

CASE HISTORY

MARRIOTT HOTEL - LIVERPOOL AIRPORT, ENGLAND, U.K.



The Marriott Hotel was once the old control tower and terminal building for Liverpool Airport. With increased demand two new wings have been added in the same Art Deco style. However in order for pedestrians to access the new development the two existing circular staircases needed to be extended through approx 140 ° and also raised by approx 750 mm (30 inches).

The Architect did not wish for the cantilevered 'I' beams to be bolted to the brick wall with conventional end plates as they would remain visible and so the contracted engineers and Cintec produced a design of casting them in.

A 200 mm (8 inch) diameter, 450mm (18 inch) deep hole was hand cored by diamond drilling into the brickwork.

All the 100 x 100 (4x4) 'I' beams were fixed to supporting scaffold after insertion and levelled by surveyors.

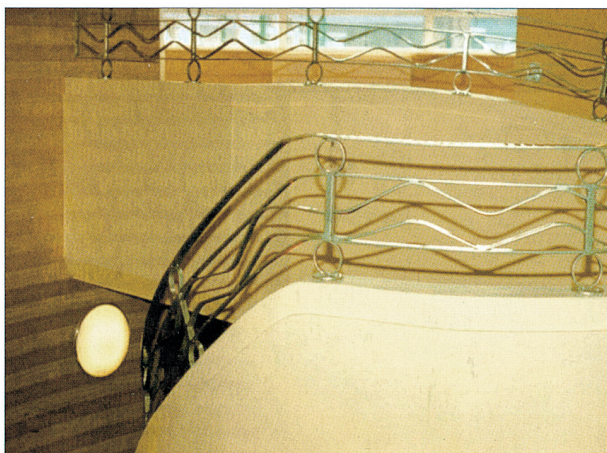
The work was carried out in 2000 by the Liverpool branch of Peter Cox.



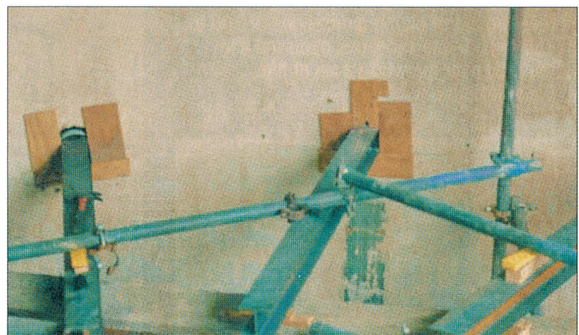
Insertion of Cintec section of 'I' beam into brickwork



'I' beam following grout injection



One of the two Cintec Anchor supported stairwells fully renovated



All installed 'I' beams levelled and supported as grout hardens

CASE HISTORY

GEOFFREY HARRIS HOUSE, CROYDON, ENGLAND, U.K.

The Geoffrey Harris House is a grade II listed building purchased by Croydon Health Authority for use as a day centre by the Mental Handicap Unit.

The Estate Department commissioned the Alan Marshall Partnership as structural engineers for the conversion project.

The building's external walls have a curious structure comprising two elements built over a century apart. The original random rubble wall was constructed in the middle of the 18th century. To this has been added a second brickwork skin.

The walls suffered from settlement of foundations and severe overstressing caused by the spreading of the roof construction and the removal of parts of the walls, resulting in instability and lack of verticality.

The displacement and general condition of the walls required careful attention.

The walling at the east end of the main building was found to be in extremely poor condition. In some places the brickwork lacked vertical support as a result of the removal and non-replacement of piers and walling in the past. It was found that the internal faces of the external walls were crumbling and it was decided that these needed strengthening, if not rebuilding, in places.

The west end of the building incorporates two bay window walls. One was built integrally with the main building, the other forms part of the front of the building and is Victorian. This bay has no foundation and the walls were built without bonding at the junctions with the main walls.

It was evident from the severe deterioration and cracking that this bay was becoming detached from the main structure and in general, needed to be rebuilt or at least strengthened and connected to other walls.

The front elevation of the building itself presented great problems. The facing wall comprised a thin 100 mm skin built without foundations. Of late Victorian age, it was out of plane, cracked and severely out of plumb. Originally built in a straight line, the cavity between the facing wall and the main wall varied from 10 - 75 mm. There are no ties or connection, except for odd pieces of timber.

Soldier arches were provided over the window openings and seen to be displaced or cracked. A survey of the facing wall revealed out of plumb dimensions of 100 to 150 mm. These variations occurred haphazardly over the whole area of the front elevation.



It was decided that the wall would have to be rebuilt. Concern at the instability of this wall was such that it was decided that, until the rebuilding could be carried out, heavy and well braced shores needed to be erected to avoid collapse. The main wall to which the facing wall was added, varied in thickness from 300 to 600 mm as piers, with infilling of solid brickwork, in general 300 mm thick.

This wall was also well out of plane, both vertically and horizontally, and was in urgent need of strengthening in parts. The parapet wall, particularly the pediment, was found to be unstable. Previous efforts made to remedy this had proved ineffective.

English Heritage was consulted about the remedial works. It was stated, in light of the historical importance of the building, that the Croydon Health Authority would not be allowed to demolish or alter the facade.

English Heritage had seen the Cintec fixing system used to save other buildings and suggested that Alan Marshall Partnership, project consulting engineer, investigate the possibility of using the system for this project.

Cintec International Ltd were contacted



and consulting engineers, Ove Arup & Partners, visited the site on the Company's behalf and, in conjunction with the installers, WT Specialist Contracts, designed a solution using the Cintec System.

It involved using stitching anchors to fix the facing skin to the main wall. The wall was then tied back to a solid internal wall.

For stitching, 15 mm x 15 mm RWT anchors were used. To avoid disturbing the exterior of the building, the 30mm diameter holes into which the anchors were inserted, were drilled from the interior.

The fixings used to anchor back the external wall were 30 mm x 30 mm WSA fixings. The repair solution involved inserting anchors into the external and internal walls at approximately 450 mm centres.

Tie rods T16 were provided between the floor joists, suitably connected and anchored to the internal walls. Turn buckles allowed for tightening. The holes in the internal walls were drilled 'by dry process', drilled from the inside of the building, giving a penetration of about 80 mm into the external skin.

Small holes were drilled in the brickwork from the outside in the mortar joints to locate the anchors. These pilot holes were filled and rendered almost invisible. Vertical tie anchors were drilled through the brick-

work to give support to the anchors but, in many cases, the condition and out of plumbness of the walls prevented this being possible. Tie rods were provided to anchor the west bay into the main walls at frequent intervals vertically at the junctions and also at floor level.

Architects for this project were Andrews Sherlock & Partners; the Quantity Surveyors, David Langdon & Everest; and the Consultancy Civil/Structural Engineers, Alan Marshall Partnership.