NEWSLETTER August/September 2021

Hello Gents and welcome to another interesting Newsletter.

First some Club news:

- **The Workshop.**

  The workshop has been tidied up and quite a bit of junk has been taken to the tip. The junk has accumulated over the past couple of years, but we simply do not have any spare room to store it. We ask that no more unsolicited items are dropped off. If you have small items you would like to dispose of, by all means bring them along to a meeting, but please take them back home with you if they don't find a new home.

  We will always try and help you dispose of anything decent, by e mailing details to members on the contact list, and including a notice in the Newsletter. Please ask.

- **The Mike Sayers Trophy. Club Meeting on Wednesday 6th October 7.00 pm**

  The Mike Sayers Trophy was a victim of Covid last year, but fingers crossed for this year's meeting in the Pickering Memorial Hall third floor 'Mill Suite' **. The meeting will be Zoomed for those not able to attend.

  As mentioned previously, it isn't easy to include Zoom only entries and also create a level playing field for the judging, but with a lot of hard work from Mike Sayers and David Proctor we have succeeded this year.

  By the time you read this, entries to the competition will have closed, although a late entry will be considered. Please contact Mike ASAP (that is, not a couple of days before the event). ** Serviced by a lift

- **PEEMS Annual General Meeting (AGM). Club Meeting on Wednesday 3rd November** *(Time To Be Confirmed).*

  The year has flown past, and it's time for us to reflect on this year, and plan for next year and the future. Please do try and attend and voice your opinions; tell us what we do right or wrong. Your thoughts and ideas are valuable. Pie and peas will be served. Those on Zoom will be able to watch us eating !!

  You are invited to step forward to join the Committee or to be considered for any official position. If there are no nominations, the present officials and Committee members are happy to continue. Our long-standing Treasurer, David Hampshire would like to retire from the position, and consequently we are looking for a replacement.

  David has developed a simple accounts system and is very happy to help his successor. Can you help us?

- **Visits**

  Visits have been harder to arrange this year, and since lockdown eased, many attractions have had staffing difficulties, (*'The Pingdemic'*, for example), resulting in reduced opening days.

  We are planning to visit the *Ellenroad Engine House and Steam Museum* which is near Rochdale, on Sunday 7th November, (link: https://www.ellenroad.org.uk). It is scheduled to be a 'Steaming Day', but this is to be confirmed. It's about 1¾ hours from Pickering by car. If you would like to car share or can offer a seat, please let me or any Committee member know. Final details will be announced at the November Club meeting. If the 'Steaming Day' is cancelled at the last moment, it probably will not be worth travelling.

  I am also hoping that a visit to a local private vintage Motorcycle collection in Pickering, will soon be arranged. Details to follow as soon as a date is confirmed.

  Stay safe and keep busy!

  Jonathan

- **Brian and May Stephenson's Garden Party.**

  PEEMS thank Brian and May for hosting an excellent garden party at their home on Sunday 15th August. The weather was good and the food was excellent.

  Brian and May thank everyone who came and contributed. **£410** was raised for *Cancer Research UK*.

- **Some Potential Speakers For PEEMS.**

  There are some engineers, running very interesting projects, who have offered to speak to us.

  - **Ivan Shaw.**

    PEEMS have been following the progress of the build and flight testing of Ivan Shaw's "Personal" single seat aircraft G-SEKR. Since he introduced the aircraft to us in September 2018, PEEMS also had the chance to inspect the aircraft at Ivan's home workshop in April 2019. The aircraft is now in the early stages of flight testing at *Leeds East Airport* (previously *RAF Church Fenton*).

    Ivan was interviewed by Ed Hicks of *Flyer Magazine* at the Light Aircraft Association (LAA) rally at Sywell Aerodrome on the Weekend 3rd - 5th September. Ivan was a keynote speaker.

    Here is the interview with Ed Hicks, where Ivan discusses the trials and successes of the flight testing so far:

    Ivan Shaw and His 180kt Home Build – YouTube.

    https://www.youtube.com/watch?v=9Y9fdcvmk00 *Please press on link. To return to the newsletter click the back arrow at the top left-hand side of the screen.*

    

    

    For your information: X-Plane is a Flight Simulator with Aerodynamic Modelling software, and C/L means Coefficient Of Lift. Vne means 'never exceed' speed and Vd means dive speed.

  - **Jonathan Selby.**

    Jonathan is a colleague of Ivan, and has been working on developing Ground Effect Vehicles (GEV). Jonathan lives in Malton and is currently at the stage where he has built some radio-controlled models and is now preparing to flight test them.

    The GEV is a stage up from a hydrofoil, with no contact with the water, instead it has been aerodynamically designed to ride on a cushion of air. There have been other GEVs built, especially by the Russians, but the technology is now available to create a commercial state-of-the-art vehicle.

    You can see the concept in action on this website:

    www.wigetworks.com *Please press on link. To return to the newsletter click the back arrow at the top left-hand side of the screen.*

    

    

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- **Graham Sykes.**

  Graham gave PEEMS an excellent talk in February 2019 about his Steam Rocket bike *"Force Of Nature".*
  He would like to establish a speed record for thrust vehicles and for steam powered vehicles in the UK Timing Association.

  Paul Windross was talking to Graham Sykes and he said, with no encouragement from Paul, that he would like to give a talk to PEEMS on the latest developments with his speed machine.
  He has a larger pressure vessel with a fresh way of welding stainless steels. It is a variation of MIG welding which needs no purging gas.


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It looks as though we will have some interesting talks to look forward to.

- **The Empirical Validation Of Galileo's Gravitational Theory ~ On The Earth ++.**

  Someone sent me the link to this experiment, and I thought it would be good to share it in the Newsletter.

  According to Galileo's theory, if you remove the air from a room to create a vacuum, and drop feathers and a cannon ball (a bowling ball in this case) into it, both will hit the ground at the same time!

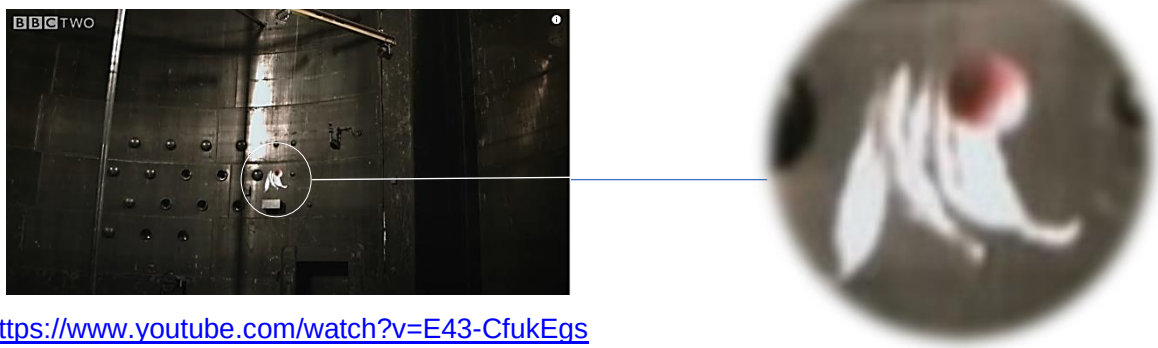
  Indeed, according to Galileo, the speed of an object is independent of its mass in a vacuum.

  In theory it works, but in his time, Galileo could not prove it definitively** ... It took about 380 years before the experiment could be carried out.

  While we all understood and accepted his theory, to see it verified is remarkable.

  As this is a BBC production it features Prof. Brian Cox, a 'Mission Control Room', a buzzer, a red flashing light, a count-down, a finger pressing a button and……dramatic music. So bear with it.

  It is a very interesting demonstration of gravity:



  https://www.youtube.com/watch?v=E43-CfukEgs

** Between 1589 and 1592, the Italian scientist Galileo Galilei (then professor of mathematics at the University of Pisa) is said to have dropped two spheres of different masses from the *Leaning Tower of Pisa* to demonstrate that their time of descent was independent of their mass. Galileo had not yet formulated the final version of his law of falling bodies. He had however, formulated an earlier version which predicted that bodies of the same material, falling through the same medium, would fall at the same speed. This was contrary to what Aristotle had taught: that heavy objects fall faster than the lighter ones, and in direct proportion to their weight. While this story has been retold in popular accounts, there is no account by Galileo himself of such an experiment, and many historians believe it was a thought experiment. (ref: *Wikipedia*)

++ Astronaut David Scott performed a version of the experiment on the Moon during the Apollo 15 mission in 1971, dropping a feather and a hammer from his hands. Because of the negligible lunar atmosphere, there was no drag on the feather, which hit the ground at the same time as the hammer. (ref: *Wikipedia*)

Nevile Foster

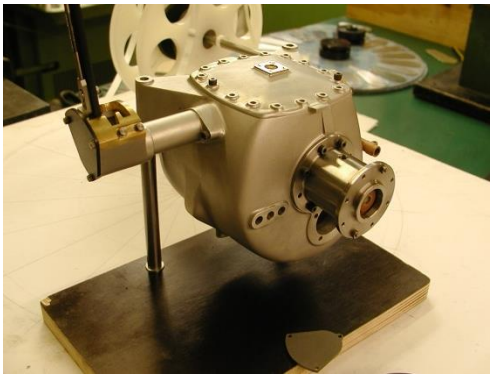
- **Club Meeting 1st September 2021.** ***A Beginner Looks For Help With 3D Printing*** **~ A Talk By Mike Sayers.**

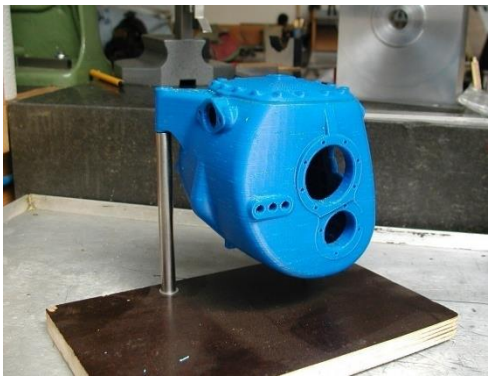
  There was a reasonable turnout of members for the PEEMS September Club meeting, at the Pickering Memorial Hall 'Mill Suite'. Four guests attended.

  Mike began his talk with a disclaimer that this was not a comprehensive guide to 3D printing, rather it was an overview of how 3D printing is a useful asset when it comes to the visualisation of complicated components, prior to them being machined in solid metal.

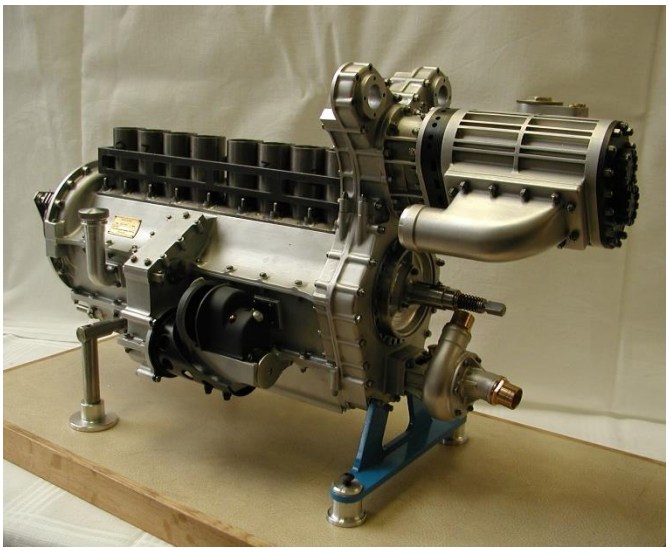
  - **The Original Idea For Using 3D Printing As A Visualisation Tool.**

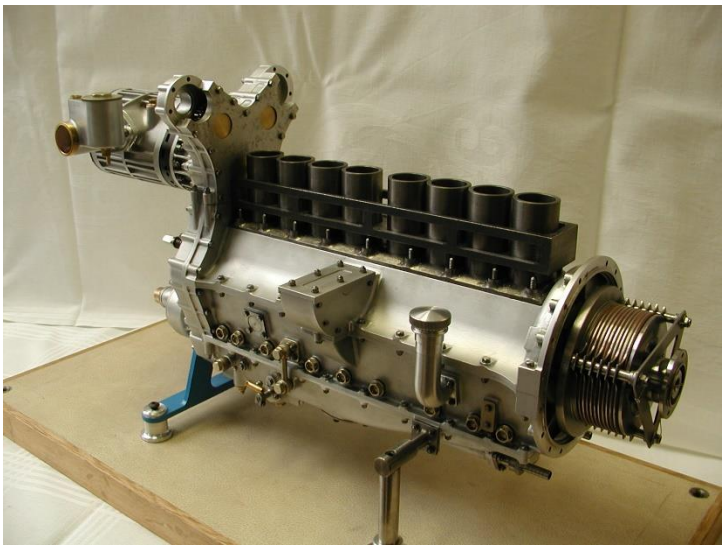
  When Mike was building his 1/3rd Scale 'Blower' Bentley engine, he had problems building the gearbox because it had such a complicated shape. He couldn't work out how he would hold and machine the component. Mike's stepson Paul, as a birthday present, made the odd shaped gear box by 3D printing, so Mike could handle the part and work out how he was going to machine it. There was the advantage that there was already a 3D computer image which allowed the 3D printed part to be made. The 3D print is quite rough and the finish is abysmal, but it is reasonably accurate in shape and dimensions. The other advantages of the 3D model were that Mike could work out how to orientate the component, and to make sure the cutters didn't interfere with the area that needed to be machined next.





  - **Using 3D Printing As A Visualisation Tool For The Current Delage Project.**



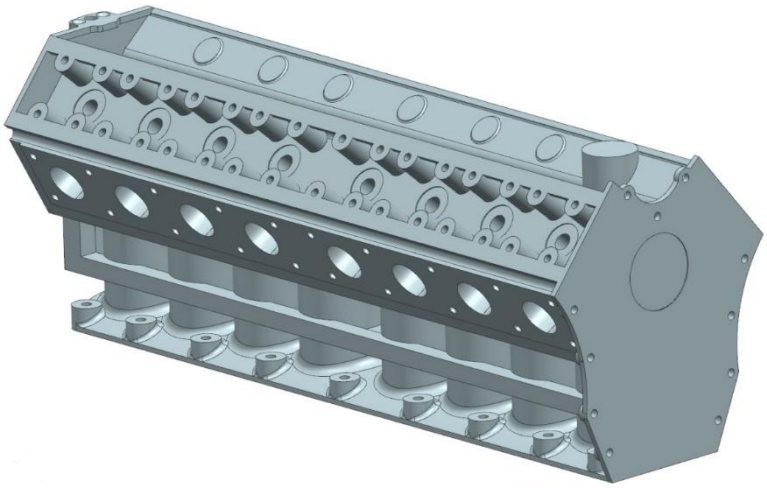


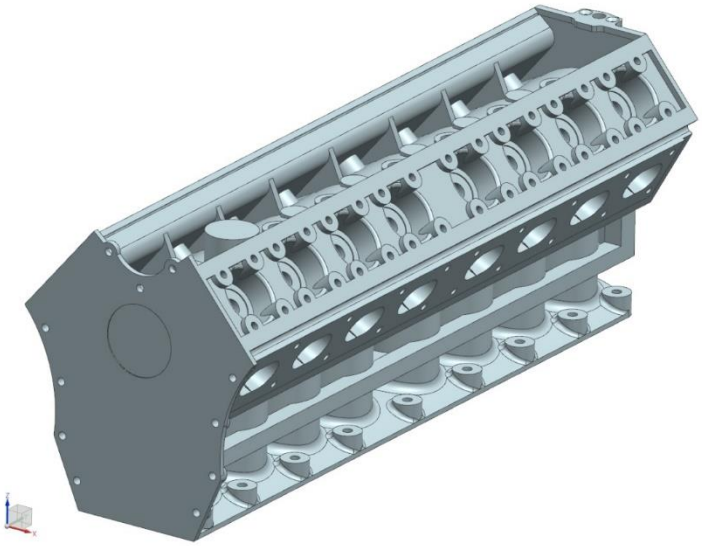
This was the state of build on the evening of the talk, with the top assembly still to be mounted on the cylinder liners

The ongoing Delage engine construction has been discussed in the October 2019, March, May and November 2020 newsletters. This year (2021) there have been progress reports in the February and March newsletters.

When Mike approached the Delage cylinder block, he realised that 3D printing would be an advantage here as well. The Delage presents similar challenges to those of the 'Blower' Bentley. The 3D computer images that Paul drew up for him, were based on photographs and sketches of the original cylinder block measured up at the *Brooklands Museum*. As can be seen on the following page, it is an awkward component to machine out of blocks of cast iron.

Initially Mike was unsure how to go about it, but thought, why not obtain a 3D print of the cylinder block to help visualise the approach? How difficult can that be?





Cylinder Block upside down

Well, it wasn't as easy as first thought.

Paul's colleague had set himself up with a comprehensive home 3D printing setup, and offered to do this work for him.

There were a couple of problems:

Problem 1. The component was too large for domestic level printers and would have to be printed in two sections.

Problem 2. The material cost alone was going to be £100 and time to print would be 1 week.

If Mike had gone to a commercial outfit, it would have been very expensive.

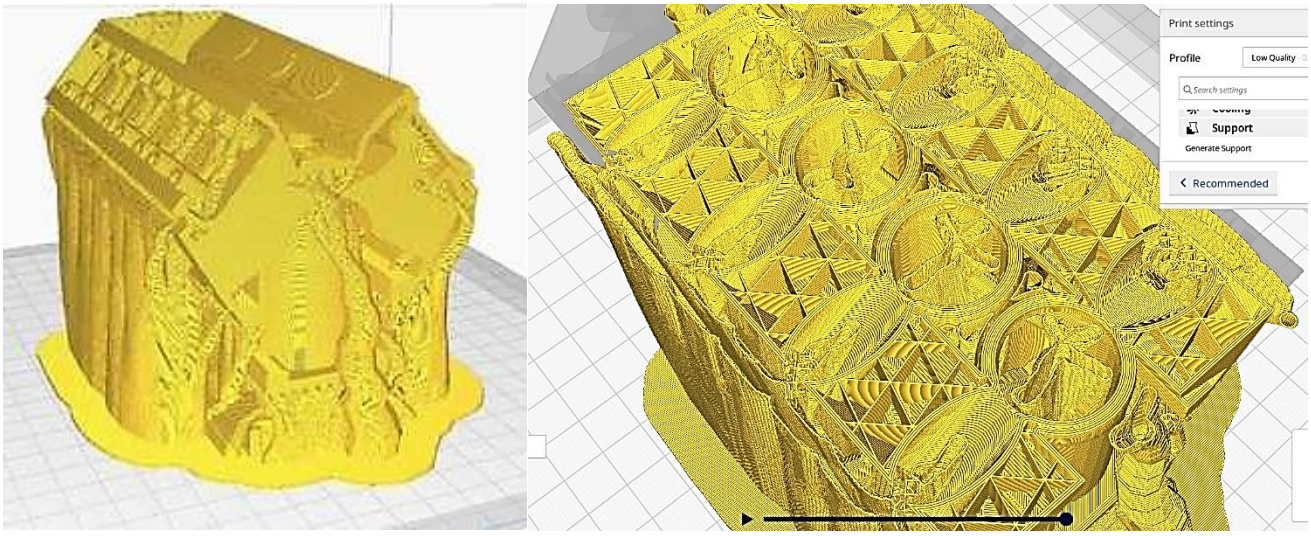
Mike was in possession of the 3D computer images, which could be loaded into a 3D printing programme in two sections, so he could see what the machine could produce. He requested that photos be sent as the 3D printing was progressing, in order to illustrate this talk. However, what he received was unexpected.

First though, it will be expedient to describe the three main methods of 3D printing.

- **3D Printing Methods.**
  - **FDM** or ***F**used **D**eposition **M**odelling* where a melted filament is deposited layer by layer. Not particularly accurate and slow to print. Poor finish.
  - **SLA** or ***S**tereo**L**ithogr**A**phy*, using laser light cured photo polymer liquid resin. This gives high dimensional accuracy and a fine finish. It is a three-part process.
  - **SLS** or ***S**elective **L**aser **S**intering*. This uses laser fused powder and can produce engineering quality usable components depending on the powder used. Very expensive.

- **Comparison Of The FDM and SLA Methods For 3D Printing The Delage Block.**
  - **The FDM Process.**

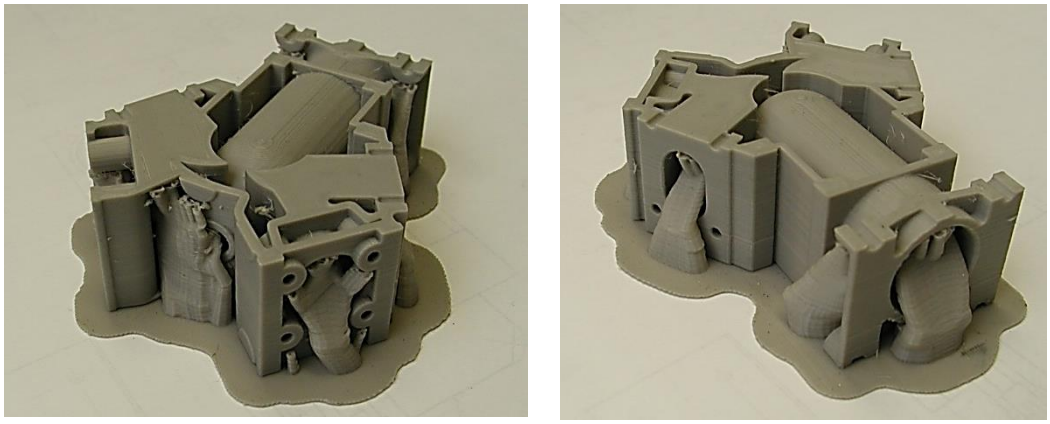
    These are the first views of the digital image of the rear half of the cylinder block, as it would be printed using the FDM process:



    The basic outline of the block can be seen, but there is supporting structure to keep the 3D model in shape while it's still warm and flexible. This is all calculated by the 3D printing programme. The programme decides what support is required, and where. It is quite complex, and the supporting structure has to be removed.

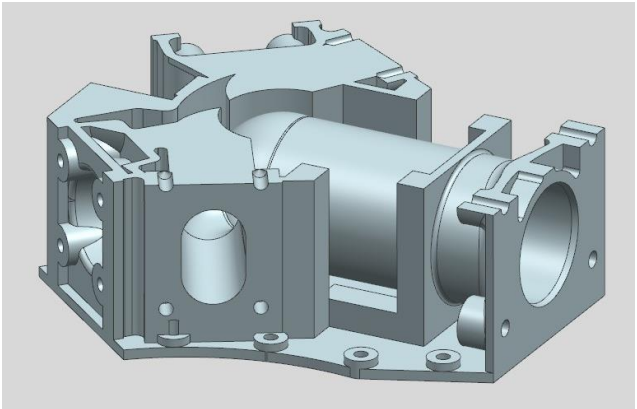
    Due to the size and time constraints, it was decided to produce the centre cylinders only, by the FDM process, as it was going to take so long to produce them all. As can be seen below there are a number of supporting structures on the cylinder, all of which have to be removed.

    Two views of the actual FDM print of a centre cylinder with all the supporting structure still intact:

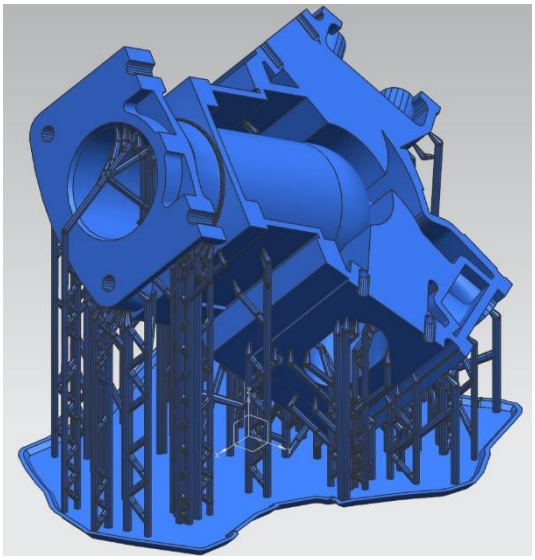


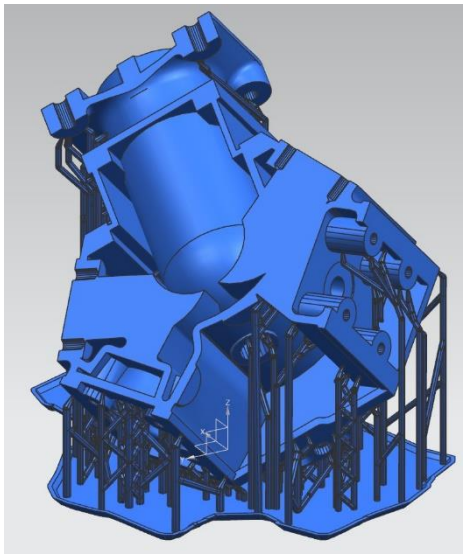
  - **The SLA Process.**

    The front and rear cylinders were produced by the SLA process, because of the slightly quicker printing time, and more accurate definition. Below is the digital computer model of the front cylinder, in what was thought to be the attitude in which it would be printed using the SLA process.



This is the digital model of the same front cylinder produced by the SLA process. The 3D printing programme has decided the best orientation and the degree of “scaffolding support” required.



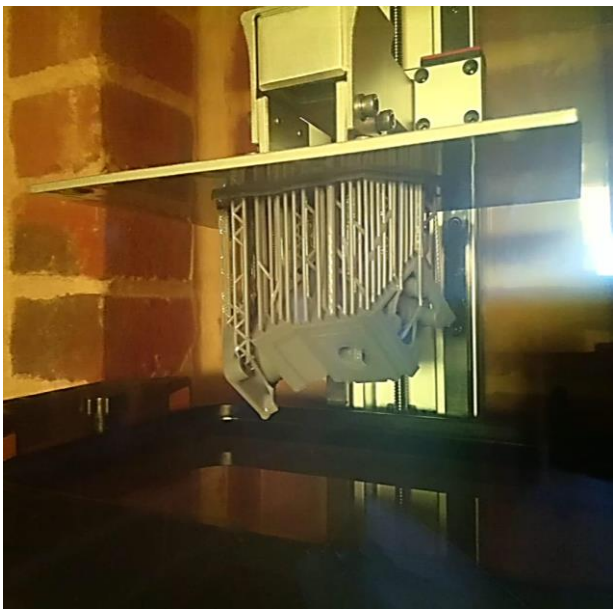


- **The SLS Process.**

  Mike decided there was no way he could afford to do anything with the SLS process!

- **The SLA Process In Photographs.**

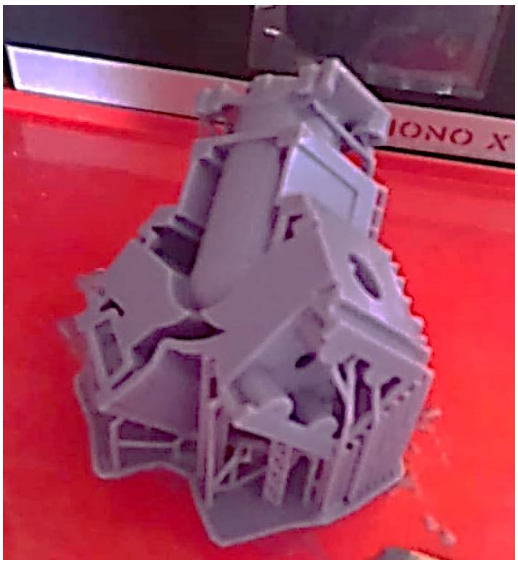
  Mike decided that the SLA 3D printing method was the most appropriate for the Delage cylinder block sections**.**



The photo shows the front cylinder being printed.

Note that it is printed hanging from the platen.

When immersed in the vat of resin below, the guided laser light cures the relevant areas and produces the shape.

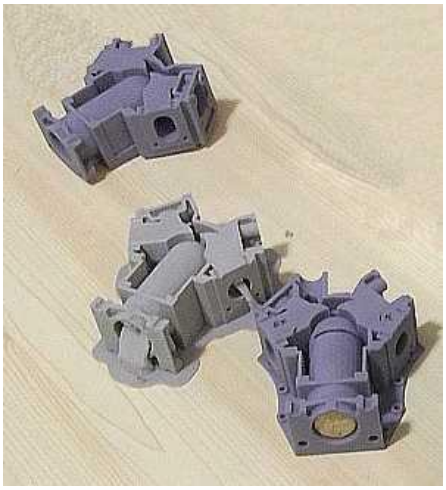


The completed print with its support structure still attached.

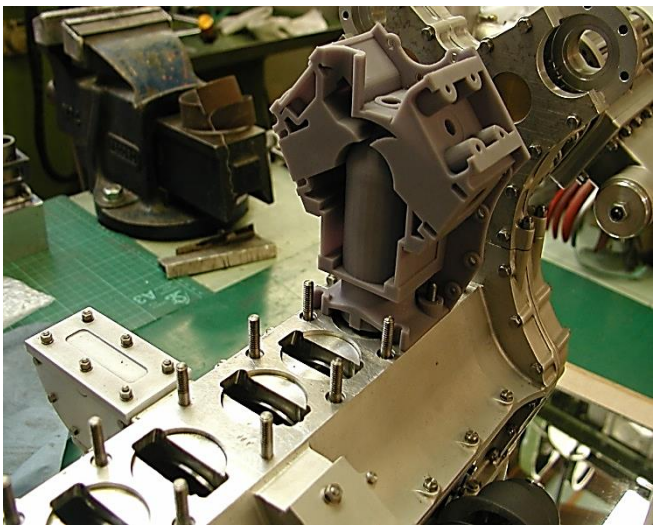
After removing the support structure, the print is then washed in isopropyl alcohol to get rid of excess resin, and then dried.

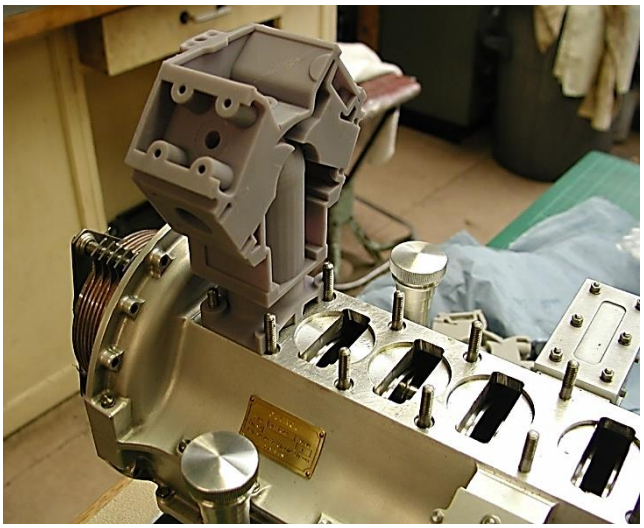
It is then exposed to UV light in a curing cabinet to complete the process.

Front and rear cylinder 3D prints completed.



Photos of 3D printed cylinders with and without supporting structure.





These photos show the front and rear 3D printed cylinders mounted in position on the crankcase. With a sectional drawing, the component can only be seen in one plane. Each cylinder is the same, but with the 3D prints, the shape of the cylinders on the engine can really be appreciated.

The engine can be “seen into” more, and there is a better feel for what needs to be machined.

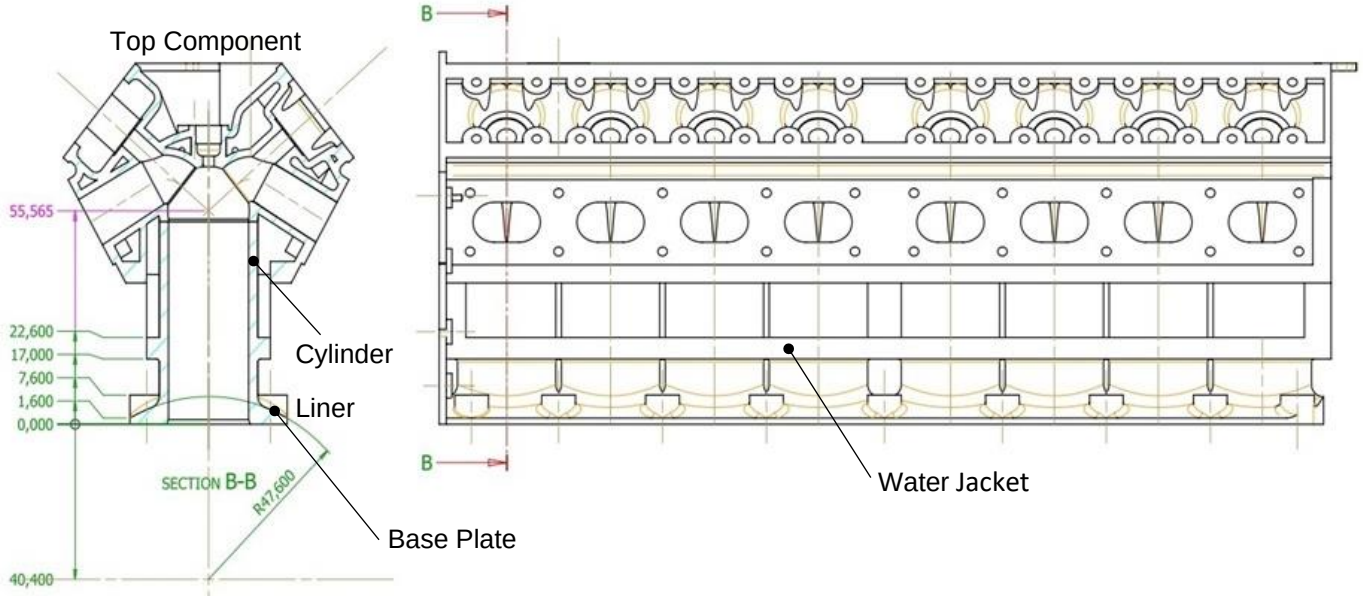
- **The Machining Progress Of The Delage Cylinder Block Components.**

  At the Club meeting in February 2021, Mike discussed what he intended to do to transform the cast iron blocks he had, into Delage engine components. This has been written up in that month's Newsletter (pages 13 through to 16).

  At this meeting Mike explained how those iron blocks were finally transformed into actual engine components. The assembly of the engine involves silver soldering, and this aspect of the construction will be covered in a later talk and Newsletter.

- **The Cylinder Block Assembly**

  This is the very first drawing of the Delage cylinder block side elevation, and a section through the first cylinder. It was dimensioned, but this drawing was all there was to work with initially.



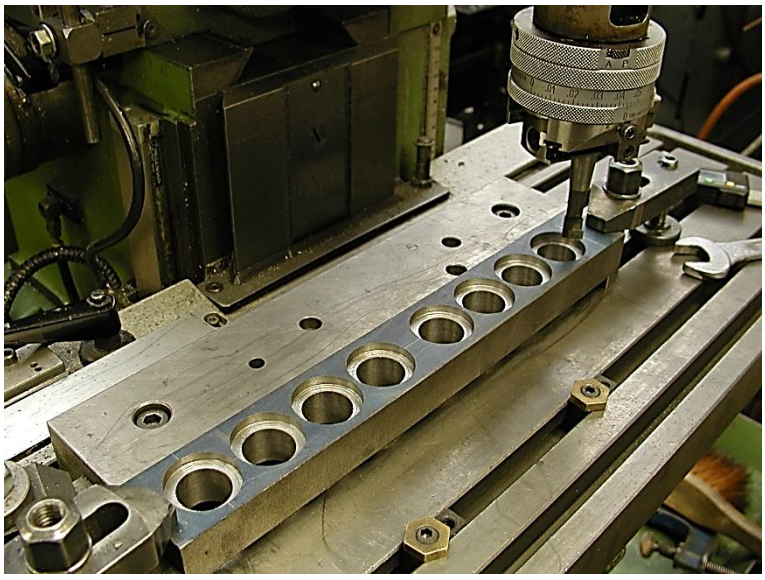
  This cylinder block assembly sits on the crankcase, and it was very easy to decide to make it in four parts:

  - The base plate
  - The cylinder liners.
  - The water jacket which encloses the cylinders.
  - The top component which contains the sixteen valve gear cam mounts, the spark plugs etc. This is a separate part that will drop on the top of and locate on the cylinder liners. This is very similar to the arrangement on the 1/3rd Scale 3 Litre Bentley Engine described at the top of page 6 of the PEEMS February 2021 Newsletter.

  The only problem is in the top component. As can be seen on the section, there are only two planes that are parallel. The other faces are at either at 30° or 40°. This made it very difficult to work out a datum.

  The intention was to have only one datum on each drawing, and all the dimensions would be taken from that datum. A datum, however, was chosen which will be described later.

- **Machining The Base Plate With The Cylinder Recesses.**



  This is the first machined part of the cylinder block. Here the cylinder liner recesses have been machined.

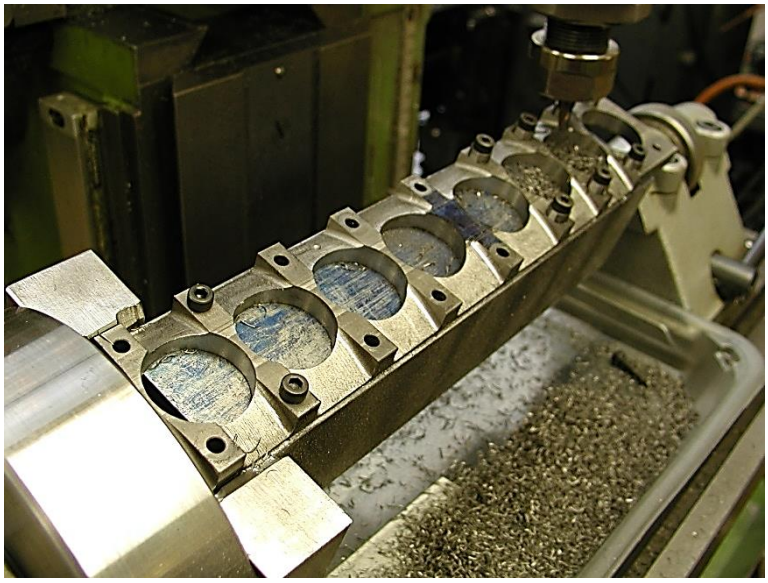
  The holding arrangement is similar to that used for the Bentley Engine Model (ref. PEEMS February 2021 Newsletter page 7).

  There is a parallel 'fence' bolted to the machine bed with a stop at the end. The component can then be put up against the parallel, and against the stop.

  Mike decided to move the longitudinal datum to the centre of the first cylinder.

  The component had to be precisely centred on the bed, otherwise once the cutter got to the other end, it would have run out of movement.

The previous photo shows the job finished with the packers and parallels removed. The “threepenny bit” items are *Mitee-Bite* clamping devices. They fit in the “T” slots, and work around an eccentric headed cap screw.



The next stage is to fix the machined base plate onto a jig block, mounted between centres in the dividing head.

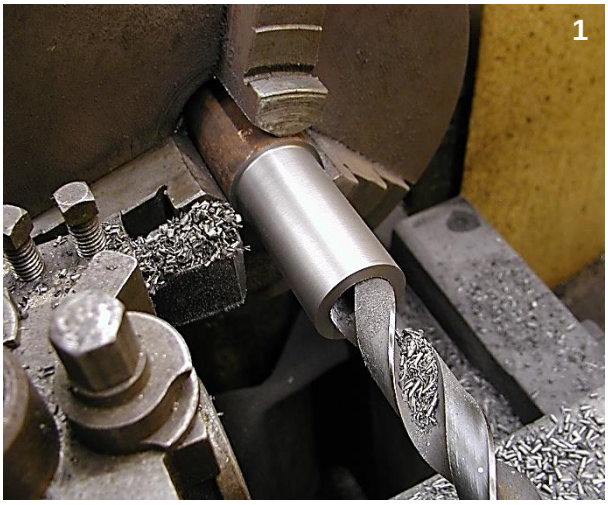
This allows the plate to be rotated 47.6mm off centre, in order to machine the curves between the hold down bosses.

Using a 4mm ball-end mill, it’s just a question of setting the datum, and then moving it either side and rotating the component back and forth in the dividing head, so that the requisite curve is machined.

The process is repeated at each location until the other end is reached.

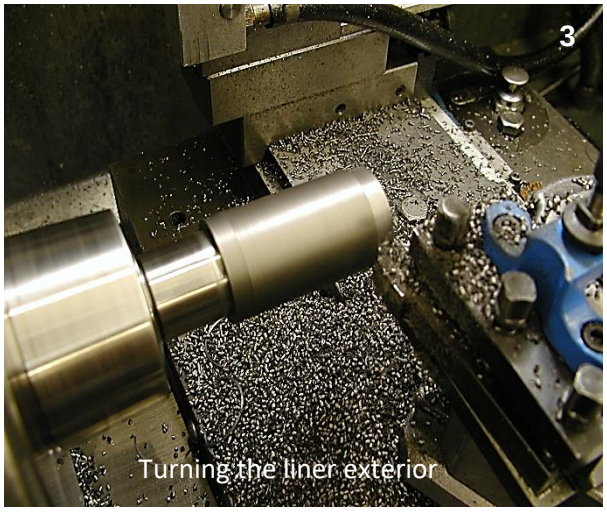
Using a ball-ended mill results in a bit of a ‘tramline’ surface, but it is easy to dress that off at the end, with a needle file.

- **Machining The Cylinder Liners.**



Simultaneously turning and drilling the cylinder liners, before fine boring and honing to size.

Turning the expanding mandrel to match the bore of the liners.



All the liners are then put on the expanding mandrel. If there are eight liners, Mike always makes nine. The extra one is used as a ‘setter’ which is used to ‘set’ the tool. Then all the liners are run through with exactly the same setting. This means they all come out parallel, concentric and with the correct dimensions.

Any further operations on the eight liners will be done on the ‘setter’ first.

All the liners are fitted into the base plate.

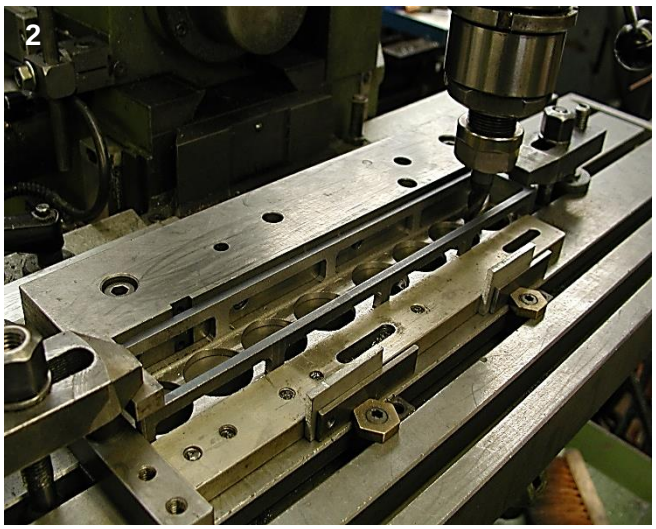
All fit well.

Note the ridge near the base of each liner that will support the water jacket.

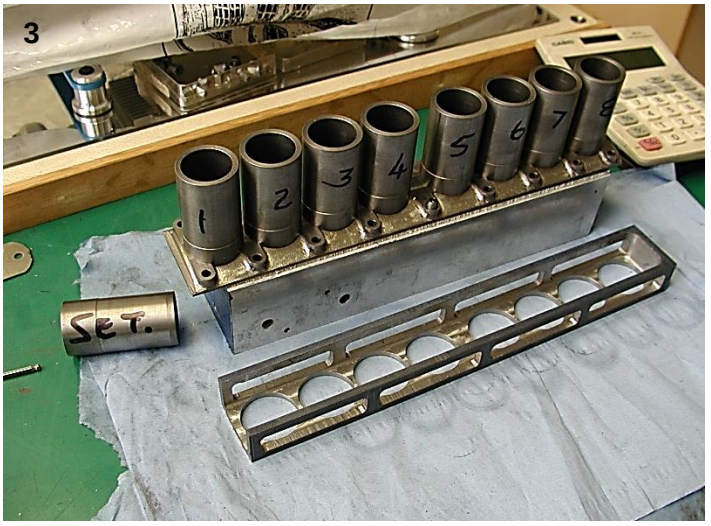
- **Machining The Water Jacket.**

The water jacket is another block of cast iron that needs to be machined, using the same clamping set up as the base plate. There is a lot of machining here, with the *Mitee-Bites* used to clamp the block against the parallel fence.

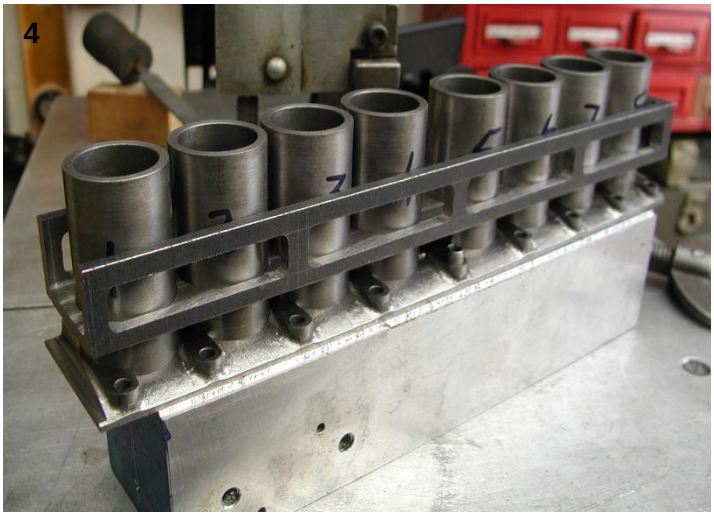
Here the access openings in the side of the water jacket are being machined. These will eventually be closed by screwed on water plates.



Hollowing out of inside of the water jacket.
The swarf has been cleared away. There was a lot.

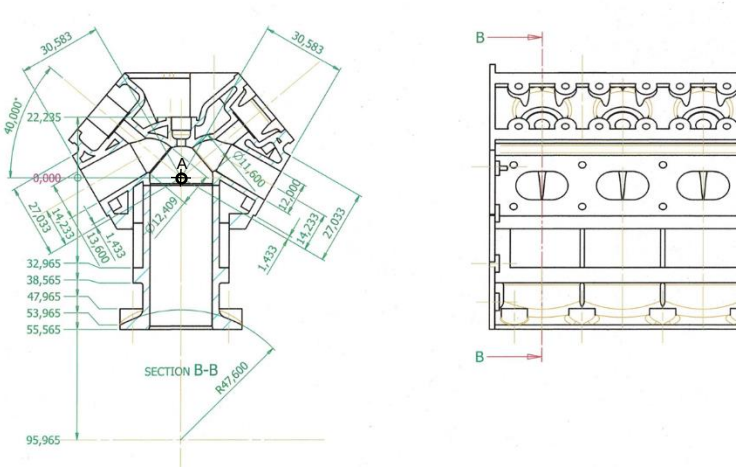


This is the resulting water jacket. There's not much material left, and it's a bit delicate.



Everything is in line. Using the parallel fence, the stop and the correct datums everything assembles without needing any filing.

- **Machining The Top Component**.
  - **Datums.**

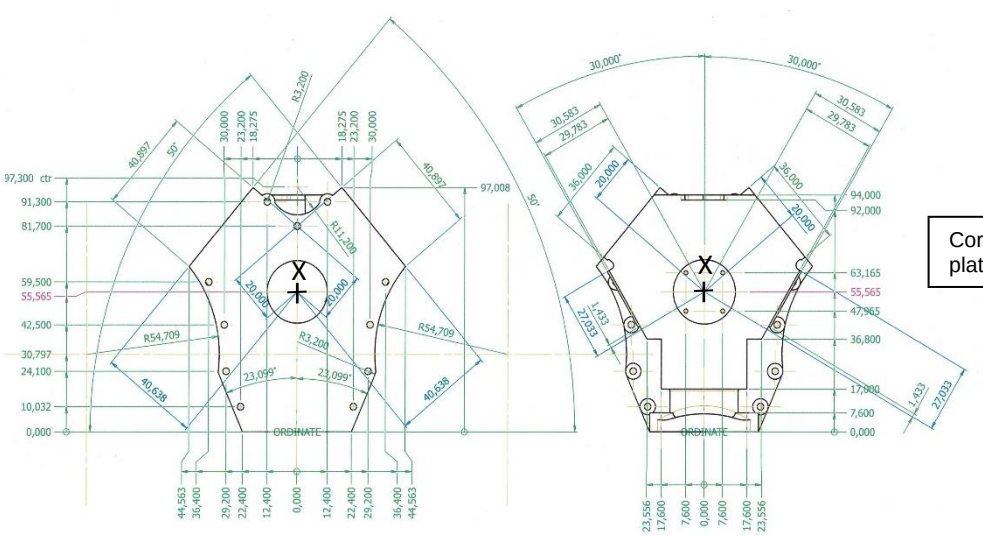


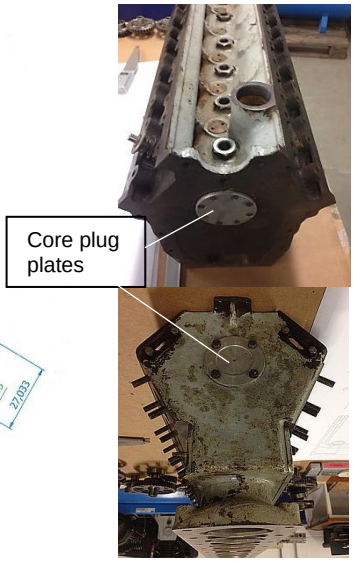
The top component started life as a large block of cast iron. As can be seen from the sectional view, this is where 3D printing comes into its own.

Mike decided to use the datum at the virtual point A.

The datum is at the coincident point where the spark plug and valve axes cross. It is useful in that it gives a reference for all the external faces. The point doesn't actually exist in the section, so Mike had to figure out how to use the point as a measurement datum.

The drawing gives the angles, widths and distances from the datum point front and back.



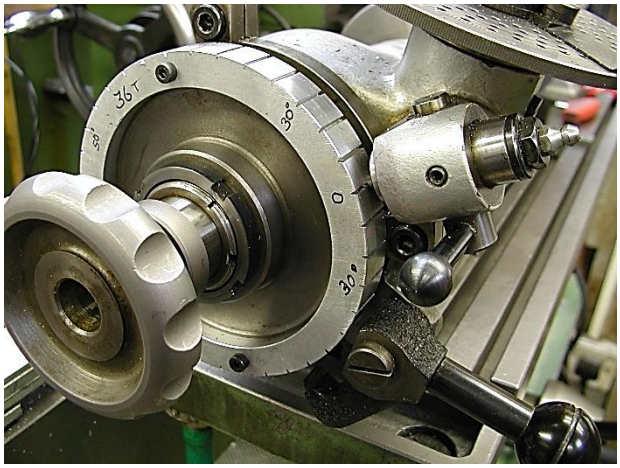


Front and Rear Elevations Of The Cylinder Block

As can be seen from the photos of each end of the cylinder block, there is a large core plug with a screwed on aluminium plate.

These core plugs were in an undefined position. Mike decided that if he centred the core plugs on virtual point X, and instead of a hole they became a protruding 20mm diameter boss on each end of the block, these cylinders could be used to hold the block in a collet at one end, and on a centre at the other. The centre of these bosses could also become datum point X, so that the tool could be touched on the outside of the bosses, and then moved the required distance to locate each of the faces.

Having the cylinders on the ends of the block, means that one end can be held in the dividing head of the milling machine to rotate it.



Another problem was that Mike's fairly sophisticated dividing head has a 40-tooth worm, and it has a direct dividing device on the end with 60 teeth. Neither of these would give the 10° increments required. Mike had to make a new dividing plate with 36 teeth (10° per division). Using the 10° increments, Mike can now divide to each of the faces without having to use the worm division, and without having to count holes, both of which can cause mistakes. Mike will leave the worm engaged for rigidity.

The photo shows the new 36 space dividing plate to allow direct divisions in 10° increments.

- **Machining Operations.**

This is the first step in machining the material for the top of the cylinder block.

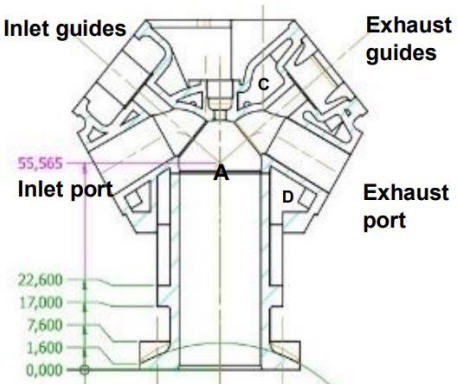
The block is 290mm long, 83mm wide and 60mm thick.

The weight is 11 kg. There will not be a lot left at the finish!

This is the first trial setup of the top cast iron block in the milling machine. It is held at both ends by the protruding 20mm diameter bosses. At one end, it is located in the collet of the dividing head. Some security brackets will be added at this end when the machining begins.

At the nearest end the block is held by the centre in the middle of the boss.

Mike can locate the position of all the faces of the component by touching the tool on the outside of the bosses and then moving it the required distance away to each face.

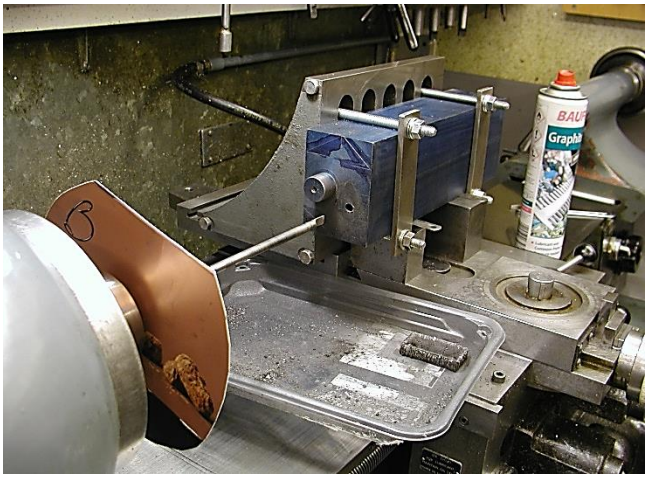


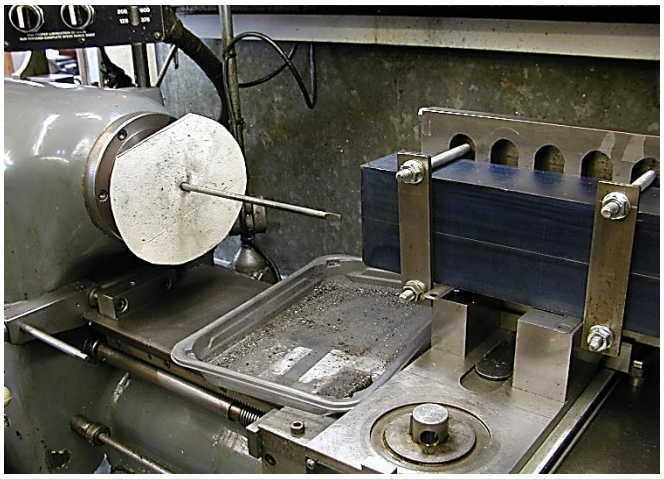
For the first machining operation, Mike has decided to carry out the riskiest operation first; the drilling of the waterways on the exhaust side of the top block. These waterways extend the full length of the block.

On the inlet side, hardly any water space exists around the port and fortunately, there is little need for any on the model. On the exhaust side it is different. There are large water spaces at C and D.

These can only be replicated by drilling the largest diameter holes that will not break into the exhaust ports, along the full length of the block. Holes could then be drilled between the cylinders vertically, to communicate with the major water spaces and outlet points.

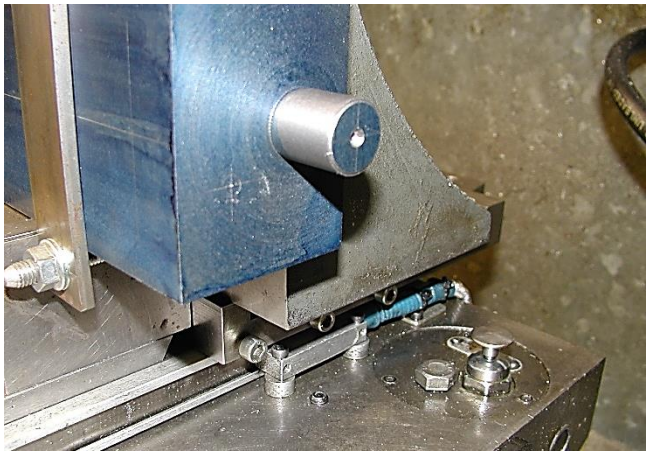
The important function of the waterways around the cylinder is to keep the exhaust side of the cylinder block cool.





Here the longitudinal waterway is being drilled 10.5” deep, using a ¼” home-made ‘D’ bit. The component is set up on an angle plate and bolted to it, after being packed up with precision blocks and feeler gauges. Mike started with a carbide centring drill. He then drilled slightly over 1” into the block with a 5.9mm drill. The hole was then opened out with an end mill. That provided a start for the ¼” ‘D’ bit.

The ‘D’ bit has to be withdrawn every .025”, and the chips blown out with an airline. The card disk is to help keep dust out of the spindle and collet. Rate of progress is about 1” per 30 minutes.



Hopefully the ‘D’ bit will emerge exactly on centre at this end. <u>If it is more than .025” out, the block will be scrap.</u>

This is because a .025” error will cause the cutter to break through the relatively thin exhaust wall.

Post Script: A day or so after the meeting, Mike announced that the operation had been successful and the drill had emerged on target after 5 hours! A small leap for mankind, but a giant leap for Mike.

Questions and Answers.

Q: How many times did you have to sharpen the ‘D’ bit?

Mike: Three times, and I’ve had to make a new one.

Q: On the drilling through the block, why didn’t you drill from the other end as well?

Mike: That’s what I’m going to do. I debated about doing it because it’s a job setting it up accurately. It took me several hours to set it up with sufficient accuracy, on centres.

I had a needle holder held in a precision chuck at the opposite end to the drilling. I had a similar setup at the headstock end.

I used an eye glass, and I took my feeler gauges apart so I had individualised adjustments, sliding the individual leaves underneath until the whole thing was right.

I got the angle plate dead true beforehand, so I knew it was correct longitudinally. I had a screw jack at each end of the cross-slide, and adjusted them up, ‘eye-glassing’ the arrangement whilst using the feeler gauges. I was hoping I wouldn’t have to do it again, but I will do at the undrilled end, so at least any error will be halved.

Mike: Everyone thinks you can get a 3D printer and just start producing parts, but you have to be skilled at 3D CAD drawing before you start.

Q: Is the ‘D’ bit silver steel?

Mike: Yes.

Q: Could you have just used an ⅛th drill to start the waterway, and just drill in, say, ½” ?

Mike: An ⅛th drill has a tendency to bend under pressure, going off centre. I would rather do the operation slowly, with the steps I described previously, taking a few hours to do it. I haven’t a lot of experience with deep drilling, and I don’t like doing it. I had to drill a hole slightly longer than the Delage’s in the Bentley 3 Litre crankshaft, and that was all over the place. It was about ¼” out at the other end. An expensive length of 3” diameter nitriding steel was scrapped.

Q: Could you just explain for the guests, the difference between modelling the Bentley engines and the Delage?

Mike: Yes. When I modelled the 3 Litre and 4½ Litre ‘Blower’ Bentley engines, I thought they were complicated enough, but in fact, the Delage is far more so. The Bentleys were production engines, that were relatively easy to assemble. They had built in methods of adjustment for all bevel gear drives to the camshafts and other ancillaries, so matching tolerances could be much wider.

The Delage was an out and out racing engine, built in the works tool room in very small numbers. They are known for their complex gear train at the front of the engine, which drives water and oil pumps, magneto, supercharger and both camshafts. There are fourteen gears in all, mounted in double ball-races (28 in total), in a separate timing case. This means that the sump, upper and lower crankcase, cylinder block and cam housings need to be machined to close tolerances, so that the camshafts align exactly with the gear centres in the timing case. No adjustment exists. For this reason, there are no gaskets between any of the major components, so that alignment is maintained exactly.

Unlike most other engines, the crankshaft main bearings do not have separate bearing caps; the lower half of the bearing housings, are machined in the lower half of the crankcase. It is a very stiff arrangement that needs careful machining.

The full-size engine used roller bearings for the mains and big ends. Although I attempted this in the model, I made the mistake of using EN40B nitriding steel for the crankshaft, as I had done in the other models. This steel is only useful for surface hardening, which would not have tolerated having rollers running on it, plus I could not get reassurance from the hardeners that there would have been little or no distortion. All the work machining the cages and rollers was scrapped, and plain bearings were fitted.

I assembled some of the cages with their rollers, and made them into key-ring fobs, and sent them to friends who had helped in some way with the project.

Q: What Brake Horsepower, and what capacity is the engine?

Mike: The capacity is 1500cc to match the GP formula at the time. It produced around 180 BHP, running on a methanol, benzol and petrol mix. Little power or torque is produced at low revs.

Q: Have you seen a full-sized engine?

Mike: Yes. I first saw the full-size car at the 2017 *Goodwood Festival Of Speed*. The car had been left to the *Brooklands Museum* on the death of its previous owner. Unfortunately, during a demonstration run, the engine broke a conrod, which flailed around and did a lot of damage. The damaged engine was on show, out of the car, and they were collecting donations towards its repair. As the 'Blower' Bentley model was almost finished, I thought that this supercharged straight eight engine would make a good subject for the next model. Negotiations with *Brooklands* over the next few months ended with their allowing us complete access to the damaged engine, and Paul and I were able to complete the dismantling. We could then measure and photograph all the parts.

Without this level of access, it would have been impossible to produce such an accurate scale model.

All photographs have been provided with kind permission from Mike Sayers. They should not be reproduced without Mike's permission.

- **News From Elvington And Santa Pod ~ Paul Windross.**
  - **Elvington.**

I was at Elvington on Saturday 21st August and was also there on the Sunday.

Graham Sykes has a larger pressure vessel on his "*Force Of Nature*" steam rocket bike, with a fresh way of welding stainless steels. It is a variation of MIG welding that needs no purging gas. It also provides a simple way of increasing heat transfer to the pressure vessel.

The larger pressure vessel has redesigned *De Laval* nozzles. There is more direct flow to them as there are no twists and turns.

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Beccy and Mick Ellis had their latest machine there, it was geared for 280 mph. Their test runs were on the Sunday and dependent on conditions.

On Saturday, despite a wet start in the morning, Jack Frost ran 254 mph.

There were also two motorcycles that had run at Bonneville in attendance, a lovely old BMW and a Triumph based ‘Streamliner’.

The Triumph was going well and then locked up. I have a few pictures and video of the partial strip down. Maybe the gudgeon pin that broke the piston was a ‘lump of ally’.

As I have mobility knee and back problems, my friends Beccy and Mick Ellis bring a mobility buggy to help me get around the paddock.

On Sunday 22nd August, the weather was good and we had a French competitor having a go. Beccy Ellis was being cautious with her new machine, as any breeze makes it hard to control.

Jack Frost did a personal best. Everything clicked on one of his runs, and he ended up doing 269 mph.

There were a few fast cars having a go as well. Graham Sykes’ new speed machine was also driving round the paddock.

A friend’s diesel go-kart did about 68mph, first time out. The engine will be put in his small 4-wheel streamliner next.

- **Santa Pod.**

I was at Santa Pod on Saturday 11th September for The European Finals. There were some very fast drag cars and motorcycles. Last time I was there, was in 1974, with my double engine bike.

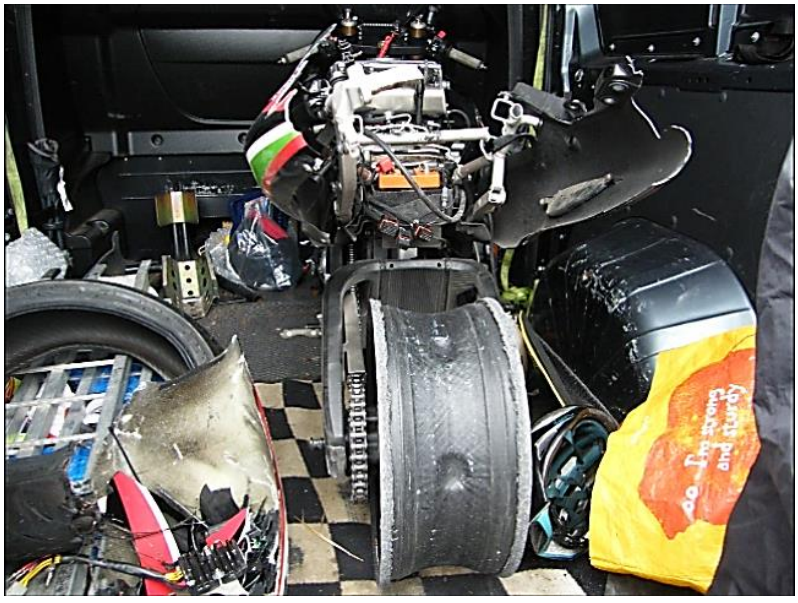
I was interested in a Frenchman's hydrogen peroxide rocket motorcycle. It does speeds in excess of 250 mph, at the end of a standing start quarter mile.

- **Elvington (again).**

I spent Monday 13th September at Elvington. There were a few disasters:

- William Formosa's low bike split its gearbox.


- Irishman Jack Frost had a miracle escape from disaster. His motorcycle is a regular 250 mph machine. At those high speeds, the tyre was still spinning, trying to find grip. It must have reached its limit and exploded. He has a very sore bum. He managed to keep the machine upright, riding on the carbon composite wheel rim.



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Two Items For Sale:

- **Drilling Machine**

This drilling machine was donated by John Powell to PEEMS. It was agreed that it should be offered to Club members in return for a sensible contribution to Club funds.

It is a 10mm capacity lever operated precision drilling machine used by John when he earned his living as a professional clockmaker. It is in excellent condition and comes complete with a high precision Albrecht chuck and machine vice.

It needs a good new owner who will use it in appreciation of John's valuable contribution to the Club.

If you are interested in this drill, please contact Mike Sayers. Mike's contact details are on the Members list.

- **Myford MF 74 Lathe**

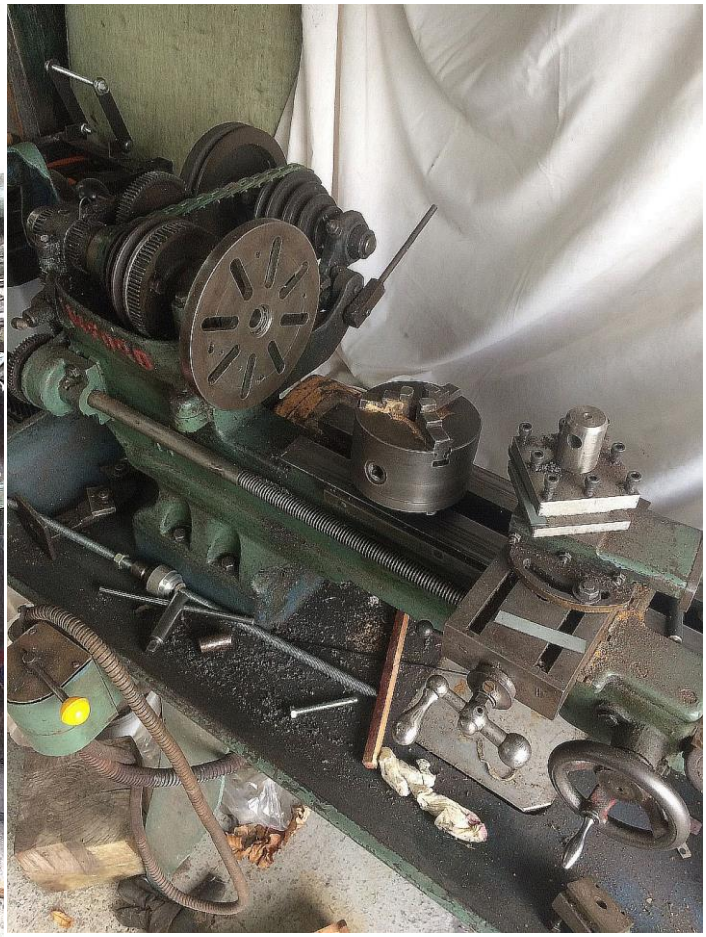
I am selling my lathe. It dates from the 1940s, and consequently cannot be described as in good condition.

It is single phase, and includes screw cutting with change wheels.

It was described as a 4" x 24" Precision Lathe.

It runs well and is quite a sturdy machine.

£400 o.n.o. Please contact Jonathan. Contact details 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