

A Healthy and Sustainable Living Space – LOHAS

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ABSTRACT

The vision of LOHAS (Life of Health and Sustainability) is to enrich and live up to a healthy lifestyle which has become a trend worldwide. Health and Sustainability are the two major elements of LOHAS. In the past decades, we were more focused on sustainability for the physical living environment, but may have overlooked the importance of healthy lifestyles. In the concept of LOHAS, a healthy living lifestyle and its environment has again become the core spirit of design.

Mental and physical health are inextricably connected in terms of the health of LOHAS. It discovers beyond the healthy spaces and facilities, but also the relevant activities organized in order to satisfy residents both mentally and physically which are compliant with interests and local context.

The Waveland, consisting of three 14-floor RC mixed-use buildings with residential units, shopping mall, art village, and sport club. It is not only a stylish construction with integrated design, it is also injected with LOHAS spirit throughout the entire site, from exterior to interior, from large scale master planning to furniture details; it represents an organic carrier providing smart living. There are three parts of LOHAS design concepts introduced in the development.

- For sustainability, the building orientation and landscape are conducted by computer simulations for a comfortable environment filled with daylight and natural ventilation to reduce energy consumption.
- For health, organic gardens are inserted into green roof and landscape. All residents can obtain food ingredients planted by themselves, and visitors can also enjoy healthy foods in the restaurant.
- For wellness, diverse venues with nature and a pedestrian path winds between and around buildings like a hillside trail to encourage social interactions throughout the site.

This paper will discuss the concept of LOHAS designs and the details in design development stage.

Keywords: *sustainable neighbourhood, wellness design, Taiwan*

1. INTRODUCTION

In most of modern cities, people live a fast-paced life under various pressures. The convenience that human get from modern life may not be a healthy one as it usually accompanies along with pressure, pollution, and the feeling of alienation. Even though the threat to health is recognizable, the majority of the public could not just leave where they are at, and therein lays the problem. Thus, some of them started to look for the possibility of new urban lifestyle, which may be relatively inconvenient but more importantly, healthy.

In order to build a healthy and sustainable building, style or form should no longer be the only thing architects care about. There are numerous issues to be responded in the design such as nutrition, fitness, and wellness. In the coming chapters, a newly designed community following the concept of LOHAS will be a demonstration that showcases a living space where metropolitans would be desired to live in.

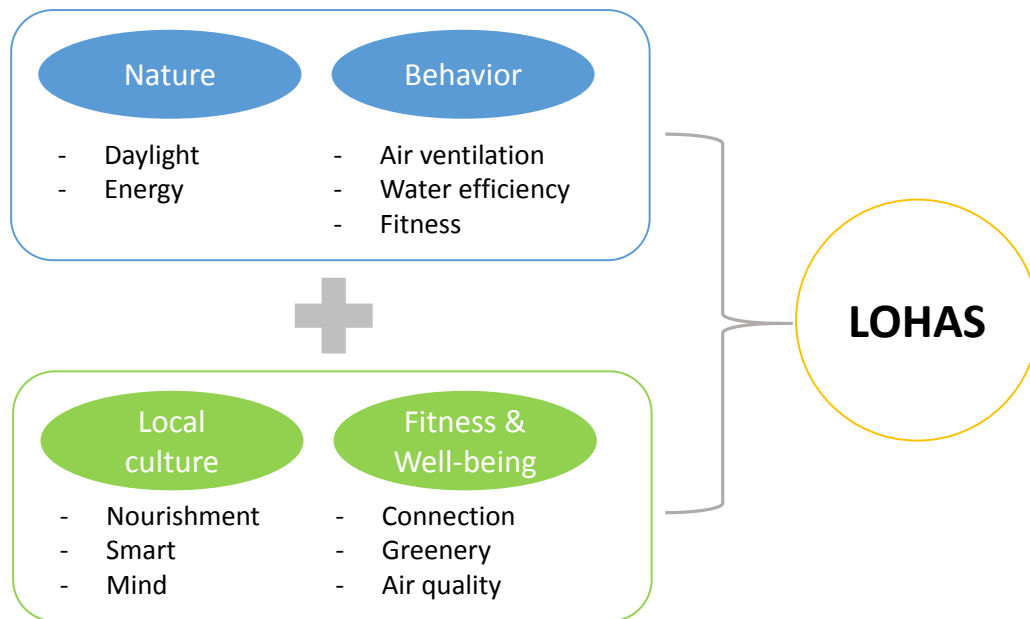


Figure 1: LOHAS concept

1.1. Design Trend

Since the Industrial Revolution in the 18th century, architecture and construction had got into a vast evolution. New materials and the change of the society had driven urbanization to bloom in that period of time. In the 20th century, the world was already occupied by lots of modern buildings constructed by concrete. People soon recognized that this was growing to become a threat for which themselves were the causes, so they began to talk about building sustainability. In the past 20 years, green building took the spotlight in this industry. Energy savings and environmental friendly design was the key topic that architects use to sell their designs. During this design trend, the needs of occupants were pretty much ignored.

Discussions and topics regarding the health of occupants emerged after the sustained debate of building sustainability. Engineers, scientists, and researchers have all joined the design team to contribute on the pursuit of healthy and sustainable designs. Nowadays, architectural designs not only emphasize solely on the importance of energy saving but also the impact on the human health and welfare.

1.2. Taiwan lifestyle

The economy and society of contemporary Taiwan was built upon agriculture. Looking back 50 years from now, the life was regular and simple in Taiwan. In that agricultural society, the economy was mainly dependent on crops productivities. Physically, people were healthy due to the daily works in the farmland; mentally, Taiwanese were happy because of the close interpersonal relationship in the small villages. The air was clean and the environment was full of greenery in that period of time.

As time goes by and along with the industrial development, most people left the farmland and moved into major cities as a metropolitan such as Taipei and Kaohsiung. Today, they can only experience the fresh air either in the countryside or in front of the air purifier. If you choose to live in the countryside, the life will be a bit dull due to the isolation of the location. Therefore, Taiwanese who live in big cities are used to and keen to have a weekend in the countryside to take a breath mentally and physically. That is one of the main reasons for the growing trend of stylish villas in Taiwan.



Figure 2: Life in modern city Taipei is tense and fast

1.3. Next generation of lifestyle

In consideration of the advantages of both urban and rural life, a new design concept is inspired - A LOHAS community that benefits the natural environment and the occupants at the same time. The environment is one point which shows human's care to others like biodiversity indicator in Taiwan green building system. Convenience would be another key point for which this design should also consider advanced systems, social activities, and interpersonal relationship that enables the occupants to feel like they are still living in an urban area and not isolated.

In addition to the points described above, the next generation of lifestyle should be affordable and able to blend into the daily life rather than a weekend holiday mode only. In this kind of community, people are able to actually enjoy their life with anything they need, as if they were still in urban areas.

In the following chapters, a newly designed community, the Waveland, consisting of three 14-floor RC mixed-use buildings with residential units, shopping mall, art village, and sport club will be an example to show what a LOHAS living space is.



Figure 3: The Waveland (Highlighted) is surrounded by nature

2 SUSTAINABILITY

Meanwhile, Sustainability remains a key in the contemporary building designs. More and more designers have recognized the importance of the environment, and thus more and more sustainable strategies have been invented and implemented in the design and construction process. For a community intending to support a LOHAS lifestyle, the practice of environment friendly design plan is essential.

2.1 Nature

2.1.1 Daylight

A successful lighting design not only aids to achieve energy saving in lighting but also in HVAC. Daylighting diminishes the demand for artificial lighting, and the accurate control of daylight penetration helps to minimize the impact of solar radiation, for which it may lead to the increases of energy consumption required for indoor thermal comfort if solar heat gain is not properly addressed. In the Waveland, retail lobby and residential flat unit have applied computational daylight simulation to information daylight design.

2.1.2 Energy

Low carbon and energy efficiency design is the primary element in LOHAS. The Waveland applies the energy conservation hierarchy – first, make use of the natural environment to have passive design; second, optimise the efficiency of building services system; lastly, apply renewable technology to further offset the energy use. The technology development of renewable energy is on the cutting edge of trend day by day, and as a result, higher acceptance and usage in the architecture design. On-site produce and on-site consume is recommended for renewable energy planning as to minimise energy loss during the delivery process.

2.2 Behaviour

2.2.1 Air ventilation

Taiwanese are welcoming natural ventilation, and they generally have a behaviour to accept the slightly higher indoor temperature in naturally ventilated environment. This can greatly increase the usable period of natural ventilation. Advanced natural ventilation design reduces the energy consumption for air-conditioning equipment, and also provides sufficient fresh air to improve the indoor air quality. In this case, advanced computational fluid dynamics (CFD) technique is used to enhance the mountain shape design figure to maximize natural ventilation.

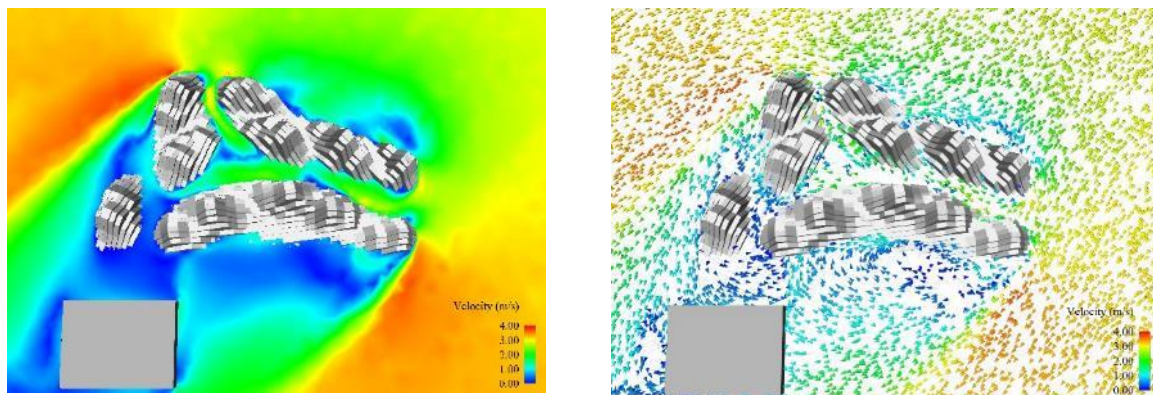


Figure 4: CFD air-flow simulations facilitate the wind environment design

2.2.2 Water efficiency

Waste water and the demand of potable water are two major issues to influence the environment on the water resource aspect. The uses of water efficient fixtures are common now, but this implementation is not good enough to reduce the impact and burden on the environment. Water recycling design should be the most significant strategy to deal with these issues such as gray water treatment and rainwater recycling systems for irrigation and flushing. However, in Taiwan, people have the perception to avoid using recycling water with human contact. In Waveland, the rainwater recycling is applied, and sufficient educational panels and facilities are provided to drive for users' behavior change.

2.2.3 Fitness

In urban cities nowadays, advanced transportation and labor-saving jobs has provided us a convenient life but at the same time threats has been brought to impact the citizen health. A high portion of the citizens cannot reach the suggested daily activity hours, which may cause obesity and cardiovascular diseases. It has been proved that

sufficient exercise everyday benefits both physical health and mental health for humans. Some special fitness design ideas are inserted into this case such as horse riding, windsurfing, jogging path, and stair promotion.



Figure 5: Fitness concepts are applied into the design to provide a healthy living space

3 HEALTH AND WELLNESS

Human health issue was easily neglected in contemporary sustainable design. In the past 20 years, architects and designers paid more attentions on the outdoor built environment and building energy efficiency, but have ignored the indoor occupants and their needs. The new lifestyle, LOHAS, emphasizes the balance between outdoor and indoor living qualities. Today, a healthy living space, both mentally and physically, has become a core that cannot be ignored anymore.

3.1 Local culture

3.1.1 Nourishment

Food is the main source that humans obtain their nutrients and therefore has a direct impact to human health. Nowadays, the industrialized agriculture has altered the quality and quantity of food we take. There are more and more processed foods and artificial ingredients on the dining table, and it is either difficult or expensive to have a healthy meal. In the LOHAS community, the nutrition information of foods are to be shown clearly and those unhealthy products should be limited. On-site farming with local species is encouraged to control the quality of foods to be served in the community.



Figure 6: Organic farm and restaurants provide a healthy and local choice to occupants

3.1.2 Smart

One of the distinctive attractions of urban life that people nowadays can't live without is convenience. For example, U-bike, the public city bike rent system provides an easy way to ride and explore in Taipei City. A smart and

convenient transportation system encourages citizens to take public transportation for their daily move to reduce carbon footprint. In addition to smart transportation, a smart building system which is based on the advanced information and communications technology (ICT) in Taiwan effectively influences occupants' behavior to avoid energy wastes like daylight sensor, information dashboard, and demand control. Smart Home concept is implemented in the Waveland.

3.1.3 Mind

The mental status somehow influences the physical health both directly and indirectly. Anything that makes occupants happy and peaceful in mind benefits their health status too. In the concept of LOHAS, nature and beauty are two key points to evaluate design level in this category. A design linked to local context and culture is highly probable to be recognized as beauty. Plants, animals, arts are all included in this aspect.



Figure 7: In terms of beauty, nature and culture are two major factors

3.2 Fitness and well-being

3.2.1 Connection

The feeling of alienation is common in the urban life which may lead to negative impact on mental health. In this LOHAS community, the architect designs many meeting corners such as coffee station, vanilla garden, and links them together by a jogging path which winds between and around buildings to encourage social interactions throughout the site. There are also many courses and activities arranged for all residents to improve the connection in the community with the intention of providing a living environment as close as they were in urban area, or even better.



Figure 8: Specific space design links occupants together and improves interpersonal relationship

3.2.2 Greenery

Greenery benefits a lot in reducing urban heat island effect. Additionally, it is one of the key points to recover the natural habitat and to reduce energy consumption. A new thinking for greenery is to have the awareness on the plant species selection which influences the water demand of irrigation and the efficiency of cooling down the ground or roof temperature. For example, in this case, the roof is 100% recovered by greenery and the roof temperature is lower than concrete roof.

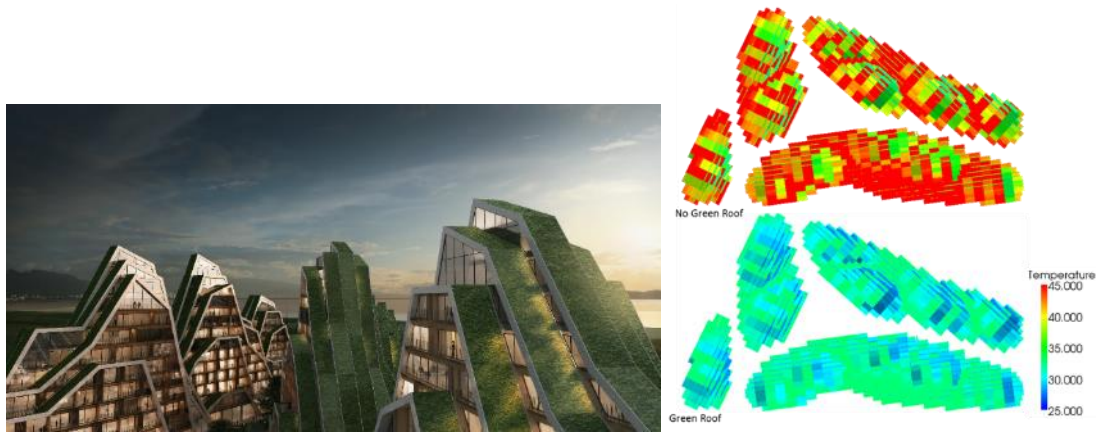


Figure 9: Maximum green roof design efficiently reduces urban heat island effect

3.2.3 Air quality

Urban residents in Taiwan would drive for hours just to go to the countryside to spend their weekends, in search for clean fresh air. The air pollutants such as PM_{2.5} and PM₁₀ have been threatening human health tremendously in big cities. That is why natural ventilation may not be welcomed in the urban area. Before the outdoor air quality is improved in big cities, a high efficient air filter and indoor air quality monitoring are recommended to maintain the occupants' health, integrated with the Smart system. People spend 90% of their time indoors like in workplace, home, shops, restaurants, and therefore the indoor air quality is the first priority to ensure a healthy living space.

4 CONCLUSION

The two core values of LOHAS are “sustainability” and “health and wellness”. According to the study of Taiwan society, there is an obvious and strong trend of demand for new lifestyle that combines the advantages of urban and suburban area. This situation is believed to be common in the modern cities around the world, and LOHAS may be one of the best solutions to this.

LOHAS represents a balance between the environment and its occupants. The human health, including both physical and mental parts, is as important as building sustainability. Nowadays, if a building only focuses on sustainability aspect would not be good enough to meet the public desire of life. Thus, a healthy and sustainable living space where the designers pay more attentions on the health issues such as nourishment, fitness, and interpersonal relationship could be an exemplary approach to response to the desires of residents in the modern cities, and it is expected to soon become the standards for future building industry.

REFERENCES

- [1] Architecture & Building Research Institute, Ministry of the Interior Library (2014) Green Building Evaluation Manual. Basic version. 2015th edn. Taiwan: Architecture & Building Research Institute.
- [2] International WELL building institute (2014) Available at: <https://www.wellcertified.com/> (Accessed: 20 September 2016).
- [3] LEED | U.S. Green building council (1993) Available at: <http://www.usgbc.org/leed> (Accessed: 10 September 2016).
- [4] Ritchie, A. and Thomas, all (2002) Sustainable urban design: An environmental approach. Edited by Randall Thomas. New York: Taylor & Francis.