CASE STUDY

STANDBY GENERATOR PACKAGE FOR NEW GROUND BREAKING LONDON CANCER TREATMENT FACILITY

Customer: One of the country's leading construction companies behind some of the UK's significant projects delivering award winning construction, development and regeneration projects across public and commercial private sectors. Strongly positioned on the UK healthcare market.

End client: London hospital founded in 1834 with approximately 670 beds, 12 operating theatres and the largest single critical care unit in the NHS. It is also used for Biomedical Research and is the teaching facility for bioscience and medical students.

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THE Generator COMPANY A DIVISION OF TGC INTERNATIONAL LTD

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Project: Standby generator power package for new state-of-the-art hospital dedicated to advanced cancer treatment and surgery services in central London.

Following a government announcement to invest £250 million towards a vital cancer treatment and surgery facility, our customer was awarded the contract to design and build, using the process of BIM (Building Information Modelling), a new state-of-the-art hospital dedicated to advanced cancer treatment and surgery services in central London.

The elected site for the new building was a disused area within a working NHS Trust hospital, was chosen by The Department of Health in 2015 for their expertise in the services currently carried out at the hospital and their links to academic research and owing to its close proximity to the hospitals current Cancer Centre and Radiotherapy Services. The Trust has more expertise in the conditions that would be treated than any other centre in the country.

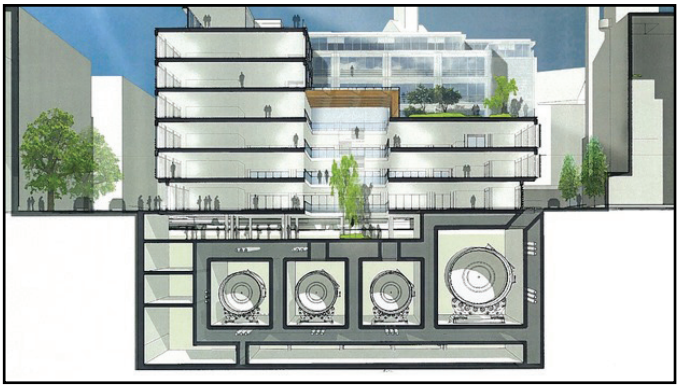
The aspiration of this new building is to create a leading hub for cancer treatment in central London with both the current and new buildings linked by the hospitals existing underground tunnel network. It will make a significant difference to the lives of hundreds of NHS patients every year along with helping the hospital to advance their research into precision medicine.

The Generator Company were contacted by our customer's Production Manger towards the end of 2016 to enquire if we would like to work with them to design, deliver and install a new standby power package for this new state-of-the-art NHS cancer treatment facility, currently one of only two to be built in the UK; the other based in Manchester.

Having worked with the client on previous occasions, we were delighted to be able to work with them again on such an exciting and pioneering project.

The advanced 31,500sqm, 11 storey building consists of five storeys below ground and six above. The height of the building, including below ground is 58.5 metres, making it equivalent to London's Tower Bridge.

Below ground level is a 16,000sqm five-level building extending 28.5 metres below ground built with 44,000 cubic metres of concrete reinforced with approximately 8,000 tonnes of steel which comprises two mechanical and electrical plant levels, two floors for patient therapy care and a short stay surgical service in addition to eight surgical theatres.



Above ground is a 15,500sqm, 30 meter six-storey hospital incorporating Europe's largest centre for the treatment of blood disorders.

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Some additional interesting build facts include:

- Earth excavated: 80,000m3, which is the equivalent of 640 double decker buses, or enough to make 39,000,000 bricks,
- 3000 people involved in the construction overall,
- 1,100,000 iPhones could be charged with the power needed for the Centre.

Our Project Sales Team attended numerous post tender meetings with the client's Projects Team to discuss the project in greater detail determining any site restrictions, together with the specific requirements of the end-client thus ensuring that we were mindful of strict deadlines and stringent stipulations of the project based on the proposed use and location of the building. This allowed us to provide them with a bespoke power solution for this ground breaking project.

The first stage of the project required temporary standby power to support site during the construction of the building providing back-up power for equipment, machinery and welfare facilities. Following discussions on the power needs for the build it was agreed to supply a 700kVA temporary containerised standby generator with a daily storage tank that would be housed on a gantry, with the welfare cabins, adjacent to the site. The generator was delivered, craned onto the gantry and commissioned by our commissioning team.

The second stage of the project was to supply standby power to support 100% of building load to include all equipment within the building and the critical life safety system of the building incorporating the Proton Beam equipment.

In line with the initial requirements of the end-client, we proposed 2 off 1500kVA generators sized on the load profile information available at the time for the new cancer treatment equipment, boilers, UPS system and other essential plant.

The proposal was modified on request of the end-client due to changing of suppliers during the tender process, with the generator resized to 1 off 2500kVA with an oversized alternator to meet the revised load profile, thus reducing the footprint area of the generator.

Value Engineering was applied in order to overcome challenging obstacles regarding available roof-top space for the Generator and Acoustic Enclosure, the eye line height restriction and the actual load profile. Maintaining the design noise target of 70dBA@1m with limited space on the rooftop location was the greatest challenge.

Corresponding to the noise target, the package included a self-contained acoustic enclosure to minimise noise levels for private patient rooms on level 5, an exhaust silencer and a 4,000 litre day

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tank which were to be housed on the roof of the building with the generator. A 40,000 litre bulk fuel tank was to be located in a dedicated 2-hour fire rated room in the basement area and sized to provide 72 hours of emergency backup at full running load.

With the equipment being located on the roof of the building in a prominent area of central London, we needed to take into consideration and respect planning rules in regards to height restrictions. This meant that the acoustic enclosure was required to be below 2500mm in height and the exhaust silencer had to be hung on the side of the enclosure so as not to obscure the London eye line. The transportation and lifting of the equipment, using a 500 tonne crane, had to be carefully planned as the location of the site was surrounded by very narrow roads on top of a network of underground tunnels.

Following further discussions and sign off of all the equipment by the customer one of our experienced Project Managers was appointed to work closely alongside the customer to ensure that the project ran smoothly and all necessary site surveys, drawings, risks assessments, method statements and other associated aspects of the project were managed in an appropriate and timely manner. This included co-ordination of an offsite witness test along with traffic management and road closures for the multi-staged delivery onto the roof and into the basement area.

As the generator and fuel oil system was to interface with many other systems within the hospital, our project manager met with the hospital's fire officer, local authority and design team to ensure that the hospital would not be put at risk at any time during the project.

On acceptance of the equipment by all parties and prior to delivery, a Factory Acceptance Test of the open generator set took place at the manufactures site, attended and witnessed by the customer to determine that the equipment met all requirements. Following this successful test the equipment was transported to the premises of our acoustic container specialists for the manufacture of the acoustic container. It was then broken down into four movable parts to allow for it to be safely transported to site by Hiab lorry. The 40,000 litre bulk fuel tank was delivered early on in the construction of the building and installed at basement level 2 followed by the generator and ancillary equipment at a later date.

On the programmed days, our logistics team transported the rest of the equipment on 5 lorry loads over 5 days, with 2 escorted vehicles owing to the fact that the loads were over 4 meters wide, to the site to meet the crane team who expertly offloaded and positioned the generator, acoustic container, attenuators and exhaust silencer onto the roof.

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The installation of M&E works was completed over 4 months with numerous co-ordination and design meetings required to finalise the routes for the fuel system pipework and control cables for the master control panels between the generator located at roof level and bulk fuel tank and master control panels at basement level 2.
All final connections were carried out over a 2 day period by our skilled project engineers followed by commissioning pre-checks of the generator and a loadbank test utilising our own 2500kVA resistive/reactive loadbank.

A successful black building test was carried out simulating a power outage to test the functionality of generator to ensure that it would support the property during an emergency situation in the event of a power outage.

The Generator Company submitted the final operation and maintenance documents onto the Edocuments/BIM system as instructed by the customer, to include systems description, equipment and material schedules, health and safety documentation, test certificates, maintenance schedules and drawings.

An annual maintenance agreement was included within the package providing the end-client with a dedicated Service Contract Manager, 2 off 6 monthly generator service and maintenance visits, over the phone technical guidance and access to our 24 hour emergency call out service.

We would like to say a big thank you our customer for allowing us to be part of this amazing project to create a building fit to house pioneering technology to help in the ongoing fight against cancer and we are proud to have been part of this project.

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