Pyestock – The National Gas Turbine Research Establishment

Phil Retter

The former National Gas Turbine Research Establishment (NGTE) at Pyestock, Hampshire, is probably unknown to most members, even those with an interest in aviation, but it played a key role in the development of gas turbines and jet engines for over 40 years.

From the 1950s through to the 1970s, Pyestock was the largest facility of its type in Europe. It tested many of the engines used in Britain's civil and military jet aircraft, as well as gas turbines for the Royal Navy's surface fleet.

By the late 1990s however, the engine research facility was largely decommissioned – partly because of the relative maturity of jet engine technology, but also because of the increasing use of computer modelling in testing.

During 2004 and 2005, the Museum of London Archaeological Service undertook a major programme of building recording and research at Pyestock, although no material has been released for public inspection yet. The whole site is something of a mausoleum to former British electrical engineering and manufacturing companies, and while it awaits its fate, has also become an unofficial online museum. This is due mainly to its discovery by urban exploration groups, who have posted many images on the internet. A few are used to illustrate this article and hopefully will give an impression of the scale of the facility.

While Pyestock is an important technical and historical site in its own right, it is also home to some large-scale steam machinery which may be of more immediate interest to ISSES members.

A major part of the site was devoted to running jet engines in actual flight conditions in dedicated testbeds, or cells. This required the movement of huge volumes of air and to provide this, the appropriately named Air House was commissioned in 1961. This boasts eight GEC compressor/exhauster sets (Nos. 1-8), designed to blow (or suck) air at up to supersonic speeds through the engine test cells. Each of the compressor/exhauster machines consists of three 3:1

Main photo: Three drum boiler in Battle Test House

Left: GEC compressor/ exhauster sets in the Air House

Images © Simon Cornwell

centrifugal compressor stages mounted in line, with a 27.5 MW (36,000 hp) electric motor at one end of the connecting shaft and an 8,000 hp steam turbine at the other end.

The steam turbine was used to start and accelerate the machine to its normal running speed of 3,000 rev/min, at which point the electric motor could be synchronised with the National Grid supply frequency. The combined power from the electric motor and the steam turbine was then available to meet any load conditions. Power requirements were shared between the turbine and the motor on each set to give the best economy, or most convenient running condition. Inter-connecting air pipes allowed the eight sets to be connected in various configurations to meet demand from the test cells.

Even this large installation was unable to meet air suction requirements when more modern, high output gas turbines were being tested, and two more large, electrically driven exhauster sets (Nos. 9 & 10) were later provided.

Pyestock was also a massive consumer of electrical power and an on-site generating capability was an essential part of the facility. Therefore, one of the first buildings designed and built was the power station which provided electricity for the site and bolstered the supply taken from the National Grid. The station housed a 12.5MW Parsons/Belliss & Morcom steam turbo generator set and a 6MW gas turbine set. There were also several smaller diesel generators.

Much of the generating machinery was removed as the site was run down, but the Parsons steam set remains in-situ along with much of the original control gear.

A 500 kW turbo generator and a larger, 14,000 hp Brush steam turbine were also part of the site's original steam plant.

The other major steam installation surviving on site is in the Battle Test House. This was originally built to house the site's boilers, but has been extended and modified many times over the years. The two original boilers (A+B) were taken from *HMS Namur*, a Battle class destroyer, and gave the building its name. *HMS Namur* was one of several of her class building at the end of the Second World War, but she never entered service, being broken up at the builder's yard in the early 1950s. Her boilers were built by J Samuel White to an Admiralty three drum design, complete with force draught blowers and three burners per boiler. Some years later, a third

Parsons turbo-generator set in the power station, Pyestock
Image © Simon Cornwell

boiler (C) was installed in the house, this being a five drum marine type boiler manufactured by Yarrow, and a fourth boiler (D) installed outside. A, B and C boilers could each export up to 130,000 lb of steam/h while D boiler had a rated export capacity of 500,000 lb of steam/h. Stop valve conditions were 400lb/sq in and 650°F (343°C).

The superheated steam generated in the Battle Test House supplied the various steam turbines as required and also provided steam for auxiliaries and for heating buildings around the site.

The two original boilers may have been something of a bargain when purchased in the 1950s, but as they came to the end of their lives, their projected replacement costs could not be justified and the boiler house was closed down in 1993.

The boilers and much of the other heavy plant is in still in-situ, but this situation is likely to change in the near future, as there are now plans to redevelop the whole site. Although it may be considered to be of national importance, the extremely specialised nature of Pyestock's structures means that it is likely to be completely demolished.

The current plan is for a giant supermarket distribution centre to be built here – something which speaks volumes about the changing face of British enterprise.

Pyestock has a dedicated website, put together by Simon Cornwell, and much of the information in this article has been taken from there. Another fascinating site is that by Malcolm Knight, whose father was a senior engineer at the Establishment.

More information, particularly images, has been posted on the various websites devoted to urban exploration and photography.

www.ngte.co.uk
www.malcolmknight.org/open/pages/indices/knight/ngte.htm

An alternative view of the urban environment

Phil Retter

Once a workforce leaves an industrial site for the last time, scrapmen, developers and vandals can quickly erase all traces of its original purpose. Those seeking to research buildings, machinery and even topography need to move fast, if any record is to be made.

In the past, access to such places was reasonably easy; a phone call to a sympathetic owner, or a word with a security guard would often allow access for photography and note taking. Recently, health and safety concerns and other factors, have meant any approach must be more carefully prepared. Even if access is granted, it may be restricted. Of course, ISSES have plenty of experience of this type of planned exploration and the success of our site visits programme shows how well it can work.

Bracebridge Pumping Station.
Image © tims, www.urbexing.co.uk

Such has been the speed of change in industry, however, that even important sites have gone from being working commercial premises to padlocked, stripped out shells in a matter of weeks. Often, if contact is made at the 'eleventh hour', demolition and clearance can take place before permission is granted for an 'official' visit. One way of avoiding these scenarios is good information gathering and dissemination. The more people there are actively keeping on eye on worthwhile sites and passing on news about any change in circumstances, the more chance there is that they can be documented before they disappear for ever.

Again, ISSES and other groups have much experience in just this sort of activity, with the pages of past *Bulletins* documenting the decline of old technologies and the changes to manufacturing industries around the world.

Not everyone has the resources and patience of our society however, and a new breed of 'urban explorer' has emerged in recent years. They are eager to see and photograph abandoned commercial, institutional and leisure sites. Using the internet as a focus, a sizable community has now grown up around websites such as 28dayslater in the UK, and UER in Canada. Participants have a common curiosity in what lies beyond 'Trespassers will be Prosecuted' signs, and most are also after the thrill of unauthorised entry to 'off-limits' property.

Those indulging in this practice are regarded as outsiders by established historical and architectural groups, and generally dismissed as irresponsible trespassers – although most explorers are at pains to point out that they do not break into secured premises. Disapproval from official bodies and bad press reports are to be expected though, when images taken from the tops of power station chimneys and the inside of redundant police stations, are uploaded. Beyond the chatter of the web blogs, however, there are now signs that the community is maturing, with some individuals and small groups making efforts to gain permission for visits. Their internet posts are also being backed up with solid background information and good photographic records. These more thoughtful explorers are serving a real purpose in recording buildings which heritage bodies have chosen not to spend resources on, and their online archive of images is building into a database of the forgotten and overlooked.

Simon Cornwell runs several websites documenting urban remains, and he has a particular interest in the large asylums built for the care of the mentally ill in the early years of the 20th Century. On his site, www.simoncornwell.com/urbex/, he writes:

"I had long wanted to fully document an asylum, and whilst sneaking around and snatching what I could from urban exploration worked to an extent, there was always the realisation that to do things properly would require some form of permission.

My big break was after a call from the BBC. A team were making a regional programme called 'Restoration Nation' (a 'Restoration' spin-off) and were attempting to document the conversion of asylums. After setting up interviews at Severalls (a derelict asylum near Colchester, Essex), they had to call off the project, as NHS Estates would not allow permission to film. They then contacted me and I suggested Rauceby Hospital (Lincolnshire). They had permission within a day.

Free to roam, I walked the corridors, snapping everything I could and with these pictures, Rauceby became the most extensively documented asylum on the Internet."

Cornwell hopes that from the data he has collected, a 3D model of the asylum can be constructed – something that could be downloaded from the web as an historically accurate tool for future researchers. Although this may be some way off coming to fruition, his website is already preserving a strand of social history that might otherwise be lost, by attracting comments from former staff at Rauceby:

"I have just viewed your pictures of a derelict Rauceby Hospital and it brought back vivid memories of my early days in nursing in the early 1950s. I flicked through the various shots of the wards and the titles etc. and I remembered back before they were called Hazel Ward, Cedar Ward, Willow ward etc. Hazel Ward was the old Hospital Ward. Cedar Ward was Central Ward which was a locked ward and contained violent and dangerous patients - one of those side rooms down towards the back entrance was a padded room."

"I am now 76 years old and still nursing at Sutton Lodge Nursing Home at Sutton-on- Sea. Thanks for the pics and the memories. If I can be of any help about Rauceby Hospital I will be only too pleased."

So, the urban explorers of the last few years may yet prove to be tomorrow's mainstream researchers and archivists. They would be following a route already taken by the architectural historian, John Harris, a self-confessed trespasser who made a study of abandoned English country houses during the 1950s and 60s.

While Harris took advantage of the abandonment of stately homes when punitive death duties were imposed on the owners, today's explorers have rising maintenance costs, and the NHS's Care In The Community programme to thank for the wholesale redundancy of old asylums and hospitals. Likewise, the rapidly changing markets and globalisation of the 21st Century has brought about the end of many manufacturing and service industries, leaving deserted buildings of all types littering the UK's urban landscape.

Above: Porth Wen brickworks
Image © shutterstock.com

Left: Bracebridge Pumping Station
Image © tims, www.urbexing.co.uk

So, all well and good – but should this interest ISSES members? It should for several reasons. Firstly, the activities of the various urban exploration groups are likely to occasionally overlap with our own, and might well have a negative impact on our legitimate attempts to gain entry to buildings and sites. Secondly, and more positively, their explorations may reveal sites unknown to ISSES, such as NGTE Pyestock. Finally, we may yet benefit from a trickle of new members as individuals seek a more conventional way to indulge their passion for our industrial past.

How many of us in ISSES can say we have never at some time ignored a 'Keep Out' sign in order to secure that elusive glimpse of a rusting engine or crumbling pump house? It may be that we were urban explorers ourselves before the term had even been invented.

Sources

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