

# ARCHITECTURE

Vinod Gupta's Energy Conserving Constructions

## When asked to

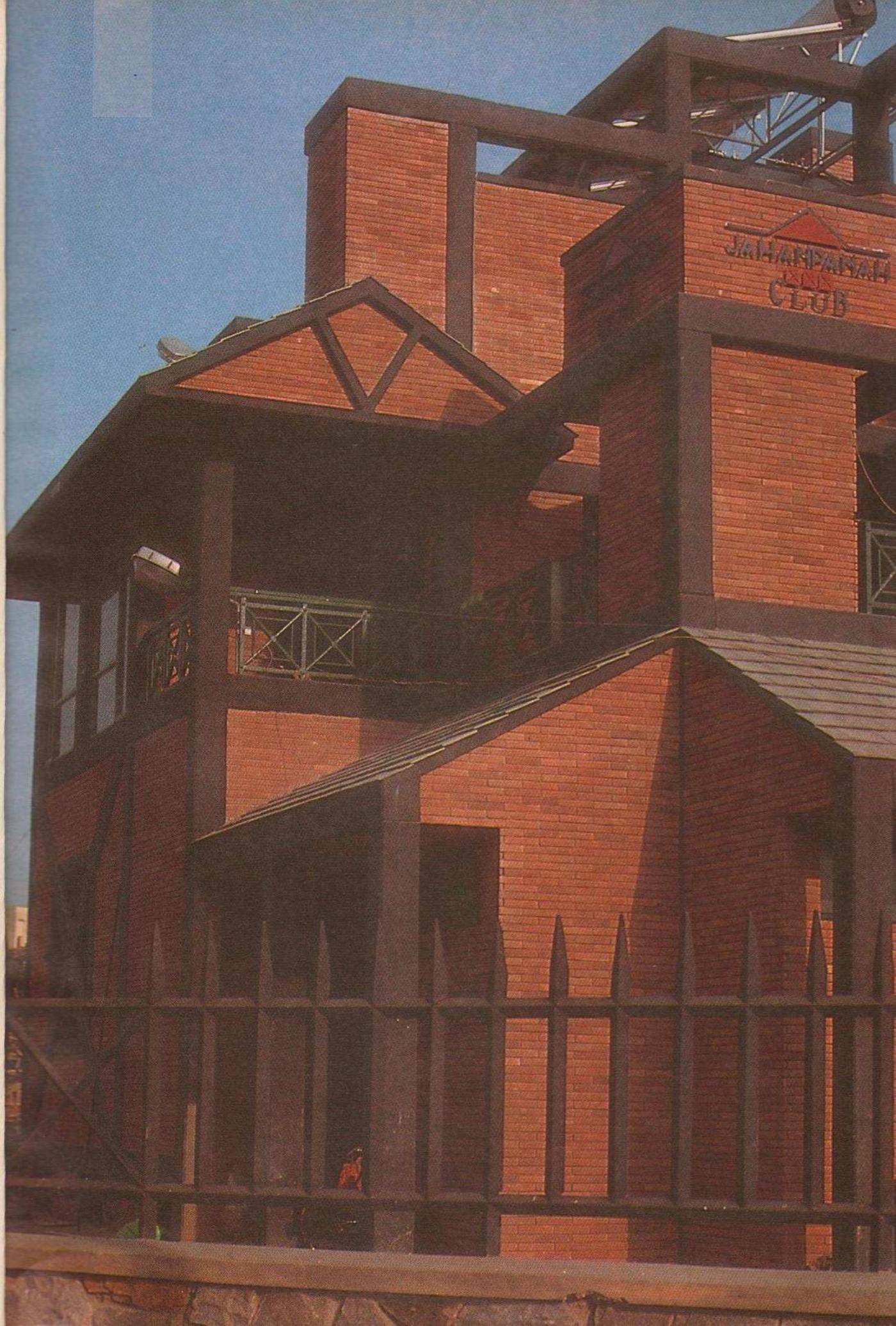
create space for piranhas and crocodiles in a modern-day office, architect Vinod Gupta was taken aback. Not one to refuse a challenge, he soon found a way to accommodate them in the building he is designing for KLG, a software company, at Gurgaon. "Each client has his whims and fancies and we have to cater to them. But most of the time it is the architect who guides and advises, so if there is a fault in designing, the final blame lies with us," he says. A very refreshing point of view. Most architects would ascribe all faults in design to clients' unreasonable demands.

Vinod was very clear about what he wanted to do after graduating from the School of Planning and Architecture (SPA), Delhi, in '69. He wanted to do some good for society as a whole. He went to work on prefabricated housing in Europe with an architectural firm called TVP Plan and then returned to teach at SPA for 16 years. "I was involved with various social groups working for rural development. The movement was slow and it was terribly frustrating," he reminisces. So he got into designing buildings which conserved energy. Not satisfied with that, he went in for a doctorate at the Indian Institute of Technology, Delhi. Meanwhile, he dabbled in several experimental buildings and developed a passion for problems such as contamination of rivers and piling up of garbage.

He does not even remember his first project — he has done many since then. In '82 he set up Space Design Associates with partner Rasik Bahl. Since both prefer to work on individual projects, Vinod has concentrated on office buildings and interiors, hostels,

*Facing page:* The recently completed Jahanpanah Club in New Delhi is a brick structure framed in wood, reminiscent of the cottages found in the hills, which inspired Vinod's architecture.

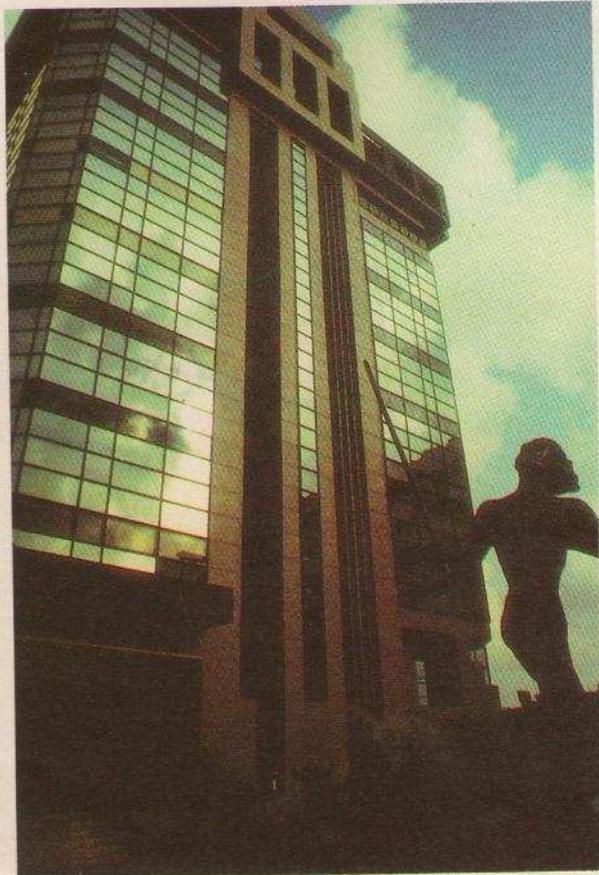
Text by Ruby Dash



JAHANPANAHI  
CLUB



Photographs by Vinod Gupta



shops, housing complexes and experimental buildings. He prefers to stay away from private homes. "House owners have a lot of free time on their hands, so they tend to change their minds a lot," he says. He derives satisfaction from his office projects because the clients trust him and accept his suggestions with an open mind, he adds.

Vinod's design philosophy is very clear. "We must reduce energy consumption in construction by using low energy, natural materials such as earth, stone and wood." He seeks to avoid mechanical cooling and heating and tries to reduce the load by using solar passive techniques such as proper orientation of buildings, sunshading of windows and earth shelters. He also recommends the use of solar cookers and water heaters, windmills and biogas plants.

Apart from his much publicised CMC building in Bombay — the first "intelligent" building in the country — he has designed the Jahanpanah Club in Delhi; the American Institute of Indian Studies at Gurgaon; Saga, a department store in Delhi; an office for UBest, a computer software firm in Calcutta; an office for Tata Telecom in Delhi; an extension to the University of Jammu; offices and showrooms for Cottage Industries Exposition in Delhi; National Media Centre, a residential complex, in Gurgaon; Solar Energy Centre in Gurgaon; and, a solar passive hostel for the University of Jodhpur.

His design idea is apparent in the CMC building and the Solar Energy Centre. "The story of how we got the CMC project is interesting. Earlier we had competed for their project in Hyderabad. Despite winning the competition, we didn't get that particular project, but the next one was ours," explains Vinod. The design brief was simple — the clients needed a

**"We must reduce energy consumption in construction by using low energy, natural materials such as earth, stone and wood."**

building of the 21st century with unique features. Comprising 10 floors with a rooftop swimming pool, it is built like a spiral. So there is no clear distinction from one floor to another. "It was our mission to use information technology in architecture. The various automation features integrate the work culture in this office. The multi-storeyed building is centrally airconditioned and was meant to be used by computer professionals."

However, the hi-tech elements of the building do not exhibit themselves in any visually exciting architectural feature. In fact, it is a straightforward curtain wall structure. The highlight of its design is the computerised control and management of its lighting, airconditioning and other functions which result in a saving of approximately 25 per cent in energy costs. A Shubhika Lal bronze sculpture, signifying the spirit of challenge, at the entrance, serves as an introduction to the essence of the CMC building design.

The way Vinod sums it up, it sounds real easy. "The main feature is that since the climate is hot and humid, the building required central airconditioning. We wanted little artificial lighting, which meant that

*Right* : The Solar Passive Hostel in IIT, Delhi uses solar energy to its optimum. The structure was created on an experimental basis by the Centre of Energy Studies. *Facing page, above* : The rooftop swimming pool on the CMC building where the employees cool off. *Facing page, extreme left* : The glass curtain wall on the exterior of the CMC skyscraper reflects the heat helping to keep the building cool. *Facing page, left* : Larger than life fibreglass sculptures by Suruchi Chand, on the ceiling of the CMC building, meant to signify aspiration.





Shashi Sahai

if the interiors are daylit, more heat is let in through the windows. That's how the concept of motorised venetian blinds, which tilt according to the angle of the sun, came about. The computers calculate how much daylight is coming in and cut down on artificial light. With more than 300 windows in eight different directions, the process is highly effective."

The priority at every stage was to save on energy. In the event of a power-cut, it had to be decided which were the functions that needed to be kept working. Which was more essential — computers or the security system? Since CMC is strict about restricted access for people, the security system gained priority. The building is fire-safe as certain doors close down in reaction to smoke and airconditioning systems are sectioned off once the effective sensors are activated. Moreover, in case of a fire, the unitary AHUs (air handling units) will switch off automatically, start the ventilation fans and pressurise the lift lobby immediately.

"Computers also make it possible for the building to respond intelligently to outdoor weather

conditions and thus optimise energy use within," explains Vinod. Computer-controlled motors operate the reflective, mirror-coated venetian blinds of the upper sections of the continuous windows on each floor. By this operation the slats are tilted to appropriate angles depending on the angle of sunlight on different faces of the building. The ceiling, painted white, flat and angled with non-glare reflective panels, disperses diffused light throughout the building.

The principal determinants of the CMC building design were energy conservation by using daylight in most of the office spaces and reduction of floor barriers by breaking down each floor into four different levels, tiered to give a gradual ascent to the building. A central atrium opens up the volume to daylight. Thus the approximately 22m x 25m floorspace is effectively reduced to a 9m wide space around the atrium. This design also enabled the team to create small, 20-25-person work modules arranged around the atrium and connected in the form of a helix with a four to five stair difference in level between adjacent floors. The end result is a building

**The principal determinant of the CMC building design was energy conservation by using daylight inside.**



*Above* : A typical workstation cluster around the meditation area in the centre of the UBest office in Calcutta. The fans were specially designed by Vinod to match the interior decor. *Facing page* : The basement office of KLG in Gurgaon has worktops, cabinets and conference tables, all in one place. It's practical and functional, and hides away all computer hardware.

where floor divisions have more or less disappeared.

The Solar Energy Centre in Gurgaon, built in '91, carries Vinod's energy saving principles further. Located on a 200-acre site, the single-storeyed building designed around the courtyard concept, comprises a guest house and blocks consisting of laboratories, workshops and offices. "The entire structure is daylit and the roof is a curved, thin concrete shell. The structure has high ceilings and high windows with no curtains. Nobody bothers to open the curtains in an office and I believe natural light is best to work in. Our intention was to reflect light in a diffused way throughout," says Vinod. Apart from the buildings, the campus includes a 50 kw solar power plant, a bio-mass plantation and a large outdoor facility for testing solar devices. Unlike the CMC building, there was more freedom here to determine an appropriate form. Therefore the building was conceived as a low, spread-out structure

arranged around courtyards, maximising the use of an evaporative cooling system on the roof. The laboratories, which required airconditioning, were put in one block.

Another building in the same mould is the solar passive hostel at the University of Jodhpur. "This hostel for married students is designed for a hot, dry climate. The design constraints were water scarcity and the strong desert winds," Vinod explains. The structure was put up as part of a research project undertaken by the Centre of Energy Studies, IIT, Delhi. Although energy conservation was the prime objective, the design attempted to test and demonstrate suitable methods of providing comfort in the hot and dry climate of Rajasthan. Due to the dry air, evaporative cooling in summer can prove extremely effective in Jodhpur. The water scarcity, however, renders any water-dependant cooling system inappropriate. The design, therefore, uses a favourable orientation, a massive structure, an air gap in the roof for insulation, reflective external finishes, deep sunshades and a wind tower to take advantage of the cool winds.

The prevailing direction for cool winds in Jodhpur is the south-west. But windows cannot open to the south-west as the afternoon sun at a low angle is very hot. To overcome this a wind tower concept was used.



The tower is in the staircase shaft and serves two purposes. Cool air reaches each room through this tower and normal windows or smaller shafts (towers) on the leeward side distribute the cool air throughout the building. The walls are of local light-coloured stone while large slabs of the same are used for roofing, staircases, partitions and lintels over the windows. Solid timber shutters, in addition to glass, prevent heat loss during the night. Roof insulation is provided by using small inverted terracotta pots over the stone slabs and filling up the intervening spaces with lime concrete.

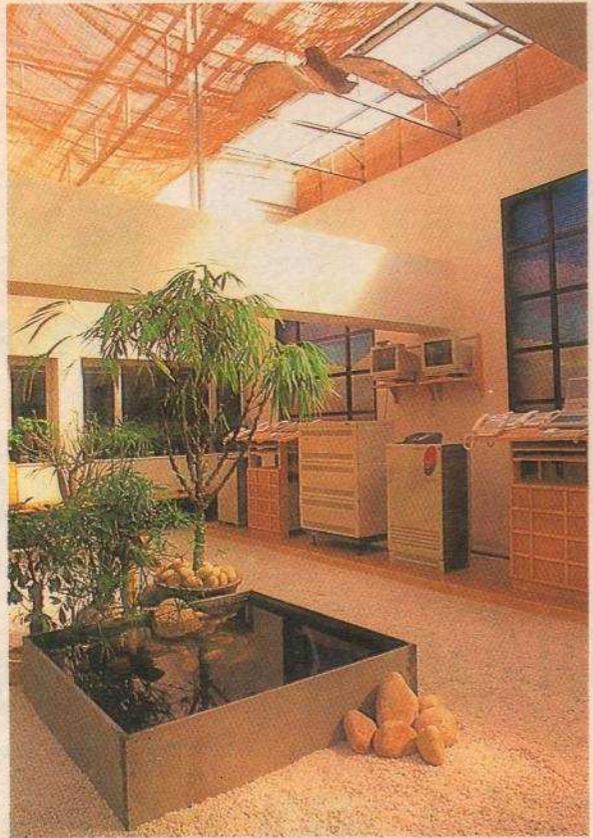
Vinod's favourite is the Jahanpanah Club. According to him an architect develops as he works on various projects and this building is the culmination of his own philosophy. "I remember, as a child, going to hill stations where the wood-framed buildings enthralled me," reminisces Vinod. The slate roofs and the brick infill relate to those buildings and also duplicate the Tudor look. The chimneys on the sides, which enhance the look, are actually for plumbing wastes. "In every building an overall form has been thought of earlier. You don't create out of nothing. Here, too, geometry is part of the architecture and the smoking verandahs accentuate this. I have tried not to use a lot of glass because it can make the building boil from inside," he explains.

He considers himself lucky in having been assigned

*Above*: At the Tata Telecom office in Delhi, Vinod used a startling red to depict the young spirit of its team. The client, though, used to blue and grey shades, took some convincing. *Facing page, right*: The garden showroom in the centre of the Tata Telecom office is visible from all offices in the building. *Facing page, above left*: The National Media Centre in Gurgaon has cul-de-sacs which look like driveways and ensure privacy to the entire row of houses. *Facing page, below left*: The courtyard of the technical blocks in the Solar Energy Centre in Gurgaon uses geometrical structures and a curved roof to create a striking effect even while using traditional methods to design a building which stays cool naturally.

to do the interiors at the club as he gets to control the environment. Usually, since an interior designer is not able to understand the architect's concept, the process ends up as a limiting experience. Why limiting? "If you have designed the building, you can't decide to change the interiors when the structure is complete. Some changes are possible at that stage but you are sometimes stuck with the general layout. On the other hand, if I am doing only the interiors of a place, I have a free hand to break any wall because I am not accountable," he replies.

This is what happened when Vinod was asked to design the interiors of KLG in Gurgaon. Designed by someone else, Vinod was hauled in to rescue the



project when the company ran out of money. He didn't do much for the exteriors except for adding black local slate stone. This is where the piranhas and crocodiles are going to be — crocodiles in a moat outside and piranhas in a glass tank inside. "In case an employee doesn't work, the bosses can throw him to the crocodiles," suggests Vinod. Of course, it could be the other way round. At present the office operates from the basement. The worktops have been designed to provide enough space for all sorts of hardware.

Vinod's design for UBest, a software company in Calcutta, is unconventional, to say the least. A mud wall encloses a resting area right in the middle of the office. Everything flows around the central area which is used by the employees, who work odd hours, to relax during the day. Handloom upholstery, coir matting, individual fans and rubberwood furniture make the decor unique. The black and yellow wall fans over each seat are designed by Vinod himself. "Though fans are out of fashion, we decided to have them as they are needed once the ACs are off."

Referring to the Tata Telecom office in Delhi, Vinod says, "This is one company which loves to work with blue and grey, but I stuck to red which is startling and appropriate for a young and efficient team." In the middle is a showroom designed like a garden, which is visible from all the offices.

One of his toughest projects was the housing

colony for journalists in Gurgaon, the National Media Centre. The colony has 180 houses and each one was custom-made. There were single-, two- and three-bedroom houses, each set within its own plot of land. "The houses are built to stay cool and this works as I have noticed most people are doing without coolers or ACs," says Vinod. The houses are all built around huge parks which also helps to keep the temperatures down.

Another important area of concern is water scarcity as, in this area, the ground water level is constantly dropping. There is a lot of landscaping so that all the rain water which falls on the 23-acre site gets absorbed. This was achieved by reducing the areas covered with solid material such as concrete. The waste recycling system is made practical as each house separates the waste into categories such as recyclable, biodegradable, and so on. The one common theme is that all the houses are designed like cottages but with different facades.

Vinod has been able to instil the need to save energy in his students. Though not a teacher at present, he is still a member of the doctoral committee at SPA. And given a choice he would return to teaching. For, as he says, this is the best way to ensure propagation of his architectural philosophy. And, energy efficient buildings is not just desirable, but necessary in today's context. □