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Faculty of Engineering
Universitas Indonesia

**THE 12th
INTERNATIONAL
CONFERENCE On QiR
(QUALITY in RESEARCH)**

in Conjunction with
ICSERA 2011

Program Book

QiR

Bali,
4-7 July 2011

ISSN 114-1284

<http://qir.eng.ui.ac.id>

WELCOME FROM THE RECTOR OF UNIVERSITAS INDONESIA

I am honoured to have the opportunity to officially welcome you to the 12th International Conference on QIR (Quality in Research) 2011. As we are all aware that the impact of globalization has resulted in a very competitive business environment; a condition that makes the fulfilment of the needs of customer/clients' ever-sophisticated project, product, or service most challenging. Without any doubt, a sustainable design and technology is the key factors in assisting our industries to enhance their contributions to the future development of humanity. Therefore, it is our hope that this conference will be able to provide an international forum for exchanging knowledge and research expertise as well as creating a prospective collaboration and networking on various fields of sustainable engineering and architecture.

In order to achieve business objectives and benefits, engineering products or projects require various resources, skills, and technology. Accordingly, we need an application of knowledge, tools, and techniques necessary to develop sustainable products or projects, which are environmentally friendly, produced through efficient processes, and adapted to local conditions. And this may be achieved by eco-technology. Eco-technology is a technology that will give consumers what they want; lower cost, convenience, save money and deliver what people everywhere needs: less waste, less pollution, and green environment. Eco-technology practices can facilitate to conserve and restore the environment through the integration of engineering and ecological principles. However, eco-technology requires multidisciplinary synthesis of knowledge and skills; and the development and application of this technology in the sector of industry and services is therefore a crucial requirement for sustainable development process. For this reason, we urgently need new technologies and practical applications to be further developed based on the current knowledge.

Accordingly, I hope this conference can be a kick-off for the strengthened action and partnerships on creating a platform for us; national and international thinkers, academics, government officials, business executives and practitioners, to present and discuss the pivotal role of engineers in creating sustainable development.

I would like to thank the Faculty of Engineering of Universitas Indonesia for organizing this meaningful and timely event, and supporting organizations for their participation and contributions. I am sure that you will all find this conference stimulating and rewarding and with this, I wish you all a fruitful conference.

Prof. Dr. der. Soz. Gumilar Rusliwa Somantri
Rector
Universitas Indonesia

**WELCOME FROM THE DEAN OF FACULTY OF ENGINEERING
UNIVERSITAS INDONESIA**



On behalf of the Faculty of Engineering, University of Indonesia, it is my greatest pleasure to extend our warmest welcome to all of you to the 12th International Conference on QIR (Quality in Research) 2011. As we know that this conference is conducted to cover a wide range of sustainable design and technology issues, I hope this two days-conference will be spent in interesting discussions and exchange of ideas. I also hope that this conference will be able to provide a state-of-the-art information and knowledge in this challenging world of sustainable design and technology. The growing success of our institutions and expertise should urge us to develop our competitive capabilities, especially when we face certain challenges which should be overcome with hard work, cooperation, and working together hand in hand. We will work together to develop a common path and develop collaboration opportunities for future action and research on multi-disciplinary engineering areas for quality of life and humanity.

I am delighted that you have accepted our invitation to this conference in such a large numbers as indicated and that we will have many international speakers and papers from various countries to be presented and discussed in these two days. We will explore various issues on sustainable development and we must widen the scope of sustainability from a product-, system-, or an individual building-scale to the whole community-scale. At the same time, we have to widen the focus from ecological aspects to social and economic aspects. This means that environmental solutions should always be considered from the aspects of human health and well-being, safety, and economic point of view. This conference provides an excellent forum for engineering professionals, business executives, industry practitioners, and academicians to exchange ideas and to share their experience, knowledge and expertise to each other.

I would like to thank our sponsors, supported bodies, and various contributors for their generous support of this conference. I would also like to thank our distinguished speakers for agreeing to share their insights with us. To our friends from overseas and other provinces of Indonesia, I would also like to extend a warm welcome to you and wish you an enjoyable stay in Bali. Last but not least, I would invite you to join me in thanking the committed staff that made this conference happen and to make it success.

I wish us much success in the deliberations, discussions, and exchange of ideas which we will have within this conference and I wish you a very pleasant and enjoyable stay here in Bali.

Prof. Dr. Ir. Bambang Sugianto, M.Eng
Dean Faculty of Engineering
Universitas Indonesia

WELCOME FROM THE QIR 2011 ORGANIZING COMMITTEE



On behalf of the Organizing Committee, it is my greatest pleasure to extend our warmest welcome to all of you to the 12th International Conference on QIR (Quality in Research) 2011. The selected theme for this year's conference is "Integrated Design in Urban Eco-Technology for Quality of Life and Humanity". With this theme, the conference focuses on the scientific analysis and design of the key factors explaining the success applications of integrated design in urban eco-technology, their market perspectives, and their contributions to the existing and future development of humanity. In line with this theme, it is our utmost pleasure to hold the QIR 2011 in conjunction with the 2nd International Conference on Saving Energy in Refrigeration and Air Conditioning (ICSERA 2011).

With its continuous presence for 12 years, QIR has become an icon for Faculty of Engineering Universitas Indonesia in serving the objectives to provide engineering excellence for both national and international in all aspects of engineering, design, and architecture. For the first time, the QIR 2011 is held in a famous beautiful island of Indonesia - Bali. The QIR 2011 is supported by Universitas Udayana, in the spirit of strengthening of cooperation and mutual growth to be world class institution. I am delighted to inform you that we have such a large number of participants today, as indicated, that we will have 21 invited speaker presentation and more than 520 papers from more than 20 countries to be presented and discussed during these two days-conference. We are fortunate to have a lot of good quality papers belong to:

- 32 papers on ICSERA
- 39 papers on Chemical Engineering
- 115 papers on Electrical Engineering
- 37 papers on Mechanical and Naval Architecture Engineering
- 101 papers on Materials Engineering
- 54 papers on Architecture & Planning
- 75 papers on Industrial Engineering
- 72 papers on Civil Engineering

I would like to thank all contributors, speakers and participants for your generous support to this conference. It is my pleasant duty to thank all the members of Organizing Committee and the International Board of Reviewers for their advices and help. We are grateful to all Sponsors, Supporters, Exhibitors, Partner Universities and Professional Associations, for their spontaneous response and encouragement through committing funds and extending help in kind. I would like to sincerely thank the Rector of Universitas Indonesia and the Dean of Faculty of Engineering, for fully supporting the Committee and providing all supports to make this conference happen and to make it a success.

I wish you a very pleasant stay here in Bali; and finally, let me wish all of you a meaningful and fruitful conference. Thank you and we hope to see you again at the QIR 2013.

Prof. Dr. Ir. Bondan T. Sofyan, M.Si.
Chairman of QIR 2011 Organizing Committee

Architect's Action to Control Damage of Environmental

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ABSTRACT

Along as population growth and development, it happens that the physical development of the city begins with the rapid developments in the suburban. This was marked by numerous changes in land use from green open area into an area built, resulting in uncontrolled growth of cities (Urban Sprawl). Increasing the number of people followed by improvement of the infrastructure is directly or indirectly been drained of natural resources, which ultimately resulted in a decrease in carrying capacity. To avoid a crisis of natural resources, sustainable development must be realized, where development should be considered against the social, cultural, and economic. Here, many parties must play a role in creating sustainable cities. Therefore it needs a strategy for urban development in order to manage natural resources. Development must rely on all the actors and for the good luck together.

Architect is one of the actors who played a part in creating a sustainable city that damage of environmental can be controlled. Much to be done by the architect to create a friend, urban environment, urban space planning with comprehensive and integrated models of participatory planning and over-the-board planning or cross-sector planning process is performed in consistent, sustained and sustainable.

Keywords:

Architect's Commitment, Degradation of Environmental, Sustainability

1. INTRODUCTION

Man is a component of the natural environment along with other natural components of human beings live together and manage the natural environment. Using science and technology has developed people main easy and natural to organize according to their needs. Architect as one of the actors that play a role in designing and constructing the built environment ranging from macro level (city and urban planner, landscape architects) to micro level (building design), often less attention to the harmony of nature, in terms of utilization of natural resources and use of technologies that are not friendly to nature. Therefore, the Architect has a big hand trigger environmental degradation resulting in decreased quality of human life. Implementation of government policies related to the regulation that refers to carrying capacity and meet the requirement of safety, health, comfort and ease in its implementation faces many obstacles. Some thinkers in the field of planning and urban design, and the built environment in urban areas argued that to achieve sustainable development process, it is necessary to plan and design that is based on ecological and non-anthropocentric environmental ethics. Non-anthropocentric environmental ethics saw man as a living community in the world, as well as all other living things, and have an equal footing with other living beings (Taylor, 1986). Since the second half of the 20th century the development of non anthropocentric environmental ethics as a result of environmental crises. This paper aims to determine the extent to which Architect make an impact on environmental damage than make a recommendation to the Architect in controlling damage to the environmental based on sustainable planning. This paper also expected to provide input to government on policies related to regulation in the planning, design and development, to the relevant actors, and society.

2. RESEARCH METHOD

This research is case study and field, with the characteristics of the problems associated with the back ground and current conditions and their interaction with the environment and to provide a complete picture of the case. Book study done by reviewing the written sources such as documents, reports, legislation, and others. Collecting data through field sources associated with the natural situation is accomplished by direct contact with the ground situation is through observation, interviews, focus group discussions (focused group discussion). Done in descriptive analysis techniques aided by visual media such as photos, drawings and so forth.

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3. RESULTS AND DISCUSSION

Definition of Environment Indonesia according to Law no. 23 in 1997, The Environment is a unity with all things space, power, circumstances, and living creatures, including humans and other living things. While the scope of Indonesia's environment includes the space, where the Republic of Indonesia in implementing the vision of the Archipelago's sovereignty, sovereign rights and jurisdiction. In the environment there are ecosystems, the order of environmental elements that are integral part of a comprehensive and mutual influence in shaping the balance, stability, and productivity of the environment.

3.1. Damage of Environmental

Based on the causes, Damage of Environmental can be divided into 2 types :

- a. Damage of Environmental due to Natural Event
- b. Damage of Environmental to Human Factors.

Man as ruler of the environment on earth plays a major role in determining the sustainability of the environment. Man as God's creatures who understands the world could change the face of the pattern of simple life to modern life forms today. But unfortunately, often what the man is not balanced with thinking about the future life of the next generation. Much progress achieved by humans bring adverse impacts on environmental sustainability

3.2. Architect Role

Architecture according to the Oxford dictionary: art and science of building, design or style of building (s) is the art and science of designing buildings. This understanding can, more broadly, covering all architectural analysis and planning process all the physical needs of buildings, ranging from macro level of town planning, urban design, landscape architecture, down to the micro level that is designing the interior / exterior. Architecture also refers to the results of the design process. The role of the architect, always-to-date and follow the will of the client, always will be no dialogue between communities and between the owner with architects, and between architects with other related fields. And the result is an output called the architecture, as a product and a solid discipline. Proverb says Architecture is a silent language not spoken, but to understand the users. In a book written by Vitruvius De Architectural, disclosed that a good building should have aspects :

- a. Beauty/ Aesthetics (Venustas)
- b. Strength (Firmitas)
- c. Function (Utilitas)

Architecture is the balance and control between the three elements, where all aspects have the same portion so that there can be no single element in excess of other elements. In the modern definition, architecture must include consideration of function, aesthetic, and psychological. However, it can be said also that the element itself functions in it already includes both aesthetic and psychological elements. Architecture is a multi-disciplinary field of science, which includes math, science, art, technology, humanities, economics, social, politics, history, philosophy, and so forth. Required ability to absorb a variety of disciplines and implement them in a systematic integral. Vitruvius states: "Architecture is the science that arise from other sciences, and is equipped with the learning process: assisted with the assessment of the work as art." He also stressed the need for an architect to understand the social, medical, law, economics, philosophy, etc. Philosophy is one of the principal in the architectural approach. Rationalism, empiricism, structuralism, post-structuralism, and phenomenology are some of the influence of philosophy on architecture

3.3. Effort to Achieve Sustainable Development

Environmentally sound development is the quest to improve human quality gradually by taking into account environmental factors. Environmentally sound development known as Sustainable Development. The concept of sustainable development agreement outcome Earth Summit in Rio de Janeiro 1992. It contains two important ideas :

- a. The idea of needs, especially basic human needs to sustain life
- b. The idea limitations, namely the limited ability of the environment to meet needs of both the present and the future.

Government efforts to achieve equitable and prosperous life for its citizens without having to cause environmental damage followed up with the concept of sustainable development.

3.4. Criteria for sustainable development in urban areas based on ideas formulated three "Pro" above can be described as follows: (by Madrim Djody) :

- a. Pro Social Justice, Justice and Equality means of access to natural resources and public services (water, soil, air, environmental sanitation, social facilities, transport), respect for cultural diversity, gender equality.
- b. Pro Economic Welfare, which means that economic growth is intended for the welfare of all members of society (not just the elite), can be achieved through innovative technology that minimum negative impact on the environment.
- c. Sustainable Environment Pro, which means non-anthropocentric environmental ethics (the view that humans are not doing the oppression of other living beings and the environment) to guide people's lives so that they always strive for sustainability and environmental balance.

The process of sustainable development can be restored if the interaction between social environmental, economic must be balance. If the third dimension can not be balanced, so the process of sustainable development will not materialize. If only the pursuit of economic growth without considering others, such as land use changes from open green areas to building area will cause environmental damage. In this context, axioms "design with nature" (design with nature) has long been suggested by landscape architecture, pioneered by the late Lan L.Mc Harg since 1960, including here is a significant change in the system is awareness among planners, architects, and landscape architecture. Thus was born the movement resource management (resource management movement) are beginning to feel its influence in the landscape architecture profession. The main change comes in the transitional culture thinkers (the cultural mindset) of systemic design movement in Architecture in year 70's who later disappeared and was replaced by the sustainable development movement. From the case of the built environment and its relation with human beings, there is already a real difference in approach affects the life to come. Here, architects, academics, and other parties as one of the city development stakeholders, and designing the built environment is the party that was instrumental in providing consultancy services for construction and development of the built environment. Architects play an important role in designing buildings for shelter, work, recreation and others. Architect responsible for designing buildings habitable and used for economic and social activities daily. Basically, each development will definitely change the balance of the natural environment and transform it into the built environmental (Built Environmental). In designing the Built Environment, architects should consider one of them is climate change is something which affects the building that will be made, and also people know that climate affects where he lived. There are many ways to approach climate change macro and micro-climate also (local) in various regions. Creating micro-climate (in a certain location) by green open space planning (to reduce solar heat, as water catchment areas, social space), cross-ventilation and natural lighting (to reduce the cooling load of air), making the canopy (tropical architecture).



Figure 1: Architecture should strive for harmony with nature both in terms of technology and in planning

Technology is not always contributes to global warming, but also with the application of good technology and planned will be a good built environment and sustainability. Environment to adapt to local climatic influences and global climate can be put to good use in order to realize a sustainable built environment.

Tropical Architecture as one of the traditional architecture that aims to exploit the geographical conditions in the tropics to reduce energy consumption. The principles of Tropical Architecture was later developed into the "Green Architecture" and "Sustainable Architecture".

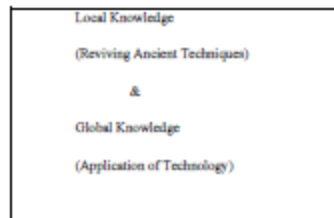


Figure 2: A cross between Local and Global Knowledge as a way to create a Green Architecture

In order to control damage of environmental, architects have a very important role not only building a strong response to climate change but also how to plan buildings or cities that can reduce the effects of global warming, given the Architect also indirectly contributed to environmental degradation. Theories of Development by Institution Hesley, said that in every process of development occurs negotiation among the actors involved in each event (event) that took place, which is influenced by power relationships among the actors, who each have their own resources. According to Elias, negotiation is necessary because there is dependency among the actors, including the dependence of economic, juridical and communication / information. City regulations can be viewed as part of the development process, as negotiations between the product of the actors involved. The negotiation process will be influenced by the presence of economic dependence, legal and communications / information among the actors. New paradigm with the concept of good governance is born from the changing perspective of the planners and designers due to the emergence of ecological awareness since 1960. People are starting to be aware of the high costs required to overcome the problem of environmental degradation. Anthropocentric view of nature (which looked at the problem only from the point of human interest only, thus ignoring the problems of ecology as a sustainable of life result in lower quality of natural & artificial of environment.

	Modern	Conservation	Participant
Target	Efficiency and growth	Natural Conservation	Resources Participation
Level Assignment	Rejuvenation of Government Funds for rural and urban infrastructure development	Management of beaches, mountains, Integrated Forest Management	Community Development Budget
Non-aesthetic purpose	Economic	Science	User
Decision Making	Top-down	Top-down	Bottom-up
Symbol Key	Power	Non-Consumptive	Uniqueness
Convergence (Coherent)	Directed	Based on ecological awareness	Direction of the self
Function Designer	Giver of Forms / Technician	Giver of Forms / Technician	The facilitator / technician

Figure 3: Modern Theory and Participatory Conservation in the Landscape Planning & Design

This paradigm has a partnership approach, community participation, transparency, accountability, decentralization, reduction of the role of government, effective, efficient and sustainable. In terms of macro scale, this includes aspects of conservation in the cross-administrative governance, and bottom-up orientation in which public participation is also an advantage (the principle of conservation and participatory).



Figure 4: Flooding occurs due to less green space, the number of construction, remove liner, building regulations are not implemented



Figure 5: The beach reclamation area resulting in reduced water, sea level rise.



Figure 6: Building Green building should start from the most simple and small



Figure 7. Building Green also applied to high-rise buildings.



Figure 8. Building with modern technology greatly contributed to environmental damage, but can be controlled.

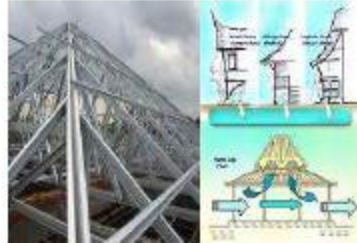


Figure 9. Environmental damage starts from the construction to the operational development.



Figure 10: Environmental damage starts from the construction to the operational development



Figure 11: Traditional Architecture has a lot of thought to the maintenance environment



Figure 12: Planning of buildings and city planning that right should be able to control
 Damage of Environmental.

4. CONCLUSION AND SUGGESTION

From the above analysis and discussion it can be taken several conclusions and suggestions as follows:

1. Architect turned out to have a significant stake in the process of environmental destruction. Environmental destruction occurred from the construction phase, the use of materials, to building operations. Architects as city planners, building planners have a moral obligation to participate in reducing/ controlling the environmental damage
2. In order to control damage to nature, job as an Architect :
 - a. Having a concept that, climate should not be a constraint in the design but must be the potential to be used in yielding an architectural masterpiece.
 - b. Using environmentally friendly building materials
 - c. Having the concept of energy efficiency, for example by way of planning and natural lighting as much as possible natural cross-ventilation.
 - d. In harmony with nature, for example maintain the natural contours

- e. Meet/ comply with building regulations, such as outbreaks, GSB, KDB, plan Porous Soil Layer
 - f. Fulfilling one of the requirements of building permits is the EIA documents that have not been applied to all projects.
 - g. And others how to plan the work of architecture that has the concept of "Green Architecture"
3. Architect do not work alone, there should be cooperation and active participation, consistency, commitment and responsibility of both government, private, and community in realizing sustainable development.
 4. The city is one of the masterpieces of architecture. Urban planning should be done wisely, and made with a comprehensive policy, bottom-up, internal and external -sector, and can accommodate the aspirations of the community (participatory).
 5. The city is one of the works of architecture, if the city has recognized the role or placed in a position as a developer of economic strength or all actors, and all actors have the ability to have a partiality to the interests of the environment and the public, the sustainable urban development will be realized, so that is not can directly control environmental damage.
 6. Establishment of good governance for economic growth and mental good of Human Resources will establish a system of good governance, one that is by implementing the right policies, thus supporting the achievement of sustainable development that could indirectly control the environmental damage.

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