

Passenger Terminal Building, Southampton International Airport

For:
BAA plc



Architect:
Manser Associates

Structural Engineer:
Peter Brett Associates

Steelwork Contractor:
Dyer (Structural Steelwork) Ltd

Main Contractor:
Warings Contractors Ltd

The Passenger Terminal Building is 64m x 90m long and uses steel frames on a 9m grid. Two clear roof spans of 25m on each side of a 14m wide three storey central core, enclose departures and arrivals. The central core extends 24m from one gable of the building while the roof beams used in the clear roof spans extend 4m on two sides of the building to provide a canopy running down each side of the building.

It was decided at an early stage to use structural steel for the superstructure on the basis of flexibility, aesthetics, cost and program. The intrinsic flexibility of the building, which was a Client's requirement to permit the future extension of the building, allowed the Client and Architect to progress the internal enclosure and

partition layout independent of the building fabric.

The central core floors at plant-mezzanine and first floor levels are formed in precast prestressed concrete slabs. The floor is supported on steel spine beams running continuously over the length of the building using the parallel beam approach. The concept of continuous twin steel beams supporting 250mm thick precast slabs in a floor construction of only 275mm deep overall provided a thin floor structure capable of supporting plant and office loads on a 9.0m x 7.5m grid.

The central core roof beams are curved, and span simply supported over the full central core width. The main roof envelope is formed by curved

and tapered steel plate girders that are supported off the central core frames by triangulated strut-tie frames.

The use of diaphragm design for the roof deck eliminated the need for plan cross bracing which was important in a roof construction visible from below. As a further consequence bracing costs were not incurred. The use of fixed base foundation design on the long elevations eliminated the need for vertical cross bracing, easing the planning and the detailing of the external cladding.

The triangulated strut and tie arrangement supporting the ends of the main roof girder provided a very efficient structural solution by reducing

the effective span of the roof by approximately 5m. This saved roof structure costs by shortening the girder span to 20m and provided a lightweight, airy structural form under the roof glazing strip which runs alongside the central core on both sides.

Main roof girders were delivered in lengths of 24m incorporating the 4m external canopy structure avoiding expensive and time consuming cantilever connections. The girders were fabricated from plate with a combination of circular and compound curves and differing radii for the top and bottom flanges in accordance with the visual requirements of the roof.

By a combination of the original curved roof concept and exposed structure used in much of the building, an economic and visually exciting structure was achieved at minimum cost.



Judges' Comments

This is the flagship of a new generation of functional, yet elegant, provincial airports which, through the extensive use of steel framing, has reduced the cost of airport terminal buildings to half that of the more conventional solution.