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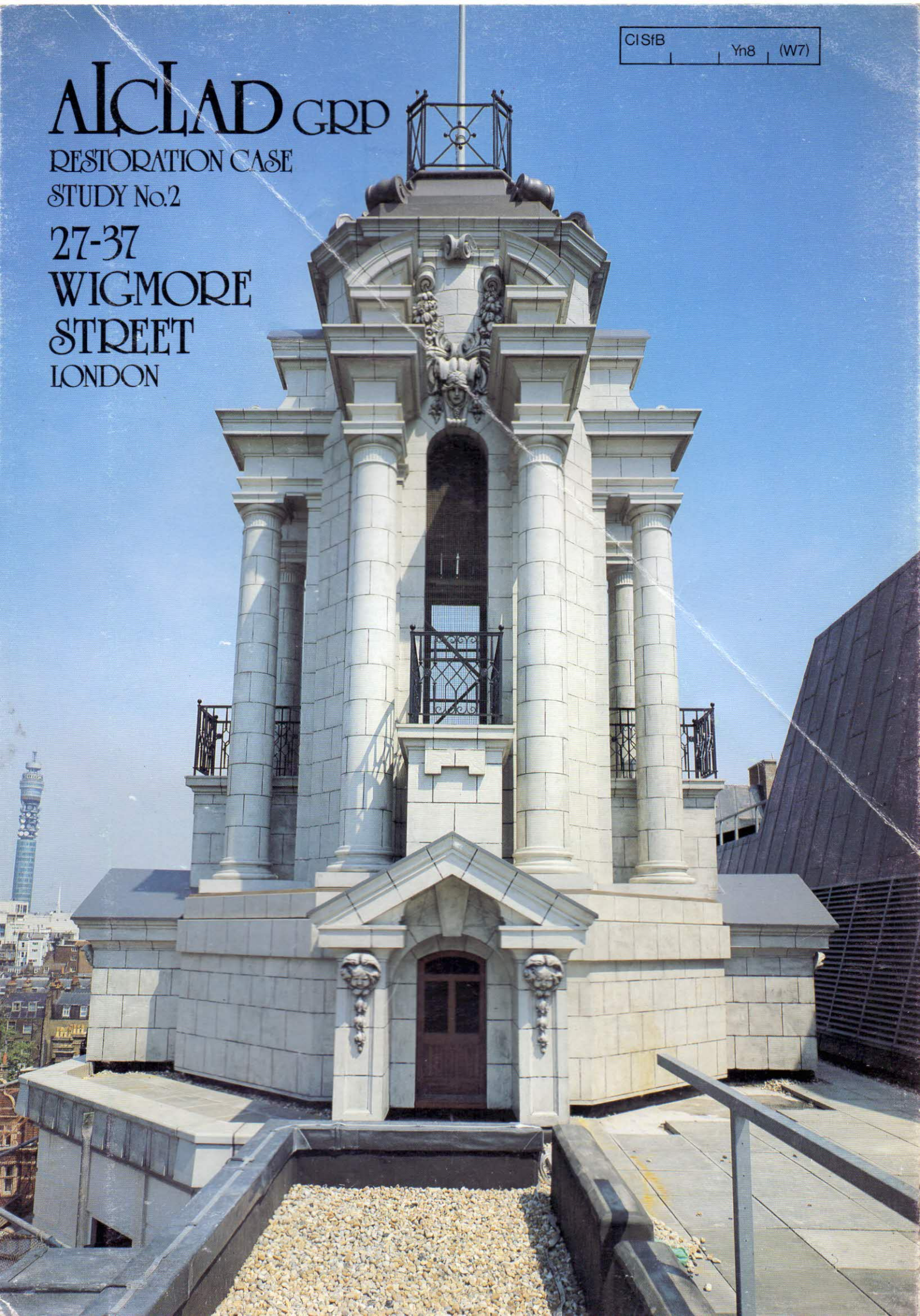
(W7)

ALCLAD GRP

RESTORATION CASE

STUDY No.2

27-37
WIGMORE
STREET
LONDON



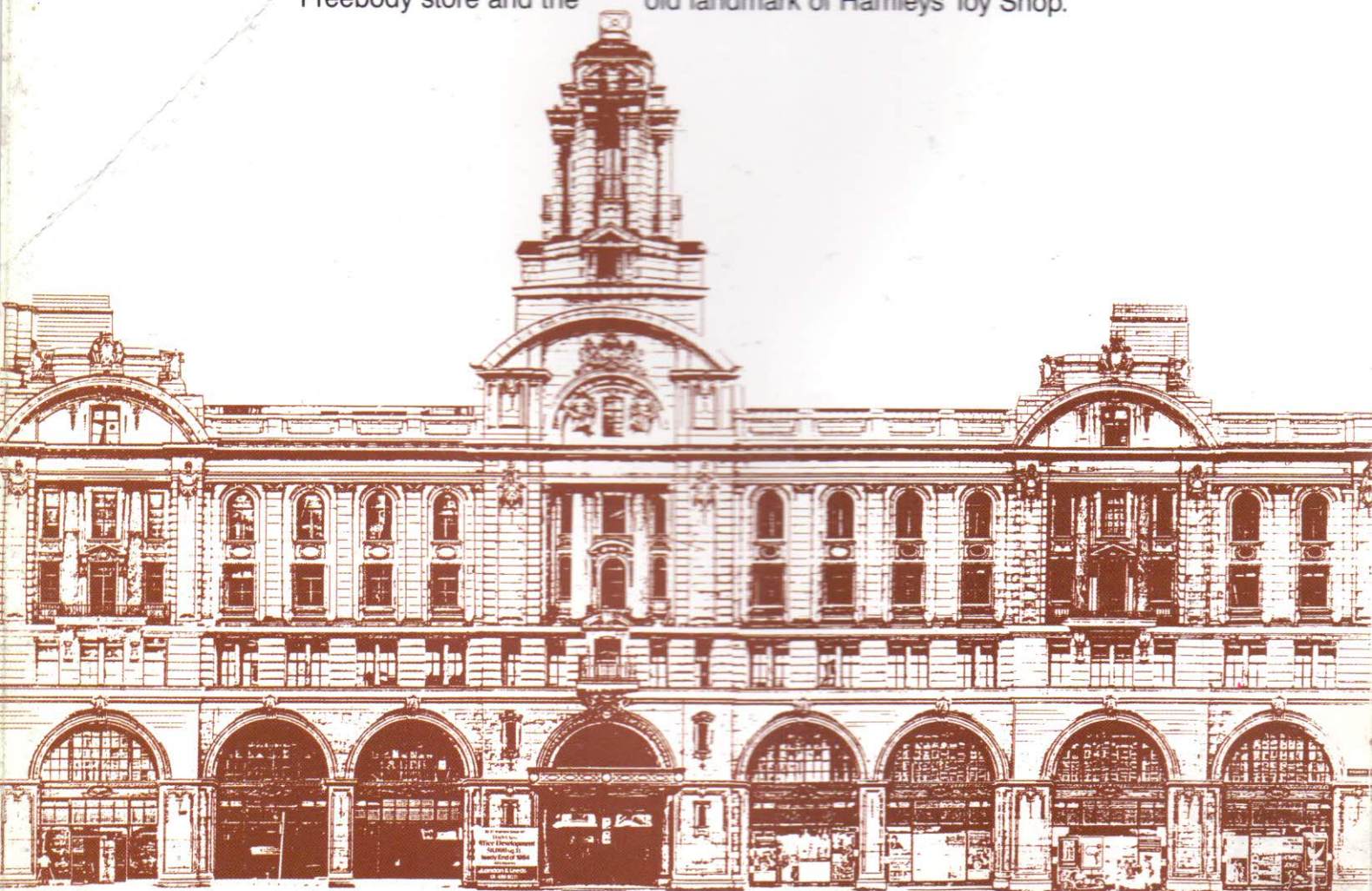
A thorough survey was carried out by Alan Butcher Associates Limited prior to the dismantling of the entire glazed terra cotta cupola and associated decorative shield and statues. Photographic records together with detailed drawings of the existing cupola were produced and some of the highly enriched features removed from site for additional reference during reproduction in Alclad GRP.

Our design proposals were submitted and approved by the District Surveyor, architects, and main contractors.

The shape of the cupola — whilst highly decorative and extremely large — lent itself to being produced in four basic sections, each of the four faces of the cupola being a repeat of one another. All remaining developments of the design for reproduction were based on this principle.

The supporting reinforced concrete (R.C.) structure was designed and built by Alan Butcher Associates Limited as part of the design package. This R.C. tower was built with apertures to receive fixings contained within the Alclad glass-fibre units.

The survey additionally entailed dimensioning each joint and spacing of the individual pieces of the terra cotta that make up the whole of the cupola as well as recording the surface textures and colour of the terra cotta. Lead and copper dressings also had to be reproduced and the existing wrought iron ballustrades removed and repainted for re-use on the new Alclad GRP cupola. This had to be, in every respect, identical to the original which had become unstable and therefore restricted the refurbishment and change of use of this building — the famous original Debenham and Freebody store and the old landmark of Hamleys Toy Shop.



MANUFACTURE OF MOULDS

From this thorough survey, Alan Butcher Associates produced detailed working drawings of the original cupola design and method documents for its production in glass-fibre.

The next stage was the manufacture in timber and plaster of one quarter segment of the cupola. From this the large-scale moulds were manufactured from glass-fibre (illustration No. 1). Due to the extremely complex shape of each of the four quarter segments, the moulds were designed to be dismantled in sections, allowing the quick and simple removal of the GRP replicas.

With the cupola drawing much of its aesthetic appeal from its lavish ornateness, accurate reproduction of the many highly decorative features was essential. Where these enriched features were required, the moulds were manufactured from silicone rubber. Among the many decorative features that Alan Butcher had to reproduce were cherubs flanking pedimented entrances, shields, scrolls, dentil cornices and columns with moulded capitals and bases.

The design of the cupola required two large columns to be fitted to each of the

quarter segments and these columns which form an arch on each elevation were also manufactured from glass-fibre moulds and separately dressed onto the main body of the cupola. The faience surface finish and texture, which had to accurately reproduce that of the existing terra cotta was created in the plaster pattern from which the moulds were manufactured.

MANUFACTURE OF THE CUPOLA

Due to the sheer size of the original cupola — it was 60ft high with other dimensions being correspondingly large — initial structural calculations had to be fully undertaken to establish the preferred method of reinforcing the glass-fibre replica.

Using their specialised know-how relating to GRP in all its facets and capabilities, Alan Butcher Associates' solution was that these reinforcements should consist of stainless steel ribs positioned in each of the quarter segments. These reinforcing ribs were then overbonded in glass-fibre and were also used to assist in the removal of the large GRP replicas — each weighing 1¼ tons — from the moulds.

The four quarter segments were then carefully assembled in the Salisbury workshops in a practice run to ensure that each segment would fit exactly into one another when finally in position on-site. The lower level of the cupola which features an ornate entrance pediment on each elevation was also pre-fitted at this stage (illustration 5) prior to delivery.

During this manufacturing process, an antiqued and weathered off-white appearance was achieved for the surface finish to all components of the cupola, thereby faithfully repeating the glazed terra cotta appearance of the original. In this way, restoration in Alclad GRP has been accurately undertaken without any aesthetic compromise.



SITE INSTALLATION

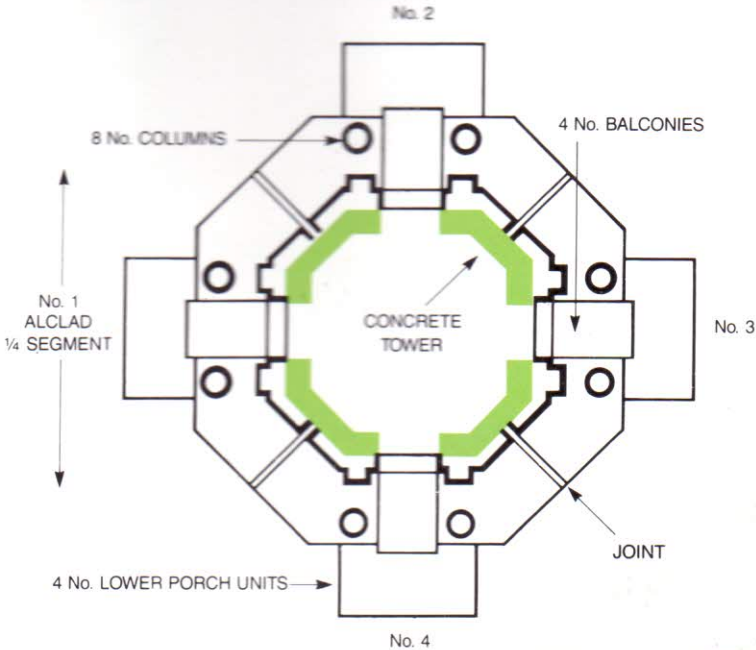
Each of the four main quarter segments was then carefully crane-lifted onto a flat-bed lorry for transportation from Alan Butcher's workshops to Wigmore Street which runs parallel to Oxford Street in the ever-busy commercial centre of London. It is believed that at this time these were the largest single pieces of glass-reinforced-plastic of their type to be transported by road in Britain — although Alan Butcher subsequently surpassed even this with massive new GRP facades for the Birmingham Hippodrome.

Arrival on-site for the GRP segments was timed for dawn on a weekend morning to allow each unit to be painstakingly hoisted by crane from the roadside up to its required position around a reinforced concrete tower on the roof of the refurbished building (illustration No. 7). Due to the lightweight qualities of Alclad GRP hoisting of each segment took only a few minutes with Alan Butcher's site installation team manhandling the GRP pieces into exact position. There they were installed by means of integral stainless steel fixings in the rear of each cupola section which passed through

apertures in the reinforced concrete tower and secured from the inside.

The vertical joints to each segment were designed to be self-draining and were further protected by a cover plate — which also simulated the finish of terra cotta. Also requiring special attention during manufacture and installation was the cupola's roof with its elaborate wrought iron balustrading. Manufactured in one piece, the roof was hoisted and placed on top of the concrete tower and secured down into a stainless steel ring beam from the inside.

To avoid the possibility of the lower section of the cupola being damaged during the hoisting and fixing operation, these were fitted last in order.



COST SAVINGS

Due to the severe structural and physical problems that would have been encountered in attempting to reproduce the entire cupola in terra cotta, Alclad was primarily specified by the project architects due to its lightweight characteristics — in GRP the new cupola weighs only 5 tons.

However, material cost comparisons were also carried out and simulation with Alclad GRP showed a saving of 220% against terra cotta or 70% against other more conventional methods of construction. In addition speed of erection with the pre-fabricated GRP sections enabled site work to be completed within four weeks, producing additional cost benefits to the overall site programme. Further important criteria in the specification of Alclad GRP was the material's durability, weather-resistance and low maintenance characteristics.

Alan Butcher Associates estimate that 40% of the entire cost was involved in the initial survey, production of working drawings, together with the manufacture of the moulds. The remaining 60% of the contract sum can be attributed to covering the costs of actual manufacture, transportation and installation.



Client: London and Leeds Estates Limited
Architects: The Halpern Partnership
Quantity Surveyors: Cyril Sweet and Partners
Main Contractors: Trollope and Colls Limited



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