

Broadgate Phase 11 Jacking of the Arches

Client: Rosenbaugh Stanhope Developments and BRPB - JV
Steelwork Contractor: Hollandia Buyck
Erection Engineers: Tony Gee and Partners



www.fagiolipsc.com

CIVIL 12



Broadgate is a major development in the City of London. The developers were Rosenhaugh Stanhope Developments and the British Rail Property Board. Of all the Broadgate buildings Phase 11 provided the most engineering challenges and displays the most impressive architecture. The key to Phase 11 is the arches - four massive steel structures which suspend the eleven storey structure over a 78 metres span at British Rail's Liverpool Street Station. The construction of these arches and the complicated jacking techniques devised by Skidmore Owings and Merrill in conjunction with steelwork contractor Hollandia Buyck made the building unique. The erection and jacking engineers were Tony Gee and Partners and the jacking works were carried out by Fagioli PSC Ltd.

The design effectively marries a bow-string arch bridge with the steel framed office block. The normal bridge hangers are replaced by steel columns which are extended vertically to

complete the structure. It was a simple and efficient concept, The four bridge arches and the steelwork for the building had to be put together as a single structure and therein was the problem. The arches could only begin to support the building when all the spans were complete. Once the foundations were complete a four metre deep girder was erected across the rail tracks. This 'raft' had the vital role of supporting the steel structure whilst the arches were completed and before the load could be transferred to them.

Initially, the arch erection was relatively straight forward. The arches were fabricated in Belgium and they were shipped to London in 13 pieces. Meanwhile a temporary steel structure was erected on the raft and jacks fitted under each of the 48 column positions. At the chord of each arch primary and secondary ties were fixed to stop the arch spreading placed at a precamber of 84mm at the highest point.