

Reinventing the Traditional Malay Architecture: Creating a Socially Sustainable and Responsive Community in Malaysia through the Introduction of the Raised Floor Innovation (Part1)

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Abstract: - The traditional Malay house embodies the form of traditional Malay living. In the Malay's haste for Western-type progress and modernity, many of its virtues have been abandoned. The traditional Malay house has evolved and adapted to the Malay needs, culture and environment. It may not be grandiose like some modern-day homes, but upon closer inspection, reveals sublime architectural qualities that express the way of life, culture and ingenious climatic adaptation of its users. The traditional Malay house has been designed to suit the local climatic requirements using various ventilation and solar control devices, and low thermal capacity building materials. The most literally ignored aspects of the traditional Malay house is the fact that the building is constructed on stilts. The traditional raised floor design involves issues such as ventilation, lighting, thermal comfort, safety and security as well as social aspects. This research dissects the superior qualities of the traditional Malay house and reveals why it is an unrivalled type of dwelling for inhabitants of the tropical climate. In particular, it intends to show how building on stilts is a fundamental aspect of sustainability. In Malaysia especially, the introduction of the stilt component could create a more integrated and responsive social culture long lost and yearned for. Therefore, this research intends to explore the sustainable aspects of our traditional architecture in creating a uniquely new design for in-house habitation as well as providing for an aesthetically pleasing look. Comparison has been made to the ubiquitous terrace housing community in Malaysia. It suggests a possible and promising way of increasing the livability of terrace housing with a sustainable approach and with the incorporation of the raised floor innovation.

Key-Words: - sustainable, ultra low energy, terrace housing, tropics, traditional Malay house, raised floor

1 Introduction

Ecologically responsive buildings in the tropics are becoming a major issue today. Many projects to reduce the impact of global warming and energy consumption in industrialized countries are under way, some with quite a success. Architecture and urban design have an important impact on the energy efficiency and sustainability of societies. Now all countries in the tropics do have a long history of sustainable buildings: the vernacular architecture. The hot and dry regions with hot days and cold nights developed over centuries a perfect balance of shading and daylighting, natural ventilation and heat storage. In the hot and humid regions, natural ventilation and shading systems were perfectly adapted to the local climate.

With the introduction of air conditioning systems, architecture became obviously independent from climate: the pure aesthetics became prevalent, most "clearly" expressed in the form of fully glazed office buildings. Architecture lost its sustainability. The

Direct effects on energy consumption can be observed all over the world. This paper will focus on ways to alleviate the impact of global warming and energy consumption in buildings in the Tropics in general and in Malaysia to be specific and it will look upon the traditional Malay house as a guide. For research intensity purposes, the scope has been limited to the terrace housing typology. However, the findings could be applied to any buildings in general.

According to Hutchinson (2002), 'A region can often be clearly recognized by the character of its housing. ... House design reflects critical factors such as climate, materials, economics and cultural background'. In Malaysia, the terrace house's rank as the major accommodation for the masses is likely to persist given its priority in the current Ninth Malaysia's Plan. Statistics have also shown that it is still the most sought after type of housing for the

average income Malaysian. Authority approval of such houses is also among the highest of all property types and demand is expected to increase. However, little has changed in term of its design innovativeness since the last 25 years. Some housing designs are devoid of basic design principles and are aesthetically offensive. Buildings are built fast and lack creative design efforts. New and innovative designs are but a mere few. Where there is one, the price would be unreachable to the average Malaysian. The livability index for terrace housing in Malaysia, in this respect, has never been analysed. Mundane design, inflexibility of spaces, ad-hoc renovations, poor ventilation, lighting and thermal comfort have resulted in unacceptable housing living culture in urban and sub urban community areas in Malaysia. Most housing schemes were typically planned in gridiron layout for maximum land use, in single or double storey with an opening of 18 to 24 feet and a depth of 60 to 80 feet. Hence, it has resulted in a habitat unit designed with no sensitivity to the warm and humid tropical climate's requirements as those evident in the traditional buildings in Malaysia such as the traditional Malay houses (See Figure 1,2, and 3) and the Chinese shop houses (built as linked buildings). Modern day terrace house whilst designed has perhaps overlooked one of the most important components of a tropical house that is the raised floor. The traditional Malay house has been designed to suit the local climatic requirements using various ventilation and solar control devices, and low thermal capacity building materials. The traditional raised floor design involves issues such as ventilation, lighting, thermal comfort, safety and security as well as social aspects. Buildings should be designed to incorporate local building materials, technologies and building practices to create work that are linked to their environments.

The Malay houses were built from timber and raised on stilts. The building is well ventilated by having doors and windows with perforated panels or adjustable louvers, and floor board with 1/4 inch gap to let the air to circulate in and out from beneath the building. The traditional Malay house has also been designed to suit the local climatic requirements using various solar control devices and low thermal capacity materials. Similarly, the traditional Chinese shop houses in the town areas have also strongly considered the need for natural ventilation to cool the building's internal spaces. Courtyard and air well are incorporated with fenestration components on windows, doors and walls. As a result, the residents were able to feel comfortable with the presence of air movement in the building.

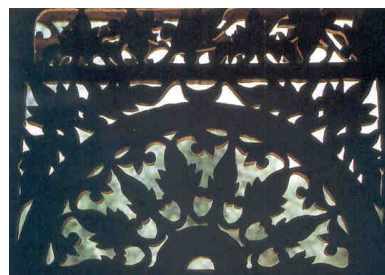


Fig. 1: Openings to exterior walls such as full height operable windows and the use of carved wooden panels and louvers add to effective ventilation devices and promote natural ventilation.

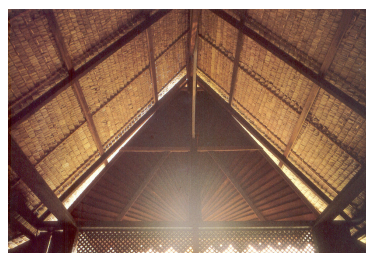


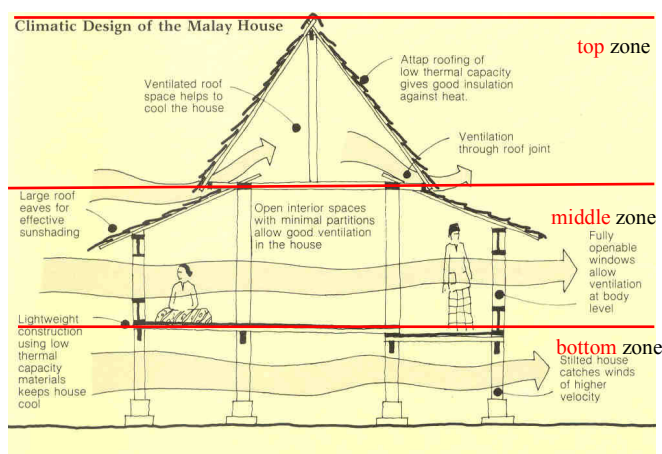
Fig 2: Steep roof and openings allows for fast water runoffs and facilitates circulation of hot air out of the house to increase natural ventilation rease natural ventilation.



Fig 3: Designed to suit the local climatic requirements using various ventilation and solar control devices, and low thermal capacity building materials

According to Taylor (1987), vernacular houses in Southeast Asia is often a reflection of social position and cultural patterns, and where these same patterns are expressed in contemporary houses they result in specific spatial arrangements. Climate and lifestyles in this region make the open terrace or pavilion a constant theme. Again this is drawn from the vernacular; the Malay kampung house, or the Filipino nipa hut. It is not simple shelter from the tropical climate but also, according to Waterson (1989), “involve the creation of social and symbolic

space – which both mirrors and moulds the world’s view of its creators and inhabitants”. Our fascination with vernacular built forms is intuitive and is “a recognition of forms and patterns that speak a nearly universal language that is deeply rooted in our collective unconscious memory”. Papanek (1988). Terrace house community however, is seen as lacking the architectural qualities evident in the traditional houses and social integrity as seen in the kampong. The traditional kampong on the other hand reveals sublime architectural qualities that express the way of life, culture and ingenious climatic adaptation of its users (See Figure 4). It is not only a physical and geographical entity but also a political and cultural institution. Our priority in habitation lies in the relationship of the idea of life, family and community. It is more of a spiritual issue and thus requires sensitive intervention. If we fail to acknowledge this, then in the sea of congested modern housing, we will be living separate and individual lives and will forever be plagued with climatic problems and cultural tensions. (Tajuddin Rasdi, 2005) It is easier to totally dismiss the terrace housing designs as inappropriate and unsuitable for the warm-humid tropical climate of the country. However, there could perhaps be a simple and yet effective solution to the terrace housing design woes and the answer lies close with us.



Reference: Lim Jee Yuan: The Malay House: Rediscovering Malaysia’s Indigenous Shelter System, Institut Masyarakat, 1981

Fig 1: Environmental details of Malay house

In the traditional Malay house, there is a clear definition of architectural elements and can be categorized into three main zones. The top zone, which covers the roof element, the middle zone for wall and the bottom zone which is the floor. The bottom zone however, is not evident in our modern

design of buildings. Therefore, the purpose of this paper is thus to discuss the significance of the proposed raised floor element for terrace houses to achieve sustainability and livability, namely the architectural and climatic qualities as well as social integrity. Fair to also note, that in recent years, several other mass housing design schemes have been researched upon and as yet still experimental. This paper does not make any comparison but merely taking cues from the past and exploring the potentials yet to be harnessed in the form of the terrace-housing scheme. The traditional Malay house possesses many sustainable features of which its potential is yet to be fully harnessed. It has several sustainable and energy efficiency features. One of the greatest feature is the raised floor which is an efficient system to safeguard against flood as well as an effective building element to improve building performances such as thermal comfort and ventilation. Its is also thermally comfortable through the application of low thermal mass materials, large overhangs, openings and shading devices to secure from the blazing heat and glare. These are some of the sustainable design principles used by our forefathers which sadly, have been neglected. These design principles could be explored and reinterpreted to create a new concept of sustainable architecture. With the ever-increasing attention on environmental protection and energy prices, the once exclusive low energy dwellings are now getting more cost competitive and contribute significantly the sustainable development the nation. The design development will look at various possible system and configuration as well as architectural concepts which incorporate sustainable approaches such as determined below.

- a. Introduction of the Raised Floor (Building on Stilts) as a new form of sustainable architecture. The architecture on stilts has only been seen on traditional buildings but rarely implemented on contemporary buildings.
- b. Green roof (Utilizing the green concrete technology created at the Faculty) and solar panels. This strategy would reduce direct heat radiation from the sun to the roof as well as provide adequate additional social space and location for the installation of BIPV panels.
- c. Rain water harvesting to capture the potential supply from the tropical rain.
- d. Industrialized Building System (IBS) with modular panels and modular coordination. This is in lieu of our Governments call for the use of IBS to improve the quality of construction and buildings.
- e. Sustainable Material Design application (which would be incorporated into the modular panels).

- f. Shading devices (fixed as well as adjustable).
- g. Internal courtyard design.
- h. Energy performance and life-cycle analysis.
- i. Fluid, heat and mass transfer studies.

2 Problem Of Livability In Terrace housing

Since 1981 several researches have determined that terraced houses are poorly designed to achieve various climatic comfort and social requirements. The buildings are not designed in response to the country's inclement climate which characterized by three main features; seasonal uniformity, low wind velocities ranging in average of 1m/s to 1.2 m/s and small diurnal temperature range (Takahashi, 1981) and high humidity and high DB temperature in the afternoon. The buildings are also not designed to cater to the diverse social and cultural community. The problems of livability in terrace housing in Malaysia can thus be looked from a few different aspects.

2.1 Ventilation

The mass housing programs resulted in dwelling units which are not designed suitable for the warm-humid tropical climate of the country. House features and components which can generate ventilation include air well (Rajeh, 1994), doors and windows, ventilation panels and fenestration walls. However, most of the houses built today are devoid of true natural ventilation for house-cooling purposes. Insufficient openings and low wind velocity have caused the air velocity in the terraced houses to be less than 1.0m/s. Rajeh (1994) has recommended that an air movement of 1.0 m/s would provide a satisfactory relief for most of the time. The air velocity helps to increase the efficiency of sweat evaporation, and thus avoid discomfort due to moisture on the skin. Climatic analysis for Kuala Lumpur has suggested openings in the range of 50% to 80% of the walls to facilitate ventilation comfort (Rajeh, 1994). Due to this discomfort, the favorite solution is to install an air-conditioning unit to the particular space that needs cooling. It is, at best, only a temporary solution, works only for those who have a high income and completely disregards health

2.2 Natural lighting

The deep design of the typical units often resulted in a lack of adequate daylight in the inner space. Most houses depend on windows or glass door for natural light either from the front or the rear of the house. Various regulations were imposed under the 1984

Uniform Building By-laws (UBBL) of Malaysia to ensure the incorporation of clerestory windows to avoid this inadequacy. Others feature the central courtyard design. Unsightly renovations to the front porch and rear kitchen area however have rendered the light penetration especially to the centre space, minimal

2.3 Thermal comfort

According to Lim Yee Juan (1987), the main causes of climatic stress in Malaysia are high temperatures, solar radiation, humidity and glare. In order to achieve climatic comfort in the Malaysian home, these factors must be controlled besides the control of rain, floods and occasional strong winds. Yee Juan also noted that to achieve thermal comfort in the warm humid Malaysian climate, solar heat gain by the building and human body must be minimized while heat dissipation from the body must be maximized by ventilation and evaporative cooling. In most terrace houses today, comfort equals round the clock air-conditioning. Various features and components are not considered in the thermal comfort of a house. Roofs for example are not designed with ventilation louver to disperse trapped heat. Thus, house owners would rather close all doors and windows and to turn on the air-conditioner in order to achieve coolness.

2.4 Privacy violation

Built on ground, terrace houses are renovated to the boundary lines incorporating high defense walls and security to secure privacy from not only passerby and strangers but also pesky neighbors. To add to those layers of visual defense, clothes are hung to dry on rows of movable drying units at the front porch where the cars are missing during the day. Gone are the social and community values as seen in the kampong. It is difficult to differentiate and demarcate the territories of public and private spaces in the village. Due to the preference for community intimacy over personal privacy, house compounds are often open and unfenced, making private spaces undefined and merges with the public spaces. As discussed later, this leads to a well-integrated spatial environment which promotes close community ties in the village.

2.5 Social and security

There are no definitive areas for social interaction and activities. The front porches are renovated to accommodate a row of cars and the children most often scattered away to play on the street where they are exposed to constant threat of accidents and

mishaps. During times of social function such as khenduri or a wedding, the street transformed to cater to welcoming guests an audience. Community living in the urban areas is significantly different than that of the rural villages. As urbanization rate increases, there is a pressing need to improve community living in today's neighborhoods as "neighborhood is seen as the most important urban element that establishes the social and economic sustainability of the area, providing the community ties which hold it together..." (Neal, 2003: 8). Efforts to improve neighborliness in today's urban community must be taken seriously because the social values in the urban areas are characteristically different than the rural community. Yahya Ibrahim (1995: 45-40) highlighted that in the urban areas, there are less cohesive relationships, greater individual freedom, breakdown of traditional values, problems of adjustment, differences in family relationship and increase in social distance.

2.6 Environmental

As recently, even the terrace-housing scheme has not been spared the wrath of Mother Nature. Constant flash floods have wrecked havoc to the nation with incurred losses in the amount of millions. Soils erosion and landslide is a norm due to unethical development of hilly areas in haste to provide accommodation and generate profits. Historically, the raised floor feature has been the best mitigation feature not only to keep dry from constant flood but also to built into the nature whilst living near slope area. Our forefathers were aware of that but not many of us have taken cues.

3 The Missing Element – The Raised Floor Of The Traditional Malay House

According to Robert Powell (2001), the essence of modernism and its subsequent philosophical and aesthetic development have often not been understood by many architects in Asian countries. At the same time, a respect for tradition and our own architectural heritage is widely acceptable. They provide the basic foundations toward developing an exciting contemporary reinterpretation of the vernacular. An understanding of the vernacular built form is increasingly relevant to designing contemporary houses. Quoting Frank Lloyd Wright, Papanek (1988) noted that "The true basis for serious study of the art of architecture lies with indigenous humble building everywhere. They are to architecture what folklore is to literature, or folksong to music...Functions are truthfully conceived and rendered invariably with natural

feeling. Results are often beautiful and always instructive". The manifestation of the traditional Malay house can easily be identified by the three basic elements of architectural studies. They are the elements of floor, wall and roof. The traditional Malay house clearly shows a distinctive separation as evident in its zoning of the elements (See Figure 2). Many a research has been done to dissect and look at various components and elements of the traditional Malay house but the raised element has not been considered to a great length. The raised floor of the traditional Malay house has often presented itself with many possibilities. In an environment which is characterized by heavy, tropical rain accompanied by the now frequently heavy flash flood, the raised floor tradition is perhaps the most ideal and immediate solution to the problem. This is a vital design element, which has been overlooked for years and which design could possibly bear a significant impact on our housing system. It is the reflection of the society's accumulated wisdom and collective images. The traditional raised floor not only allows for easy passage of air into and through the house but the area beneath the house is also comfortable for children to play and venue for various daily activities (See Figure 4 and Figure 5). In the traditional culture, one's abode is considered sacred and thus should not be constructed on the ground. There is a celestial connection between ground, man and sky. And thus his abode should be elevated and connected by means of staircase.

4 Lessons From Modern Architecture –Le Corbusier And 5 Points Of A New Architecture

The theory of Le Corbusier is multi-faceted and defies simple explanation. A fundamental aspect of his theory is that architecture relates to a fixed world-order. From *Vers une Architecture*:

Architecture is a thing of art, a phenomenon of the emotions, lying outside questions of construction and beyond them. The purpose of construction is to make things hold together; of architecture to move us. Architectural emotion exists when the work rings within us in tune with a universe whose laws we obey, recognize and respect. When certain harmonies have been attained, the work captures us. Architecture is a matter of "harmonies," it is a "pure creation of the spirit." (*Vers une Architecture*, p 23) Another aspect of Le Corbusier's philosophy was his concern for a new architecture relative to current times. Each era or period should create its own works of architecture. He has an inherent belief that

forward progress is good. "If a man does not move forward he becomes bankrupt." (Vers une Architecture, p 101). Vers une architecture contains many images of airplanes, motorcars, and ocean liners – examples of modern technology and progress. Other strands of modernism current at that time felt that a clean break from the past was necessary, i.e., virtually starting with a blank slate. Le Corbusier is different in this regard as he maintains links with the past. The most obvious, as noted above, is a belief in an absolute. In addition, Le Corbusier draws selectively from the past of Western architecture. He uses examples of Greece, Rome, and other periods to amplify his various arguments. Le Corbusier was a man to whom ideas were fundamental. It is therefore interesting to see some of the results of his thought processes, even if the underlying rationale is not made clear.

The five points can be summarized as 1) Supports or Pilotis 2) Roof gardens; 3) Free design of the ground plan; 4) Horizontal windows; and 5) The free design of the façade. It was Le Corbusier's Villa Savoye (1929-1931) that most concisely summed up his five points of architecture that he had elucidated in the journal *L'Esprit Nouveau* and his book *Vers une architecture*, and which he had been developing throughout the 1920's.

By supports, Le Corbusier states the ground level of buildings should be raised 3 to 6 metres above existing grade, so that "the rooms are thereby removed from the dampness of the soil; [and] they have light and air." (Le Corbusier and Jeanneret, P., *Five points towards a new architecture*, in *Programs and manifestoes on 20th-century architecture*, Conrads, U. - Editor, (MIT Press 1975 p 99). The main floor of Villa Savoye is set one level above grade. With the exception of bedrooms for the servants (who apparently are not covered by this manifesto), there are no primary rooms at grade level.

What this does is literally and figuratively separates the house from the ground (Figure 5). It is an interesting contrast to other design philosophies that seek to merge the dwelling with the earth, and to incorporate the experience of a tactile *terra firma* or ground in a design. However, the disassociating of the house with the ground does allow the perception and experience of the house to be more cerebral . . . i.e. it allows one to fully appreciate the absolute harmonies to which the composition is attuned.



Fig 5 Villa Savoye – Main building mass is raised on columns

5 Conclusion

Research in this area could provide a better design solution, flexibility for a current and new scenario of terrace housing or for what matters even more, any building design in Malaysia, which satisfies both private and public spaces. The design scheme will enhance local and existing culture, integrates into public facilities and activities and can be stretched into a new community lifestyle. This can be tested on in new residential areas, urban as well as suburban areas. The design could incorporate low energy design in order to build a sustainable mass housing architecture

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