

Supply, design and installation of flue systems and mast structure at the University of Warwick



“ This project was ambitious and complex and we really put Midtherm’s engineering expertise to the test. They managed to meet our high expectations and dealt with all challenges in a professional manner. The solution that was arrived at is both functional and aesthetically pleasing.

Andrew Clews, University of Warwick

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AT A GLANCE

Company: University of Warwick

Industry Sector: Higher education. The University of Warwick One of the world’s top 100 universities and one the UK’s top 10.

Number of Employees: 600+

The Challenge: To design, construct and install a new flue system which could respond to the challenges presented by a changing campus.

Solutions and Services:

- Photo realistic visualisation (as above)
- Dispersal modelling
- Surveying and site investigation
- Structural and Civil design works
- Design, manufacture and installation of new flue systems, mast structure and steel gantry, integrating heavy engineering expertise.
- Pressure testing

The Benefits:

- A flue system which meets legislative requirements
- A robust and attractive solution to a complex engineering problem.
- Built in flexibility within the foundations and main structure so that it can be added to and raised in height at a later date.

When the University of Warwick began the next phase of its campus development, it confronted issues with dispersal of exhaust gases from the Main Energy Centre multi flue chimney and sought help in redesigning the structure to meet legislation. The appointed consultant turned to Midtherm Engineering following the successful completion of various other projects together.

The business boasts over 30 years' experience designing and installing flue / exhaust systems and had sufficient resources in place to invest time into developing a suitable concept. After being awarded the contract, Midtherm Engineering were on site the very next day undertaking detailed site surveys and within six months delivering a bespoke design and innovative engineering solution on time and on budget.

THE CHALLENGE

The University of Warwick, is a world leading research and teaching institution and provides innovative solutions to global issues and to individual organisations industry; through research, education and collaboration. The University is making significant investment in its campus which required the University to increase the discharge height of existing Main Energy Centre flues and find an innovative solution to the ensuing engineering challenges.

Midtherm Engineering undertook detailed dispersal modelling and analysis which highlighted the need to relocate and modify the flues to the existing Main Energy Centre. As well as determining the new discharge requirements and finding a suitable location on site for the new structure, the work needed to be completed within a tight timeframe to facilitate the opening and commissioning of the new building.



Internal view of Pentagon Mast Structure

After careful consideration and concept development a new mast structure local to the existing multi flue chimney discharging at the new required height of approximately 26.5m would be the most efficient solution.

Midtherm Engineering has earned a reputation for providing a range of flue, mast and chimney solutions, utilising its heavy engineering expertise to confront ever more complex client challenges. When the University of Warwick approached a consultant to help find a business to solve the flue issues arising from the development of the campus, they were quick to engage with Midtherm Engineering.

The contract was awarded to Midtherm Engineering in August 2017, to be completed the following February. Given its track record and due to the early involvement with the project, Midtherm Engineering was geared up to respond to the challenge quickly and comprehensively.



To achieve this, Midtherm Engineering was instructed by the client to provide a comprehensive range of services. It proposed to undertake ground investigation studies, structural and civil design works, detailed site surveys, boiler and CHP flue designs and project management to ensure successful delivery and installation of the various disciplines. It was also able to offer galvanised gantry manufacture and installation, flue and mast structure fabrication and flue installation, pressure testing the flue systems and project management / co-ordination of all works on site.

“ We are very proud of what we have delivered for the University. They were extremely impressed that we have managed to provide a solution which is effective, robust and aesthetically pleasing. ”

Adam Slipanczewski, Midtherm

THE SOLUTION

To first move the project forward, Midtherm Engineering got straight to work on site surveys and investigations. Around two weeks were assigned to conducting over ground and underground surveys of existing structures and buildings to help inform its engineering solution. This work was then used to enable detailed structural and civil designs to confirm suitability of structures to be installed and enable early manufacture of flues, steelwork, structural mast and construction of reinforced foundations.

At Midtherm Engineering an in house expert team worked on general arrangement and manufacturing drawings for the new mast, gantry, flues and foundations informed by its experience in similar heavy engineering projects involving large commercial structures.

Part of these works involved providing calculations for the new structure's reinforced concrete foundations. Midtherm Engineering also supplied a holding down bolt cage to be cast in the foundations for the mast.

That work not only focused on accommodating the present day flue requirements, but also involved consideration that current planning allows for new surrounding buildings to be built to a height greater than that of the current requirement, therefore its future-proof design means that it can be adapted to meet any new requirements should the site be developed further. This has been achieved by designing the mast structure and foundations to accommodate a height increase up to just over 30m. A new module with factory mounted flues can be added to the top via bolted flange connections increasing the height as and when required.

CASE STUDY

Following weeks of high tolerance manufacture, the new 26.5m mast was delivered to the site in two sections. The first part was craned onto the foundations secured to the holding down bolt frame and a second section was then craned and bolted on top. Midtherm Engineering's in-house installation specialists then provided the final fixings and installed the inter-connecting flues, from MEWP's and scaffold platforms. Co-ordination and project management of these tasks was carried out by their experienced contract engineering team.

The project was delivered on time and on budget – a considerable feat given the tight timeframe and complex nature of the work. The University was impressed with the speed and efficiency with which the multi-faceted project was carried out.

For Midtherm Engineering, this case study highlights its strength in depth and the sheer scale of expertise it can bring to bear. The project is testament to its design capabilities, engineering nous, awareness of structures and services as well as project management capabilities.

“ We stand out from the competition in our ability to combine the delivery of flue systems with the type of heavy engineering skills required for complex projects such as this. This enables us to coordinate the delivery of a variety of services from dispersal modelling to surveying, design to installation. We have control of the entire process, reassuring clients all elements of the work will be co-ordinated and delivered on time to the highest standards of design, manufacturing and workmanship.

Adam Slipanczewski, Midtherm

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Final installation of flue systems and mast structure

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They have helped us future proof the project by ensuring the flue system can be raised further as more buildings are delivered. That presented some major challenges but Midtherm proved they are up to the task. We put our trust in them and they certainly delivered.

Andrew Clews, University of Warwick

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