HOUSING NEWS

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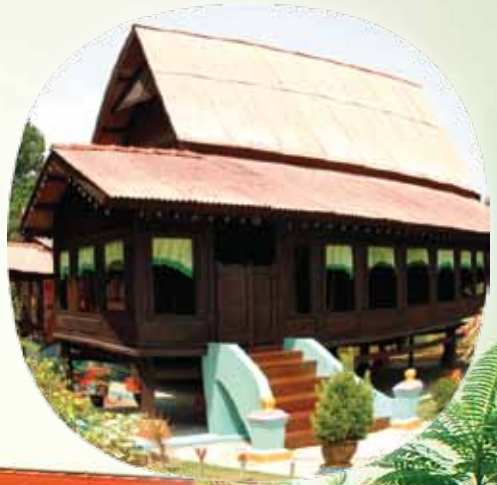
Sustainable Living



IN THIS ISSUE

EDITORIAL BOARD

Assoc. Prof. Ar. Meor Mohammad Fared Meor Razali
Chief Editor

"Man's attitude toward nature is today critically important simply because we have now acquired a fateful power to alter and destroy nature. But man is a part of nature, and his war against nature is inevitably a war against himself. We are challenged as mankind has never been challenged before to prove our maturity and our mastery, not of nature, but of ourselves." Rachel Carson, American writer and environmentalist.

Silent Spring authored by Rachel Carson in 1962 resonates loud and clear raising awareness on man's delicate relationship with nature. The book highlighed the danger posed by the indiscriminate use of pesticides in the United States and sparked changes to laws affecting the environment.

Much earlier, *Living The Good Life* by Helen and Scott Nearing published in 1954, described the couple journey towards self-reliance and building a sustainable life in Maine and Vermont USA, during the 1930s. The book spurred the 'back-to-the-land-movement' and paved the modern day movement towards sustainable living.

In this issue, **Sustainable Living** has been aptly chosen as the theme to reflect the current yearning for sensible living through sustainable designs and sustainable developments.

Green Urbanism : New Look For Future Cities? outlines the principles and effective approaches offered by urban planners to create a sustainable city.

Sime Darby Idea House: Green Ideas For Sustainable Living and **S11 House** look at two architects' creative and innovative endeavours to create a sustainable home. **What We Didn't Know About Vernacular Architecture Of The Orang Asli** offers a poignant insight on our indigenous people solution to create an 'environmentally responsive dwelling'.

Building Performance Assessment Systems : The Emergence & The Variety provides a quick introduction to various methods adopted by many countries to assess environmental impact of buildings.

A-Z Of Living Sustainably lists practical tips for future greener homes while Sustainable Furniture outlines process of manufacturing furniture using recycled materials.

In Technology News, **Incorporation Of Nanotechnology In Green High Performance Concrete** looks into application of nano materials in concrete industry. While the Grin Design illustrates the lighter side of **Sustainable Living**.

CONTACT US

Editor
Housing Research Centre
Level 10, Block A, Tower Block
Faculty of Egineering, UPM
43400 Serdang,
Selangor, MALAYSIA.

Tel : +603-8946 7849/7856/7850
Fax : +603-8946 7869
E-mail : hrcfkupm@gmail.com
Website : http://eng.upm.edu.my/hrc/

Putra Design Nucleus :

FRSB new unit to cater for green consultancy

Recent emphasis on green and sustainable way of development give rise to the need for new and specialised R&D in the construction industry that would be daunting for the private sector to embark upon. Recognising this, the Faculty of Design and Architecture has decided to play an active role to fulfill this need in the industry.

Taking into account two major resources already available in the faculty: The vast expertise of the faculty and the availability of high-tech research equipments owned by various labs, the Faculty of Design and Architecture has decided to open up its service and facilities to the building and development industry.

The unit, named Putra Design Nucleus, was formed in January 2012. Taking place in the former Design Consultancy and Training Unit, the office will promote, coordinate and conduct consultancies and trainings offered by the faculty.

The Introduction of Green Building Index (GBI) in 2008 creates a promising outlook in terms of green agenda for the building industry. Small and major players in the construction industry begin to take heed some of the more complex issues of building sustainably. Some of the requirements are quite specific and requires specialist input. Putra Design Nucleus provides some answers in this regard. Among the expertise in the green building requirements it could offer are:

- Building Environmental Performance Simulation
- Dynamic Building Energy Use Simulation
- Daylight Performance And Strategies
- Green Building Index Facilitation Service

On site planning and landscape, the unit also offers these expertises:

- Landscape Impact Assessment
- GIS Analysis
- Sustainable Landscape Planning And Management

On users experiences and Building management:

- Post Occupancy Survey
- Visual Preference for Landscape Design
- Thermal Comfort Assessment
- IEQ Assessment
- Facility Management Training

For those who are interested in the service and training offered, please contact:

Putra Design Nucleus
Faculty of Design and Architecture
Universiti Putra Malaysia
43400 UPM, Serdang, Selangor.
T: 03 89464052/4013
F: 03 89464014
E-mail: zakyjaafar@putra.upm.edu.my

PUTRA DESIGN NUCLEUS
WHERE ART AND SCIENCE MEET

Upcoming Activity

Value Engineering Training Workshop Module 1
18-22 June 2012
Kuala Lumpur

Seminar on Rainwater Harvesting System in Green Building
3-4 July 2012
Kuala Lumpur

Malaysian Architectural Education Conference (MAEC) 2012
4-5 October 2012
UPM

Sustainable Tropical Environmental Design Conference 2012 (SusTED '12)
26-27 November 2012
FRSB, UPM

Conference on Affordable Quality Housing 2012
17-19 December 2012
Putrajaya

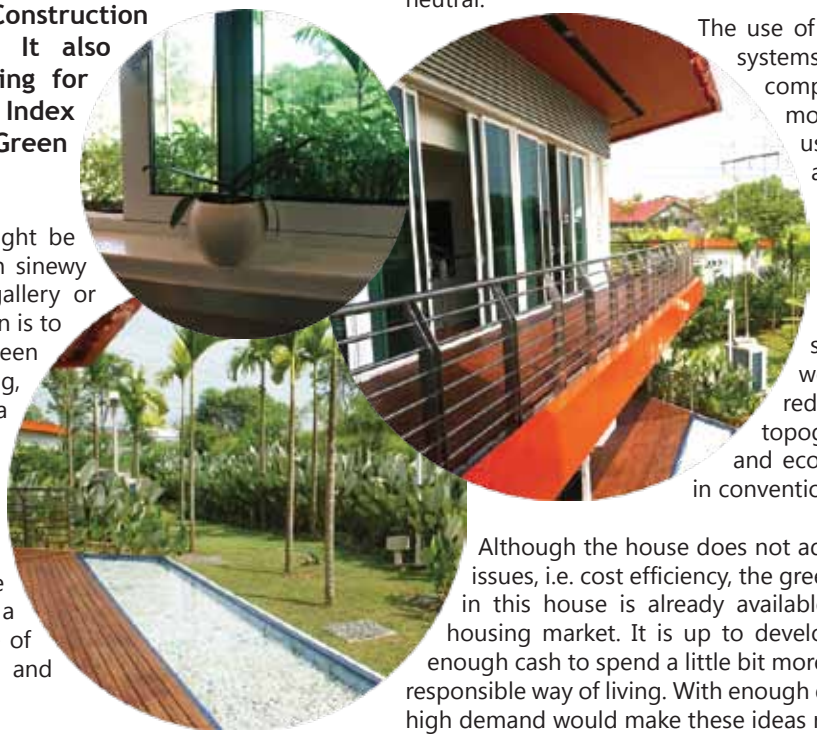
Putra Architectural Exhibition (PAX 2012)
10 July-14 September 2012
Galeri Serdang, UPM

SIME DARBY IDEA HOUSE

Green Ideas For Sustainable Living

Dr. Mohamad Fakri Zaky Ja'afar
Department of Architecture
Faculty of Design & Architecture
Universiti Putra Malaysia

Meant to be a showcase of what green technology can do to a house, Sime Darby Idea House did so with style. Winning award even before its completion, the house is brimming with green ideas for the public to learn from. Completed in May 2010, the 4,850 sq. ft. house bagged Singapore's Building and Construction Authority (BCA) in 2011. It also achieved the Platinum rating for Malaysian Green Building Index (GBI) rating and Singapore Green Mark.



Approaching the house, one might be forgiven for thinking the reddish sinewy metal box is a high tech art gallery or something novel. Yet the intention is to show a new way of thinking, a green approach, about everyday living, demonstrated in the form of a house. The green site is carefully carved so that rainwater collection, landscaping and permaculture can be integrated seamlessly with the indoor experience of the main living. The intention is to provide a wholesome setting for a lifestyle of health, wellbeing, recreation and permaculture.

The designer Jason Pomeroy of Broadway Malyan, a Singapore-based architectural outfit, mentioned the source of inspiration for the first initial idea: a Malay kampong house. Cross ventilation seems to be the main form generator, resulting in elongated planning with luxurious opening on opposite sites. The narrow form also provides ample daylighting for the house during the day. Deep overhangs provide adequate protection against solar gain and driving rain. Main bedrooms are on the first floor, whilst naturally ventilated, large openings on the ground floor dedicated for the main living and kitchen, giving the impression of stilt constructions so synonymous with the Malay kampong house.

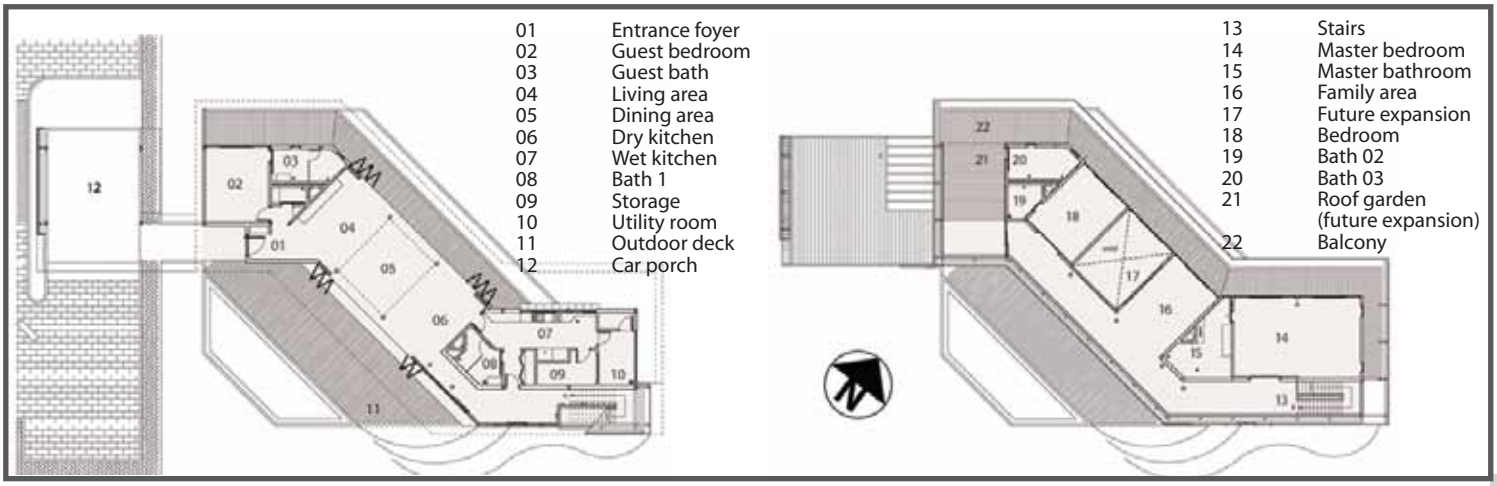
Rainwater harvested is stored in clever little pool located on site, to free the need to use treated water to irrigate the landscape. Water is further conserved by recycling water used from the kitchen and shower to be reused for toilet flushing. Aerated showers are used to reduce almost 50% of treated water usage.

With 17800kWh/yr electricity generated by solar panels mounted on the roof of the house, the house generated more than enough electricity for its needs. Although this is not a lived in house, it may well be the first residential building in South East Asia to be carbon neutral.

The use of steel structure with modular systems enables the house to be completed within 6 months, 12 months short of construction using conventional method for a building of similar scale. The use of modular system also provides flexibility for the house to be expanded in the future. The modularisation of components, prefabricated system also meant that the work on site is minimised to reduce disruption to the natural topography and existing hydrology and ecology, so commonly sacrificed in conventional construction.

Although the house does not address one of the most critical issues, i.e. cost efficiency, the green features gestures displayed in this house is already available to be implemented in the housing market. It is up to developers and house buyers with enough cash to spend a little bit more to create an environmentally responsible way of living. With enough drive, economies of scale from high demand would make these ideas readily viable for the masses.■

Idea House Floor Plan. Source: Sime Darby.



Green Urbanism
New Look for Future Cities?

Assoc. Prof. Dr. Kamariah Dola
Department of Landscape Architecture
Faculty of Design & Architecture
Universiti Putra Malaysia

"The Government realises that countries adopting sustainable energy and green technology will be winners in the 21st century as it will be the core of economies. This is not an option but a reality that all nations must face". (Prime Minister Datuk Seri Najib Tun Razak, 2009)

So, what exactly is the aim of becoming a winner city in the 21st century? One of the strategies is to adopt the principles of 'green urbanism' which are to facilitate the reduction of carbon emission to offset global warming or climate change, reduce waste, reduce energy consumption and revitalisation of pedestrian-friendly city centres.

Compact city

Embracing principles of green urbanism or simply sustainable city has proved for many professionals not to be a burden, but a competitive advantage. In future, planners, architects and urban designers are likely to be out of work if they do not know how to deliver environmentally well-performing solutions. Most urban planners, urban designers, urban managers and related practitioners would generally agree on the following statements:

- Cities and urbanised areas need to be focused on sustainable development, as it will be where (beside the industry sector) most energy is consumed and most waste produced;
- Cities are the main consumers of natural resources and the main producers of pollution;

Green urbanism could be most effectively pursued when clear principles of sustainable urban development are established. The task is too large for city managers alone; it is a more fundamental issue to be addressed by a series of disciplines, including environmental engineering, urban planning, architecture, urban design, economics, landscape architecture, sociology, and others. All disciplines working closely together could achieve the goal of the 'winners of the 21st century'.

Some of the most effective and available urban planning and design approaches for green urbanism are listed below:

- Minimising the consumption of land through compact development, and densification by containing the footprint;
- Using existing and renewable urban resources such as brownfield sites, integrating underused buildings, structures and sites;
- Designing urban quarters where walking and cycling are highly attractive, with good landscaping and a diversity of uses;
- Utilizing underused sites within walking distance of public transport nodes to reduce reliance on the automobile and to increase pedestrian activity;
- Developing urban areas where efficient infrastructure systems and public transport are already in place, to reduce the need for the automobile;
- Creating a sense of urbanity through density and the design of real places;
- Developing sites in a way that the consumption of energy, non-renewable materials and pollution is reduced;
- Better considering the building's placement on the site, orientation and density issues, with a focus on public space and good landscaping;
- Designing developments in ways that increase access to affordable housing and transportation choices;
- Designing spaces with direct access to natural light and air, and better orientation to take advantage of passive solar design principles;
- Designing spaces with direct access to natural light and air, and better orientation to take advantage of passive solar design principles;
- Optimising orientation and solar exposure to maximise the use of renewable resources in the operation of buildings and complexes; and
- Applying the following eight key principles for urban sustainability:

  i) low-rise, high density compact communities;
  ii) functional mix with local and culture-specific uses;
  iii) eco-buildings which better harness sun, daylight, wind, rain;
  iv) integration and reuse of existing buildings with elements of local identity;
  v) fine grain, with attention to architectural detail and smallness;
  vi) high quality public space network;
  vii) reliance on public transport and use of bicycles;
  viii) variety of urban greenery, integrated in the building.

Some cities have already developed compact city as one solution for better urban living that could give minimal impact to the environment. Grouping residential units or townhouses together in compact volumes of around four or five storeys – similar to the nineteenth century ' compact city block ' model found in Paris, Barcelona, or Berlin – would bring considerable environmental benefits, such as:

- Smaller building envelopes, therefore less land use;
- Need for fewer materials, therefore lower construction costs; and
- Sharing fire walls, therefore reduce energy consumption;
- Everything is within walking distance, even public transport, therefore reduce private vehicle usage;
- Sharing of basic facilities (sewage, waste collection, roads, utilities-gas, electricity, water etc); therefore reduce management cost.

Tampines Flats, Singapore. With limited land and rising population, Singapore has to adopt the concept of green urbanism-compact buildings and green roof, yet not sacrificing the luxury of quality living.

The urban planning and design principles that apply in tropical cities like Kuala Lumpur, Singapore or Brazil should provide lots of shade for comfort which means more trees and overshading between buildings, as long as the efficient natural ventilation of the spaces between the buildings is considered. The concept of smaller homes or offices at homes could also reduce energy usage. With abundance of sunshine all year round, homes and offices could be oriented to enhance passive solar heating and cooling, for the use of solar hot water heaters, for maximum natural daylight, and for taking advantage of the local prevailing wind direction to catch cooling breezes. Despite increased density, the city could still contain small urban gardens for recreation or even food supply, in combination with green roofs to collect the rainwater for irrigation of those gardens. The installation of rainwater tanks, the development of more effective recycling water programs (grey water usage), recycled sewage, and the ability to harvest the storm water runoff, all need to be part of an urban water strategy. It is generally important to ensure the 'hard' appearance of a new development is

lessened by soft landscaping, tree planting and vegetation. Innovative ideas of vertical landscaping and the re-creation of ground conditions to roof gardens ('cool roofs') are now being applied by many designers. Today, most cities have established policies on the principle that removal of a potential green area at ground level should be offset by planting the equivalent area at roof level.

Greening the Transportation System

Although the automobile is not the only source of emissions, it is considered as a major one, thus actions to reduce it should be one important parameter for green urbanism. Most CO_2 emitted by global traffic comes from cars (44.5%) and from trucks (25%). Cars will not disappear that soon, therefore we need to develop more appropriate, energy-efficient models, such as electrical or hydrogen fuel-cell powered automobiles or efficient light transit system. Improving public transport with a modern light railway system could reduce our car dependency.

Pedestrian friendly landscaping is also possible with integrated light railway tracks in a compact city. Good traffic planning will be essential for green urbanism, and there are now plenty of innovative ideas and traffic concepts to reduce our car dependency. While it is not possible with buildings, given the appropriate legislation, almost all motorised vehicles could be replaced by environmentally friendly ones within a decade.

The picture displays a green railway in St. Etienne, France where the green tracks are position right next to buildings yet look pleasant. Example of 'hard' appearance of a new development, being lessened by soft landscaping.

The Hague, Netherlands, there is something quite magical about watching trams in Barcelona, Strasbourg or Frankfurt glide silently along beds of grass as they do their city circuit. Where possible, this attractive combination of efficient public transport and inspired landscaping should be standard as part of the urban fabric.

A few of the concepts for sustainable transport planning that could be applied:

- Effective improvement of integrated public transport, where rail/bus/tram/subway/ferry timetable schedules are all coordinated with each other;
- Improved coordination of timing between various red lights (the use of Smart Traffic lights) to avoid unnecessary halts of traffic flow;
- Step-by-step reduction of inner-city car parking spaces through improvement of parking facilities at the fringe of the historical centre, combined with park-and-ride concepts for rail/light railway stations;
- Street profiles to integrate cycle paths that are sufficiently safe and wide (e.g. Melbourne has now increased the width of cycle paths from 1.5 to 2.5 metres), offering bike stations to park and repair bikes (as is common in the Netherlands and Japan);
- Constructing linkage systems to connect their various centres with an efficient, high speed linkage, such as a monorail or light railway system with pedestrian pathways and parkings; and
- Adopting a general attitude based on the fact that 'pedestrians are more important than vehicles'

These lines of green linkages supply a host of benefits to any urban area, like reducing urban heat island effect, providing a permeable surface for storm water to infiltrate, and reducing pollution.

Towards Green City in Malaysia

"Putrajaya and Cyberjaya will be developed as pioneer townships in green technology in the "shortest time possible" to reflect the Government's commitment towards environmentally sound and sustainable practices", announced Prime Minister Datuk Seri Najib Tun Razak during the inaugural Green Technology Council meeting which he chaired, adding that this was among efforts undertaken by the Government to ensure the use of renewable energy and green technology was actively pursued *(The Star, Tuesday January 26, 2010)*.

The Malaysia Plans, supported by the Outline Perspective Plans, provide the framework within which Putrajaya city seeks to be a sustainable city. In a sustainable city, residents have access to planned development, control over trade, city beautification, health services, road systems, traffic management and public transportation, water, sewage and related water disposal and treatment plants, garbage removal and treatment, libraries, parks and gardens, community and cultural facilities, recreational areas and other services. High social cohesion is expected as residents could enjoy peace in a vibrant and lively city.

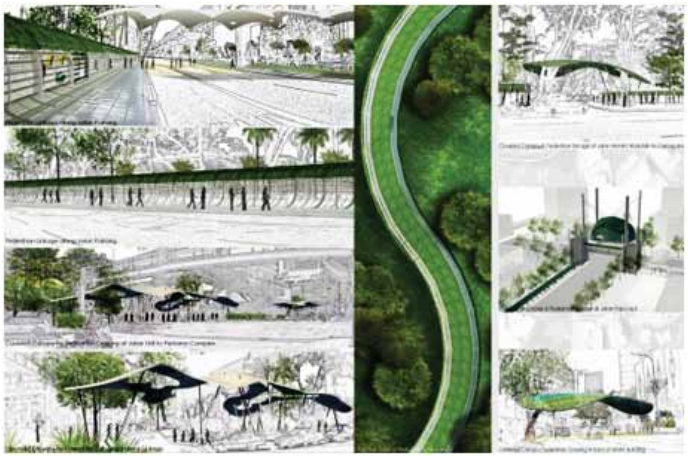
Among Putrajaya Green Initiatives:

- To develop green performance standard for structure and local plan where 40% of total area designated forgreen spaces (Parks, Lakes and Wetlands);
- To encourage buildings with High GBI and planning guidelines based on Low Carbon Emission; and
- To promote Recycling Programme.

Other Malaysian cities such as Kuala Lumpur, Petaling Jaya, Melaka and Bandar Iskandar have also shown commitment towards becoming green or sustainable. For example, the strategies for Green Transportation for Greater Kuala Lumpur include:

- Public transport based on bus transit system and rail.
- Improve walking and cycling facilities.
- Integration of transportation modes efficiency.
- Limit vehicle volume into city centre.
- Shift from fuel to electricity/gas.
- Land use policy to support green transport system.

Adding to that, actions to pursue for green urbanism in Malaysia is fully supported by many top policies such as in Land use Planning (National Physical Plan and National Urbanisation Plan), on Climate Change (National Policy on Climate Change and Road Map for reduction of GHG emission), and for Green Technology (National Green Technology Policy). Overall, it can be concluded that good foundation have been set and efforts towards Green Urbanism have been fully supported by the government and it is up to professionals to take up the challenge. ■



Plan for improved Pedestrian Network in Kuala Lumpur City center .

Image Sources:

http://blog.propertyguru.com.sg/3773/hdb-launches-3923-new-bto-flats.html
http://www.wayfaring.info/wp-content/uploads/2009/02/green_railway3.jpg

What we didn't know about *Vernacular Architecture* of the Orang Asli

Dr Nur Dalilah Dahlan
Department of Architecture
Faculty of Design & Architecture
Universiti Putra Malaysia

Meet the Orang Asli: Embracing the Basics

The Orang Asli are the indigenous people who first dwell in the Malay Peninsula. Currently, they comprise 0.5% of the population or roughly around 148,000 people. There are three main tribal groups that are categorized as Semang (Negrito) tribe, Senoi tribe, and also Proto-Malay tribe in the Peninsula Malaysia, which they reside in the northern, central and the southern regions of the peninsula, respectively. Originally, each of the individual tribal groups exhibit varies lifestyles depending on the environment that they are living in. Fishing is the main occupation of coastal communities while some tribes practice permanent agriculture *(Carey, 1976; JHEOA, 2008)*.

This article discusses the values we can learn from the Orang Asli communities in order to improve sustainable contemporary living. You probably wondering: why is it relevant for us to adopt these values in our house design? The answer is simple: environmentally responsive dwelling that utilizes forest resources such as bamboo and timber based materials. Moreover, the design is engineered to be lightweight, permeable, easy to assemble, minimum to no construction wastage and of course, cheap.

The dwelling's simple form reflects its builders cum owner belief on comfort and basic need fulfilment. Due to the low complexity of their house physical form, the interior space embraces social-cultural factors, namely, strengthening family ties and the freedom to manoeuvre certain functions in response to special occasions. The behaviour of the Orang Asli also reflects on how he manipulates his environment out of respect but within his own flexibility. In order to understand the preindustrial vernacular dwellings, Rapoport (1969) proposes that the built form of these dwellings complies with the concept of genre de vie (lifestyle), in which importance of basic needs is determined more importantly by the way the these needs are handled. He then added,

> ***It is not whether there will be a window or door, but their form, placement and orientation which are important; it is not whether one cooks or eats, but where and how.***
>
> ***Rapoport 1969, p. 61***

Our Changing Lifestyle

Dictating how the way we live in our houses, was sparked by Le Corbusier in the mid 1920s during the Modern Movement. He was the architect and theorist responsible of coining the idea of the house as machine. Transparency and the adjacency of interior and exterior spaces transformed his house design into works of art. The interior environment of the house no longer is designed to cater for social cultivation as found in its more vernacular counterpart but rather fuels the individual idealistic of self-sufficient (Lefas, 2009).

In apply a certain material to form a building, one must understand how the interior and exterior behaviour of the building in response to its surroundings. Without this understanding, we are actually creating a space, be it interior or exterior, that releases unwanted energy and unnecessary expenditures. By embracing the local materials and passive design strategies that our local vernacular architecture displays, much can be improved to provide for better living comfort through breathable and shaded yet not too gloomy interior spaces, better space for family interaction and flexible spatial function maneuvering.

In other words, it is not a good practice to design our spaces according to universal style and ignoring the local micro climate. Even though the economical demands of today permits high life cycle cost and large carbon footprint, material usage in houses with the understanding of how a social interaction should perform culturally could suggest a more comprehensive atmosphere in cultivating contemporary comfortable living. Among the important values that we learned from the Orang Asli is that dwelling design should respect the local microclimate through the utilisation of indigenous materials and exhibiting spatial flexibility. ■

Image Sources:

http://forum.mygeoportal.gov.my/smanre/tanah/tnh_orangasli.php
http://www.facebook.com/note.php?note_id=199959596682336
http://tripwow.tripadvisor.com/slideshow-photo/orang-asli-house-jerantut-malaysia.html?sid=27041842&fid=fb-100000424563371_750540

BUILDING PERFORMANCE ASSESSMENT SYSTEMS:
THE EMERGENCE & THE VARIETY

Dr Zalina Shari
Department of Architecture
Faculty of Design & Architecture
Universiti Putra Malaysia

Due to the rising interest and demand from policy makers and increasing pressure on the construction industry to achieve a sustainable built environment over the past decade, there has been a plethora of building performance assessment systems (BPAS). BPAS – this general terminology is used here to mean any method of assessing the environmental impact or sustainability of buildings, emerging as one of the strategies in, and perceived as tools for, promoting and contributing to sustainable construction (Ding, 2008). The development of assessment systems for buildings has its origin in the 1990s as this was the year when the first BPAS, the UK Building Research Establishment Environmental Assessment Method (BREEAM) was introduced. Following the launch of BREEAM in the UK, many other BPAS were developed around the world. Principal examples of BPAS used in different countries are shown in Table 1, modified from Chew and Das (2008) with additional list of assessment systems which are a replica, minor variation or a combination of any two or more of the principal examples. Cole (2005) observed that all of these systems are gaining some market recognition (with the exceptions of Green Building Index and Greenship, which are still relatively new).

In general, BPAS have been developed by governments and private organisations, both those established by the industry on a not-for-profit basis and those seeking to establish commercial measures of sustainability (Retzlaff, 2008). This leads to the fact that some systems are implemented voluntarily for building owners, developers, and designers to provide a catalyst for market transformation or to obtain a differential identification in the market (Cole, 2003); whilst others are used by the authorities as a stimulus for the adoption of good practice or as a compulsory part of the fulfilment of certain requirements (Cole, 2005).

BPAS are developed for different purposes, for example, research, consulting, marketing, decision-making, and maintenance; hence, lead to different users. Different BPAS are also used to assess new and existing buildings. In this regard, they provide a means to rate, rank, or assess potential impacts, performance and improvement potentials compared to typical practice and/or to ultimate goals (Malmqvist, et al., 2010). Apart from individual buildings, some assessment systems assess groups of buildings, developments, or neighbourhood; hence, used as the basis of most green building policies and programs (Ding, 2005).

Many BPAS are specific to one type of building only, such as commercial development, residential, or renovation projects. Accordingly, this influences the choice of the BPAS. However, developers of many BPAS have often created separate systems for different building types and are therefore able to provide assessments for a range of buildings. Different BPAS also cover different phases of a building's life cycle and take different issues into account. As such, BPAS focus on different aspects, but a common aspect of these systems is that they facilitate a comprehensive environmental assessment of buildings. They focus on energy use in buildings, indoor environmental quality, building materials, water use, waste management, and/or many other environmental aspects in fragmented or integrated manners.

BPAS typically work by awarding points for criteria organized under categories such as water, energy, waste or site. Many BPAS require a minimum amount of points in each category. Different point values assigned to each element effectively weight them to account for their differing importance and impact on sustainability issues (Papamichael, 2000). Different levels of achievement are based on the number of points that a building or development accrues. Ultimately, a building receives a total score to "reflect" its sustainability. Often, the scores are used to assign a ranking, such as platinum, gold, or silver; or 6 stars, 5 stars, or 4 stars. ■

Table 1: Summary of principal building performance assessment systems - modified from Chew and Das (2008)

Year	Principle Examples	Developer	Country
1990	Building Research Establishment Environmental Assessment Method (BREEAM)	Building Research Establishment (BRE) Ltd	UK
1993	Building Environmental Performance Assessment Criteria (BEPAC)	Environmental Research Group, University of British Columbia	Canada
1990	Hong Kong Building Environmental Assessment Method (HK-BEAM)	HK-BEAM Society International	Hong Kong
1990 2006	Green Building Tool (GBTool) Sustainable Building Tool (SBTool)	Initiative For A Sustainable Built Environment (iiSBE)	Canada/ International
1998	Leadership in Energy and Environmental Design (LEED)	U.S. Green Building Council (USGBC)	USA
2003	Green Star	Green Building Council of Australia (GBCA)	Australia
2004	Green Globes	The Green Building Initiative (GBI)	USA
2004	Comprehensive Assessment System for Building Environmental Efficiency (CASBEE)	Japan Sustainable Building Consortium (JSBC)	Japan
1998 2005	Australian Building Greenhouse Rating (ABGR) National Australian Built Environment Rating System (NABERS)	Department of The Environment and Heritage (DEH), commercialised by Department of Energy, Utilities and Sustainability (DEUS)	Australia

Year	Additional List	Developer	Country
1999	ESCALE	CTSB & the University of Savoie	France
1999	EcoProfile	Norwegian Building Research Institute (NBI)	Norway
2001	Comprehensive Environmental Performance Assessment Scheme (CEPAS)	Buildings Department, Hong Kong SAR Government	Hong Kong
2004	EcoEffect	KTH Centre for Built Environment BFR, Swedish Council for Building Research	Sweden
2005	BCA Green Mark Scheme	Building and Construction Authority (BCA)	Singapore
2009	Green Building Index (GBI)	Greenbuildingindex Sdn Bhd	Malaysia
2010	Greenship	Green Building Council of Indonesia (GBCI)	Indonesia

A-Z of Living Sustainably

Mohd Zairul Mohd Noor
Department of Architecture
Faculty of Design & Architecture
Universiti Putra Malaysia

What is the first thing come across your mind when the sustainable mantra rings in your mind? Living in Utopia? Wearing a knapsack? Bare footed to the office? If you're not living in the lifestyle it is not easy to deduce the real meaning of it. So what exactly is the meaning of Sustainable Living? As simplest term we can get, Wikipedia defines sustainable living as lifestyles that attempt to reduce individual and society's use of earth's natural resources. Does that sound distressful? Wait till you find the simplest tips to get you house a little bit greener than your neighbors'. First of all you are not a Captain Planet who can save the world by yourself and it is not necessary to fork out your fortune just to make your home environmental-friendly. Remember small steps can make a huge difference. Here I list down A-Z green and sustainable tips for your future greener home.

A ccessorise with used furniture and antiques. When it's time to accessorise your rooms, check out for a thrift shops, garage sales, used stores and antiques from your parents or grandparents. You might not realize some thrash could become ideal assets for your interior scheme.

B uy only when necessary - It is about time to make the checklist. The DO's and DON'T's is very important to ensure you are not stacking another junk at the corner of your room or your living area. Make an inventory of your current furniture and ensure the lifespan is still good and maintain the old ones whenever necessary. THINK BEFORE YOU BUY!

C lothes - Fill in your closet with natural fibres, such as cotton, hemp and wool and made with all-natural dyes (such as vegetable dyes or herbal dyes).

D isinfectants - several drops of pure essential oil to one cup of water in a clean spray bottle can kill mold effectively. Start to use lavender, tea tree oils, thyme and grapefruit seed instead of harmful disinfectant.

E nergy - Use compact fluorescent light bulbs rather than incandescent light bulbs as your light fixtures to save on energy while opening the light.

F looring - Carpet can harbor allergens and pesticides that are tracked in from outside. Synthetic carpet can also contain volatile organic compounds or VOCs, a class of chemicals that can be harmful to your health.

If you have hardwood floors, it's a good idea to preserve them. If not, you can try Earth-friendly flooring options like bamboo,

G arbage - Be alert when you throw your garbage. Divide the rubbish into three components; recyclable, consumable,and composted. You can then use your compost for a nutrient-rich fertilizer!

H omemade remedies - There are many problems and tasks that can be solved by using home remedies and without relying on harsh chemicals. Start to asking your parents and look on remedies using natural solutions from books and other reading materials to make your house safer by using natural pest remedies.

I nnovation - Look out for up-to-date green innovation in the market to help and promotes green living.

J ars - Reuse jars can be reused and turned into attractive gifts to store stationery and craft supplies.

K ettle - Fancy a cupper? It is time to fill in the kettle only with the amount that you needed!

L awn – When watering your plants or lawns do it longer to allow the moisture to soak down to the bottom of the roots where it will do the most good. This will prevent the water to evaporate quickly due to a light sprinkle and helps to prevent shallow root systems.

M icrowave - Use only heat-resistant glass or ceramics to reheat your food because chemical tends to leach out from the plastic into your food.

N atural - Natural! Natural! Natural! Get organic food that free from toxic chemical pesticides.

O rganic - Buy organic grown flowers to reduce toxicity and brings life to the soil and also promotes long term sustainability farmland.

P aint wisely - some paints materials contain chemicals. They also contain VOCs like benzene, formaldehyde and toluene. These VOCs can cause shortand long-term health problems like dizziness or nerve damage.

When you buy paint, look for natural, non-toxic or zero VOC paint. You don't have to worry about color options. These paints come in a wide variety of colors, so your choices shouldn't be limited.

Q offee - Yup use your 'used' coffee grounds for instant compost and to avoid slugs from your plants.

R ecycled - You're not really recycling unless you're buying recycled products. The most important part of recycling is buying products for your household that contains as much "post-consumer recycled content" as possible. After this you need to remember that recycled logo!

S ensors - To ensure electricity is only use when you need it, look into installing occupancy sensors that will only turn on when they detect your motion.

T aps - Check your taps regularly. Remember one drip per second wastes around 1200 litres a day!

U tensils - Refuse unneeded plastic utensils and replace with ceramic or stainless steels.

V alue - Dispel the myth that environmental responsibility is expensive, read sustainable value book from Patrick J. Cescau.

W ood - When buying wood products, look for labels that indicate the source of the timber. Support the forest that promotes sustainable and makes sense for biodiversity.

X -ray - Once in a while X-ray your house with Thermal Energy Audit. Although this is new in Malaysia maybe in the future it will become common in real estate industry.

Y ou - the motion of change start from yourself! You have to start somewhere although the contribution is small.

Z ack Zairul – Stay tuned for more tips on Ideal Green living from Zack.

Ruhaizin Bin Sulaiman
Department of Industrial Design
Faculty of Design & Architecture
Universiti Putra Malaysia

Sustainable Furniture

Sustainable by Design

The term sustainability can be difficult to define for the contemporary furniture designer or manufacturer. Sustainability can mean social responsibility, use of non-polluting technologies and certified materials, employment fairness and more. Though these "manufacturing with a conscience" ideals cannot be argued with, often they are difficult to implement on a regular basis. To encompass these practices we need to be responsible for the production cycle from raw material acquisition through to manufacture, end use and final disposal.

Furniture Sustainability Reports

Some of the available reports are as follow;

1. EPA Profile of the Wood Furniture and Fixtures Industry
2. Establishing Sustainable Manufacturing Practices in SMEs
3. From Forest to Furniture
4. Green Seal - Office Furniture
5. Sustainability Guidelines for Office Furniture Manufacturing and Supplies.
6. Viridian – Ecofurniture
7. Waste Reduction Guide for Furniture Industries
8. Wood Waste Recycling in Furniture Manufacturing
9. What's in the Design?

In this issue, 2 furniture designs are presented. Both refer to application of new materials into ordinary manufacturing processes. The elements of sustainability in these furniture designs addressed the environmental impact of furniture products on the environment by considering all aspects of the design and manufacturing process. The design considerations include; using recycled materials in the manufacturing process and products that can be disassembled and recycled after their useful life. Sustainable furniture design looks to create a closed loop cycle where materials and products are perpetually recycled so as to avoid disposal in landfills.

Furniture Design 1: **Beledo (Bench)**
Designer: **Amirru Abdullah**
ID No. (IPR) **MY10-01579-0101**

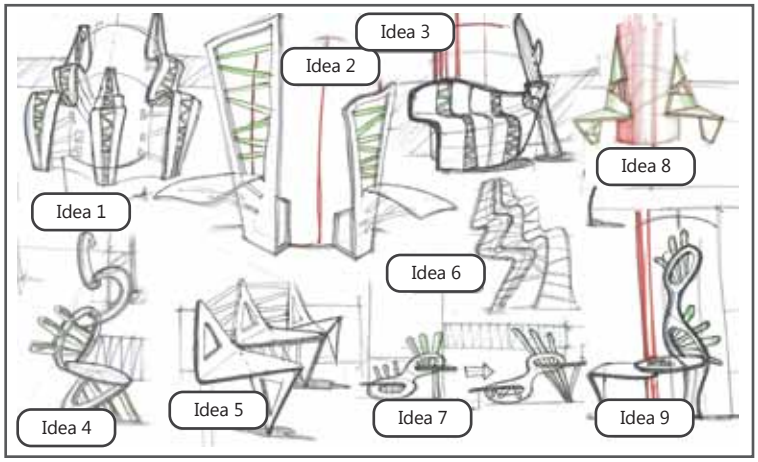


Fig. 1 Sketches show several concepts. Ideas and design development provide solution to the issue through different considerations.

"beledo" is a name given to this outdoor bench. It is proposed to be placed at the corridor of the UPM's banquet hall. It was designed with prioritising of sustainable furniture. The green elements including; less number of parts and components, ease of assembly, low maintenance and the most important is the material used to produce this furniture. Fig. 1 shows several concepts during the development of idea. Fig. 2 shows computer images of the selected concept from the 2-Dimensional sketches. With the application of design software the product now could be viewed in 3-Dimension.

The Material

The main material used for this prototype is called Oil Palm Fibre Reinforced Plastic Composite (FRPC). The oil palm fibre came from processed empty fruit bunch (EFB) which is an agro waste. It is a composition of two base materials which are oil palm fibre and plastic pellet (PP, PE, PVC, PF or PU). These natural fibres (NF) are renewable and biodegradable after their end use. The applications of FRPC(green materials) to this bench encourage the manufacturing of sustainable furniture.

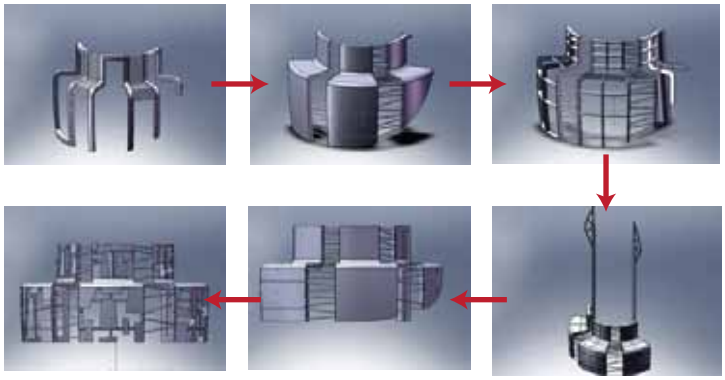


Fig. 2 Computer generated images show the design and development process. The figures also show the components and parts of the furniture as well as the product assembly. This eases the prototype fabrication and useful for future manufacturing planning.

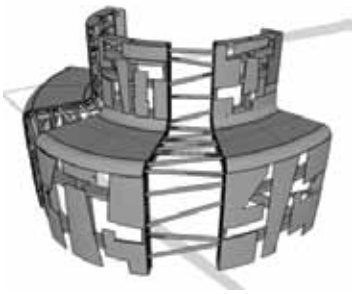


Fig. 3 The computer generated images.

Fig. 4 The prototype was fabricated accordingly to the proposed design.

Fig. 3 shows a 3D view of the furniture design while Fig. 4 shows the fabrication of the prototype. "beledo" is used to be mounted to a pillar as it was designed with a half-round shape of the back-rest. The back-to-back arrangement of 2 units of "beledo" on the other hand would results as stand-alone furniture.

Manufacturing Process

Products using FRPC could be manufactured through such an injection moulding process. Another manufacturing method beside injection is extrusion moulding. Dies are used to produce furniture parts or components. Raw materials had to be melted and injected into the moulds or dies and following the rest of the injection moulding process. Fig. 7 shows the example of extrusion moulding process.

Furniture Design 2: **Cyclitic (RSAs/R&R Bench)**
Designer: **Mohammad Rizal Bin Mohammad Rusli**
No.ID (IPR) **MY10-01581-0101**

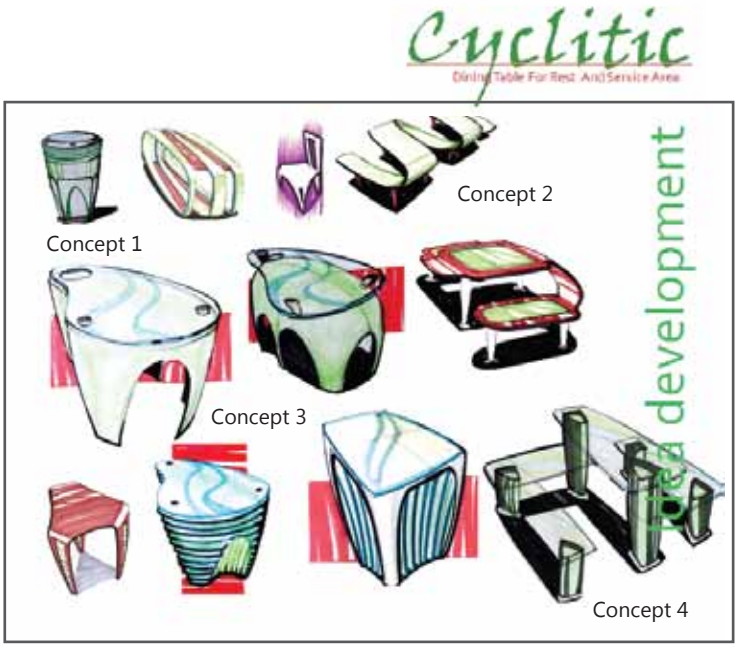


Fig. 5 Sketches show different ideas.

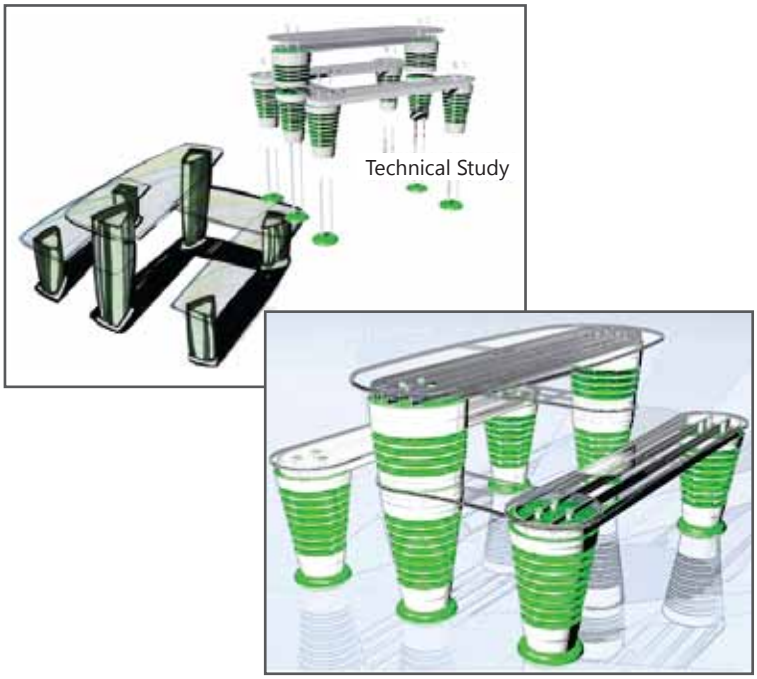


Fig. 6 Concept No.4 was selected for prototype fabrication. The figure shows the exploded view and assembly.

The Design

"cyclitic" is a name given to this bench. It is proposed to be placed at Rest and Service Area (RSAs or R&R) of our highways. It was designed with prioritising of green furniture. The green elements including; less number of parts and components, ease of assembly, low maintenance and the most important is the material used to produce this furniture. Fig. 5 and Fig. 6 show several concepts during the development of design.

The Material

The selected material for "cyclitic" is Wood-Plastic Composite (WPC). WPC is made from wood waste (in the form of sawdust or fibre) and combined with thermoplastic resin (HDPE, LDPE, PVC, PP, ABS, PS or PLA). Both materials with certain ratio and added with other additives are blended to become WPC. It also produced in the form of pellets which later on re-melted and formed into the final shape. Manufacturers claim that WPC is more environmentally friendly and requires less maintenance.

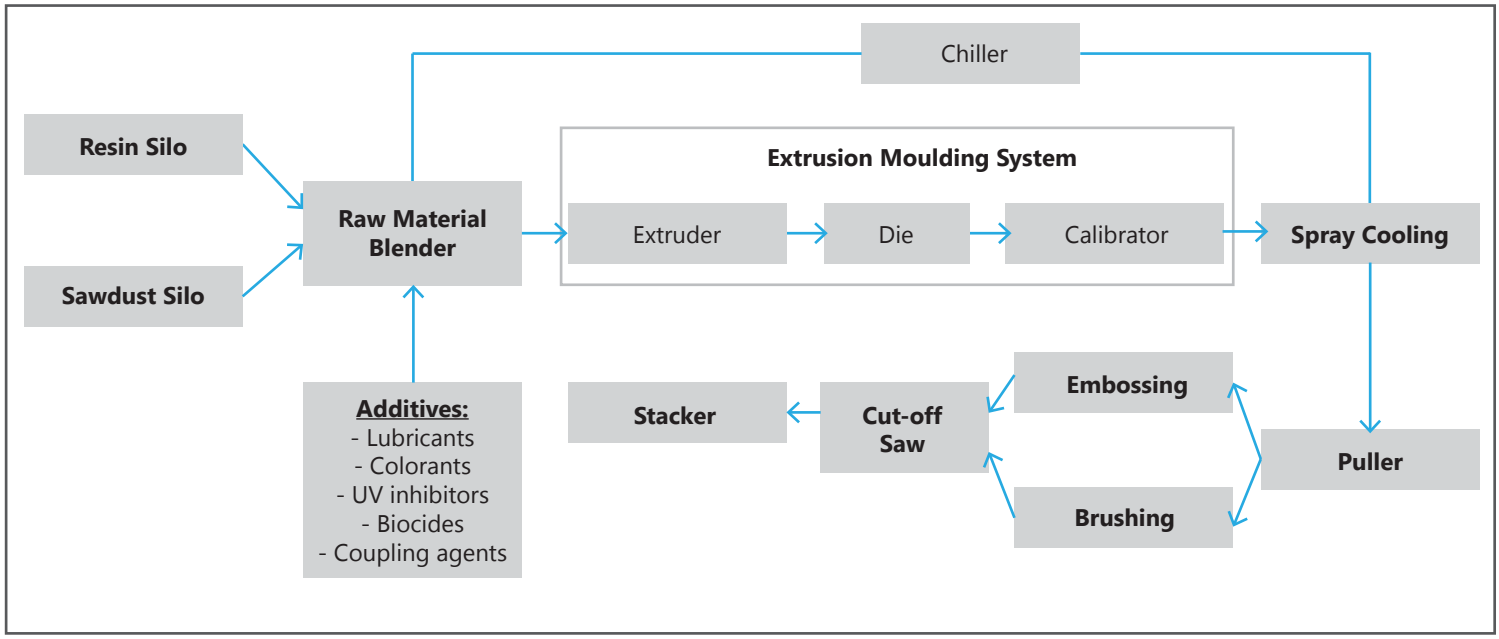
Advantages of WPC

This material offers great flexibility in terms of shapes and colours of the manufactured products. WPC is potentially recyclable since this new recovered material can be melted and re-formed. On the other hand, the presence of wood in a plastic matrix increases the product stiffness and durability. It could also lower the raw material cost rather than using 100% plastic resin.

Manufacturing Process

WPC material has no problem to undergo ordinary extrusion moulding process. It could also undergo injection moulding process. Fig. 7 illustrates the manufacturing process of WPC using extrusion moulding system. Different dies will form different components where at the end assembled to be complete furniture.

Fig. 7 Extrusion Moulding Process used for WPC based furniture components



INCORPORATION OF NANOTECHNOLOGY IN GREEN HIGH PERFORMANCE

Nima Farzadnia
Housing Research Centre
Faculty of Engineering
Universiti Putra Malaysia

TECHNOLOGY NEWS

Concrete is widely used as building material all around the world due to its significant qualities such as being low cost, moldable, adaptable, fire resistant, and being easily engineered. Every year more than 1 m3 concrete is produced per person which is give a total of 10 billion tons a year. At the same time, manufacturing Portland cement is merely responsible for almost 7% of carbon dioxide emission into atmosphere. Furthermore; the consumption of hefty amount of aggregates (9 billion tons per year) and water (900 million tons per year) as other constituents of concrete are debatable since water resources are limited and forests are being destroyed to take advantage of sands and aggregates especially in south East Asia. On the other hand poor quality of cast concrete ends in piling up debris and landfill problems.

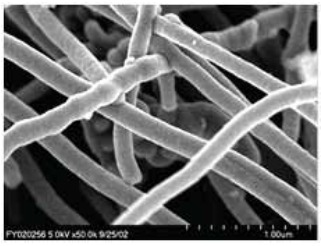


Figure 1 Nano silica

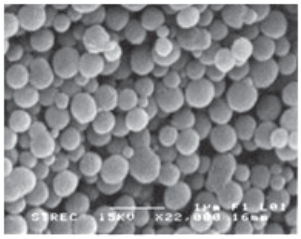


Figure 2 Carbon nano tubes

After introduction of nanotechnology by the physicist Richard Feynman in 1959, a new approach towards concrete industry started. Nano materials can be applied in concrete due to their nano sized particles which can act as fillers and increase the density and strength as well as durability issues (Figure 1). This quality may be used to broaden the limitation of supplementary cementitous material incorporation and lowering percentage of cement use. Moreover, it may boost the strength in concrete made with recycled materials as well. As for reinforcement, Carbon nano tubes (CNT) act as bridges across cracks and voids to form reinforcing mechanism and arrest cracking in cement matrix due to their high aspect ratio and nano scale diameter (Figure 2).

So far replacing aggregates with recycled concrete, glass orscraped tire are remedies to lower the amount of aggregates being used in concrete, although such concrete can only be used in pavements since its mechanical properties can't meet the requirement of related standards. Also, incorporation of mineral admixtures into concrete which are mostly industrial by-products such as silica fume and fly ash is a promising key to lower cement use in concrete as well as enhancing its mechanical properties and durability. Beside such industrial by-products, agro wastes namely rice husk ash, palm oil fuel ash, olive ash and sugar cane ash also can be added to improve the concrete quality. A case study by G.C.Isaia (2000) states that a reduction of up to 67% of the energy requirements and 80% in the cementing materials cost may be expected when industrial by-products are added of up to 50%.

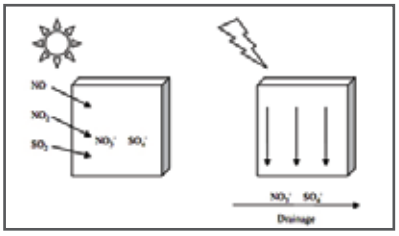


Figure 3 Depolluting effect of nano titanium

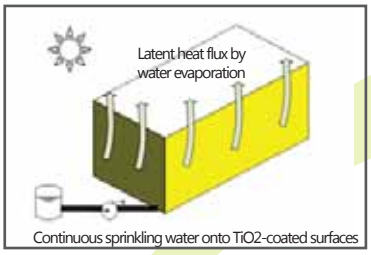


Figure 4 Cooling system by applying titanium on outer surface of buildings

Being anti-bacterial and anti-fungi are two outstanding qualities of some nanomaterials like nano titanium. In south East Asia regarding the special climate of equatorial region, it may be an issue. Other functions are worth noticing too; depolluting and cooling effect. By incorporation of Nano titanium onto the building external cover; its photo catalytic quality may be used to depollute the air in large cities surrounded by high rise apartment blocks which suffer from massive amount of pollutants (Figure 3). Also, to avoid using air conditions and to lower the negative impact on environment and electricity consumption, by using the Nano titanium in concrete we may take advantage of a natural phenomenon as a cooling system. In this method water is consistently sprinkled onto to the surfaces of buildings. The surface absorbs water due to the available titanium in concrete cover and a very thin water layer of approximately 0.1 mm thickness covers the whole surface of the building. Due to evaporation of water on the surface, the temperature drops of up to 15 C° (Figure 4). ■

S11 HOUSE

Wan Srihani Wan Mohamed
Department of Architecture
Faculty of Design & Architecture
Universiti Putra Malaysia

The "going green" fever is not just loving our nature and appreciating what is surrounding us but also designing our built environment which responds to our climatic conditions as well as using what we refer to as "green materials" and not to mention providing spatial composition that reflects our lifestyle and comfort.

Recently on 5th March 2012, Faculty of Design and Architecture, UPM, had the honour of hosting a talk by Ar. Dr. Tan Loke Mun, whose house achieved the first GBI platinum-rating for residential category, shared his principles and approaches on how he managed to exploit the passive design strategies in his own home. Last year the house won an international award - Sustainable Design Award as well as the Residential Unit Award at the 2011 Asia Pacific Design Centre Awards held in China.

The Site Planning

The house is located in Section 11, Petaling Jaya old suburban area. The site used to have an old unattended house, which was demolished to plan for the new tropical house. "The old house on the site was built in the early 1960s and had become dilapidated over the years. When I bought it, I designed a new green tropical house for the site and conceptualised it along the lines of a tree," says Dr. Tan. The S11 House, with a built-up area of 12,000 sq. ft., features a design akin to a tree in the hot tropics with a large insulated canopy roof providing wide sanctuary for the habitat beneath.

The Recycling of Materials

Many of the materials from the demolished house was reused in different forms and functions for the new house:

- The old crushed concrete roof tiles were reused for gravel fill.
- The old clay bricks were stacked as feature walls.
- Roofing timbers were found useful for formwork strutting and propping.
- Crushed concrete and cement apron were reused for backfilling aggregate.
- Old steel was sold to scrap yard.

The Comfort of Interior/Exterior Spaces

The S11 has 5+1 bedrooms and six bathrooms with a north-south orientation for all its generous openings and windows. The double-volume family room at the first floor has a 7-m-high full sliding glass walls to facilitate maximum cross ventilation whilst also opening up the entire internal living space unto the outdoor deck. Most of the internal partition walls were minimised to promote cross-ventilation and to create unobstructed space between the living room and the koi pond, as well as the dining area, which opens out into a lawn leading to a 6.5 m x 17 m saltwater pool. Both water bodies help provide evaporative cooling for the house.

Creative Use of Innovative Technology

It is not so much of using high technology equipment but rather how he achieved thermal comfort and energy saving through a creative energy-saving solutions. "My current electricity bill is only about RM400 (US$130) per month, whereas a normal house of this size would probably average around RM3,000 per month."

Some of the features that help in reducing the cost is the use of a low pitch white roof to reflect heat at the same time it offers a relatively flat surface to install solar PV panels, solar hot water heating, wind turbines and light tubes as means to harness renewable energy.

All of its windows and openings, which uses low-E laminated glazing are evidently located on the north-south walls of the house while those walls facing east-west are constructed with insulated aerated light-weight concrete blocks, painted with heat-reflective paint and simple wire nettings were fixed across the wall to allow creepers to grow.

On top of that, Dr. Tan provided a composting yard that treats all household organic and garden wastes, and provides high-grade compost fertiliser for the vegetable and fruit gardens. Tan says: "Because we live in a green house, we have learnt to live quite sustainably with minimal wastage." ■

Owner: Dr Tan Loke Mun & Chew May-Ann
Architect: Dr Tan Loke Mun of ArchiCentre Sdn Bhd
GBI facilitator: Greenscapes Sdn Bhd
Interior designer: ArchiCentre Sdn Bhd
C & S engineers: Jurutera Perunding TSSC Lim Sdn Bhd
Landscape architect: Dr Tan Loke Mun of ArchiCentre Sdn Bhd
Contractor: Atlantic Builders Sdn Bhd
Certification: GBI Platinum (DA)
Awards:
Gold Award, haven/The Edge My Dream Home Awards 2011
Sustainable Design Award and Residential Unit Award, 2011 Asia Pacific Design Centre Awards

Past News

1) HRC Colloquium 2011 "The Way Forward"
HRC organise a colloquium on R & D with the theme "The Way Forward" on 16 November 2011. The activity takes place at HRC and attended by 13 HRC members, the researcher from various departments and faculties. It is been facilitated by Prof. Dato' Abang Abdullah Abang Ali, the coordinator for HRC. The main objective of the colloquium is to brainstorm, deliberate and plan the future prospect of HRC

2) HRC is granted for the Science Fund Grant under MOSTI through ASM – Geopolymer Cement From Ground POFA by Alkali-Activation Method for 24 months starting March2012-February 2014.

2) On 16 December 2011, **HRC Won 1st Place Intra-Faculty the for Best Office 2011** among 14 departments/units in Faculty of Engineering.