

# Award ~ Industrial Buildings Award

## Royal Mail Distribution Centre, London NW10

*Owner: Post Office Property Holdings*

**Architect:** Broadway Malyan

**Structural Engineer:** Mott MacDonald Group

**Steelwork Contractor:** Westbury Tubular Structures Ltd

**Main Contractor:** Tilbury Douglas Construction Ltd

This road/rail 'hub' is at the heart of joint plans by Royal Mail and British Rail for a fully integrated mail distribution system linking road, rail and air, which is aimed at delivering one hundred million more letters a year on the day after posting. The hub is a modern distribution centre, equivalent to a mainline station and acting as a centre for 16 new Railnet trains, controlled and owned by Royal Mail. Twenty per cent of the nation's middle to long distance mail for the South Eastern Region will be redistributed from it.

The platform area is enclosed by an open-ended barrel roof, with louvre elevations providing cross-flow ventilation. The centres and spacing of the columns are deliberately positioned on the centre of each platform to avoid the BR/HMRI requirements for impact protection. The roof is supported on only 28 CHS columns, with a clear span of 51.6m and 9.2m 'wings' cantilevered from the main columns. The clear height of the columns - which are tied together at their tops in both directions - to the underside of the curved bottom tie is 9.5m, with a 16m maximum roof height.

The structure was analysed initially as a single truss which established that the concept would work efficiently and that sizes, depths, deflections etc. were acceptable. The final design was then undertaken for several complete bays. The design was chosen to achieve as many large repetitive items as fabricating, transportation and lifting would realistically allow. The design of the connections allowed rapid bay-to-bay erection times, comparable to a simple two dimensional single truss structure.

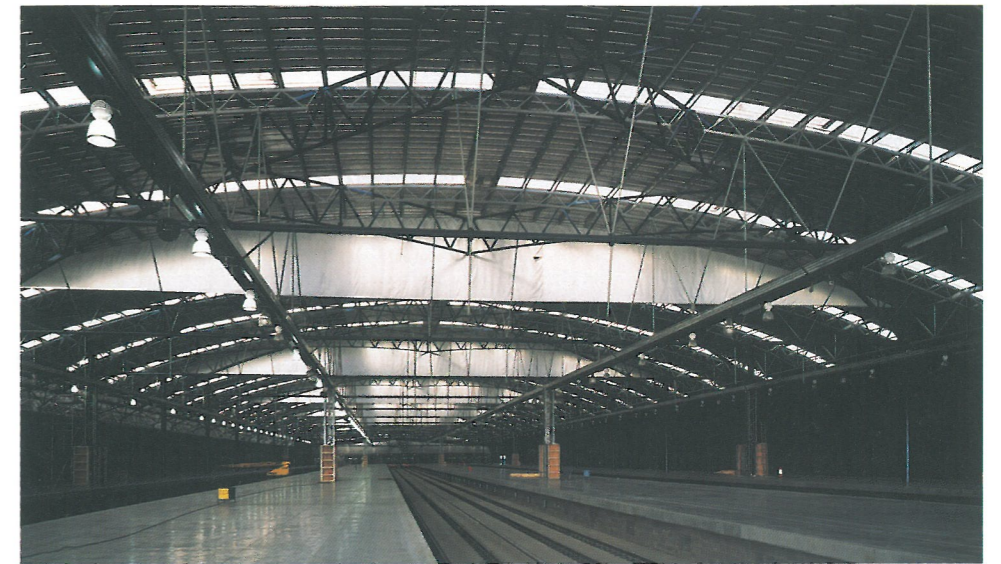
The forces in the booms of the primary trusses reverse, depending upon their positions, from being tensile to compressive in any one continuous member. The analysis made full use of the efficiency and economy of the sections by varying their sizes along the members. The columns are fully fixed at their bases, with the top connections providing lateral stability, as vertical bracing was discouraged, whilst also minimising the effects of horizontal deflection due to wind loads.

All site connections to the column tops and the truss intersections were 'simple machined pins' passing through flat steel plates. High strength steel pins were introduced at connections of high shear transfer. The roof structure was designed in sealed square hollow sections, chosen for their efficiency and economy. Cold rolled purlins provide primary support for the lightweight uninsulated roof. The services required by BR and Royal Mail were carried by four kilometres of dedicated Cellform beams running along the platforms' centres. The overhead electrification system was supported by the roof structure.

The space truss configuration was intrinsically rigid, meaning bracing wasn't necessary, but wasn't fully stable until the final connection was made. An adjustable trestle was used at the centre of the span and then moved progressively along the length of the roof to help erect the next truss. The trusses were pre-cambered to negate the effects of dead load deflection.

The whole structure was designed in steel except for minor members, producing a very light and cost effective

main roof structure. The use of a comprehensive protective paint system and SHS tubes will help keep maintenance to a minimum in an environment which is quite harsh, but which is also constantly occupied.



*A dynamic, well ordered railway shed - economic yet spatially generous. Colour, services, structure and IT system are all co-ordinated in an appropriate industrial idiom. The structural form of the roof is handled with a delicate touch incorporating rooflights, lighting and extract systems.*