



## Assembly & Pretest Facility Cummins Engine Factory, Shotts, Lanarkshire

For Cummins Engine Company Ltd.



Cummins Engine Co Ltd, the largest independent manufacturer of diesel engines, is redeveloping its facility at Shotts, Lanarkshire. This development doubles the manufacturing capacity at Shotts and provides a modern spacious factory.

The redevelopment has been taking place alongside and amongst existing factory buildings owned by the Scottish Development Agency who have invested substantial amounts of capital in the new and modernised plant and buildings. The total facility will extend to 45,000m<sup>2</sup> and the redevelopment has the following main elements:-  
Assembly and Pre-test, Receiving, Machining, Storage, Office space, Canteen and Medical Centre.

The first completed buildings for Assembly and Pre-test, submitted as an Award Scheme entry have been developed to meet the following design objectives:-

- (i) Provide an uninterrupted plane 5.5m above ground slab level capable of accommodating the random distribution of monorail and bridge cranes.
- (ii) Provide deep structural zones spaced at regular intervals to accommodate primary service routes joined by shallow zones for secondary service routes.
- (iii) Provide daylight to the working areas.
- (iv) Provide a 15m square column grid to suit Cummins machine layout planning.

These requirements have been achieved by using 2m deep primary triangular prismatic trusses, supporting 700mm deep castellated secondary beams. The secondary beams at 3,750mm

centres are suspended from the bottom of the primary trusses and are further supported by the raking hangers which run from the top booms of the primary trusses to third points on the beams.

Circular hollow columns at 15m centres in both directions support the primary trusses. The columns are pinned at the base to cope with variable ground conditions across the site and at the top to avoid attracting moments into the columns. These buildings can accept crane loads of up to 4 tonnes per bay.

Protection for the structure against progressive collapse from accidental impact damage has been provided by setting the columns on 1.2m high circular concrete plinths designed to absorb the energy resulting from possible fork lift truck impact. Buckling of the walls of the steel tubes under impact damage from swinging loads has been catered for by backfilling the columns with cement grout.

The raking wall frames which provide stability to the structural system have also been used to introduce articulation in the facade cladding. This wall cladding incorporates low level glazing, providing views to the outside from the working areas.

Cladding and roofing systems comprise a long span, profiled steel deck which supports insulation and an outer skin of ribbed aluminium. Flat glazed areas are incorporated into the roofing above the trusses.

Erection was considered fully at the conceptual design stage to provide a rapid simple system of erection for trusses, columns, hangers and secondary castellated beams.

### Architects:

**Ahrends Burton & Koralek**

### Structural Engineers:

**Ove Arup & Partners**

### Steelwork Contractor:

**Redpath Engineering Ltd.**

### Judges comments

A very good example of a large engineering complex designed for a specific purpose. The efficient layout and planning give spacious working areas which are light and colourful. The extensions have been cleverly knitted into the existing structures and careful attention has been paid to detail resulting in visual excellence with innovation and economy.