

Stressing of Basement Wall Propping System

Farringdon Station, Crossrail C430, London

Client

Crossrail

Contractor

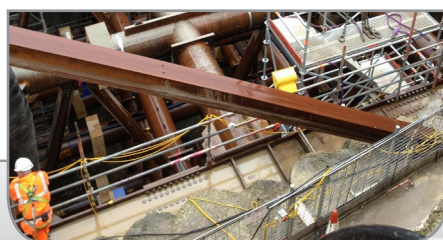
Laing O'Rourke – Strabag JV

Steelwork Contractor

Severfield-Watson Structures Ltd

Works Completed

June 2013



The work on Farringdon Station involved the installation and stressing, in a complex sequence, of 75 number reference 60 flat jacks (600mm diameter) and two number Enerpac 8002 pot jacks in order to de-stress basement props in a controlled manner.

The multi-level basement excavation forming the western entrance to Farringdon Station measured approximately 26 by 22m. It was strutted across its width by four 1084x34.1 CHS steel props at six levels. After the installation of 17 1200x600 fabricated vertical beams between levels S4 and S6, the compressive load in the props at intermediate level S5 had to be transferred into the vertical beams, acting in bending.

The transfer was done with the aid of a jacking frame that went around the back of each vertical beam. This incorporated a gap, into which a group of four flat jacks could be inserted in two sets of pairs at each position. The flat jacks were carefully inflated in groups of four until the load in the prop was released. This needed an inflation of about 15mm.

The load transfer system was more complicated in the south east corner, as site constraints meant that there was no space for the jacking frame to wrap around the back of the vertical beams. Instead, the flat jacks were inserted between the piled basement wall and the waling beam. This meant that prop 4 at this end of the site needed a different deloading method.

First, two 8002 (505mm diameter, 800 tonnes capacity) pot jacks were lowered into position either side of prop 4 using the tower crane. They were located into prefabricated jacking brackets each side of the prop and nipped up so they were just taking load. Both jacks were then inflated in increments using a 110 volt pump via a controlled hydraulic manifold system, complete with in-line pressure gauge. Pressure was increased until the 25mm pack plates in the prop were free and could be removed.

Following this, seven reference 60 flat jacks, complete with thrust plates were installed in each location at the waling beam together with an 800mm square by 50mm thick grout bag. The grout bag was inflated with Tecroc CS grout which was then allowed to cure.

In a carefully choreographed sequence, in which the pile walls were continually checked for movement by LOR-S, the seven flat jacks were inflated while the two pot jacks were deflated. Thus the load was carefully transferred from prop 4 into the vertical steel beams at either end.