

TGV and RER Train Station Glass Roof, Charles de Gaulle Airport, Paris

For:
ADP and SNCF



Aéroports de Paris's strategy for the Charles de Gaulle Airport is to transform it into a central node in the European Community by increasing its capacity and linking it to the high speed TGV train system.

The underground train station, located in the heart of the terminal 2 redevelopment, straddles the main axis of vehicular circulation at a transport hub called the "Module d'Echanges". The 500m long station is divided in two and is symmetrical about the main axis. Each half is split into an outer and an inner zone by a circular access road, the two outer zones being horizontal vaults and the inner zones inclined.

The architectural design concepts for the steelwork were inspired by the idea of an "emergence" of the glass roof from underground. The primary concept is one of distinct layers

of structural elements each with a different geometry and scale: the pylon columns, the main transversal "croissant" beams and the glass grid. The layers pull apart as the roof emerges to allow a view between each layer from the different levels in the Module d'Echanges.

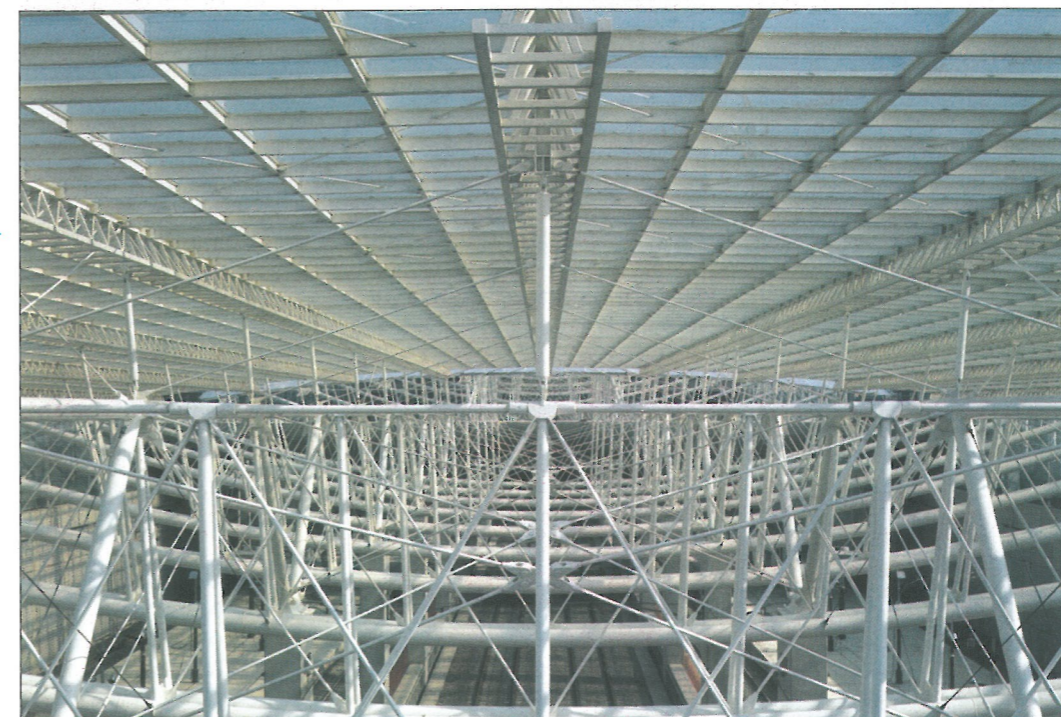
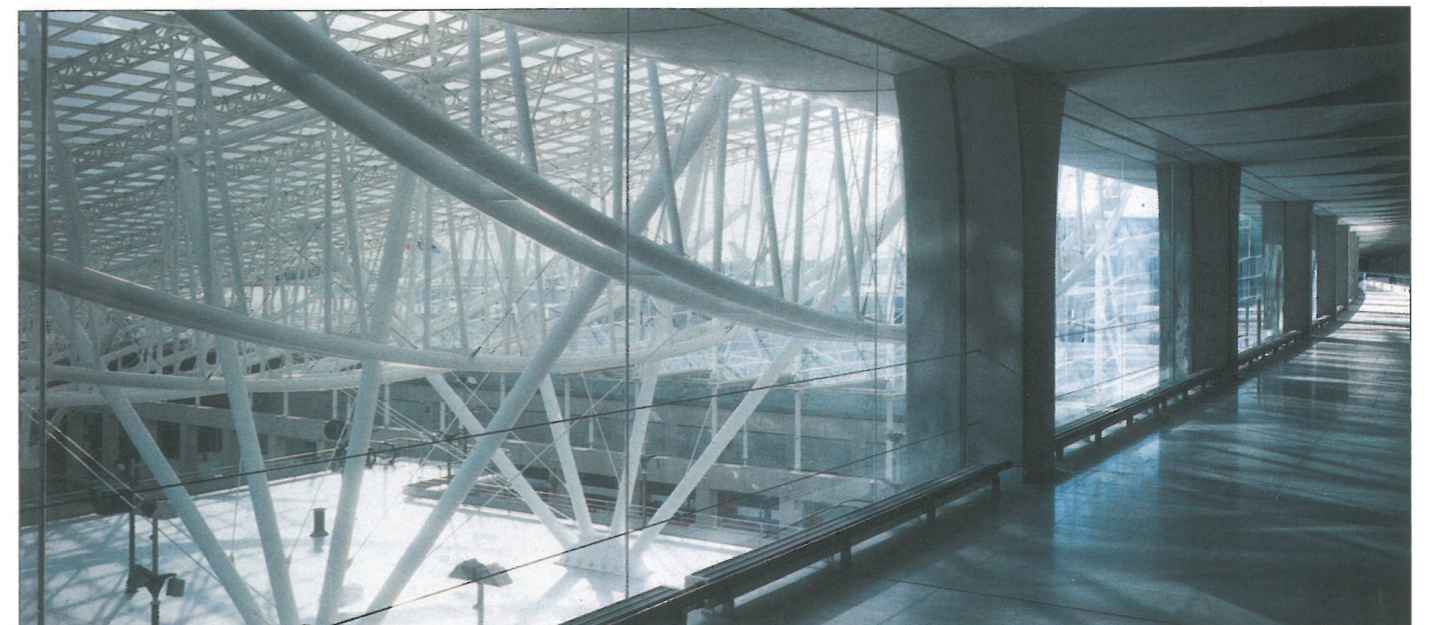
The "metamorphosis" of the structure as it emerges from the underground trench is also important; the transverse "croissant" beams becoming deeper, the pylon structures becoming more complex and the glass roof changing from curved to flat. Finally, the view out from the underground station platform toward the planes and the sky beyond is an essential element of the design.

The longitudinal view of the structure is dominated by the two surfaces created by the continuous glass roof and the

tubular compression members forming the underside of the "croissant" beams. The lateral facades are independently supported by cantilevered masts.

The pylons rest on central concrete piers. Transversely, two pylons support one "croissant" beam. Longitudinally, the pylons form a "fan shaped" system of pin ended struts and ties. Transverse stability is achieved by cross bracing between parallel branches of pylons to form a portal frame.

The 47.5m long "croissants" are supported at the top chord level by the pylon assemblies and cantilever 18m at each end. Each "croissant" consists of an upper tension member and a lower Vierendeel beam, linked by tubular verticals and diagonal ties. The ends of the "croissants" are tied back to the ground by vertical ties.



Photographs courtesy of Paul Maurer

Judges' Comments:

The station complex forms a transport hub for the airport. The light and welcoming ambience of this large space has been achieved by the creative use of steelwork in a beautifully detailed roof structure of evident high quality.



Architects:
ADP, SNCF and RFR

Structural Engineer:
RFR

Steelwork Contractor:
Watson Steel Ltd