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Precast concrete cladding

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# Precast concrete cladding

Neither monolithic (poured) nor masonry-like, this material poses problems in its aesthetic handling. Surface staining remains an outstanding technical problem. *Boyd Auger* seeks a characteristic image.

An immense amount of information is now readily available to the architect on the technical aspects of designing precast concrete cladding. Structure stability, joints, insulation, moulding, curing, transporting, lifting, and placing, are all subjects which have been widely researched and for which specialists abound. Much effort has also been given to developing surface finishes for pre-casting and although many new developments are likely in this field, the time is generally past when an architect can expect to "invent" a new finish by specifying a treatment or choosing an original mould lining. Today practically every variation has been tried and catalogued and so most architects accept advice either from a research association or their contractor to produce the finish required.

## Component design

Armed with advice as to dimensions, weight and structural needs the architect is free to design his own component within the usual constraints supplied by the client's budget and the logic of the medium, which in this case is the moulded form. Moulding is of course a very flexible medium for visual form giving, and this fact has been widely exploited in the search for originality in design. Although there is great scope for original design in this field the flexibility of the medium is in itself a danger which must be guarded against by understanding the aesthetic implications of the forms produced.

There are many ways of building with precast concrete but the technical problems involved result in the majority of examples exhibiting two characteristics. The finished surface of the components resemble stone and the joints between the components are clearly visible.

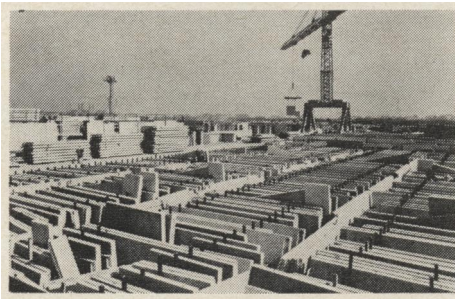
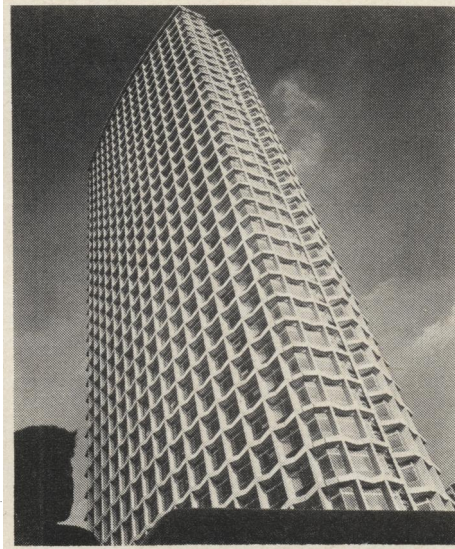
Thus to the sensitive layman a precast concrete facade most commonly appears as an assemblage of units which have been cut from the solid. Also, except where very thin precast units are used, such a facade will appear to be load bearing. This, of course, is the logical aesthetic image for cut stone which the precast units resemble.

## Scale

This has a particular implication for the scale of the units. There is usually no point in casting small units for small scale buildings. A storey height unit six metres long may be a logical casting size for a small building but if such a panel is moulded to appear as a single carved piece the result may be cyclopean and upset the scale. The error of course is not in using too large a unit but in failing to model the surface to the correct scale. The new Institute of Hydrology building at Wallingford is a fine example of large units sensitively moulded to the correct scale.

## Texture

For simplicity many precast components are flat panels or have large flat areas and these are often treated to produce a textured surface. The texture may improve the surface and prevent weather staining from marring



Top Centre Point; architects R Seifret & Partners. A building surrounded by controversy which is irrelevant to its architecture, the bold quality of which has an immediate appeal particularly to the layman. The tower is a real tower the surface of which is strongly modeled by the large precast units. The building has crudely detailed and fussy glazing which would now be unnecessary because air conditioning would be used. Centre Point is an unfortunate product of its time and despite its planning defects deserved a better fate than that of symbolising rabid speculation  
Below Cubitts Thamesmead factory

the appearance of the panel.

The smallest scale of texture used is that obtained by exposing the concrete aggregate by tooling or chemical means. As a surface finish this treatment is limited as corners are very difficult to treat and can appear very rough and ragged. Specialists always advise leaving a border around each surface of unexposed aggregate. This framing effect, the reverse of the classical rusticated quoins, has a rather artificial appearance which can be exploited by the designer.

Stronger textures can be produced by the use of mould liners. Various rubber mats, plastic sheets or one-off expanded polystyrene patterns can be fixed in the moulds, and the concrete poured over them to reproduce a mirror image of the texture on the surface of the component. Such a finish is usually applied to flat panels or to panels with a simple curvature in one dimension. It may be used to disguise all or some of the joints so changing the overall effect of the construc-

tions appearance as well as providing a texture.

A major texture can be produced by forming ribs or bands in the mould which will strongly pattern the surface of the panel. This may completely hide the joints as well as providing bold shadow effects. It is also a means for controlling weather staining.

## Weather staining

Weather staining takes two forms, surface staining and pattern staining. Surface staining is a problem particular to concrete. With cut stone the variations of surface absorption relate to the stratification of the original stone and the tooling. The absorption of water and the resulting staining from dust, soot, and efflorescence combined will thus be related to the stone texture and if not excessive will do little harm to the appearance of the building. Concrete, however, has no such natural texture thus the surface porosity varies irregularly, and likewise the staining. The addition of a texture to the surface will break up the flat surfaces upon which such irregularities are visible and provide an overall small scale pattern staining effect which will hide the surface staining. In general very smooth concrete surfaces, produced with polished mould surfaces, should be avoided as these are inclined to craze.

The problems of pattern staining are common to both stone and precast concrete and ways of mitigating the effects were discovered long ago. The very simple forms and details used in modern architecture prevented the use of these traditional solutions and the all-glass era made them unnecessary. Now, however, that glass is being used more sparingly, we have again discovered the need to deal with pattern staining. Fortunately the more strongly moulded forms now favoured provide scope for the details required. Ribs and slots hide channels for draining intermediate surfaces such as cills and window heads and deeply set windows provide a more limited and controllable run-off which will not so readily wash dust from cills over absorbent wall surfaces. The techniques for combating pattern staining are simple if the architectural form permits their use.

## Characteristic image

The most common image obtained with a precast concrete facade is that of cut blocks of stone. The image has therefore a traditional origin but as the concrete can be reinforced it is possible to obtain skeletal effects which are impossible with stone. Such effects can be very successful because the intelligent layman appreciates structural virtuosity as a sign of progress. No similar value is placed upon irrational scale effects and these should usually be avoided. Exposed aggregate finishes emphasise the cast nature of a precast component, although leaving edges unexposed gives an artificial effect.

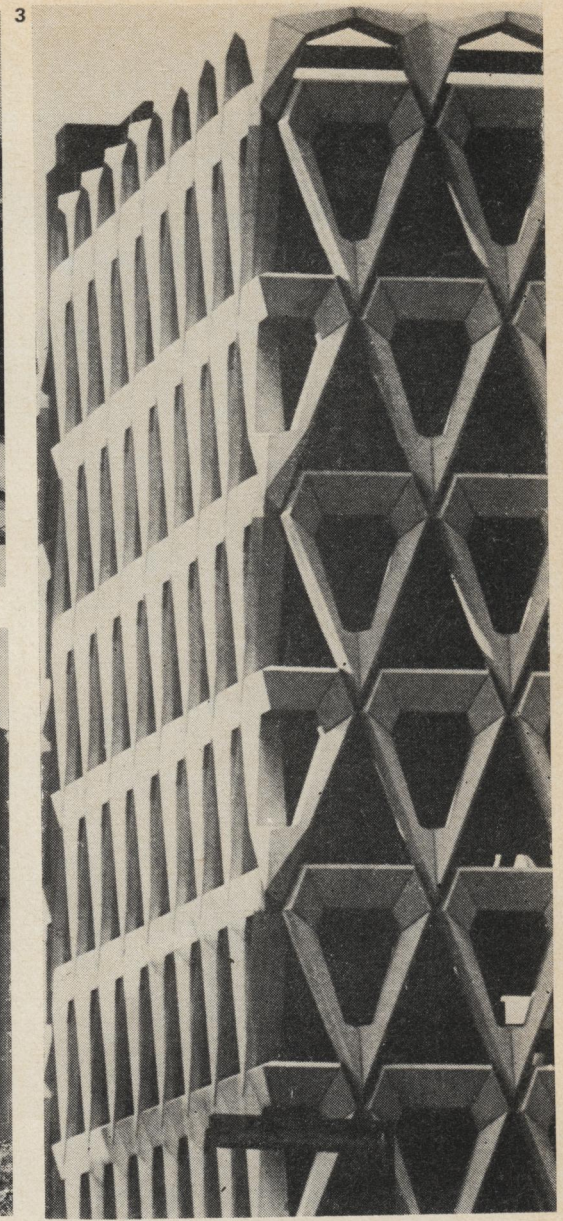
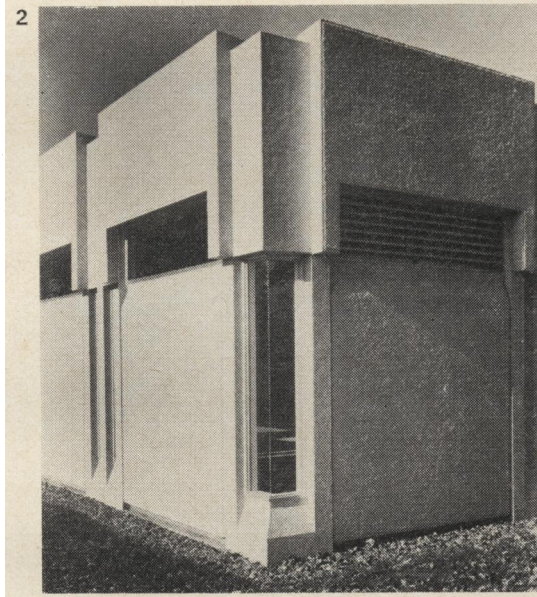
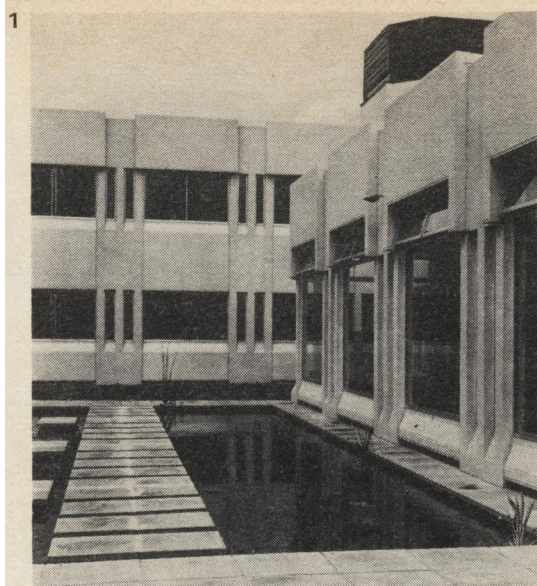
Precast concrete is one of the most expressive mediums available to the architect. Successful use is dependent upon many technical factors but as the illustrations show the basic design rules are unchanged.

## Scale

**1, 2** Wallingford, Institute of Hydrology; architects: Design Partnership. An example of detailing scaled exactly to the size of the building—careful edge details, beautifully cast, in no way overpower the one- and two-storey structure

**3** Car park for Debenhams by Michael Blampied & Partners. Inappropriate scale of unit for a building which is fairly tall and has a small plan area. It is almost impossible for the human to measure himself against the module. A similar structure on a bigger building with a lot of space around could be very fine

**4** Printing Works for Riddington & Co Ltd, Leicester; architects: O Singer and G Ripley. Precast double-T units produce a prominently vertical ribbed effect on the exterior of the windowless machine room. If the photographer had not placed a figure against the wall the size of the building would have been very difficult to gauge



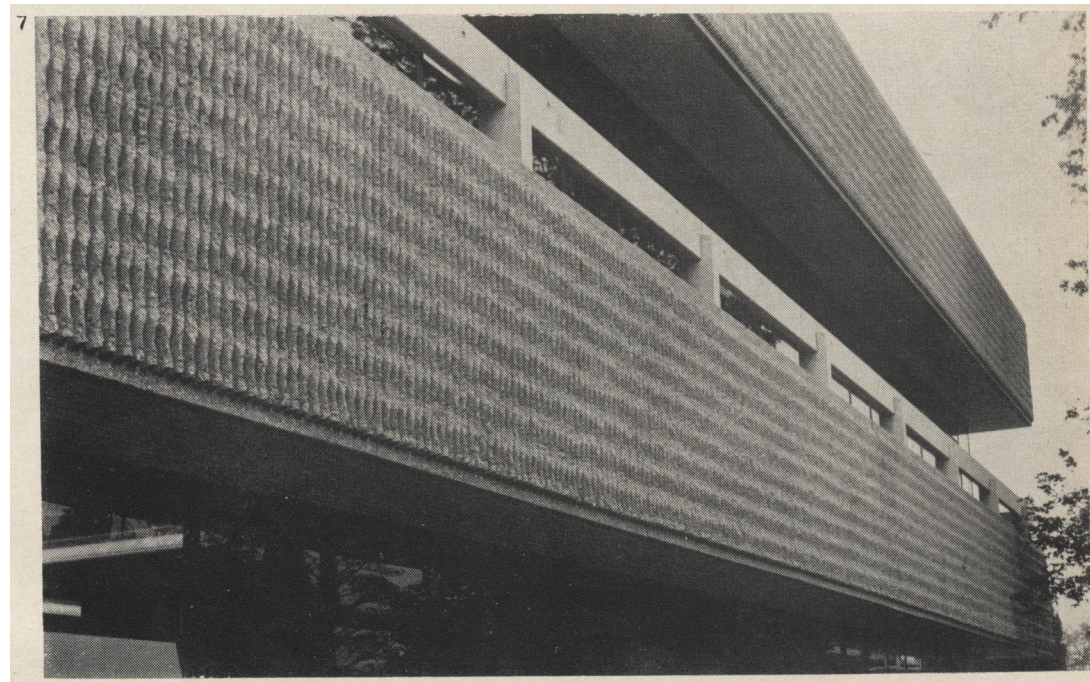
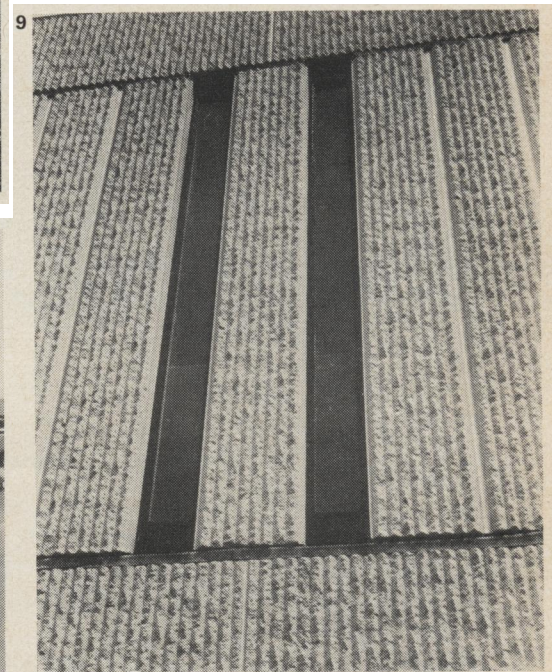
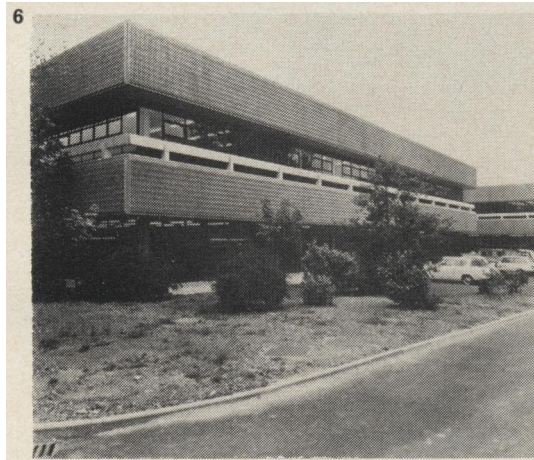
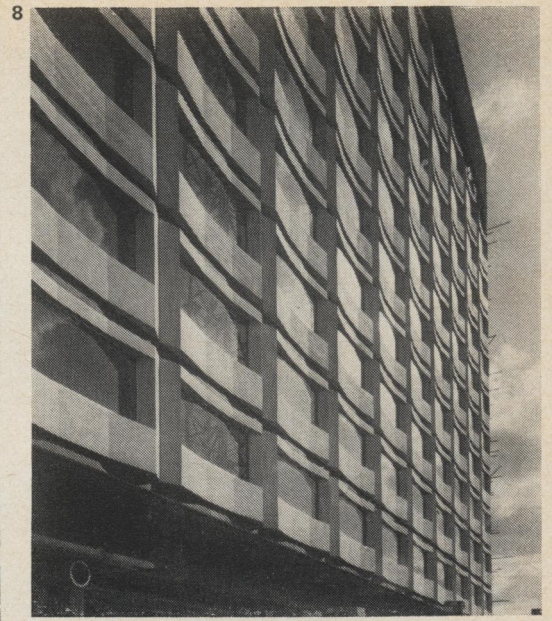
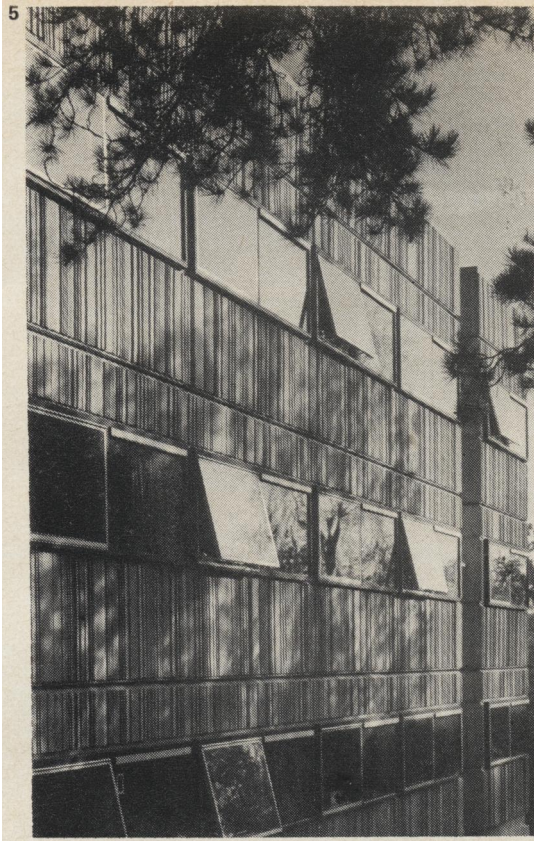
## Texture

**5** University of Southampton, Glen Eyre Halls of residence; architects: Sir Basil Spence, Bonnington & Collins. The strong vertical ribbed texture successfully conceals vertical joints as well as dealing with possible weathering problems. The essentially panelled form of the building takes on a homogenous appearance

**6, 7** Beecham Laboratories, Dorking; architects: Sir William Holford & Partners. Another example of a carefully textured slab cladding almost completely disguising the vertical joints to produce an essentially horizontal aesthetic

**8** Post House Hotel, London Airport; architects department Trust Houses Forte Ltd. A very fine finish to precast concrete panels, the quality in fact makes them look like something else. The fixed windows suggesting full air conditioning give the building a very crisp appearance

**9** Hampton Loade Treatment Works, Shropshire, designed under the direction of R H Taylor, Chief Engineer to the South Staffordshire Waterworks Co. with architects Harry Bloomer & Son. Bush hammering on a strongly ribbed surface overcomes the necessity to design a framed edge which is often required by this finish



## Material

10 Office Building for Penguin Books; Arup Associates. An elegant single-storey office block of the type originated in the States by SOM among others. The use of concrete in situ and precast, rather than steel frame, is unusual; perhaps the rather heavy "egg crate" structure and fascia is slightly oppressive

11 Cladding for housing at Thamesmead. A panel is being washed down with a high-pressure hose to remove the retarded surface and expose the aggregate finish

12 Liverpool University, Mathematics Building; architects: Bryan & Norman Westwood & Partners. An interesting spandrel panel between block concrete mullions at 5ft centres. The panels are reinforced and form the edge beam for the floors. The crisp geometrical surface is in fact against a polystyrene mould and like the Post House uses a white cement on the surface

13 A precast detail which is directly responsible for a serious pattern staining. Water falling on the sloping handrail drains to the bottom corner and drips on to the fascia below

14 Construction joint provides a stop from which water blown across the surface drains on to the panel below, resulting in pattern staining with efflorescence

