

4. Precedent Studies

4.1 Linked Environments

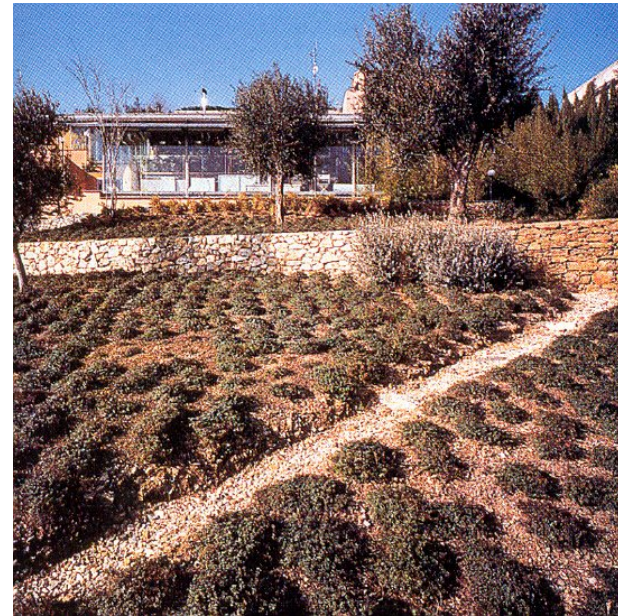
-Renzo Piano's Building Workshop offices & UNESCO Laboratory
-Vesima, Italy
-Renzo Piano, 1991

Renzo Piano's workshop building sits on the slopes of the Gulf of Genoa, Italy and serves as the home for the Renzo Piano Building Workshop and UNESCO Research Laboratories (Betsky, 2002, p55).

The main structure of the building is a series of square steel sections that are secured to concrete retaining walls, along which a steel sub-frame runs between the retaining walls and supports the timber floor. The timber floor is reflected by the laminated timber rafters and beams that hold the glass roof panes (Buchanan, 1995, p76). Above these, a system of mechanical louvres and solar cells respond by opening or closing depending on the level of light outside (Piano, www.rpwf.org/frame_workshop.htm).

The building cuts into the slope on which it sits and lies parallel to it (Betsky, 2002, p55). It is tied to the land with a strong fusion between the interior and exterior environments that is formed by the series of terraces that remain uninterrupted from the exterior of the building through the interior. On plan, the building is staggered, forming social spaces on the terraces. Along with the timber structure, interior planting and glass walls, the interior-exterior boundary becomes very blurred.

This indoor-outdoor fusion also occurs perpendicular to the terraces, with outdoor spaces in the form of balconies



4.1 During the day, the building disappears into the slope, while at night it seems to step away from the slope, completely exposing the interior as its own environment.

punching through the roof, providing vistas down the slopes to the coastline. The glazed walls and roof, along with the open plan provide complete permeability, creating an awareness of the land on which the building sits and also the distant surrounding environment.

The interior terracing provides a sequence of spaces that create an awareness of the building itself (Piano, www.rpwf.org/frame_workshop.htm). The sequence of spaces may or may not create a hierarchy of uses, but the potential of doing so exists. The terracing of the land is an ancient agricultural practice of the region (Betsky, 2002,

p55); implementation of these terraces therefore not only provides a strong physical link to the land but a less obvious cultural recognition emerges.

The transparency of the building contributes to the awareness of the surrounding environment in reverse by allowing the light reflections from the water in the gulf below to scatter within the building.

The retaining walls make a more physical response to the environment by being built in the same rough stone and finished with plaster and a pale pink paint reflective of the surrounding buildings (Buchanan, 1995, p76).

4.2 The natural materials and invisible roof and walls create a refreshing, open environment.



4.3 The edges between indoors, outdoors, floor levels and vegetation become unidentifiable, the natural environment seems to move through the built environment.



4.2 Cultural Identity

-Africa Centre for Health and Population Studies
-Somkhele, Kwazulu-Natal, South Africa
-East Coast Architects, 2002

The Africa Centre, designed by East Coast Architects is a research centre established by the Medical Research Council, University of Natal and the University of Durban, Westville. The centre is involved with office and field based research in health and population problems with its area of study being its immediate surroundings of the district of Umkhanyakude.

The building is made up of two clusters of buildings separated by a 15m water tower. The main building is made up of four research laboratories that enclose a courtyard used for social interaction. The rest of the centre consists of workshops, stores and security accommodation (Digest, 2003, p62).

A number of low-tech sustainable design solutions have been incorporated into the centre, it is through these that the

building begins to reflect a regional identity.

The building structure is an exposed concrete frame with concrete block-work in-fill panels that are finished with decorative plaster work, murals and ceramic mosaics done by members of the surrounding community. The water tower is supported by trunks from the abundant Eucalyptus trees in the region. They also form the main roof structure while the saplings are used for shading devices.

Passive thermal controls have been extensively incorporated into the building. It is naturally cooled through 'stack effect' via the water tower, while internal courtyards provide the entire building with natural lighting and air changes. Temperatures are kept down further by minimising solar heat gain with deep overhangs on the north of the building and shading devices on the east and west facades.

Low-volume flush toilets and low-volume water showers are used to conserve water, along with the 'grey' water being used to irrigate the gardens. Sewage is treated on site and



4.4 North & west elevation

the purified water is used for the community vegetable garden while rainwater is collected and stored in tanks.

Indigenous plants within the building footprint were relocated off site while a small indigenous nursery provides plants for the site. Medicinal plants are also incorporated into the landscape to emphasise traditional healing methods (ibid).

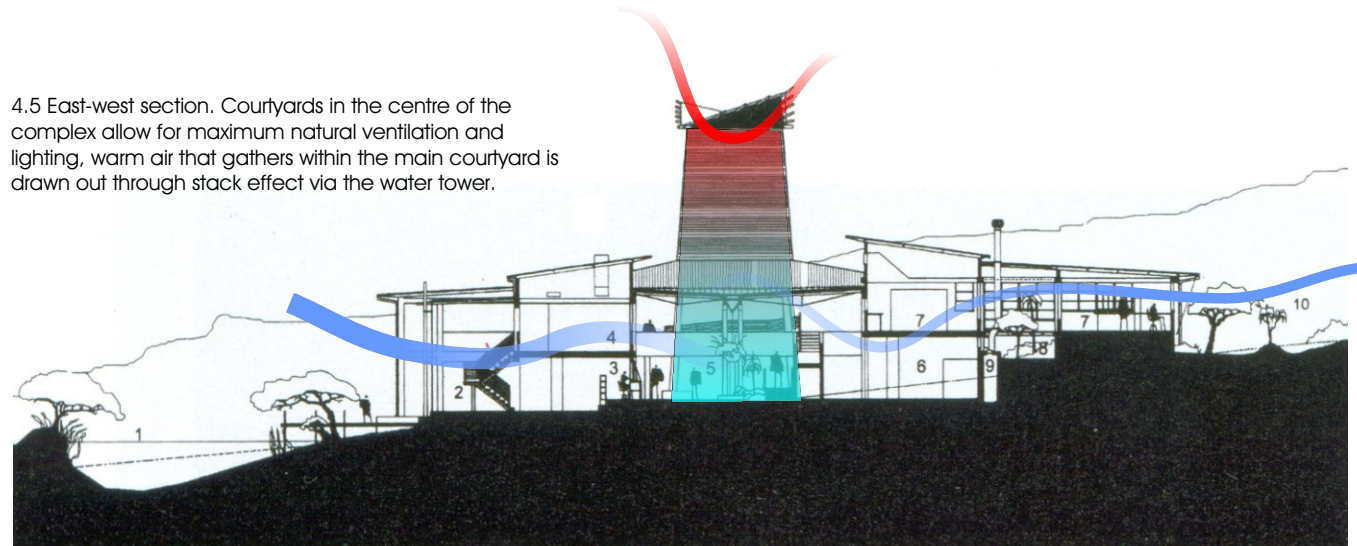
By implementing these low-tech methods of thermal control and water conservation, they become obvious and possible solutions for the community to use and adapt into their own homes and work places. The centre not only serves the community on a functional and educational level, but provides a sense of ownership, this was achieved by using the community for all of the unskilled labour force and 75% of the skilled staff, while further members of the community were involved in the landscaping, arts and crafts for displays, sun screens, furniture, gates, furniture manufacture and mosaic work (ibid).



4.6 Corner detail. Natural materials used give the building a unique regional quality.

By involving the community on such a large scale, the building starts to develop a regional character of its own, especially with the paint and mosaic work. The use of natural/local materials and colour schemes that reflect the surrounding environment contribute to this character, as well as creating a building that the community can relate to and be proud of.

4.5 East-west section. Courtyards in the centre of the complex allow for maximum natural ventilation and lighting, warm air that gathers within the main courtyard is drawn out through stack effect via the water tower.



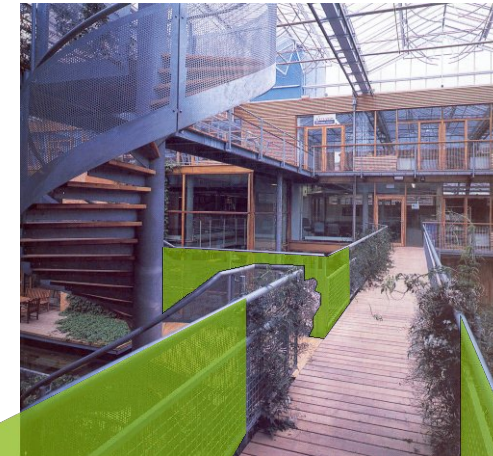
4.3 Inclusive Function

- The Institute for Forestry and Nature Research
- Wageningen, Netherlands
- Stefan Behnisch, 1998

The Institute For Forestry and Nature Research building is located in Wageningen, Netherlands, finished in 1998 by Stefan Behnisch of Behnisch, Behnisch and Partners. The concept was to create a building that could be environmentally conscious without spending any additional money in doing so. The building was also to represent the ecological concerns of the Institute.

The building is E shaped with the fingers housing the library, cafeteria, conference suite and offices while the spine houses the laboratories. Located between the fingers are the two glazed gardens (Metz, 2000, p96). The most important factor with these gardens is how they function within the Institute. The gardens have a multiple layering of uses, they obviously serve the tenants with social and recreation spaces, but are designed as an extension of the workplace and are used for meetings, briefings etc. The gardens are also home to many of the ecological experiments that the Institute undertake. The plants act as climatic buffers by humidifying hot air, cooling it, while in winter they act as solar collectors.

Other sustainable initiatives include rainwater harvesting and 'grey' water recycling for the ponds in the gardens, irrigation and reuse in the toilets. The gardens are enclosed with glazing and blinds are pulled shut at night to prevent re-radiation of solar gain, in summer if the temperatures become too high, the blinds will close and roof vents are opened to create 'stack' ventilation. The extensive glazing



4.7 Internal vegetation. Plants growing on the building continually change the image of the building. These plants are used for research within the institute.



4.9 Internal garden. The building within a building concept creates a giant air-gap between the interior and exterior that provides maximum temperature control. This allows for the use of large expanses of glass that seems to draw the external environment indoors.

provides large amounts of natural lighting reducing the need for electric lighting, while temperatures are kept comfortable with the double glazing and timber frames.

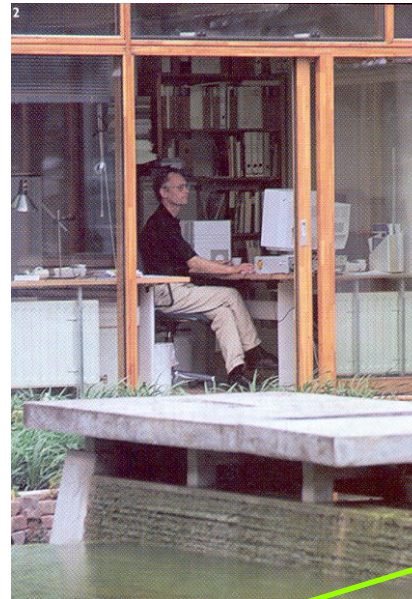
The focus on the design was to reduce the embodied energy of the building, for this reason large amounts of timber were used because of its regenerable quality, but small sections were specified, thus using pieces that would normally have been thrown away. Sun screens and glass components are off-the-shelf greenhouse components used in a unique way.

The offices have doors and windows opening directly onto the gardens encouraging manual thermal control and providing comfortable work environments (Blundell-Jones, 2001, p29).

4.9 Internal courtyards. Office activities are encouraged to overflow to the exterior so movement paths become active spaces.



4.10 Office spaces. Large openings give tenants complete thermal control while allowing for interaction with the outdoors.



4.11 Internal-external connection. Vegetation is encouraged to grow over and through the building, giving a relatively simple building form a composition of ever changing forms.

