Environmental Review

Building for the Millennium

Penoyre and Prasad's robust and finely detailed Eastbrookend Visitor Centre presents an exemplary working model for ecologically sustainable development

Photonics Centre/Adlershof, Berlin
Architect/ Sauerbruch and Hutton
Review by Lindsay Johnston
Photography by Bitter & Brecht

● **Eastbrookend Visitor Centre is a project funded by the UK National Lottery** and is one of the first buildings to be completed with a grant from the Millennium Commission. The building is located in the tough run-down suburb of Dagenham, on the eastern fringes of London. An 80 hectare site of former gravel pits, previously excavated to build Dagenham's huge Becontree housing estate, has been rehabilitated with heathland, hillocks, urban woodland and fishing ponds, and is now called Eastbrookend Country Park and Chase Nature Reserve.

The project was awarded through a limited competition to architects Penoyre and Prasad, who set out to design a simple and robust building that would demonstrate, using their own words, "how to make a building which uses as little energy as possible in construction and use; which causes the least possible disturbance to the environment; and which will be easy to maintain." This and the fulfillment of the requirements from the local council for "an eye-catching, welcoming building" constituted the main aspects of their brief. The building incorporates two large exhibition spaces on the ground floor and, on the upper floor, offices for the country park's six rangers, along with facilities for visitors and staff.

The architects' intention has been to use the building as part of the learning experience for school groups and other visitors to the park, by demonstrating principles of ESD (ecologically sustainable development) in their design and materials specification and, in some cases, by exposing the construction to view with explanatory text. Within the building, diagrams explaining the construction have been mounted as a permanent exhibition. The building plan is oriented to the south to obtain good solar access in winter, with large eave overhangs to eliminate unwanted summer sun.

The section and roof profile are designed as part of an integral ventilation 'diagram' to allow various permutations of natural cross ventilation, and the 'cocky' portion of steep 45 degree roof is to accommodate photovoltaic solar collectors which, alas, have not been fitted in the original phase of the works. A wind turbine has, however, been used to produce electricity. Materials selection has been strongly influenced by issues of embodied energy (energy consumed in their production) and by their health aspects.

Interestingly, considerable attention has been given to the decommisioning and recycling of the building at the end of its use. The result is a striking robust articulation of forms with fine detailing (not surprising as Penoyre and Prasad are former employees of Edward Callanan), and an interior enriched by expression of structure and a diverse play of natural light. It is good to see that fresh and vibrant modern architecture at this modest scale still exists in England when freed from the historicist and contextual constrictions that abound.

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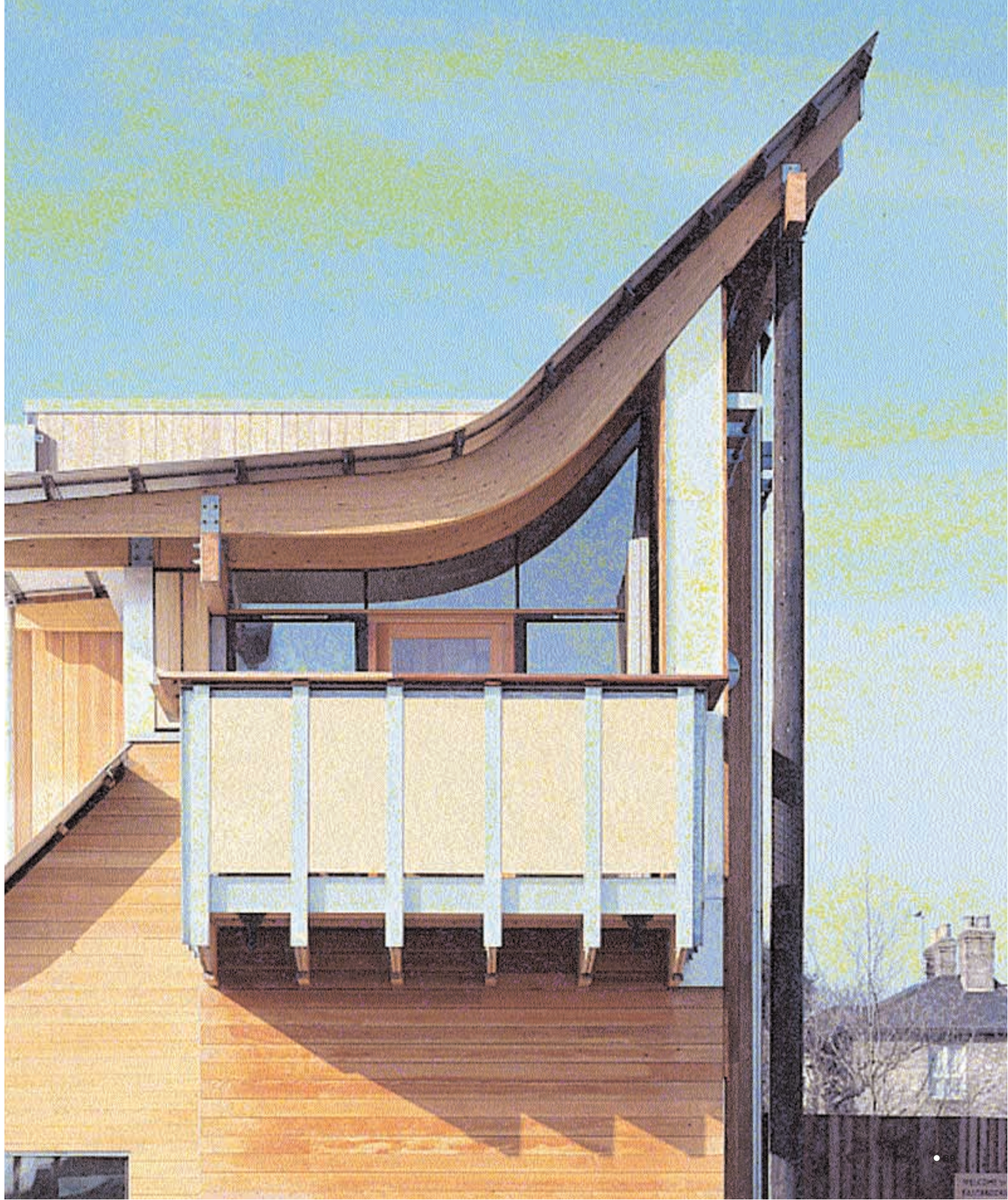
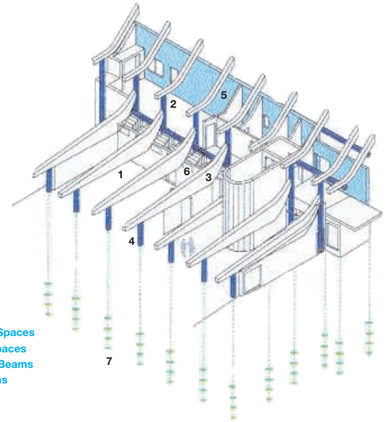
below The building in its rural setting.
facing page Exterior view with sloping roof.





1 South-facing Exhibition Spaces
2 Offices above Service Spaces
3 Laminated Timber Roof Beams
4 Recyclable Steel Columns
5 Masonite Stud Wall
6 Cross-ventilation Ducts
7 Steel Srew-in Foundations

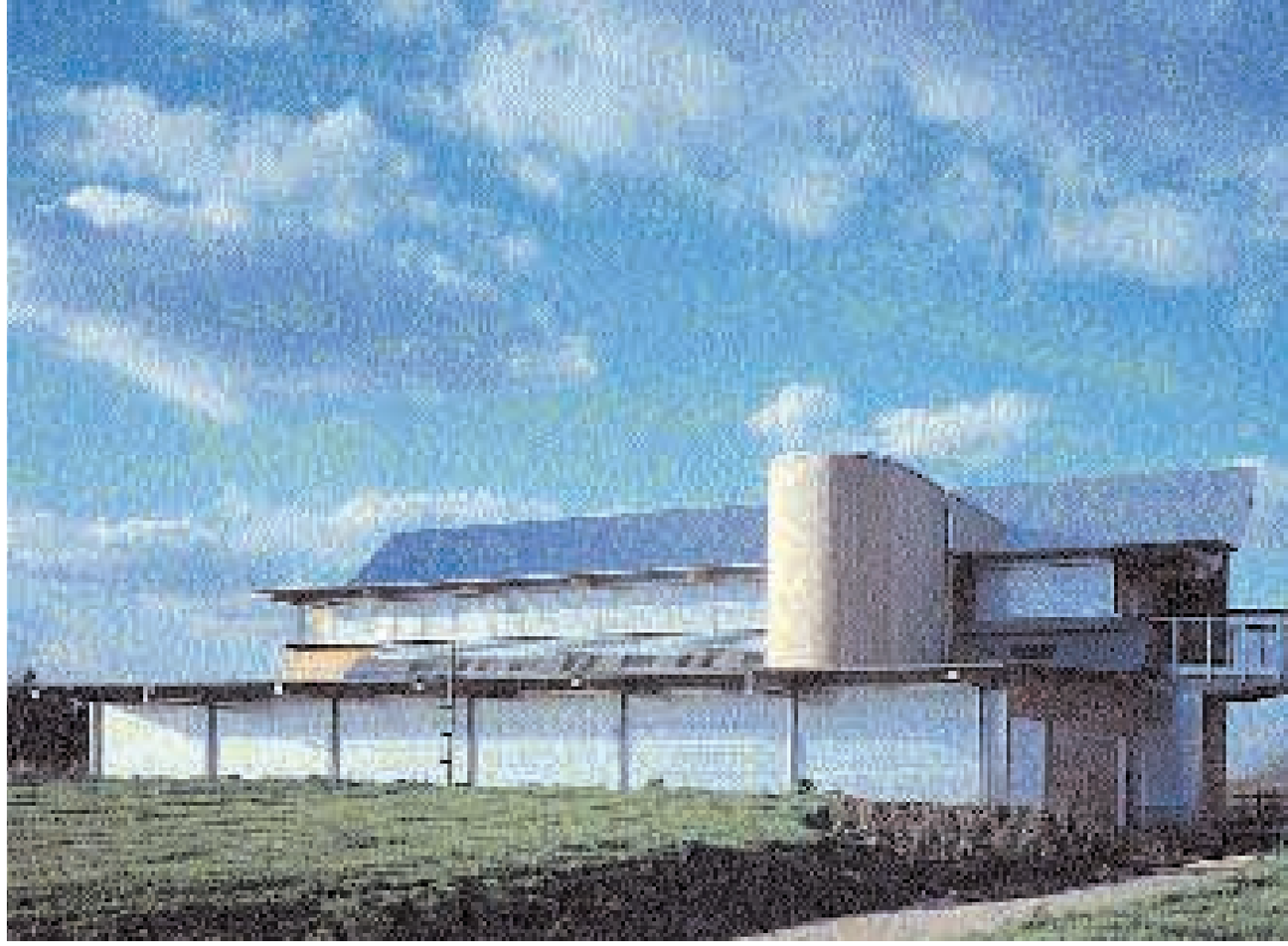
left View of corridor with air circulatory ducts.
below left to right The rear of the building; and the ranger's office.
facing page View of the front façade with shutters down.

Screw-in foundations
Apparently a first in the UK, the building is founded on steel screw-in piles similar to those used in Australia for timber frame domestic construction. The piles are at 3.6m centres to a depth of 11m and have in-situ concrete pile caps and pre-cast concrete ground beams supporting the walls. All can be readily removed at the end of use when the building is being 'deconstructed'. This construction also avoided deep excavation into a site that was suspected of having contaminated fill.

Dry ground floor construction
The solid ground floor provides necessary thermal mass as a necessary heat sink to retain solar gain in winter. To minimise in-situ concrete (which cannot easily be removed at end of use) and high associated embodied energy, the main ground floor is constructed of pre-cast paving slabs on compacted sand and gravel mix with an integral dpc and 50mm foamed glass insulation. Another reason cited for minimising concrete use was the health risks said to be associated with manufacturing cement.

Natural ventilation
An open and close slot above the skylights to the lower level allows control of natural ventilation through the exhibition areas and a ceiling plenum over the ground floor amenities area. This can be fan assisted or utilise a natural stack effect on hot summer days.

Sustainable timber
The main roof structure is of curved laminated timber beams using fast growing plantation softwood. External wall structural studs are 250mm timber 'I' sections, similar to Australian 'Hybeam', except using 'Masonite' webs. External cladding is Douglas Fir from sustainable sources in the US. Interior fittings are of planed timber and plywood.



Breathing external walls
The external wood cladding has a backing of expanded metal lathe (to discourage intruders with a chainsaw), an air cavity and 15mm bitumen impregnated fibreboard. External wall insulation is 240mm cellulose fibre insulation made from recycled surplus newsprint blown in between the studs. Otherwise there is no vapour barrier or building paper, allowing the walls to breathe and avoiding trapping stale air inside the building. Calculated U-value is 0.15 (R 6.5).

Recyclable steel and aluminium
Steel structural columns and an aluminium roofing sheet are justified, notwithstanding relatively high embodied energy ratings, on the basis that they are recyclable at the end of use of the building.

Sun and wind energy
Passive solar heat gain has been controlled to provide warmth in winter and avoid unwanted heat gain in summer. A disappointment is the failure to install photovoltaic panels on the steep roof as intended. The wind turbine may, one suspects, be more symbolic than functional, but will produce some positive contribution to the energy audit. No energy consumption or greenhouse gas emission figures are available as yet.

Project Summary Eastbrookend Visitor Centre, Dagenham, England **Architects** Penoyre and Prasad **Project Architect** Robert Wills **Client** London Borough of Barking and Dagenham **Location** Eastbrookend Country Park and Chase Nature Reserve **Construction Budget** Stg 650,000 (A$ 1.73 million) **Area** 404 sq.m **Date Completed** December 1997 **Builder** R.G. Carter Builders **Structural Engineers** Buro Happold **Services Engineers** Max Fordham Associates **Quantity Surveyor** Peter Gittins and Associates