

## **David Dawson – My first ten years.**

My first visit to Crossness was in the summer of 1994. The first person I met was Mike Dunmow. I had come on a guided tour. I think we must have arrived late because the first thing Mike said was “Mr. and Mrs. Dawson?” – we had not met before, so we must have been the last on the list!

It was a visit that was to lead to many years as a volunteer and the start of many new interests and friendships. After a lifetime in mechanical engineering, both in industry and teaching in further education, this visit was to lead to an extension in my experience in both those areas. I learnt, however roughly, new skills in, what was to me, new areas of practical engineering that were heavier than anything I had previously come across. Working with men that had experienced, in their working lifetimes, the handling of heavy machinery was like serving a new apprenticeship. Safety to these men was paramount, they never took risks!

After that guided tour I went back into the Engine house to have another look. Dave Wilkinson was there. I can't remember what was said but it was enough to convince me that it was worth becoming a volunteer.

The first week I was taken under the wing of Mike Dunmow. Mike had been involved with the trust from its beginnings in 1985, becoming Secretary and then Editor of our magazine “Record”. We had to remove some of “Prince Consort's” last remaining rods from the high pressure valve gear, below the floor. This involved removing badly corroded nuts etc and then the lifting of the now free rods to the ground floor above. They were then transported to the Fitting Shop for restoration. Many pieces of the engine ended up there where they awaited their turn to have the corrosion removed and then to be polished until they looked like new. In fact many years later, when I was guiding visitors that came to see the engines, they would ask how we managed to make the new levers! They were comparing “Prince Consort” with the three other engines, which at that stage, had not been touched!

Removal of corrosion often required that components had to be taken apart. In some cases this would have meant altering the setting to which they had originally been set in order that they would operate correctly when the engine was in steam. We did not want that setting to be altered. A gauge had been made so that before anything was taken apart it could be reset on re-assembly. It consisted of a piece of mild steel bar about 3/8” square and about 8” long. Near each end a hole had been drilled to give a centre distance between the holes of 6”. Into these holes round pins, sharpened to a point and hardened and ground like centre punches, were inserted and secured. The part that needed taking apart was then marked by using the gauge to produce two punched marks in line with each other (at 6” apart of course) one on each of the two components to be parted. Then the assembly was taken apart and restored. On re-assembly the gauge was used to reset things as they had been before being taken apart.

I can't remember who made this very useful device, it existed before I arrived on the scene. It was probably Harry Collinson. He was full of good ideas!

The rods and levers necessary to operate the engine varied in size and weight. One rod which needed special attention was the piston rod which supports the high pressure and intermediate pressure pistons. It runs from the beam down through the intermediate and high pressure cylinders to its lower end. It was about 30ft long! Although we had quite a

long bed lathe in the Fitting Shop, it wasn't that long! An outside firm at West Kingsdown was found that could refurbish it for us.

It was badly corroded where it passed through the cylinder glands in the top plate and the plate between the two cylinders. Getting the rod ready for transport was quite a job. Not only had the rod to be removed from the engine it's two pistons had to be taken off and the rod had to be lifted up into the roof of the engine house before it could be lowered down and laid on the floor.

This job was entrusted to the Crossness 'A' team, led by Harry. At the time there was a television programme which featured the 'A' team, they were a group of men that never failed to solve a problem, however difficult it may appear.

Removing the high pressure piston was done down in the basement and the piston lowered to the floor. The intermediate piston had also to be removed but was more of a problem. The hexagon nut securing it, about 8" across flats, would not move despite the use of a specially made "flogging" spanner. It was eventually decided that the nut should be cut off it's piston rod. To do this a special jig had to be made. This is shown in the pictures on the next page. Picture 1 is of the nut in position under the piston. Picture 2 is of the jig. The idea of the jig was to allow a series of holes to be drilled into two opposite flats of the nut and then to cut through the holes and then wedge the nut apart and splitting it. Care had to be taken not to drill too deep as this would damage the thread on the piston rod, depth gauges were made to achieve this. The operation was done successfully, the piston was removed and the 'A' team triumphed. All of this operation took some weeks in the planning and manufacture of the jig and then using it. Why had that nut been so stubborn? Paul Sleight, our librarian at the time had worked at Fort Halstead in the past and was able to take a sample of metal from the split nut and analyse it. What he found was that the nut was made from Lowmoor wrought iron. This material was commonly used in the 1800's, and because of the way in which it was formed by rolling, it had directional properties which gave it a grain. Paul found that these layers had begun to open up and, in effect, locked the nut on it's thread. The jig is on display in the Beam engine house.

Once the intermediate piston had been removed the rod could be lifted clear and lowered. A dummy run using plastic drainpipes joined together to give the right length was used along with the lifting gear needed. This was recorded by David Wilkinson and appeared, speeded up on the first Crossness video. It worked and shortly after the "real" rod was extracted from the engine in the same way as the drainpipe had been.

A special wooden box was made by Peter Baker, our carpenter at the time, that would support the rod at certain points in order that it would not bend under it's own weight during transport. It was loaded on the Hotchkiss lorry and taken away to their workshop for the restoration to take place.

Other shorter rods and levers were refurbished in the Fitting Shop. The long lathe there saw Bert Casciani reliving the days when he worked in the Woolwich Arsenal turning gun barrels!

Sheet 2 of 8.

Another job for the 'A' team was on the engine Water Pump down in the basement. A clevis was jammed in the bottom of the pump guide. The drawing below shows this.

In the absence of any drawings there was no clear indication as to how the two parts had been fixed together. After some

months trying to separate the parts by force, a trepanning tool was made to cut upwards between the guide and the clevis. The tool had four carbide tipped cutters. A freehand drawing of this is shown in picture 7. After the cutter had been rotated by hand for several days it cut through and it was possible to separate the clevis from the guide.

Another problem arose when, down in the basement, the pump plungers had to be disconnected from the pump rods.

It was not going to be possible to run the pumps using the engine. We weren't going to be pumping anything and the years of corrosion meant that the plungers could not be moved. Even if they could be "cleaned up" there was

no way that they could be lubricated, unlike when they were in daily use!

There is a spanner for every nut on the engine and there was one for these two nuts,

Again they are about 8" across flats.

The spanner was tried, without success. A weight was applied to the end of the handle of the spanner, like a hammer, no good. Loads of release fluid was pumped in. Nothing moved!

A rig was made up from channel, one piece down each side of the offending part and end pieces. This formed a support for an hydraulic jack.

The spanner was modified from an open ended type by having a ring welded on top by Ernie Burrell so that it could not slip off the nut. The spanner was put in place on the nut and a hydraulic jack was put in place. I think it was a 20 ton jack that was used around the site for lifting when necessary. The pressure was applied to the end of the spanner. All that happened was that our supporting rig twisted!

The rig was stiffened up with more channel and a 50 ton jack was hired from a local firm. The jack was applied to the end of the spanner again, the spanner was about 3ft long by the way, but still nothing happened!

The hire firm was approached again and we requested a 100 ton jack, They wanted to know what we were up to! They brought the jack round themselves but could not make any suggestions as to what to do.

So the jack was duly applied to the end of the spanner. It worked! The nut began to turn! But whereas usually once a nut has been freed it will turn easily this one didn't. The jack had to be lowered back to it's starting point and the spanner moved round on the flats of the nut and the pressure applied again. Again the nut turned, but it would not run freely!

The operation had to be repeated again and again until the nut had been turned right off the thread! The result of all this force was that the nut would not go back on the thread, something had been strained, apart from the team of volunteers.

Bert came to the rescue and chased the thread out on the lathe and it finally fitted. The second nut was just as difficult but gave up under the 100 ton jack.

We didn't send the jack back immediately because we had only removed the nuts from one plunger and there was another one not very far away and we anticipated another problem similar to the last!

The rig was set up around the other plunger, the jack positioned and pressure applied. The nut turned, no problem! Why? The first nut seemed to have a white lead compound in the threads which we think had held the nut which had probably never been removed. The second plunger nuts had probably been off for some reason as there was graphite grease in evidence. Again, weeks had passed from starting the job to arriving at a successful conclusion.

Another tricky job was the removal of the low pressure piston from its shaft. Again Harry was involved with Mike Seaman. The problem this time was that the piston was located on a tapered portion at the lower end of the shaft and held in place by a nut. The nut came off but the taper would not let the piston go! Weeks of hard work went into making jigs etc until eventually success was achieved.

Checking bearings was another of the important jobs that had to be done. Some could be checked when parts were removed for restoration but there were several that had to be checked in position. The connecting rod at the end of the main beam which connects the beam with the flywheel and crank was one of these bearings. It was under the so called "Cheeseweights" that had been placed on the end of the beam when the engines were upgraded to triple expansion in the early 1900s. They can still be seen today. They were given this name in the specification for the "New" engines and were included to help balance out the engine which had gained two cylinders, pistons and rods in the upgrade, all at one end.

These weights had to be lifted so that the bearings could be inspected. This required the building of a tower from scaffolding, the use of pulley blocks attached to a beam in the roof and some one on high to attach them. I think it was Ray Marshall who did the deed. Each weight had holes into which eye bolts could be screwed and then the lifting hooks attached to them.

Once lifted the weights were placed on the beam floor until the moment came for replacement when they were lifted back into position.

Eventually the time did arrive when parts of the engine could be put back in place. I was involved mainly with restoration and the reinstatement of the valves. Along with Ray Marshall we gradually put the valves back in their housings, exactly as they had been removed. New gaskets had to be made and put in place. The valves were cylindrical and were supported on rods which were quite long. The valves rocked back and forth when in use. They were supported in the valve box, at one end and in the end plate at the other. Getting the shaft to locate in the end plate was just one of the problems that had to be solved.

Cleaning the parts in the Fitting Shop required the removal of quite deep corrosion in most cases. This was achieved by the use of various means. Some parts could be taken on by Bert on the lathe, other parts were cleaned on the bench using a power drill with a rubber backing disc and an abrasive disc fixed to the front.

The discs come in various degrees of coarseness, the coarsest being used first to penetrate the worst of the corrosion and then reducing to finer grits. Eventually fine flap wheels could be used in the electric drill and then even finer emery paper by hand.

Once parts had been restored they had to be protected to prevent the damp atmosphere starting the corrosion process again! The only heating in those days was in the canteen, and that was only on a Tuesday and Sunday when the volunteers were in. A liquid known as “Rustilo” was painted on the restored part. It gave the part a light brown appearance but it did the trick. Later, once parts went back on the engine, Harry made up a clear liquid which did the same job but without “colouring” the parts.

John Ridley carried out many important tasks at Crossness, largely unreported. John was involved from the start, well before I came on the scene. I can remember him restoring one of the engine pistons in the Fitting Shop. A record of this appeared on that video mentioned earlier. He also removed the original lagging from “Prince Consort”, again before I arrived. The top plate of the low pressure cylinder also had insulation in it and again John was involved in its removal. He also started the restoration of “Victoria”.

It is only too easy to concentrate on the restoration of “Prince Consort” but much other restoration has taken place apart from that. Crossness is more than just the engines. The buildings are all a part of the restoration programme.

In fact the most well known photograph of Crossness must be the magnificent views of the Octagon that always appear in articles and features. Phil Wilson was the guiding light here, setting the colour scheme based on fragments of old paint that can be found around the engine house. In the Octagon volunteers were responsible for cleaning off the old institutional coats of paint from the days of the London County Council and their successors the Greater London Council, and underneath it all the Metropolitan Board of Works insignia were revealed. There is still one on view now, unrestored, just as it was discovered by Phil and his group. (see picture 9).

The brass handrail in the Octagon and down the stairs to the basement had to be replaced and some of the brass castings that secure it to the upright supports.

The Beam was restored and painted after cleaning as was the Flywheel. The latter in its unrestored state shows evidence of how this enormous 28ft diameter wheel was cast in parts, to ease transport and then re-assembled on site. Look at an unrestored one to see this. It is not easy to see on “Prince Consort’s” Flywheel.

The beam floor is covered in cast iron plates with small holes through them. Those around “Prince Consort” have been restored. This involved wire brushing, in the main, to remove the accumulated rust and dirt. Spending her Tuesdays on her knees and carrying out most of this work on the Beam Floor was Jill Wilkinson! It involved the cleaning mentioned above, applying a primer coat of paint then the colours were applied. It is a very long job and at the end of a day you don’t see much for your efforts, but the overall impression is well worth those efforts!

Remaining on the beam floor many of the sash windows had to be replaced and others refurbished. Peter Baker was responsible for most of this work along with George Olmit and Wally Thake. Peter also made the information boards.

Over the original main entrance, up on the beam floor, on the river side, is a tiled area. This has been restored. It was in a sorry state to begin with. Many of the original tiles were missing or damaged. George Olmit wrote to a firm in Stoke-on-Trent to see if they could supply something like what was still on the floor. They wrote back to say “Yes we

still make the tiles.” In fact they were the original firm, Maws, that had supplied the tiles when the engine house was built.

In those days they had a works in Broseley in Coalbrookdale, Shropshire. They moved there in the 1850s. In fact impressed into the back of one of the original tiles was the word, Broseley. Bob Keaveney laid the new tiles which we had to buy and a list of donors is displayed in the area.

Alan Parfrey and Jackie Barter did magnificent work in removing literally tons of sand from within the pumps and culverts in and around the engine. It was put there once the old works had closed and the new works was opened and the engine house and the engines ceased to be used. It was to reduce the risk of gases from the old culverts and pumps leaking into the engine house. I remember when I started gas testing was carried out by Martin Wilson before work was allowed to start and the gas testing instrument was working all the time anyone was in the engine house.

We used to turn up at Crossness on Tuesdays and Sundays to carry out the restoration. One Sunday a group of lads turned up from Wildernes School in Sevenoaks, in a van with Frank! Frank and the lads had come to assist in the gardens around Crossness, and a good job they did.

After some weeks they thought that they would like to get involved with the restoration in the Engine House. It was at the time when it was the turn of the gallery around “Prince Consort” to be restored. So the Sevenoaks group helped us remove the cast iron plates from on high so that they could be sent away for shot blasting. Then when the flooring came back they applied the primer, undercoat and top coat and also helped us to reinstate the floor. The result of their effort is on show today. Then they all went to University and as far as we know have not been seen here since! Frank, however, has visited.

The Trust has a collection of memorabilia, some on display in the Boiler house, but much more in the Museum Store. It ranges from items found on site, when the trust started restoration, to toilet pans and cisterns, commodes and the like and also items of interest from various sources. This collection was started by Peter Taylor. He visited all kinds of architectural antique dealers in order to build up what we have today. Among these items is an ancient Jennings toilet which has a hand pump for flushing. When the Duke of Edinburgh visited in 1998, Peter was showing him some of the exhibits and the Duke noticed the Jennings. He said “we have one like that at Windsor Castle !” We have also been given items by members and the public generally. Some have come via Thames Water.

Another area of interest that has built up over the years has been concerned with the people who lived and worked here. Items given to us by relatives include many photographs and other items of interest. Peter Skilton was the keeper of this information, again, some of which used to be on display. Peter has also a wide knowledge of the site in general including the School that was here.

On the 8<sup>th</sup> July 2003, “Prince Consort” was back in steam. The Prince of Wales, just as a previous one had done in 1865, turned on the steam. After eighteen years of restoration “Prince Consort” was working again. It was really great to see that engine come back to life and a real credit to all those who had anything to do with achieving it. I have mentioned names in this piece but many are omitted, not intentionally, I hasten to add, but all the volunteers efforts made that day possible. We now have visitors who come to see us from literally many parts of this country and abroad, as our surveys have shown.

Restoration goes on. “Victoria” has been started by a mainly new group of volunteers. They will do things their way, they will come across many problems just as daunting as those outlined above on “Prince Consort” and they will be solved by different but just as successful methods.