

Award

AESC, Sunderland

PROJECT TEAM

Architect and Consultant Engineers:
Tetra Tech | RPS

Structural Engineer and Steelwork Contractor:
Severfield plc

Main Contractor:
Wates Construction

Client:
AESC UK



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The AESC UK Gigafactory in Sunderland is a landmark steel-framed industrial facility that sets a new benchmark for sustainable construction and advanced manufacturing. The project forms part of a £1bn initiative with Nissan and Sunderland City Council to create EV36Zero, an electric vehicle hub creating a world-first EV manufacturing ecosystem. Designed to produce batteries for 100,000 electric vehicles annually, the facility spans 360 metres and covers an area equivalent to 23 football pitches, making it one of the largest and most ambitious industrial developments in the UK.

The main steel frame and associated structures, comprises both hot and cold-rolled fabricated and installed elements, coated in a combination of primed

and fire-protection paint. The project involved the construction of large, fabricated truss sections, necessitating expert fabrication and precise material handling to accommodate substantial floor loadings from the battery making equipment. The column flanges, exceeding 90mm in thickness, were designed to support the overall structure and were spliced and bolted together on site.

From the start of the project, ground conditions were challenging so there was a stringent focus on the safety of personnel, equipment and deliveries. There were up to 50 loads of fabricated steelwork offloaded to site daily, at its peak, so coordination was imperative to maintain safety and programme efficiency.

One of the most complex challenges centred on the various elements of the design that form the fire strategy. In particular stopping fire passing through services, compartments and other sterile zones. A big consideration was given to the fire stopping and compartmentation detailing around the movement joint and the movement that had to be accommodated due to its proximity to the transition point between the multi-storey and single-storey areas of the building. The varied fire risk profiles and environmental conditions, driven by multiple cleanroom and manufacturing processes, required constant design adaptation and coordination with MEP systems. Fire engineering considerations influenced steel section sizing and intumescent paint application, ensuring compliance with rigorous safety standards.

From an engineering perspective, the project presented several challenges in accommodating expansive areas with high imposed loads to support manufacturing equipment. This led to significant equivalent horizontal forces (EHF) loads, which required meticulous planning and robust structural solutions. Stringent deflection limits were imposed on long-span floor beams to uphold structural integrity and performance standards. There was also limited availability of locations for vertical bracing, which demanded innovative engineering solutions to effectively maintain stability.

Steel enabled the long-span floors required for this behemoth factory and could be more readily adapted as the design evolved throughout the process, shaped by the latest battery making technologies coming to market. It was an evolving process with designs changing during the fabrication process, which demonstrates the flexibility the material affords during the build, but also provides an adaptable space for future changes.

A key strategy of the project, to meet the demands of the client who wanted to procure as late as possible to incorporate the latest technologies, meant that the erection sequence was outside a conventional and logical programme. This meant that ongoing requests could be accommodated and saved a significant amount of time. This was further enhanced by adopting a modular

construction approach, whereby the steel frames were taken to an off-site facility where mechanical, electrical and plumbing services were installed directly before being lifted into place on site. This innovation eliminated over 500,000 hours of working at height, enhancing safety and efficiency.

Environmental impact was a core focus. The project incorporated a vast system beneath the car park, capable of storing rainwater equivalent to five Olympic-sized swimming pools. With 80% of the construction premanufactured off-site, carbon emissions were reduced, and 60,000 onsite man hours were saved. Relocating steel assembly to Pallion shipyard, just five miles from the site, cut transport distances by 27,200 miles and saved 38 tonnes of CO₂.

The Gigafactory is powered by 100% carbon-neutral energy and designed to support the UK's transition to next-generation electric vehicles. Its advanced batteries offer a 30% increase in energy density, improving vehicle range and efficiency. The facility will create over 1,000 jobs and contribute significantly to the UK's carbon reduction goals.

Community engagement was integral to the project's success. An on-site allotment was created featuring artwork from employees' children and local schools, fostering pride and involvement. School tours offered students insight into the construction process and inspired interest in careers in the built environment.

The Gigafactory's delivery required unprecedented collaboration and adaptability. With no blueprint for a facility of this scale, the flexible approach by the team enabled rapid design adjustments and unconventional phasing to meet aggressive programme deadlines. Proactive coordination ensured seamless integration of modular frames and maintained quality throughout.

The AESC UK Gigafactory stands as a transformative achievement in industrial construction. It combines technical excellence, environmental leadership, and community engagement to deliver a facility that will power the future of sustainable transport in the UK and beyond.



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“ Judges' comment

This ambitious and nationally significant project hosts AESC's cutting-edge production facility manufacturing batteries for 100,000 electric vehicles annually. Covering an area equivalent to 23 football pitches and with battery production technology evolving even as the building was being erected, the whole project team responded to the challenge with impressive speed and flexibility.