

“SUSTAINABLE APPROACHES
FOR BUILT ENVIRONMENT IN DEVELOPING COUNTRIES”

PROCEEDINGS



The 14th International Conference on
**SUSTAINABLE
ENVIRONMENT
AND ARCHITECTURE
(SENVAR)**

Banda Aceh 7, 8, 9 November 2013



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The 14th International Conference on Sustainable Environment and Architecture (SENVAR)

*"Sustainable approaches for built environment
in developing countries"*

Banda Aceh, 7-9 November 2013

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Hermes Palace Hotel, Banda Aceh, 7-9 November 2013

THE
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Welcome Remarks

Your Excellency, Mayor of Banda Aceh City, the president of SENVAR, and the Rector of Syiah Kuala University. Honorable guests from Heriot Watt University Edinburgh UK, Institute Sultan Iskandar UTM Malaysia, UTM Skudai Johor Malaysia, Tokyo Institute of Technology Japan, Hiroshima University Japan, Deakin University Australia, Australian National University, HCU-Hamburg Germany, Universiti Teknologi MARA Perak Malaysia, Tanri Abeng University (TAU) Jakarta, Parahyangan Catholic University, Bandung Institute of Technology, Institute of Technology Sepuluh Nopember Surabaya, Atma Jaya Yogyakarta University, State University of Medan, Gunadarma University, Sebelas Maret University, Lambung Mangkurat University, University of Brawijaya Malang, University of Gadjah Mada Yogyakarta, Mercu Buana University, UNDIP Semarang, Sebelas Maret University, Duta Wacana Christian University Yogyakarta, Universitas Indonesia, Muhammadiyah University of Aceh, Research Institute for Human Settlements Ministry of Public Works, Denpasar Experimental Station for Traditional Housing Technology Development, Citra Rancang Consultant, academia civitas of Syiah Kuala and all of distinguished guests and students.

It is a great pleasure as a chairperson of organizing committee to welcoming all of you at the official opening ceremony of the 14th International Conference on Sustainable Environment and Architecture (SENVAR) 2013. Additionally, I am honored to host such an important event which is a part of the 50th anniversary of Engineering Faculty, Syiah Kuala University. As I mention in the initial speech, this event is attended by six different countries including United Kingdom, Malaysia, Japan, Australia, Indonesia, and Germany. The event is being sponsored by Syiah Kuala University and supported by some industries.

Ladies and gentlemen,

The theme of this year's conference is "Sustainable approaches for built environment in developing countries". All invited speakers and presenters from abroad and Indonesia will disseminate and discuss about the diverse issues related with sustainable architecture, local wisdom and sustainability, sustainable construction and material, low energy indicators for built environment, sustainable urban design and planning, sustainable village planning.

Finally, I would like to express my gratitude to all participants and sponsors, and also my sincere appreciation to all of seminar committee for all effort to make this seminar come about. We wish you to enjoy the programs of conference in plenary lectures, parallel presentations, and poster session and city tour of Banda Aceh.

Dr. Ir. Izziah, M.Sc

Chairperson of SENVAR 2013

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Preface

The accumulation of human action and the effects of development pattern pursued by humanity to the environmental systems, such as landscape changes, water and air pollution, acid rain, ozone depletion, global warming, species extinction and resource depletion are leading to global changes in climate, ecological health, and in turn could affect the existence of human being.

Cities had been built on only two per cent of the world's land surface. Nevertheless, they use 75 per cent of the world's resources and discharge large amounts of waste. The growth of city is linked to urbanization. Because of urbanization, the number of city dwellers has increased and consequently the demand for building also increases. Buildings and the whole process of creating built environment contribute significantly to global environmental and ecological degradation. Two examples where this phenomenon can be observed is when affluent communities in developing countries develop built environment believed to perform high technology that actually neglect the adaptation to the local climate. The implication is excessive use of energy. On the other hand the marginal communities use local materials believing that it is a form of adaptation to the local climate when it actually lead to an excessive use of materials causing the scarcity of the products.

Therefore people are urged to give high contribution to a saver planet and consider efficient use of our resources. It is time to shift attitude and consciousness to the new paradigms and approaches that should be used by building professionals and stakeholder involve in the process of creating built environment to protect ecosystems and provide the basis for sustained life opportunity on earth. It is time to build with ecological and environmental consciousness not only for amenity and economy but also for sustainability and habitability.

Concerning these issues, the 14th International Conference on Sustainable Environment Architecture (SENVAR 2013) invites researchers, academia, government officers, practitioners and professionals to share and exchange knowledge and expertise in search of appropriate and effective strategies toward a more sustainable built environment and architecture. Strategies that help the concept of sustainable development and architecture to be viable and realized into development practices and could provide the best solutions for the wellbeing of both human as well as the environment specifically in developing countries.

The Committee of 14th SENVAR

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Prof. Dr. Mohd. Hamdan bin Ahmad	Institute Sultan Iskandar Universiti Teknologi Malaysia 81310n UTM Skudai Johor, Malaysia drmedan@gmail.com	Sustainable Metropolis - Low Carbon Society Of Iskandar Malaysia
Prof. Tri Harso Karyono	School of Architecture, Tanri Abeng University (TAU), Jakarta, Indonesia Email: karyono15@gmail.com ; t_karyono@yahoo.com karyono15@gmail.com	Indonesia Sustainable Development: Minimising CO ₂ Emissions And EF Levels Without Sacrificing The Nation's Well-Being

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Development of Sustainable Construction Planning Model at Living Houses Based on The Urban Public Perception in Medan

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Abstract

Medan is currently developing and building incessantly towards the modern city and metropolis. Direction of the development of the modern city and the metropolis tend to impact on the concept of thinking or behavior of society, especially in the field of construction and architecture. Behavior in practice tend to give priority to the construction of physical factors without considering building regulations that have been set previously, the context of the building to nature and environment, as well as the quality of the space created from the design and planning of the construction practice.

This research aims to identify the concept of thinking, rather than behavior and perception, urban communities in the city of Medan in construction practice. The issue of sustainable construction is the theme to know the views and perceptions of the community and the offender or the construction of the alternative construction concepts are much different than before. From the observations, discussions, interviews, and in-depth approach to the object and the respondent, is expected to designed a model of sustainable construction plan as an effort to create a practice that is much better construction, quality, environmentally conscious and help curb the greenhouse effect.

Initial data collection is done by the method of observation, questionnaires, interviews, exploration of a variety of sources such as literature, experts, practitioners, urban communities. Collected data will be analyzed by descriptive analytic, quantitative and qualitative, and the results of the analysis will be used as a framework to obtain the possibilities of sustainable development planning model construction residential character and fit the needs of its occupants.

Keyword: sustainable construction, residential, public perception, Medan

I. INTRODUCTION

The concept of sustainable development or construction arises due to awareness of environmental issues such as global warming and climate change. Intensively discussed environmental issues, environmental causes tremendous damage makes the earth and its contents suffered and entered a period of crisis. Development or construction is one of the many factors that contribute to environmental degradation. Development or construction that should be done to improve the quality of human life became the largest contributor to the destruction of nature. Globally, the construction sector consumed 50 % of natural resources, 40 % energy and 16 % water. Damage caused by the construction process can be seen from the start of activities to get materials, processing materials, the construction process, to the use of buildings, people constantly take natural resources. Current construction practices implemented based on economic considerations. However, base on the construction of sustainable best considerations related to quality of life and long-term energy efficiency. By implementing sustainable development or construction, then the attempt

the use of water, materials, energy, and all building activities can minimize damage to nature.

Residential development is an indicator of the condition of the city's most conspicuous. He is the debate between the tastes, lifestyle, ideals, and even ideology. At this time the world of construction rose in line with the economic revival.

Medan is a city that is growing and building incessantly towards the metropolis. Medan city development direction of modern metropolis and great impact to the way of thinking and behavior of society, because all the facilities met by the city government through its relentless development such as construction of shops (shop), shopping malls, hotels, restaurants, residential complexes and office buildings. Property development which is often not fast enough attention to existing rules, sometimes made structures do not take into account the environmental, human, nature and quality of the urban environment.

The Issues of concern in this study are:

1) Increasing the greenhouse effect which led to global warming, prosecute construction to examine the

- condition and seek appropriate solutions in planning, designing and carrying out construction work.
- 2) The phenomenon of urban housing in a heavily discussed topic, ranging from design, lifestyle demands, and of the growing style house and grew up in urban communities, especially in Medan.
 - 3) The development of the field of modern metropolis immediate change public perception. Developments in the field of bolted construction, especially housing, has become a new problem for users and performers construction. All parties are invited to more wary of the growing uncertainty, before the chaos ensue resulting in a decrease good quality of life in individuals (micro environment) or group (macro environment).

This research aims to identify the concept of community in Medan in the process of establishing residence, as well as their perceptions of the concept of sustainable construction. This research will contribute in the form of positive feedback in the form of principles, concepts, and construction background material applied in setting up homes with sustainable building concepts. For construction actors and stakeholders in the field of construction to obtain important information regarding the public perception of the phenomenon of sustainable construction.

II. RESEARCH METHODOLOGY

The research was conducted in Medan. Samples were taken of houses that are in each district contained in 21 districts in the city of Medan. Samples were selected based approach to construction-related building characteristics, building style, both built with or without the services of a professional design process at all. The population is people living in all districts spread across the city of Medan. In this study a random sampling done by selecting two respondents from each district. Selected respondent is a resident who lives in general or specific neighborhoods, with its own ownership or lease, using the services of a professional or not.

This research was conducted with the empirical approach to understanding the concept of sustainable buildings developed in the community. The approach is also performed by observing, observe and gather public opinion through questionnaires that measured conceptual thinking of the behavior plan, design, and build the house stay. The study was conducted with the survey approach through questionnaires and direct observations of the object carefully, namely residential buildings. The method used in analyzing research data conducted quantitative and qualitative, where the measurement and objective statistics through scientific calculations derived from the sample population living in 21 districts in Medan.

Categories nature of the research is descriptive, not only limited to data collection and data processing, but continued to the data analysis and interpretation of data. Data obtained from the field, respondents, and other references analytically analyzed descriptively. Data analysis was using the method of approach to sustainable

construction and an understanding of human perception (environmental impact of result design). The result of the analysis is a framework to obtain the development possibilities of the model and the concept of sustainable construction in residential buildings is based on the public perception in Medan.

Data collection was done by:

- 1) Non participant observation
- 2) Researchers simply observe what happens on the field and record it.
- 3) Questionnaire

The research questions in the form of statements and concepts related to the concept of sustainable construction. Questions are used in the questionnaire is the result of the elaboration of research literature on the concept and framework of sustainable construction outlined by the UIA (United of Architect) at the Copenhagen Declaration on December 7, 2009. Questions used in the questionnaire are closed, where respondents were asked to answer by choosing from several alternatives is given. With a lack of clear boundaries in this study, researchers will be easier to analyze.

Supporting materials that are used in the study include photo documentation, design drawings or existing buildings obtained from direct observation and resource persons (residential homeowners or developers). Concepts related to sustainable buildings (the principles, concepts, models and material construction and definition) in the form of drawings, sample cases, definitions and explanations related to a deeper understanding of sustainable construction is obtained from various sources through library. The tools used in this study include: stationery, digital cameras, roll meter, scanners, and questionnaires.

III. RESULTS and ANALYSIS

Results obtained through photo record documentation, design drawings and existing homes, as well as distributing questionnaires are divided into three parts, the first part is the data itself respondents; total number of 8 declaration statement. Part II is an aspect that relates to the concept of building a house; statement total number of 46 statements, and the third part is the aspect related to the concept of sustainable construction; the total are 18 statements.

From questionnaires that are distributed to 21 districts, obtained preliminary data showing that 35 respondents are working-class people with PNS (civil servants) and quantity 19, and was followed by a private employee group / state with 10 quantities, as well as self-employed with the quantity class 6. Community group that became the sample in this study, have an average income of Rp 5.000.000, - s / d Rp. 10.000.000, - the nature of the ownership of the house is its own / private. Calculation results are described in Table 1 s / d Table 2. General picture obtained from the calculation of income level, social status and the nature of home ownership indicates that the respondent is a society with high social status who

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lives all-sufficient with a high enough income, and has a permanent home privately.

TABEL I
RESPONDENTS COMPOSITION OF THE 21 DISTRICTS IN MEDAN BASED ON LIVELIHOOD

No.	Indicators Evaluation	Quantity
1	Civil servants/Retirement	19
2	Private employees/state-owned enterprises (BUMN)	10
3	Entrepreneur	6
4	Profession (doctor, notary, architect, etc)	0

TABEL II
HOUSING PROPERTIES

No.	Indicators Evaluation	Quantity
1	Self-owned	24
2	Rent	0
3	Family home	8

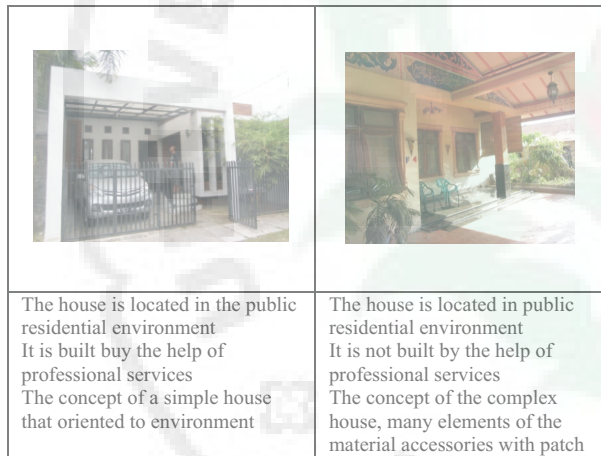


Fig. 1. One of case study houses are located in the district of Medan Johor and Medan Area

In residential locations, found 65.7 % of respondents live in the general area or neighborhood residential neighborhood adjacent to the general public with a variety of social levels. And 34.3 % of respondents living in specific neighborhoods are communities that have almost the same social level, such as housing estates and real estate agencies. Most respondents inhabit the house with building types ranging from 100 m² - 500 m². It is stated that the people in the city of Medan has a high demand for spaces in the living house. However, the awareness to use the services of planners and construction is still relatively low at around 28.6 % . People prefer to plan and design a living house with the ability and experience of its personal. It gives the real picture that people in the city of Medan have knowledge of planning and construction is still limited. For it should be given the knowledge and socialization to the community in the city of Medan importance of planning services , in order to realize the appropriate residence habitable standards , both micro and macro. In addition, professional services also have the virtue of being able to plan cost, schedule, and more mature design and integrated.

TABEL III
SPECIFICATION OF RESIDENTIAL ENVIRONMENT

No.	Indicators Evaluation	Quantity
1	General neighborhoods	23
2	Special neighborhoods	12

TABEL IV
BUILDING TYPE

No.	Indicators Evaluation	Quantity
1	< 100 m ²	5
2	100 m ² – 500 m ²	26
3	> 500 m ²	4

TABEL V
PLANNING SERVICES

No.	Indicators Evaluation	Quantity
1	Architect and engineer	10
2	Craftman	10
3	Personal experience	15

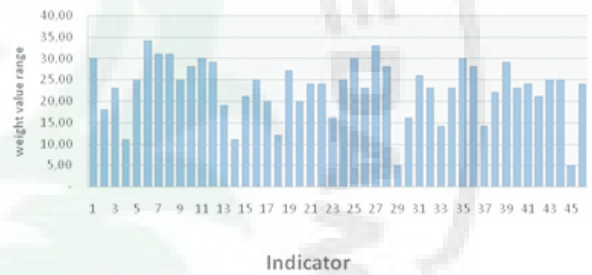


Fig. 2. Quantity value charts



Fig. 3. Percentage figure of each indicators evaluation

The results of calculations of data in Fig.2 and 3 illustrates that the concept of living house is planned with consideration of costs (indicators 1-2), the selection of site (indicators 3-5), site planning (indicator 6-10), environment (indicators 11-14), pre-design concept (indicators 15-20), programming architecture (indicators 21-35), the construction process (indicators 36-39) and the style of the building or home concept externally (indicators 40-46). Identify concepts are summarized in the following explanation:

- a. Cost
The calculations show that the city of Medan planning to build a house with the concept of limited funds. When the construction work going on at the time of the addition or change in the design, then the funds for things that are not taken into account unforeseen at the beginning of the work.
- b. Selection of Site
In general, Medan choose to live in public housing neighborhood by choosing the site or land in the residential neighborhood general, they can plan the home in accordance with the wishes and needs of

each family member. If the available site in the residential neighborhood more general than in specific neighborhoods so people prefer to live in public housing neighborhood. And from about 65.7 % of respondents overall community has chosen and lived in the site or location in accordance with the provisions of the land use has been regulated by the government through the Department of City Planning, which is the residential zone. However, it is not uncommon that there are still people who live in public housing with limited site conditions and environment between the dwelling jostling with each other phenomena such settlements is a question for researchers, whether it is all building and building societies are based on the rules of urban planning. This problem is the task of construction actors, communities and governments in providing the right solution and wisely in order to realize the micro and macro environment of a higher quality and more sustainable.

c. Site Planning

From the comparison of quantity values is clear that people in Medan prefer planning in accordance with the conditions of the site. Planning related to the balance between site and space in also an important consideration for the community, in addition to consideration of the technical boundaries of urban design and planning from the circulation or to tread. Consideration of the technical boundaries building structure should be the main focus in determining the concept of building footprint. With the order listed in the technical regulations, it will directly affect the determination of the condition of the building land users and the surrounding environment, the amount of space and form of the building mass, circulation, and balance of micro and macro land.

d. Environment

Data acquisition for environmental indicators show that the lack of awareness of the city of Medan to plan home context with the surrounding environment. Planning through environmental considerations will indirectly have a positive impact on the environment, region, and even in macro. Creation of environmentally friendly building will provide a good influence for human survival and character; otherwise if the building is planned regardless of the environment it will worsen the quality of life, environment, region, and city.

e. Pre-Design

Most of the planning field house with the help of experts and built from personal experience. That is, the pre-design phase of homeowners already undergone the process of beginning a systematic design planning. Where experts (architects and civil) has directed the public to follow the rules of standard design without ignoring the internal factors homeowners (activity, profession, family members, costs, occupants character). But of the many people who use the services of an architect or engineer, there are still about 50% of people who had not planned to stay home with thorough planning. That is, the field is

still planning a home without considering the aspect of space requirements based on the function and activity of a family member, the cost and availability of imaging of character occupants.

f. Architecture Programming

Judging from the distribution of the quantity values for this indicator, the field has a high awareness in planning the spaces inside and outside their house. The concept of the planned start of the problems of organizing space, the possibility of development, imaging and character you want to show up to the consideration of the selection of material and type of construction of the building. This condition applies if the observed already has sufficient economically, and has a high need for active spaces in the house. Where most of the people in this group outdoor activities, so that home is a place of relaxation after a weary back to a day of activities and not just a mere shelter. Conversely, when the house only serves as the need for shelter, the desire to plan space with a well-planned concept will never materialize. Of the many indicators in the programming aspects of architecture, found one that has a quantity indicator to its lowest value of building material selection considering the materials that can be recycled, with a percentage of 1.4 % of total respondents. It is claimed that almost all the people in the field do not have the awareness to choose materials that can be recycled. For example, when there is an old building or house will be renovated then dismantling the remnants of a material can be reused in the new building. However, this is far from reality. Most of the people are no longer considering dismantling the remnants of the material that can be recycled, rather than choosing the material or material which is much more recent, trends, and sometimes excessive in terms of functionality, cost and design. Awareness of the role and construction is needed in creating the concept of green building and sustainable, for the continuation of human and natural resources in the future someday.

g. Construction process

Quantity or percentage values obtained from the construction process indicators stated that in general, people in Medan did not consider the factor of construction management in implementing residential construction. Possibility is based on the ignorance of society to benefit construction management, and financing sources or factors limited the construction work. This can be a very positive outcome for the architect or engineer (civil experts), and the parties related to construction work more factors to consider in the management of the construction process. The main purpose of this application will bring the perpetrators construction, also the owner of the house, for a more mature concept building, especially residential. Whether planning costs, schedules, material, financial, and workplace safety, and sustainability of the physical building and the environment.

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h. Home concepts

In general, it can be concluded that the majority of respondents, particularly in Medan, preferring the concept of home care and attention to climatic and environmental conditions, as well as carefully planned by experts and design is the part of the owner's personal experience. Most people plan home with popular imaging through the application materials are trends and some simple home concept. And not infrequently develops the concept of home in Medan has followed the rapid urban growth to the metropolitan. This condition is followed by the mushrooming and popping or residential complexes built by real estate developers who pay less attention to the context of micro and macro environment, and just put the economic side alone. This phenomenon will worsen the real estate community mindset to the ideal concept of a dwelling. Unconsciously, people were led to think and act practically, without considering the values and ethical conduct of a dwelling, dwelling on the environment and the context of the basic essence as a character dwelling occupants.

IV. CONCLUSION

In this research note that the indicators are considered most important by the people who live in the city of Medan is planning a building site in accordance with the conditions of the site and the concept of space that suits your needs and family activities. While, the concept of materials selection that can be recycled is the lowest indicator of the selected respondents. The next survey should be conducted with a more narrow scope by taking the population of the areas in the district (the village) as the benchmark to obtain more accurate data. Then the

indicator will be obtained by planning concept that society has primacy in creating and setting up residence. The data obtained will be compared with the results of focus group discussions conducted by experts.

The results obtained can be developed a model which departs from the indicator and can be used by the public as an independent guide. Or a plan that can be a generator for the community so as to improve the physical quality of life and environment in the micro and the macro, the quality of the sustainable city.

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