RGPF Siemens Fire Alarm System Restoration

Introduction

In an explosives factory it is obviously essential to have personnel and equipment available to rapidly deal with any fires. Most important is a means of raising an alarm once a fire has been detected. In the days before a telephone system was generally available a telegraphic system was used.

The system installed at the RGPF consisted of a number of fire pillars and a control panel at a central location. It was battery powered with four batteries made up of Daniell cells, these would probably have been housed in a cabinet supporting the control panel.

The pillars were wired in series and in the absence of an alarm the current flowed continuously through the complete loop and was indicated on a meter, i.e. it was a closed loop system so that a fault on the landline was easily detected.

On pulling the handle to send an alarm a clockwork mechanism was released and a code wheel sent a series of dots and dashes to the control panel. At the panel bells sounded, flags dropped and the signal was recorded on paper tape. Because each pillar sent a unique code the source of the alarm could be identified.

The system was known as the Siemens system but no manufacturer's marks were found on any of the components. Gerry Miller, one of the regular volunteers, whose first contact with Waltham Abbey was when he was an inspector of MoD fire stations, contacted Siemens UK who were very helpful. Some of the photographs in a publication they supplied appeared to show some components identical to ours. Later one pillar mechanism was found that was marked Siemens & Halske (this was thought to be a later replacement part).

We hoped to restore the system to a working condition, with initial work concentrating on stripping and re-painting one of the pillars.

Restoration

Just before the site was re-opened as a visitor attraction the system was returned from Westcott along with other items and temporarily stored in L176, now the Café, (fig 1) and later moved to 83B.

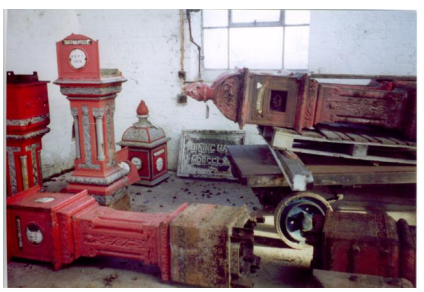


fig 1



One was put into the main exhibition hall without any further restoration. This had been restored and painted silver and red, not the original red only, and mounted outside the fire station on south site.

Most of the pillars bore plaques marked as ‘RGPF 1906’ (Royal Gun Powder Factory). Two pillars were of a slightly different design with crossed flaming torches cast into the sides of the top box that housed the mechanism. These had plaques identifying them as ‘RSAF 1910’ (Royal Small Arms factory) pillars.

About May 2003 one of the RGPF pillars was returned to L182, the Friends volunteer base at that time, for restoration and the paint was stripped off in June 2003 revealing a casting that was in very good condition with much detail that had been hidden under many layers of paint. (fig 2)

The pillar was repainted with red oxide and finished with Crown Flame Red, which seemed appropriate! Fig 3



fig 2



fig 3

The pillar door hinge pins had to be sawn to remove the doors and were replaced with M7 hexagon headed set screws which were the closest match obtainable.

Not all the pillars contained mechanisms but three were found and a preliminary inspection was made with a view to return the system to an operating condition. Sometime in 1989 the electronics section had built a power supply to replace the batteries and tested the system, so there was a real hope of success. An incomplete photocopy of a document describing the fire alarm at the Royal Small Arms factory was found in the archive collection which was very helpful although there were some obvious differences in the control panel we had and the circuit diagram; the document was missing illustrations referenced.

The control panel had been to Westcott for storage and for some time after its return it was kept in L153 gathering dust and with some parts lying loose and a number of broken wires. The glass-panelled enclosure in the south east corner of L168 seemed a good place to set up the control panel and it was moved to that location before any work was done on it. A wooden frame was built to support it.



A genuine RGPF telegraph pole was found and sawn into two pieces to carry wires from a pillar to the control panel and attached to the walls in L168. The pillar was bolted to the floor and conduit and wires installed. One mechanism had been partially dismantled and inspected in an attempt to draw a circuit diagram but some contacts were in poor condition and without disturbing the old brittle wiring a circuit diagram was not completely drawn at that time. It was established that an alarm signal could be generated.

The mechanism marked Siemens & Halske was found about this time and it was decided to use that in the restored fire pillar as it seemed to have been the one used at the time the electronics section worked on the system. The other mechanism was set up in the control room, where its action could be seen when working. A third mechanism was later almost completely dismantled and the parts cleaned before rebuilding. During this process a circuit was drawn and the pillar mechanisms are now understood.

A Siemens UK manager and the Editor of their house magazine visited to discuss our work and take photographs and later an article appeared in that publication and was copied to publications overseas, so the RGM had some free publicity.

Control Panel

This was the part of the system that needed most work. The milliammeter had come adrift and had to be remounted and reconnected, later the Earth Detector milliammeter was found to be disconnected although it was mounted on the back panel and the wires were fed through the panel. Several wires had broken where they should have connected to terminals and these were traced and repaired by soldering on short lengths of wire. When the system appeared to be complete testing was started,then other faults were found and gradually the system came to life. Then all available mechanisms were capable of sending an alarm signal that could be heard at the control panel. Recording the signals on paper tape is sometimes possible but normally the system was demonstrated without paper tape as the available ink evaporates quickly, we do not have the special telegraph ink intended to be used in Morse Inkers. Neither is it possible to source the narrow tape used in the morse inkers. The Morse Inkers and take up spools required further attention to bring them to a fully operational condition.

The good news is that the circuit of the panel has been traced and a modified version drawn out. The write up we have claims that the system can handle two simultaneous calls and instructions on the panel explain how to restore functionality if a wire is broken. It has been shown to function with one wire disconnected and it is certainly possibly to record two calls if one starts slightly after the first, but until the Morse inkers are performing almost perfectly demonstration of the finer points of operation is not very convincing.

Now the system has been moved to the Green Hut and is powered by a 12-volt old car battery and, therefore, no centre tap so two simultaneous alarms are not possible (also because of the unavailability of narrow paper tape and telegraph ink we have stopped demonstrating signals recorded on paper tape.)

The pillars and their mechanisms are of high quality and in contemporary Siemens literature were described as too expensive for small towns. We also have a very much simpler pillar and mechanism. This pillar has now been stripped, repainted and erected outside the main entrance to Walton House. Its mechanism has been shown to work with the control panel.

RSAF Pillar

In September 2004 one of the RSAF pillars was returned to L182 to begin restoration, the top box had been removed and transported separately; the bottom of the pillar was attached to a mounting plate. The pillar appeared to have spent some time lying on its side in damp conditions as most of the paint was missing from that side and it was badly rusted.

The first step was to remove the remaining paint and this was completed after a month's work. The top was removed from the top box during this process and this was found to be cast as one piece, the earlier RGPF pillar top was in two parts. The crossed torches were found to be a separate brass part fastened with small screws onto the box side. A visit to Berlin where similar pillars could be seen in tourist locations showed they were identical castings complete with crossed torches.



Fire pillars in Berlin

Left at Spandau

Right at Tegel



The wiring would originally have run down inside the pillar and then underground or up to a telegraph pole. At some stage an earth wire had been bolted onto the outside of the pillar just below the top box and a piece of conduit had been fitted into a hole cut in the rear door below the central circle around the crossed torches. These later additions were removed and the holes filled.

The side access plate near the base of the pillar was removed by drilling out unmoveable retaining bolts and freeing the edges of the plate with a small diamond grinding wheel, then gently tapping and prying it free. Badly rusted metal was treated with Hammerite Kurust. The whole was painted with Hammerite red oxide then finished with Crown Flame Red as for the RGPF pillar.

This pillar had a mounting flange with sections of steel extension pieces bolted on at each corner. These were removed by splitting the rusted nuts and heavy angle brackets made to fit at the same points; these were fastened with shield bolts to the concrete base prepared outside L182.

In 2011 the system was removed from L168 along with the model railway, powder boat and other exhibits to make room for relocation of the rocket exhibition from L157 and setting up a 'Mad Lab' aimed at children. At present several fire pillars are still to be seen around the site. One 'simple' pillar remains in the wooded area in its original location (minus the top box, apparently damaged by a falling tree).

The move to the Green Hut

In 2016, following work on the Green Hut to accommodate the powder boat, the fire alarm control panel and a pillar mechanism were recovered from storage in L148 and moved into the Green Hut. A workbench was also moved in to permit repairs and maintenance

Once again, some repair work was needed after storage and when the system was again working work started to restore another fire pillar to mount outside the hut. When that was in place the cut-down telegraph pole was mounted outside the hut and wires run to the control panel.

The system could then be demonstrated using either the mechanism inside when the working mechanism could easily be seen or outside when the proper handle was pulled, popular with children.

When the Green hut and its contents were added to educational visits we were told to clear the hut of our work bench, tools and materials to make the area safe. There is now less control over the exhibit and it has become impossible to keep the paper tape

threaded correctly as required to properly explain the working of the system.

While it is possible to demonstrate the ink marking on tape it does require putting fresh telegraph ink substitute, fountain pen ink or food dye, neither which are really suitable as they dry up when left in the open troughs of the morse inkers. Also, the lack of available paper tape does mean that the supply we have will run out eventually.

When the system was in operational use the control panel was located with the police as they worked 24 hours in shifts whereas the firemen were only on site when work was taking place. If there was an incident in quiet hours the police would alert the firmen in their homes and call them in.

Also of interest, in about 2024 there was an RGPF pillar, complete with a mechanism, shown on television a scrap dealer's yard in Kent; I have no idea how it got there.

It is nice to know though, that a system that in 2026 will be 120 years old is still working.

Brian Clements

Other Touchpaper Fire Alarm ArcticleArticles:

TP 2003-2 Bryan Howard The Siemens Fore Alarm System
TP 2006-2 Our trip to Berlin's Pillars
TP 2007-2 Our Second trip to Berlin's Pillars