in 1953 and was sent on an electrician course at Malvern and from there to Egypt.

On arrival at 2 Base Workshops, I was first sent to a vehicle repair workshop, then to an electrical repair shop where we rewound almost anything that used copper wire. Vehicle dynamos, alternators and electric motors, all old stuff, no diagrams or details. I didn't know much about the windings of motors or wave and lap wound armatures, but learnt by trial and error. Those "pucker winders" wouldn't let on to me any trade secrets. We carefully dismantled motors and made some notes. As we knew it, it was up to us to get them going again. Armature winding wasn't a listed army trade. At the other end of this very large work shop, Egyptians rebuilt lead acid batteries and made distilled water for the batteries.

Sometime early summer 1956, I got a letter from the Army telling me to report to 32 Med Regiment Royal Artillery in Carlisle. Being small in stature they hadn't got any uniform or boots small enough for me, so I hung around in my civilian clothes for quite some time, much to the annoyance of the Royal Artillery WO1. Soon all the petrol-powered vehicles with *Rolls Royce* engines went, and *AEC Matador* gun tractors with diesel engines arrived. The Matadors were fantastic vehicles which just wouldn't give up. They were so primitive, no synchro mesh gears, nothing much to go wrong, which is good in times of need. The guns could lob a shell 12/15 miles. After some time with all the usual military messing about, we formed a thirty-five plus vehicle convoy and made our way south along the A1 to Catterick Garrison, at a steady speed of about 20 mph, blocking all the heavy goods traffic on the way.

(Please note: The photos reproduced in this article have been taken from the internet, and after a search, the copyright holders could not be found. They have been reproduced here under 'fair use' until otherwise informed)

Next day, we went to Ranby Camp near Retford, for another overnight stay. The following day when we went through Newark, the farmer's market was on, and one of the guns being towed developed a brake problem. Eventually it was lifted out of the way by the *Scammel* recovery vehicle. It turned out to be a faulty tractor to gun jump lead, which caused the brakes to be fully on. When we eventually arrived at Warley Barracks in Brentwood, we were told to leave everything, as we were now going to Southampton by train. The ship which we should have joined had already departed.

Eventually, me the electrician, and about twenty five other REME personnel boarded a ship, a WW11 *Liberty* ship *SS Sandsend*, with the fuel and munitions. The Royal Artillery gunners, gun tractors and guns were on another ship, all part of the convoy Egypt bound. Going down the Channel we broke down and were soon left behind, drifting about. Soon two tugs towed us to a location off the Needles by the Isle of Wight, where we stayed for several weeks. Apparently the 'donkey greaser' who should have increased water to one of the boilers, did the opposite, and burnt some of the tubes.

Typical of the military organisation in my experience, the gunners arrived off Port Said with no fuel or munitions. It was decided we should disembark and go to Tilshead, a TA camp on Salisbury plains where we were generously provided with tents and duck boards. After a week in October of wet battle dresses and boots/ feet, no proper faculties for washing, let alone a bath or shower, we were moved on yet again to Bulford Camp. On parade one morning in November, the Royal Artillery WO1 announced we were already demobbed. On my departure he said he hoped never to see me again, and as I was now a civilian once again, I said the feeling was mutual. A lorry took us to Salisbury station where a train was waiting to take us to London. Did anyone actually know what was going on?

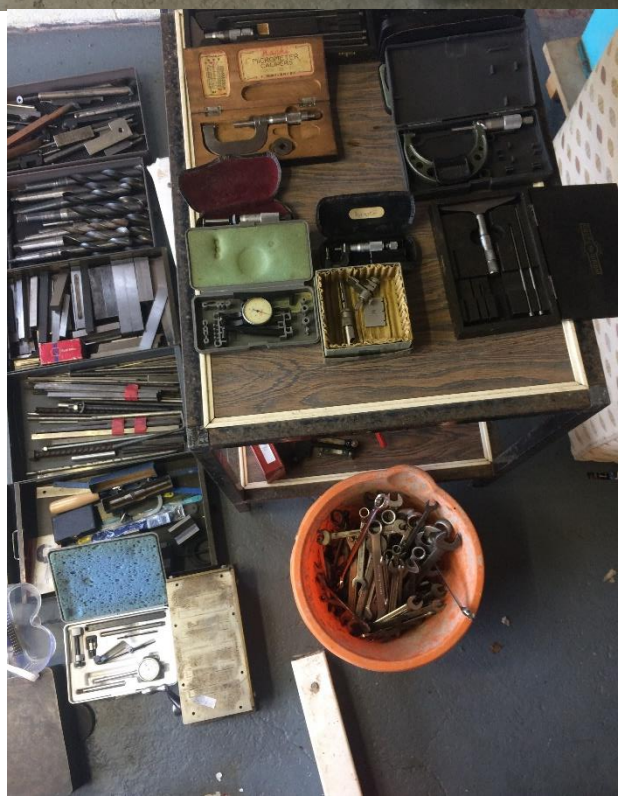
Ted Fletcher

PS: I have 7.5 meters of 3 core steel wire armourer cable, a 4 foot water proof fluorescent light, and a 120 watt tubular heater, all *Free Of Charge* should a member have need for either or all. Apparently some folk install a small heater behind the lathe bed. I have more to come later. *Ted*

Items For Sale

As many of you know, Howard Hunter sadly passed away a few weeks ago. Now whilst Howard was not a PEEMS member himself, he was well known to some of our membership and Brian (aided by Ted) - who are members are organising the disposal of Howard's extensive workshop equipment.

1 Cutter Grinder
2: Bench Drill
3: 8" Twin Grinder
4: 8" Face Grinder
5: Set 1 Morse Drills
6: Set 2 Morse Drills
7: 2 in No Angle plates
8: 3 Morse Chuck
9: Micrometer Depth Gauge
10: 2-3" Micrometer
11: 0-1" Digital Micrometer
12: 1-2" Micrometer
13: 1-2" Micrometer
14: Precision Angle Tool
15: Mercer Dial Gauge
16: Large Vernier Gauge
17: Depth Micrometer
18: Precision Level
19: Set Square
20: Dial Gauge
21: Small Gauge
22: Fly Cutters
23: Magnetic Dial Stand
24: Rev Counter
25: Set Copy Centre Punch
26: Set Copy Centre Punch L
27: Magnetic Dial Gauge
28: Round Bare Centre Pop
29: Small Angle Grinder
30: Small Angle Grinder
31: Small Number Stamps
32: Large Number Stamps
33: Large Letter Stamps
34: Large Number Stamps
35: Dremell Plugs Accessories
36: Wiggler Set
37: Small Hole Micrometer
38: Small ER Collet Set



The above list is not exhaustive - there are many clamps, drills, reamers and assorted useful mundungus not listed above.

If you would like more details of any of the above, or to inspect or purchase, please contact Brian Stephenson by telephone. Brian's telephone number can be found in The Members' List.

Contact: If you would like to contribute to the Newsletter the contact is:
Nevile Foster Tel 01751 474137 or e-mail nevf123@outlook.com