How to avoid “bulldozing” the Mekong Delta, and instead making the plan slip into place?

The project is brought forth through consideration of FLUID DIRECTION, as flows such as human activity and wind, FLUID, are handled skilfully by a continuously curved and innovative form. These flows are a necessity for any environmentally friendly building, and even more liberate architecture from dependence on machines and installations.

The surrounding mangrove forest and river are brought in and give rise to a new campus.

In rainy season, a strong squall pours down for about 1 hour each day.

TARGET1: Quantum change and transferability
How to avoid exploitation developments of the Mekong Delta, and instead create a campus through cultivation?

Agriculture in Southeast Asia is a sustainable model based on traditional practices and knowledge by which exhaustion of nature is avoided. Sensibly listening to the land and the climate, FLUID is handled carefully, autonomy from machines and installations is achieved and the materialization of an essentially sustainable-based campus and building is created. This campus is cultivating students as well as the region itself in issues of sustainability.

PROGRESS
Temperatures are high throughout the year but wind breeze is prevalent and shaded areas are comfortable in Ho Chi Minh City. We proposed a campus that would not rely on complete air conditioning. The project is progressing and made public to the end users, the students and the teaching staff. The configuration of space within the “ring road” begins with the adoption of a “celery” cross-section, that is, a diffuse spatial motif. After many discussions over an extended period of time, the current design has become a single continuous line-like building, a shape that is derived from conceiving the flows of wind and people actively as fluid.

A network of small waterways stretches out around the site. The fluctuation of water level in dry and rainy season is about 1.5m and the site becomes completely submerged during rainy season. The proposal minimizes the reclaimed land by creating a ring road embankment that surrounds the main campus.

TARGET 2: Ethical standards and social equity
Understanding the full contextual information of the site. Invisible Fluids are visualized by computer simulations and feed back into the design process.

With the help of the latest technology, FLUID simulation provides both analysis and feedback. Through advanced design studies, materialization of the project is based on simple and primitive mechanisms.

Cultural background as well as the natural environment differ between the West and Southeast Asia. It has become time for a paradigm shift in sustainable building in Southeast Asia that is characterized by a high-temperature and high-humidity monsoonal climate.

Indication of the direction of sunlight in each season. Using computer modeling, the angles and positions of the shades are carefully examined for each place, so that direct rays will not penetrate.

Park scene in Ho Chi Minh City. The Alfresco Spaces under the big trees become locations occupied by many people.

CFD(Computer Fluid Dynamics) analysis results of final proposal. Arrows show the wind direction, colours show the wind velocity.

HUMAN ACTIVITY

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CFD ANALYSIS

HUMAN ACTIVITY

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Park scene in Ho Chi Minh City. The Alfresco Spaces under the big trees become locations occupied by many people.
To seek out the material resources, human resources and techniques of the site. How to put into practice the concept of “Mottainai” in Vietnam?

Being impatient, while not doing unnecessary things, thinking thoroughly through only necessary things before designing. In order to work towards the implementation of aquired results, construction processes are adopted to local conditions, and simple and conventional methods are applied. These things make a truly sustainable campus possible.

* “Mottainai” is “a Japanese term meaning a sense of regret when the value of a resource is not properly used”.

The building facade is made by bamboo and mangrove, raw materials locally aquired and made use of, allowing the wind to flow through the porous surface.

The main structure is a reinforced concrete post-and-beam structure with brick walls, a conventional construction method in Vietnam.

Perforated cement facade materials, as they can be seen throughout Ho Chi Minh City. They combine ventilation, sunshade, and security.

The spaces are organized around a cross-section of a 4 story high FLA (Flexible Learning Area) that also acts as the circulation space. While these spaces become the hub for the activities of each faculty, indirect daylight (ceiling reflectors diffuse the light entering through skylights) and ventilation based on chimney effect is taken advantage of. Classrooms and studios located on both sides of the FLA do not face each other due to the sound insulation within the spine wall.

Cross-sectional organization

The spaces are organized around a cross-section of a 4 story high FLA (Flexible Learning Area) that also acts as the circulation space. While these spaces become the hub for the activities of each faculty, indirect daylight (ceiling reflectors diffuse the light entering through skylights) and ventilation based on chimney effect is taken advantage of. Classrooms and studios located on both sides of the FLA do not face each other due to the sound insulation within the spine wall.

Taking into consideration the maximum water level and the current ground condition, the height of the reclaimed ground is set to preserve as much as possible the existing natural setting. During high water levels, the ground is almost completely underwater, so phased pre-loading of the soil is necessary.

| Baseline | Soft clay deposit distribution map | Itemize of work plan | Land formation Plan | Basin Map |
Towards an architecture that stimulates human activity and the environment.

Traditionally rooted knowledge and present day cutting-edge simulation technology are united in the design to create a space that is new and easily adaptable. Since natural energy resources are maximized, a new design is derived.

The planning has been determined by defining “Black” and “White” spaces, that differ in the way they are used.

“Black Space” = One-to-one correspondence between space and usage. For example, in a house this would be a toilet or a closed kitchen. In a school, this would be science laboratories or storerooms.

“White Space” = Not restricted to a single usage, fluid spaces in which various usages are possible on different occasions, or usages are induced.

The inner side and outer side of the spine wall have differing characters. The inner side has many “Black Spaces” divided by cores. The outer side has “White Spaces” that include a continuous open space for fluid circulation. White spaces consist of Studios, Large size stairs, Meeting space, etc...

The main circulation that consists of the FLA is one continuous large space without dead ends.

ELEVATION
River along the site. High fluctuation of water level in dry and rainy season.

About the Project

Vietnam. Project for a new campus, for the University of Architecture (HUA), is to be established in the Mekong Delta area in the suburbs of Ho Chi Minh City. HUA is a National University and the number-one Architectural education institution in Vietnam. The university is organized into 9 departments comprising of the architecture, civil, urban, infrastructure, applied arts and interior departments. The current number of students is 6,000 (prospectively 8,000). The campus includes dormitories for 20,000 students and sports facilities. The site is situated at the edge of the Mekong Delta in the suburbs of HCMC. In the future, a main highway is planned to connect the site to central town areas, but this can only be accessed by boat. The river banks are overgrown by mangrove trees, and a gentle breeze blows over the water surface.

Target Issue 1

Planning for the students to receive their own desks and public performances are made, discussed, and sublated as role models in the 20th century.

SPACE BLOCK HAND MODEL (2003).

Non-mechanical air conditioning

Like in many other countries in Asia, mechanical air conditioning in Vietnam is proliferating rapidly with the economic development. New large-scale developments and constructions, with glass facades similar to those in Singapore, make mechanical air conditioning a prerequisite and can be seen everywhere in the city. Under these circumstances, we choose a method of capturing energy with ventilation and indirect air conditioning supported by the solar and the wind user, and elected for the winning prices of the competition.

Both in the initial and later stages of the design, meetings with each department of the existing campus resulted in responses, solving e.g. the problem of humidity in the library without air conditioning, while the overall architecture could be kept transparent. As such, the very first concept design could progress.

By reducing air conditioning in most parts of the building, the risk of Global Warming by releasing HFC and other refrigerants into the atmosphere as well as environmental loads from production of air-conditioner units can be reduced.

Security of construction

The plan is to constructed on soft soil not with bearing piles but with friction piles, since it is a low rise project with a maximum of 4 stories. The construction method is cost-in-place concrete. Despite its large volume, the scale is low. As a result, proportion scutalling on the construction site and earth work may be reduced.

Agricultural area in Vietnam.

LOW IMPACT GREENFIELD UNIVERSITY CAMPUS

Low-impact greenfield university campus

Ho Chi Minh City University of Architecture, New Campus

Target Issue 3

Paradigm shift in population accumulation region Southeast Asia. Low density opposite to nature, and remediable apply the lifestyle and culture of coexistence with nature, in Asia, to the futility and loss towards the future. Paradigm shift in Southeast Asia marked by high population growth. The method named Fluid direction and the architecture derived from it is not limited to this project, but have an effective range in the high density, high temperature, high humidity region of Southeast Asia.

SOUTH EAST ASIA

Population in 2050

African growth fastest, Asia growth Biggest

Sublation of inconsistency

The characteristic continuous architectural shape (a) of a curve is created by means of continuous organization of activities that mark the architecture universe and its facility and it develops, with the aim to make the various activities within the school interact with each other. To limit the expanse area of the main campus, the whole is made as compact as possible. On the other hand, by priority and merit of direct ventilation and control of direct sunlight, long-west school buildings would guarantee an enclosed arrangement (B). These two concepts work both harmoniously and simultaneously. Thus, the target in the design became to base the design on scheme (a) and (B) from CFD-analysis and sun light position, direct sunlight could be calculated and through evaluation of this process, the actual design started to materialize.

Human Activity within the compact (inside space of the compact campus drawn like a 3D map) and the extreme grows to apply.

Continuation on next sheet, . . . . .
Squall
A strong squall that overpowers the site once every day is an important factor for the design. The rain water is used for collecting grey water supplies, and for irrigation through sprinklers. As the circulation is secured by a string of buildings, and the spaces between them (space functions) are shaded, activities are generated in shaded flexible semi-outdoor spaces (terraces exposed).

Zoning
The lecture building for the library and general education classes, as well as the college community facility are arranged on the outside. Sections use the outside zone, while classes for other study subjects and the frequent movement from jurors are located within the inner zone. The facades of architecture, urban planning, interior etc., have a strong interrelationship, and are thus arranged next to each other. By arranging the departments along a continuous circulation path, they don’t work independently, but become encouraged by mutual incentives.

Flexibility + long life
The organization of the architectural framework with a spanning direction of circulation and space-case core ensure earthquake resistance. It also allows flexible partitioning walls between the classrooms and laboratories, that can be changed or removed according to changes in the curriculum. Supporting this, the conventional construction method of SJ (stabilized) structures already exists. The flexibility in plan guarantees a future expansion only within the main campus, which results in the preservation of greenery that is prevented from being cut down.

Target issue 4
Ecological quality and energy conservation

CONSTRUCTION
Materials and simple mechanisms of the site
The design process of the project is based on representation of IT by CFD analysis, which is used productively to design according to the idea of Fluid Direction. This becomes a motive power for inventing new shapes. In contrast, actual construction work is based on conventional materials such as organic ped/crètes, concrete, block and stone. Moreover, locally available materials, e.g. mangrove tree and bamboo, are easy to produce but not yet used, so local workers have to adopt new working methods to carry out the construction. By this, the concept of oil for material transport is kept as a minimum. By control of water (supply and more with water level fluctuations), wind and solar radiation, the use of shading based on double north, pheasant windows, louvre and vegetation, and easy maintenance by simple mechanisms, sustainable buildings are made possible. Roof and exterior walls are clad with high reflective finishes that shut out direct sunlight.

The idea of “Plasmat building, active people” are made use of as much as possible. Closed spaces are not controlled by electrical energy (air conditioning, ventilation, illumination, dehumidification etc.), but simple mechanisms controlled by people to achieve a comfortable environment regardless of daily fluctuation in temperature, humidity, and heat regulation. Installation of air conditioning is limited to the auditorium, the faculty offices and parts of the laboratories. As it is expected to be sustainable, where only minimal fluctuation is brought in sustainability based on restraint of usage of already existing air conditioning and restraint of new installation of air conditioning is fundamentally different, useful management of cost is managed recycling in a reality which strongly increases the risk of its release into the atmosphere. In this sense, entirely non-von of air conditioning is vital.

Moreover, solar energy is proactively gained by solar panels installed on the roof of the few rooms that require air conditioning.

Low construction costs
Compared to private large-scale construction works in Vietnam, this project is extremely low-cost. Only a minimum land relocation and lease protection works as well as reservation of the mangrove river bank leads to construction. Also, the use of local materials and conventional construction methods bring down the cost. Minimum air conditioning and low installation costs lead to a total low cost achievement. The differences to a high cost building, as in the 20th century “ Angieering - grade” with glass facades, upright trusses controlled by an airconditioning and illumination is clear. Conventional construction methods are consequently including local persons carrying out the work. Full-scale machinery and tools brought in from a distant land or overseas are kept to a minimum, so transportation and maintenance have only minimal energy consumption.

Low maintenance costs
In the project plan, low erosion IT was used firstly for the design proposal, while construction with local techniques and primitive materials has an extremely high economical performance. By simple mechanism, the natural energy of wind, water and sun are being used as much as possible.

Due to conventional construction methods, maintenance control after completion is simple. The maintenance of the building is crystallized by the idea of Fluid Direction. In the shades of the trees, the inside and outside continuity of activities define the impression of the campus.

Maximization of forces of nature
The whole campus is covered in the shade of planted mangrove trees. Between these trees and shales the water surface of the river, from where the wind is blowing, can be seen. A good combination and balance between Building (Extretna) and nature is the essence of this new campus. The maximization of forces of nature is being taken into consideration in the new building design. It could be said that the shape of the building is crystallized by the idea of Fluid Direction. In the shades of the trees, the inside and outside continuity of activities define the impression of the campus.

Architecture by “Group of small arrows”

20th century model = Big arrows

Complex flows/factors are not simplified and treated in a complex state

Wind/Activity/(construction) forces etc. are all the same.

Inviting spaces
The curved building-line geometry holds an endless circulation space with the FLA. This produces a constant forward moving direction without visual obstruction that is inviting through the interaction with light and wind.

Target issue 5
Contextual and aesthetic impact

ACTIVATE
Preservation of Mekong Delta
The validity and preservation of the Mekong Delta is important in considering the parts of vegetation and food supply protection issues that exist within the extremely abundant land. This land has been recognized as imparially lost, if torn down in the face of global population increases and food supply prices. In contrast to the commonly practiced development consists in Vietnam, a method of getting close to nature and slide into place while preserving nature and vegetation in the Mekong Delta can have influence on the surrounding land too.

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