Case study
Automotive Steel Store, Middlesbrough

Client: A V Dawson Ltd

Principal Contractor: A V Dawson Ltd

Structural Engineer: Thompson Consulting

Steelwork Contractor: Raisco Ltd

Roofing and Cladding Contractor: Chemplas Ltd

Solar Energy Contractor: Redsky Solar Ltd

Products: Trisomet® insulated roof and wall panel system; Trimapanel® insulated wall-cladding system; Colorcoat HPS200 Ultra® pre-finished steel

Year: 2014

A V Dawson's Automotive Steel Store was designed and built to provide optimum storage conditions for Tata Steel products used by the automotive industry. Delivering more than 9,000m^2 of storage space, the building combines renewable energy systems, including solar photovoltaic (PV) roof panels, to provide an innovative and energy-efficient solution to internal climate control.

Tata Steel's Trisomet® insulated roof and wall panel system plays a key role in maintaining the correct temperature and humidity inside the warehouse. It provided the perfect base for installation of the roof-mounted solar PV panels through Tata Steel's partnership with Redsky Solar.

The building is the first to make use of the enhanced Confidex® Guarantee for Colorcoat HPS200 Ultra®. The guarantee has been extended to include cover for areas situated under PV frame modules for the life of the pre-finished steel guarantee.

AUTOMOTIVE STEEL STORE DRIVES ENERGY EFFICIENCY

The requirement

A V Dawson operates a multimodal distribution hub on 70 acres of River Tees frontage incorporating rail freight facilities, port operations, road transport and warehousing. Working as a supply chain partner to Tata Steel, the company provides storage and distribution facilities for Tata Steel products bound for customers in the north of Britain.

To meet Tata Steel's growing needs, A V Dawson drew up plans to invest £6.5 million in a new, purpose-built Automotive Steel Store. The store would be served by a rail link – bringing Tata Steel's steel coil directly into the store by rail from Port Talbot in Wales. To store steel coil in premium condition for automotive customers, the ability to create and maintain optimum internal temperature and relative humidity were key considerations. A V Dawson opted for an efficient, renewable energy system – combining a ground source heat system with solar PV panels on the warehouse roof.

The choice of cladding for the steel-framed building was critical to maintaining the internal climate of the warehouse. Specified insulation and air-tightness levels needed to be achieved. The roof also had to be strong enough to support the solar PV array. In addition, A V Dawson required assurance that the weathering performance of the roof would be guaranteed in all areas – including underneath the solar panels.

There were two other design drivers for the cladding – ease of installation and aesthetics. A proven system with straightforward side lapping details was required for a fast and efficient build. With prestigious customers including Nissan visiting the building, it was important that the new store should look smart and impressive.

The solution

Working closely with Tata Steel and specialist contractors, A V Dawson designed the new building and managed its construction. Tata Steel's construction professionals helped to calculate the most cost-effective design solution for the building envelope and provided a design service for wind load calculations and air-tightness. For a building of 10,000m^2, Tata Steel's tested panel joints and recommended junction details provided confidence that an air-tightness figure of 3m^3/m^2/h was achievable with its Trisomet® and Trimapanel® products. The exact envelope requirements were determined for storage usage, thus optimising the most cost-effective solution for the client.

Ground works commenced in February 2014 and included excavation of 70 deep bore holes to link up with ten ground source heat pumps. Powered by 1,000 solar PV panels on the warehouse roof, these heat pumps would be part of a system producing hot air. This would ensure a minimum temperature inside the warehouse whilst extracting moisture through high-capacity ventilation units and eradicating the risk of condensation.

"Close collaboration with Tata Steel meant we were able to develop and prove a PV array solution that delivers cost savings for the client whilst ensuring that the roofing material performs at its best. Our partnership approach means we can combine and optimise building envelope and solar PV designs to suit a range of client needs." said Steven Jones, Director of Redsky Solar.

Tata Steel teamed up with roofing contractor, Chemplas Ltd, and supply chain partner, Redsky Solar. They were able to provide the structural design calculations to enable the project engineer to optimise the steel frame and envelope design to deliver an efficient and reliable roofing solution that would withstand the additional loading requirements of the PV array. Working with Redsky Solar, Tata Steel paid particular attention to the development of PV panel fixings – ensuring that the weathering performance of the roof was not compromised.

Redsky Solar, rooftop solar PV specialists, provided technical support to A V Dawson – resulting in a roof design that provided maximum return on investment for the solar PV array. The solar PV system was designed to generate 194,250 kWh in its first year – saving the equivalent of more than 105 tonnes of carbon dioxide. The payback period for the system is expected to be less than six years.

"Together with Redsky Solar, we offer a comprehensive range of solar PV solutions that have been developed to fit with our Trisomet® insulated panels without compromising the performance of the roof. It means we can provide business owners with opportunities to generate rooftop power for their own benefit – reducing their energy costs and enhancing the value of their property." said Jo Evans, Commercial Director at Tata Steel.

Fast build

The new Automotive Steel Store was built swiftly and safely. Construction of the store's steel frame began in early May 2014. The store is 264 metres long by 36 metres wide, with a small office area adjoining at one end of the building.

On 18 July 2014, Chemplas Ltd began work on cladding the warehouse building with 18,500m^2 of Trisomet® insulated roof and wall panels. This robust, made-to-measure, insulated system ensures uniform thermal performance throughout the building. For the AV Dawson project, a 40mm thick insulated panel was chosen to optimise climate control inside the warehouse. A 100mm thickness was selected for the office roof. The office walls were clad in Tata Steel's Trimapanel® System. Both Trisomet® and Trimapanel® used on the entire building envelope were manufactured from Colorcoat HPS200 Ultra® pre-finished steel for the weather side.

The cladding programme and solar PV panel installation was completed on time in just seven weeks. The new Automotive Steel Store opened for business on 3 December 2014.

"The buildability and speed of installation was one of the reasons we chose this composite panel system from Tata Steel. Using the Trisomet® System also meant we could select the optimum insulation thickness for enabling control of the internal climate of the building," said Gary Dawson, Managing Director of A V Dawson.

Tata Steel products:
Trisomet® 40mm insulated panels were used for the warehouse roof and walls, and the office was constructed from Trisomet® 100mm to the roof and Trimapanel® 90mm to the walls. These cladding systems were chosen to help provide the required internal conditions and designed to act as a base for installation of the roof-mounted solar PV panels.

The panels were supplied with the super durable Colorcoat HPS200 Ultra® pre-finished steel, backed by the enhanced Confidex® Guarantee. This guarantee includes cover for areas that are situated under PV frame modules. Colorcoat HPS200 Ultra® was supplied in Hamlet for the roof and graduated Hamlet, Albatross and Slate Grey for the walls.

Customer confidence

"We opted for Colorcoat HPS200 Ultra® pre-finished steel because of its durability and good looks, it was very important to us that the whole roof was covered by the Confidex® Guarantee. It's given us confidence that installing a solar PV array will not have a detrimental effect on the performance of the pre-finished steel and that the entire roof is guaranteed to perform for the same duration," said Gary Dawson.

"Our new Automotive Steel Store was the third and final phase of a £12.5 million investment programme and we're extremely pleased with the results. Customers who have visited the store are very impressed - not only does it look smart but the renewable energy system hasn't missed a beat and is proving more efficient than we thought." continued Gary Dawson.

Contact us:

For technical design advice or to discuss potential for installing Tata Steel's composite panel systems and solar PV modules at your premises, please contact:

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