



Slabstress

Culcheth High School, Warrington

Client
Warrington Borough Council

Architect
BDP

Engineer
BDP

Principal Contractor
BAM Construct

Frame Contractor
McFadden Construction

PT Design & installation
Freyssinet Ltd

Works Completed
September 2009

Culcheth High School is a three storey concrete frame comprising four main wings and two smaller blocks. In all, the school has 11,000m² of suspended post-tensioned floor slabs. The grid varies but is typically 10.2m x 7.9m with the slabs being 270mm to 350mm thick to suit.

The architect and engineer BDP determined at tender stage to go with PT slabs with the detailed design subsequently being drawn up by PT specialist Freyssinet.

There were several reasons for using PT. Long spans were dictated by the large classroom and laboratory areas and also by the need for economy. Having agreed to use PT slabs in the long-span areas, it was decided to keep an open grid even where it would have been possible to add extra columns within the wall space. A cost benefit analysis proved that the reduction in the number of columns and foundations more than offset the cost of the long spans.

The PT savings were derived from a reduction in the concrete volume – approximately 30 per cent less concrete compared to the equivalent reinforced concrete slab – and from increased construction speed.

The reductions in required concrete and steel also provided environmental benefits that included a decrease in the number of lorry journeys required for material transportation.

The mass and stiffness of the PT slabs were more than sufficient to provide minimum vibration and good sound insulation whilst the parabolic profiles provide excellent deflection control.

The clear flat soffits of PT flat slabs enable complete flexibility of service layout. The absence of trimming beams around service cores avoids conflict between services and structure. There is also flexibility in positioning holes through the slab because tendons are widely spaced and can be diverted around openings.



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