

Aurecon ensures office development an iconic 'green' initiative

Engineering, design, and advisory company Aurecon supplied mechanical and environmentally sustainable design (ESD) services for the iconic 144 Oxford Road office development in Rosebank, Johannesburg. This played a key role in the project aiming for a 5-Star Green Star Design Certification from the Green Building Council of South Africa (GBCSA).

Developer Growthpoint Properties appointed Aurecon in 2017 for the 35 0000 m² premium-grade office development, which was completed in 2019 and aims to capitalise on the demand for office space in the popular precinct.

Aurecon was part of the project team at an early stage while various iterations were reviewed in order to establish the most feasible scheme. Close collaboration with Paragon Group and the rest of the project team was necessary to ensure proper coordination of all building services. Aurecon is currently in the process of rebranding as Zutari, after



Aurecon Technical Director, Brandon Huddle.

officially announcing the separation of the African business from the Aurecon Group, effective from 1 January 2020.

The nine-storey development features two elongated office towers interlinked by a central atrium along the north-south axis. Spanning the entire nine floors, the atrium offers a visual link to the outside. The west façades are shaped towards a curved glass pinnacle that cantilevers outwards towards the road.

The main façade consists of double-glazed unitised façades, incorporating a dark grey glass. The outermost façade of the northern building features a secondary offset glazed 'skin' with raking sides. "The high-performance glazing used on the project had to be factored into the cooling load," says Aurecon technical director, Brandon Huddle. "The glazing has been coated and baked with a variety of chemicals to reflect heat. This means that, while it allows natural light to enter, heat wavelengths are reflected back out of the building."

One of the key sustainability features of the project is the air-conditioning system based on four 800 kW CIAT chillers from Sky Shot Climate Solutions. The total cooling provided for the project is 3.2 MW, serving 17

air-handling units (AHUs) that cater for the different thermal zones in the building. Each AHU handles roughly 12 m³ to 18 m³ of air, which makes for a highly cost-effective design. The Variable Air Volume (VAV) diffusers used were provided by Rickard Air Diffusion. The diffuser groups each cover a 50 m² to 100 m² zone, and can each be controlled individually.

Each AHU is fitted with an intelligent control valve with a built-in energy meter, which means that the precise R/kWh can be calculated. The CIAT chillers have variable-speed condenser fans for increased energy-efficiency, supplying water at 6°C, which is returned from the building at 12°C.

A major contributor to the optimised energy performance of the building is the fact that the AHUs have dampers that are able to shut-off the return-air flow if external ambient conditions are below those of the return-air temperature, which typically provides maximum benefit between 12°C to 18°C. This allows for natural cooling of the building, taking advantage of the ideal Johannesburg climate.

"The building is very well sealed, as normally the unitised curtain wall façades tend to leak a lot. The air under economy cycle mode needs to be released from the building

to allow supply air to enter. Relief air dampers on the roof in the atrium return-air path open and close automatically, depending on the economy cycle damper positions," explains Huddle.

As long as the external temperature is lower than the temperature of the return-flow air, it means that the air-con system operates in economy mode. The entire HVAC system, in turn, is integrated with the Building Management System (BMS), which schedules the air-con system to operate from 05:00 to 19:00 as determined by the landlord.

The roof-level AHUs are covered to protect the ducting from solar-heat gain, which saves costs such as additional insulation and cladding. It also saves costs in that components such as the AHUs, control panels, and Variable Speed Drives (VSDs) do not have to be weather-proofed.

"If you add up all the extra costs and the operational benefit, it is well worth the investment. An additional benefit is that it facilitates any maintenance needed to be carried out by technicians," Huddle points out.

A particular innovation implemented by Aurecon on this project was to detect refrigerant leaks from the air-cooled chillers. This limits the environmental damage caused by refrigerants with ozone-depletion or global-warming potential.

Another 'first' for the project was using Siemens intelligent valves, which can be accessed by means of an app in order to deter-



Above: The total cooling load is 3.2 MW, serving 17 AHUs catering for different thermal zones.

Right: The nine-storey 144 Oxford Road office development for Growthpoint Properties.

mine energy consumption, flow rate, and valve positioning. In addition, there is BMS-addressable energy-efficient lighting throughout, water-saving sanitary fittings, a rainwater harvesting system, extensive glazing to maximise external views and natural lighting, and water-efficient landscaping.

A facilities manager was actively involved during the design phase to ensure that the operational intent of the sustainability initiatives was implemented effectively following the commissioning of the building services.

Described as an iconic development, the Gautrain servitude cuts through the site, which restricted the allowable construction methodology to be used. Further to this,



Oxford Road sits within the site boundary. All these factors contributed to a long and intensive design process that took into account site-specific parameters, together with stakeholders' particular needs and requirements.

Aurecon worked closely with Growthpoint Properties, Paragon Group as architect, and the professional team through the various iterations of the building's design to ensure that the mechanical services and the sustainability objectives were aligned seamlessly with the ultimate design. □

TLT ACTOM launches complete ventilation solutions

TLT ACTOM aims to offer South Africa's mining and power sector more than just innovative ventilation fans – their customised systems ensure that working conditions are safe and energy efficiency maximized as part of a holistic Total Ventilation Solution that aims to reduce total cost of ownership.

Operations Director, Craig Johnston believes that TLT ACTOM's approach is ideal for addressing the concerns of the Southern African market. "We have come to realise that in Southern Africa power is becoming a far higher input cost in our industries and processes than it was in the past," says Johnston.

"TLT ACTOM prides itself on applying innovative, lateral thinking to solutions that save energy by offering the best efficiency selections for the applications. We can supply products that are not only more efficient in their performance but are also tailored to deliver the required air at the required time. For example, a fan that is designed to have

different degrees of control in order meet the specific levels of ventilation required for increased ambient temperature or activity or when measured pollutants move beyond a pre-set tolerance."

TLT ACTOM's Total Ventilation Solution approach aims to provide complete solutions to the challenges of subterranean mines, thermal power plants and numerous industrial process applications including cement production and waste incineration. According to Johnston, the main focus will be on make clients' operations more efficient in terms of both performance and energy consumption, thereby having a significant impact on total cost of ownership.

"Capital cost is one aspect that clients are most heavily focused on but TLT ACTOM strives for excellence in power efficiency, maintainability and life expectancy – all factors that can easily outweigh the initial purchase price. To do this we rely on superior technology derived from our parent company TLT-Turbo," Johnston explains. "The most innovative suppliers can help their clients to look beyond the initial capital cost and to consider the short, medium and long term running costs which include absorbed power and maintenance."

Johnston elaborates with an example of how their innovation ensures that clients see a return on investment. "As part of a recent study, TLT ACTOM proposed to replace two existing mine ventilation fans with a single axial fan. Because of its higher efficiency, it will use the same amount of electricity that one of the existing fans currently does, resulting in a saving of approximately 500 kW. The calculated annual energy saving is R 3.6 million making the

payback extremely attractive."

The current installed base of process and ventilation fans is aging, and in tough times this equipment has to be carefully maintained to achieve the expected life of product. To do this TLT ACTOM provides a dedicated skilled team of fan specialists to monitor and maintain installed systems.

"Where replacements are required, we offer the value-added service of critically analysing the existing plant and using an intellectual approach to offer improvements such as in efficiency, size correction or wear durability. Wherever possible this can be achieved without replacing the entire fan but in retrofitting the rotating element with minor modifications thus minimising the capital spend for the customer and ensuring an acceptable return on investment," says Johnston.

Johnston believes that TLT ACTOM is able to address the unique challenges of the African market through a combination of the design of their products, their Total

Ventilation Solutions approach and support from TLT-Turbo. "With TLT Turbo as our 'technology parent' TLT ACTOM has the ability to offer fans for the most arduous of conditions. From cement plants where wear and high temperature is a factor or mining fans where water droplet erosion can cause damage to fan solutions where erosive and corrosive

conditions exist, TLT ACTOM has a solution."

"We pride ourselves in working with our clients to fully explore options and to share the latest developments. We hope that by applying the Total Ventilation Solutions approach, our current and potential clients will come to realise that TLT ACTOM sells more than just fans," Johnston concludes. □



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