



**UNTAR**  
FACULTY OF  
ENGINEERING



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# PROCEEDINGS

2<sup>nd</sup> International Conference on Engineering of Tarumanagara

**“Urban Engineering for Future Generation”**

**Jakarta, 22-23 October 2015**

Auditorium M Building, Campus I,  
Tarumanagara University  
Jl. Letjen. S. Parman No. 1,  
Jakarta 11440 - Indonesia



**UNTAR**

## REVIEWER

1. Dr. Harto Tanujaya Tarumanagara University, Indonesia (Chair)
2. Prof. Hui Ming Wee Chung Yuan Christian University, Taiwan
3. Prof. Satoyuki Kawano Osaka University, Japan
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37. Prof. Leksmono S Putranto Tarumanagara University, Indonesia
38. Dr. Adianto Tarumanagara University, Indonesia
39. Dr. Agustinus Sutanto Tarumanagara University, Indonesia
40. Dr. Danang Priatmodjo Tarumanagara University, Indonesia
41. Dr. Naniek Widayati Tarumanagara University, Indonesia
42. Dr. Titin Fatima Tarumanagara University, Indonesia

# PROCEEDINGS

2<sup>nd</sup> International Conference on Engineering of Tarumanagara  
(ICET)

“Urban Engineering For Future Generation”

Jakarta, 22-23 Oktober 2015

ISBN 978-602-71459-1-7



FACULTY OF ENGINEERING  
TARUMANAGARA UNIVERSITY  
JAKARTA-INDONESIA  
2015



FOREWORDS  
CHAIRMAN OF THE ORGANIZING COMMITTEE

First of all let's pray and say thanks to God for giving us His mercy and blessings.

The development of technology nowadays is growing up so fast. It aims to meet the necessary of the community to get a better life. Technological innovation which needed to develop technology products that can help people in improving their lives. Therefore the academics are not only required to implement the learning process, but also have to do research and community service to produce innovative scientific research.

Indonesian academics today are eager to involve in research activities. Therefore we required a scientific forum for mutual discussion, exchange information about the research that has been carried out especially related to Urban Engineering.

Faculty of Engineering, University of Tarumanagara conducts the second international conference to bring the academics, researchers to develop their knowledge and exchange ideas so that the researchers can improve the results of research that has been done. The conference called the 2<sup>nd</sup> International Conference on Engineering Tarumanagara, 2015, which is held on the Auditorium at the 8<sup>th</sup> floor of M Building, Campus I, University of Tarumanagara from 22 to 23 October 2015. The ICET 2015 conference theme is Urban Engineering for Future Generations. Future generations as the frontier of national development should be prepared from now on, along with the necessary infrastructure. The role of technology is to support the enhancement of the ability of future generations. This event includes to the presentation of scientific papers by keynote speakers, parallel sessions presenting papers of academics and research poster exhibition.

The more extensive the information obtained, the more knowledge that we gained. Some papers submitted by researchers and academics from different countries such as, Germany, Malaysia will enrich the science and technological development.

This conference proceedings contain the full text of all papers presented International Conference on Engineering of Tarumanagara 2015. Papers are categorized based on Engineering disciplines set by the organizing committee. Then, the presentation is divided into parallel sessions.

On this occasion I would like to thank to: Foundation of Tarumanagara, Rector of Tarumanagara University, Dean of Faculty of Engineering Tarumanagara University and Sponsors of ICET 2015, for the support and help that has been given. I also would like to thank the authors for their contributions.

Finally I would like to apologies if there are deficiencies in the activity. Thank you for all the attention.

**I Wayan Sukania, S.T., M.T.**  
Chairman of the Organizing Committee

FOREWORDS  
DEAN OF FACULTY OF ENGINEERING

I would like to warmly welcome all participants of the 2<sup>nd</sup> International Conference on Engineering of Tarumanagara (ICET 2015). This conference is organized by Faculty of Engineering, Tarumanagara University. The main aim of this conference was to respond the problem related to urban engineering for future generation. As this conference was designed to gather scientists, engineers, practitioners, and industries in engineering related disciplines, I expect intense discussion will happen among them so that some brilliant ideas to be used to improve the quality of human life can be produced.

I hope this conference will create an international networking and collaborating, especially in engineering research and publication.

I would like to congratulate the organizing committee of ICET 2015, for their outstanding efforts. I would also like to express my gratitude to the sponsors for their contributions in making this conference a resounding success.

I wish the International Conference on Engineering of Tarumanagara (ICET 2015) a very useful and fruitful occasion.

Thank you for your attention and contribution.

**Prof. Dr. Agustinus Purna Irawan**  
Dean of Faculty of Engineering

SCIENTIFIC COMMITTEE

1. Dr. Harto Tanujaya Tarumanagara University, Indonesia (Chair)
2. Prof. Hui Ming Wee Chung Yuan Christian University, Taiwan
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42. Dr. Titin Fatima Tarumanagara University, Indonesia



**ORGANIZING COMMITTEE**

<b>Chairman</b>	<b>I Wayan Sukania, S.T., M.T.</b>
<b>Vice Chairman</b>	<b>Imma Sofi Anindyta, S.T., M.Arch.</b>
<b>Conference Secretariat</b>	<b>M. Agung Saryatmo, S.T., M.M.</b>
	<b>Mekar Sari, S.T., M.Sc.</b>
	<b>Didi Widya Utama, S.T. M.T.</b>

**PROGRAM OVERVIEW**

**Thursday, 22 October 2015**

No	Time	Program
1	08.30-09.00	Registration
2	09.00-09.30	Opening Ceremony a) Balinese Welcome Dance b) National Anthem + Mars Tarumanagara c) Chairman Speech d) Opening by Vice Rector of Academics and Student Affairs, Untar e) Photo Session (WRA, Dean, Chairman, Keynote Speakers, Presenters, Sponsors)
3	09.30-09.40	Sponsorship Presentation
4	09.40-11.40	Keynote Speaker 1: Prof. Zaidi Mohd. Ripin University Sain Malaysia, Malaysia Keynote Speaker 2: Ir. Irwansyah. Industrial Estate Association of Indonesia (Himpunan Kawasan Industri) Head of Environmental and Spatial Planning
5	11.40-11.50	Appreciation to Keynote Speakers, Moderator, Sponsors)
6	11.50-12.00	Sponsorship Presentation
7	12.00-12.10	Technical Information
8	12.10-13.00	Lunch
9	13.00-15.00	Parallel Session I
10	15.00-15.30	Coffee Break
11	15.30-17.00	Parallel Session II

**Friday, 23 October 2015**

No	Time	Program
1	08.30-09.00	Registration
2	09.00-11.00	Parallel Session III
3	11.00-11.15	Closing Ceremony
4	11.15-12.00	Lunch



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Invited Papers

Development of Low Frequency Electromagnetic Vibration Energy Harvester <i>Wan Masrurah Hairudin, M. Izudin Alisah, Chan Ping Yi, Tan Yee Hern, Zaidi Mohd Ripin</i>	1-8
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List of Papers - Architecture

Paper ID	Title Author/Authors	pp
AE-01	Catholic Church: Influence of Liturgical Ritual in the Building Design (Studied on Four Catholic Churches in DKI Jakarta Area) <i>Rudy Trisno, Sugiri Kustedja</i>	1
AE-02	Performance Analysis in Home Industry Scale Production of Modified Traditional Brick as Green Building Material With Reed as Filler <i>Kurniati Ornam, Masykur Kimsan, La Ode Ngkoimani</i>	1-8
AE-03	The Study of Defense Space on Chinatown Petak Sembilan, West Jakarta <i>Nafi'ah Solikhah</i>	1
AE-04	Survey on the Fulfillment of the Construction Requirements for Non-Engineered Houses in North Sumatra <i>Darwin</i>	1
AE-05	Reveal Knowledge Pacitan Rural Java Architecture <i>Triyuniastuti, HB Satrio Wibowo, Sukirman</i>	1
AE-06	Uniqueness Omah Dudur Dawa Architecture <i>Satrio HB Wibowo, Sudaryono, E. Pradipto</i>	1
AE-07	Global and Local, at the Same Time <i>Franky Liauw</i>	1
AE-08	Conducting Smart Programs in the Old Kampong Beyond the Modern Era City of Surabaya <i>Danny Santoso Mintorogo Wanda K. Widigdo, Liliany S. Arifin, Anik Yuniwati</i>	1
AE-09	Adaptation to Climate Change as the Controller of Disaster Vulnerability in Coastal Settlements in Mempawah Hilir, West Kalimantan <i>Ely Nurhidayati</i>	1
AE-10	Study of Staircases Design and Visitors' Perception at Commercial Building <i>Siti Belinda Amri, Santi, La Ode Abdul Syukur, Aspin</i>	1-8

Paper ID	Title Author/Authors	PP
AE-11	Greenship Rating of Wood Materials in Building <i>James Rilatupa</i>	1-9
AE-12	Study of Bioclimatic Application to the Spatial Habitation Along the River Bank Ciliwung <i>Handajani Asriningpuri, Ratih Budiarti, Harlisa</i>	1-8
AE-13	Public Engagement in Public Space as the Elements of City Branding <i>Olga Nauli Komala</i>	1
AE-14	Bornean Long House: Cosmological Value in Socio-Cultural Transformation Stream <i>Klara Puspa Indrawati</i>	1-10
AE-15	Potential Tour Toward Village of Cultural Conservation of Baluwerti, Surakarta, Jawa Tengah, Indonesia <i>Naniek Widayati Priyomarsono</i>	1-10

**List of Papers - Civil Engineering**

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CE-02	Identification of Volcanic Rocks in Imogiri Yogyakarta Based on Subsurface Geologic Data <i>Winarti, Hill Gendoet Hartono</i>	1-9
CE-03	Model Test of Influence Groundwater Pumping to Decrease Surface of the Land <i>Nurnawaty, M. Selintung, M. Arsyad Thaha, F. Marikar</i>	1-5
CE-04	Analysis on the Needs of Bike Share in Institut Teknologi Sepuluh Nopember Surabaya <i>Siera Rozanah, Ervina Ahyudanari</i>	1
CE-05	Flexural Behavior of Bamboo Reinforced Concrete Beams <i>Ika Bali, Erianto Wijaya</i>	1-6
CE-06	Identification of Hazardous Road Sections Using Over Dispersion-Excess Zero Data of Vehicle Accident at Johor Federal Roads <i>Joewono Prasetijo, W Zahidah Musa, Zaffan Farhana Zainal</i>	1-6
CE-07	Speed Profile Based on Design Consistency <i>Joewono Prasetijo, Zaffan Farhana Zainal, W. Zahidah Musa</i>	1-6
CE-08	DAB as an Effective Dispute Resolution in Construction Industry <i>Purnomo</i>	1
CE-09	Analysis Energy Consumption and Price of Fuel Truck in Makassar <i>Mukhtar Lutfie, Lawalenna Samang, Sakti Adji Adisasmita, Isran Ramli</i>	1-9
CE-10	Influence of Economic External Factors on Construction Project Duration Identification <i>Basuki Anondho, Yusi Yusianto, Jemmy Wijaya</i>	1-6
CE-11	Analysis of the Influence of Longitudinal Beam Toward the Concrete's Nominal Shear Strength <i>Daniel Christianto, Fannywati Itang, Widodo Kushartomo, and Irene Natasha Kosasih</i>	1-6

Paper ID	Title/Author/Authors	PP
CE-12	Stabilization of Marine Dredged Sediment With Hydraulic Binders and Silica Fume <i>Ernesto Silitonga</i>	1

**List of Papers - Electrical Engineering**

Paper ID	Title/Author/Authors	PP
EE-01	Sentiment Classification for Academic Questionnaire Using NBC and SVM <i>Amir Hamzah, Naniek Widyastuti</i>	1-8
EE-02	GUI Applications on Ground Segment Research Rockets <i>Imam Sampurno Nugroho, Yahan Nuryad, Nanniek Andiani, Yohannes Dewanto</i>	1
EE-03	Document Subjectivity and Target Detection in Opinion Mining Using HMM Pos-Tagger <i>Amir Hamzah, Naniek Widyastuti</i>	1
EE-04	Analysis, Simulation and Implementation of Linear Block Codes Using a Microcontroller <i>Joni Fat</i>	1-7
EE-05	Visual Performance of Tunnel Lighting Along the Jakarta Outer Ring Road <i>Endah Setyaningsih, Jeanny Pragantha</i>	1-8
EE-06	Microcontroller Based Speed Controller of One Phase Induction AC Motor in Escalators <i>Hadian Satria Utama, Edward Naulibasa Lie, Pono Budi Marjoko</i>	1-8
EE-07	Implementation Hadoop on Private IaaS Cloud Computing <i>Edy Kristianto</i>	1-6

**List of Papers - Industrial Engineering**

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IE-02	Workload Analysis of Manually Operator at Clean and Tidy Car Wash <i>Indra Suriyanto, I Wayan Sukania and Lamto Widodo</i>	1-10
IE-03	Designing a "Voice of Customer" Program to Support Knowledge-Based-QFD <i>Ronald Sukwadi, Mokh. Suef, Enny Widawati, Cynthia Giovany</i>	1-8
IE-04	The Strategy for Improving the Quality of Printing Film Production at PT X <i>Lithrone Laricha S, Delvis Agusman, Lucky</i>	1-8
IE-05	Research Comparison Among Business Incubator Research Sample and Analysis in the World <i>Lina Gozali, Maslin Masrom, Habibah @ Norehan Haron, Teuku Yuri M. Zagloel</i>	1-7



Paper ID	Title/Author/Authors	PP
IE-06	Developing Algorithm to Design Jig & Fixture in SME Supporting Industry Based on Quality Function Deployment Methods (Case Study: Design Assy Machine and Leakage Testing Machine for Air Brake Coupling Hose) <i>Cucu Wahyudin, Aan Mintarsih</i>	1-7
IE-07	Comparison of Modular Layout and Distributed Layout Using Simulation Approach <i>Trifenaus Prabu Hidayat, Andre Sugioko</i>	1-8
IE-08	Optimization Replacement Schedule of Chisels Based on Quality Cost With Exponentially Increasing Failure Rate <i>Dadang Arifin</i>	1-6
IE-09	Re-Design The High of Handlebar on Semarang's Bus Rapid Transit Using Anthropometry and Ergonomy Approach <i>Annissa Lutfiah Hatuwe, Annisa Nindya Putri, Hanung Kurniawan, Reza Prisman</i>	1-6
IE-10	Optimization of Production Planning Using Goal Programming Method (Study in a Cement Plant) <i>Syamsul Anwar, Lonny Afrizalmi</i>	1
IE-11	Risk Assessment of Distal Upper Extremity by Strain Index Method in a Small Shoes-Making Industry <i>Syamsul Anwar, Yuri Fandi Tanjung</i>	1
IE-12	The Effect of Working Environment Conditions on Employees' Job Satisfaction in a Palm Oil Industry <i>Elsa Febriani, Musdirwan, Syamsul Anwar</i>	1
IE-13	Improvement of Service Performance in PO. Sandy Putra by Implementation of Safety Management System for Public Transport <i>Hanung Kurniawan</i>	1-7
IE-14	Designing a Closed Loop Tutelage System to Support Student in Preparing and Executing the Study Plan <i>Andrijanto</i>	1-8
IE-15	Design of Eco-Friendly Dairy Farm Business Plan Using Business Canvas Model <i>Meity Martaleo, William Bobby Susanto, Marcellia Susan</i>	1
IE-16	Heuristic Model With Discretized Time Horizon for Solving Alternative Machine Scheduling Problem on Single Operation <i>Irwan Sukendar</i>	1-6
IE-17	Simulator of Pitot Tube, Using The Sensor MPX5100 in an Aircraft Model <i>Joko Sugiarto, Dwijati, Hendaradi, Yohannes Dewanto</i>	
IE-18	Ergonomic Aspect of Physical Environment in Junior High School (Between Individual Comfort and Saving Energy Behavior) <i>Lamto Widodo, Fransisca Iriani, Endah Setyaningsih</i>	1-12
IE-19	Embodiment Design of High Capacity Mixer (Case Study : Steamed Sponge Cake Production at "M" Home Industry) <i>Adrian Christiady, Vivi Triyanti</i>	1-9
IE-20	The Comparison of MTM-1 and MOST in Predicting Work Element Time <i>Ivana Theresia Libardus, Vivi Triyanti</i>	1-8

**List of Papers - Mechanical Engineering**

Paper ID	Title/Author/Authors	pp
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ME-02	Model Reduction Methods for Cracked Rotor Dynamics Analysis <i>Ruggerri Toni Liong</i>	1-8
ME-03	Design and Construction of a Prototype of Screw Press for the Collection of Coconut Milk <i>I Wayan Surata, Tjokorda Gde Tirta Nindhia, Davied Budyanto, Ahmad Eko Yulianto</i>	1-6
ME-04	Assessment of Outside Air Supply for Split AC System. Part B: Experiment <i>K. D. Putra, A. Bimaridi, E. Djunaedy</i>	1
ME-05	Assessment of Outside Air Supply for Split AC System. Part A: Affordable Instrumentation <i>A. Bimaridi, K. D. Putra, E. Djunaedy</i>	1
ME-06	Analysis Energy Usage and OTTV in the University Building <i>Suci, Ery Djunaedy, M. Ramdhan Kirom</i>	1
ME-07	Effect of Tool Nose Radius on Surface Roughness for Machining ST 60 Steel Using Carbide Inserts <i>Sobron Lubis, Erwin Siahaan, Teguh Imam Suyatno</i>	1-7
ME-08	Design Can Cover for Feeding Conveyor for Closing Cans in Cans Machine Maker <i>Gusti Ryandi Arief, Agung, Wina Libyawati, Yohannes Dewanto</i>	1
ME-09	Design of Cessna Aircraft Model JD - 010 Use Scale 8:1 Based Radio Control <i>Muhammad Ahda, Ahmad Ilham Firdaus, Erick H.K., Yohannes Dewanto</i>	1
ME-10	Magnet for Generate Electric Power Applications <i>Dzulfi S Prihartanto, Alva Abdul Ganis, I.G.Eka Lesmana</i>	1
ME-11	Dynamic Analysis on Conditions For Stay off Airfoil, Flying and Landing <i>Bismil Rebeta, Aprilia Sakti, Erick H.K.</i>	1
ME-12	Simulation of Non-Newtonian Fluid Flow Through Encapsulation of 3-Dimensional Stacked Flip-Chip Package Using Lattice Boltzmann Method <i>M.H.H. Ishak, M.Z. Abdullah, Aizat Abas, M.I. Ismail, M.S. Mohamad</i>	1-6
ME-13	Cyclone Turbine Ventilator as a Power Source Lamps for Home Lighthing <i>Jenny Delly, Welly Liku Padang, Baso Mursidi, Budiman Sudia</i>	1-9
ME-14	Finite Element Analysis of Modified In-Wheel Electric Motor for Hybrid Electric Motorcycle <i>Didi Widya Utama</i>	1-6
ME-15	Pathological Tremor Measurement and Reproduction <i>Ping Yi Chan, Zaidi Mohd Ripin</i>	1-8
ME-16	FSI Analysis on the Effect of Membrane Rigidity on Laminar Flow Separation Over NACA 643-218 Airfoil <i>M.S. Abdul Aziz, M.Z. Abdullah, S.M. Firdaus, H. Yusoff, K.A. Ahmad, M. Zubair</i>	1-8



Paper ID	Title/Author/Authors	pp
ME-17	Analysis Ethyl Ester in Biodiesel of Raw Material Waste Coconut Oil and Arak <i>I Wayan Bandem Adnyana, Ni Made Suaniti</i>	1-4
ME-18	Design and Development of Quadcopter Prototype <i>Riyan Fernaldo Alphonso, Agustinus Purna Irawan, Frans Jusuf Daywin</i>	1-7
ME-19	Experimental Investigation on Electronic Cooling Performance Using Porous Medium Heat Sink <i>Muhammad Zaakir Angsoommuddin, Mohd Zulkifly Abdullah, Third Author</i>	1-6
ME-20	Tensile Strength Polymer Matrix Composite With Reinforcement Gigantochloa Apus <i>Sofyan Djamil, Mohamed Azlan Suhot, Mohd Zaki Hasan</i>	1-7
ME-21	Effectivity of Heat Exchanger Using Coolant Fluid <i>Harto Tanujaya</i>	1-4
ME-22	Alitizing Process of Low Alloy Steel Emergency Doors in High Rise Building <i>Erwin Siahaan</i>	1-8

**List of Papers - Urban Engineering**

Paper ID	Title/Author/Authors	pp
UE-01	Decision Design Support System of Urban Landscape Planning Using 3D Interactive Visualization <i>Herry Santosa, Shinji Ikaruga, Takeshi Kobayashi</i>	1
UE-02	Sustainability Level of Settlement in Gajah Wong Riverside Area, Kotagede, Yogyakarta <i>Abraham Bhaskara Singgih</i>	1
UE-03	Urban Sprawl Effect to Sustainable City <i>Andas Budy</i>	1-3
UE-04	Arrangement Model on the Sustainable Coastal Settlement in Makassar <i>Naidah Naing, Asdar Djamereng, Bulgis</i>	1-8
UE-05	Implementation for Optimizing the Turnkey Project Scheme in Highrise Buiding/Flat Development Base on Duration and Interest Rate <i>Sylvie Wirawati, Ricky Pittra Halim</i>	1-13
UE-06	Spatial Articulation and Coexistence of Mode of Production in the Dynamics of Development at the Urban Fringe of Makassar City <i>Batara Surya</i>	1-11



PARALLEL SESSION SCHEDULE  
22 October 2015

ROOM : 1

MODERATOR : Klara Puspa Indrawati, S.T., M.Ars.

SESSION : 1

No.	Time	Paper ID	Title/Author/Authors
1	13.00-13.15	AE-02	Performance Analysis in Home Industry Scale Production of Modified Traditional Brick as Green Building Material With Reed as Filler <i>Kurniati Ornam, Masykur Kimsan, La Ode Ngkoimani</i>
2	13.15-13.30	AE-10	Study of Staircases Design and Visitors' Perception at Commercial Building <i>Siti Belinda Amri, Santi, La Ode Abdul Syukur, Aspin</i>
3	13.30-13.45	AE-11	Greenship Rating of Wood Materials in Building <i>James Rilatupa</i>
4	13.45-14.00	AE-12	Study of Bioclimatic Application to the Spatial Habitation Along the River Bank Ciliwung <i>Handajani Asriningpuri, Ratih Budiarti, Harlisa</i>
5	14.00-14.15	AE-14	Bornean Long House: Cosmological Value in Socio-Cultural Transformation Stream <i>Klara Puspa Indrawati</i>
6	14.15-14.30	AE-15	Potential Tour Toward Village of Cultural Conservation of Baluwerti, Surakarta, Jawa Tengah, Indonesia <i>Naniek Widayati Priyomarsono</i>
7	14.30-14.45	UE-03	Urban Sprawl Effect to Sustainable City <i>Andas Budy</i>
8	14.45-15.00	UE-04	Arrangement Model on the Sustainable Coastal Settlement in Makassar <i>Naidah Naing, Asdar Djamereng, Bulgis</i>

PARALLEL SESSION SCHEDULE  
22 October 2015

ROOM : 1  
MODERATOR : Ir. Hadian Satria Utama, MSEE  
SESSION : 2

No.	Time	Paper ID	Title/Author/Authors
1	13.00-13.15	UE-05	Implementation for Optimizing the Turnkey Project Scheme in Highrise Buiding/Flat Development Base on Duration and Interest Rate <i>Sylvie Wirawati, Ricky Pittra Halim</i>
2	13.15-13.30	UE-06	Spatial Articulation and Coexistence of Mode of Production in the Dynamics of Development at the Urban Fringe of Makassar City <i>Batara Surya</i>
3	13.30-13.45	EE-01	Sentiment Classification for Academic Questionnaire Using NBC and SVM <i>Amir Hamzah, Naniek Widyastuti</i>
4	13.45-14.00	EE-04	Analysis, Simulation and Implementation of Linear Block Codes Using a Microcontroller <i>Joni Fat</i>
5	14.00-14.15	EE-05	Visual Performance of Tunnel Lighting Along the Jakarta Outer Ring Road <i>Endah Setyaningsih, Jeanny Pragantha</i>
6	14.15-14.30	EE-06	Microcontroller Based Speed Controller of One Phase Induction AC Motor in Escalators <i>Hadian Satria Utama, Edward Naulibasa Lie, Pono Budi Marjoko</i>
7	14.30-14.45	EE-07	Implementation Hadoop on Private IaaS Cloud Computing <i>Edy Kristianto</i>

PARALLEL SESSION SCHEDULE  
22 October 2015

ROOM : 2

MODERATOR : Dr. Widodo Kushartomo, S.Si., M.Si.

SESSION : 1

No.	Time	Paper ID	Title/Author/Authors
1	13.00-13.15	CE-01	The Understanding and the Use of Motorcycle Special Stopping Space in Signalized Intersection <i>Leksmono Suryo Putranto, Minggaza Suhindra</i>
2	13.15-13.30	CE-02	Identification of Volcanic Rocks in Imogiri Yogyakarta Based on Subsurface Geologic Data <i>Winarti, Hill Gendoet Hartono</i>
3	13.30-13.45	CE-03	Model Test of Influence Groundwater Pumping to Decrease Surface of the Land <i>Nurnawaty, M. Selintung, M.Arsyad Thaha, F. Marikar</i>
4	13.45-14.00	CE-05	Flexural Behavior of Bamboo Reinforced Concrete Beams <i>Ika Bali, Erianto Wijaya</i>
5	14.00-14.15	CE-06	Identification of Hazardous Road Sections Using Over Dispersion-Excess Zero Data of Vehicle Accident at Johor Federal Roads <i>Joewono Prasetijo, W Zahidah Musa, Zaffan Farhana Zainal</i>
6	14.15-14.30	CE-07	Speed Profile Based on Design Consistency <i>Joewono Prasetijo, Zaffan Farhana Zainal, W. Zahidah Musa</i>
7	14.30-14.45	CE-09	Analysis Energy Consumption and Price of Fuel Truck in Makassar <i>Mukhtar Lutfie, Lawalenna Samang, Sakti Adji Adisasmita, Isran Ramli</i>
8	14.45-15.00	CE-11	Analysis of the Influence of Longitudinal Beam Toward the Concrete's Nominal Shear Strength <i>Daniel Christianto, Fannywati Itang, Widodo Kushartomo, and Irene Natasha Kosasih</i>



PARALLEL SESSION SCHEDULE

22 October 2015

ROOM : 2

MODERATOR : Dr. Ir. M. Sobron Yamin Lubis, M.Sc

SESSION : 2

No.	Time	Paper ID	Title/Author/Authors
1	13.00-13.15	ME-02	Model Reduction Methods for Cracked Rotor Dynamics Analysis <i>Ruggerri Toni Liong</i>
2	13.15-13.30	ME-12	Simulation of Non-Newtonian Fluid Flow Through Encapsulation of 3-Dimensional Stacked Flip-Chip Package Using Lattice Boltzmann Method <i>M.H.H. Ishak, M.Z. Abdullah, Aizat Abas, M.I. Ismail, M.S. Mohamad</i>
3	13.30-13.45	ME-13	Cyclone Turbine Ventilator as a Power Source Lamps for Home Lighthing <i>Jenny Delly, Welly Liku Padang, Baso Mursidi, Budiman Sudia</i>
4	13.45-14.00	ME-15	Pathological Tremor Measurement and Reproduction <i>Ping Yi Chan, Zaidi Mohd Ripin</i>
5	14.00-14.15	ME-07	Effect of Tool Nose Radius on Surface Roughness for Machining ST 60 Steel Using Carbide Inserts <i>Sobron Lubis, Erwin Siahaan, Teguh Imam Suyatno</i>
6	14.15-14.30	ME-16	FSI Analysis on the Effect of Membrane Rigidity on Laminar Flow Separation Over NACA 64 <sub>3</sub> -218 Airfoil <i>M.S. Abdul Aziz, M.Z. Abdullah, S.M. Firdaus, H. Yusoff, K.A. Ahmad, M. Zubair</i>
7	14.30-14.45	ME-19	Experimental Investigation on Electronic Cooling Performance Using Porous Medium Heat Sink <i>Muhammad Zaakir Angsoommuddin, Mohd Zulkifly Abdullah, Third Author</i>
8	14.45-15.00	ME-20	Tensile Strength Polymer Matrix Composite With Reinforcement Gigantochloa Apus <i>Sofyan Djamil, Mohamed Azlan Suhot, Mohd Zaki Hasan</i>

PARALLEL SESSION SCHEDULE

22 October 2015

ROOM : 3  
 MODERATOR : Dr. Lamto Widodo, S.T., M.T.  
 SESSION : 1

No.	Time	Paper ID	Title/Author/Authors
1	13.00-13.15	IE-01	Rapid Tooling Manufacturability Advanced Materials Using Automation Fuzzy-AHP Method for Injection Gyro-Magnetic Hot Mold <i>Moh. Hardiyanto</i>
2	13.15-13.30	IE-03	Designing a "Voice of Customer" Program to Support Knowledge-Based-QFD <i>Ronald Sukwadi, Mokh. Suef, Enny Widawati, Cynthia Giovany</i>
3	13.30-13.45	IE-06	Developing Algorithm to Design Jig & Fixture in SME Supporting Industry Based on Quality Function Deployment Methods (Case Study: Design Assy Machine and Leakage Testing Machine for Air Brake Coupling Hose) <i>Cucu Wahyudin, Aan Mintarsih</i>
4	13.45-14.00	IE-07	Comparison of Modular Layout and Distributed Layout Using Simulation Approach <i>Trifenaus Prabu Hidayat, Andre Sugioko</i>
5	14.00-14.15	IE-08	Optimization Replacement Schedule of Chisels Based on Quality Cost With Exponentially Increasing Failure Rate <i>Dadang Arifin</i>
6	14.15-14.30	IE-09	Re-Design The High of Handlebar on Semarang's Bus Rapid Transit Using Anthropometry and Ergonomy Approach <i>Annissa Lutfiah Hatuwe, Annisa Nindya Putri, Hanung Kurniawan, Reza Prisman</i>
7	14.30-14.45	IE-13	Improvement of Service Performance in PO. Sandy Putra by Implementation of Safety Management System for Public Transport <i>Hanung Kurniawan</i>
8	14.45-15.00	IE-14	Designing a Closed Loop Tutelage System to Support Student in Preparing and Executing the Study Plan <i>Andrijanto</i>

PARALLEL SESSION SCHEDULE  
 22 October 2015

ROOM : 3  
 MODERATOR : Harto Tanujaya, S.T., M.T., Ph.D.  
 SESSION : 2

No.	Time	Paper ID	Title/Author/Authors
1	13.00-13.15	IE-16	Heuristic Model With Discretized Time Horizon for Solving Alternative Machine Scheduling Problem on Single Operation <i>Irwan Sukendar</i>
2	13.15-13.30	IE-19	Embodiment Design of High Capacity Mixer (Case Study: Steamed Sponge Cake Production at "M" Home Industry) <i>Adrian Christiady, Vivi Triyanti</i>
3	13.30-13.45	IE-20	The Comparison of MTM-1 and MOST in Predicting Work Element Time <i>Ivana Theresia Libardus, Vivi Triyanti</i>
4	13.45-14.00	ME-04	Assessment of Outside Air Supply for Split AC System. Part B: Experiment <i>K. D. Putra, A. Bimaridi, E. Djunaedy</i>
5	14.00-14.15	ME-05	Assessment of Outside Air Supply for Split AC System. Part A: Affordable Instrumentation <i>A. Bimaridi, K. D. Putra, E. Djunaedy</i>
6	14.15-14.30	ME-03	Design and Construction of a Prototype of Screw Press for the Collection of Coconut Milk <i>I Wayan Surata, Tjokorda Gde Tirta Nindhia, Davied Budyanto, Ahmad Eko Yulianto</i>
7	14.30-14.45	ME-14	Finite Element Analysis of Modified In-Wheel Electric Motor for Hybrid Electric Motorcycle <i>Didi Widya Utama</i>
8	14.45-15.00	ME-17	Analysis Ethyl Ester in Biodiesel of Raw Material Waste Coconut Oil and Arak <i>I Wayan Bandem Adnyana, Ni Made Suaniti</i>
9	15.00-15.15	ME-18	Design and Development of Quadcopter Prototype <i>Riyan Fernaldo Alphonso, Agustinus Purna Irawan, Frans Jusuf Daywin</i>
10	15.15-15.30	ME-21	Effectivity of Heat Exchanger Using Coolant Fluid <i>Harto Tanujaya</i>



PARALLEL SESSION SCHEDULE

23 October 2015

ROOM : 1  
MODERATOR : Mekar Sari, S.T., M.Sc.  
SESSION : 3

No.	Time	Paper ID	Title/Author/Authors
1	09.00-09.15	AE-01	Catholic Church: Influence of Liturgical Ritual in the Building Design (Studied on Four Catholic Churches in DKI Jakarta Area) <i>Rudy Trisno, Sugiri Kustedja</i>
2	09.15-09.30	AE-03	The Study of Defense Space on Chinatown Petak Sembilan, West Jakarta <i>Nafi'ah Solikhah</i>
3	09.30-09.45	AE-04	Survey on the Fulfillment of the Construction Requirements for Non-Engineered Houses in North Sumatra <i>Darwin</i>
4	09.45-10.00	AE-05	Reveal Knowledge Pacitan Rural Java Architecture <i>Triyuniastuti, HB Satrio Wibowo, Sukirman</i>
5	10.00-10.15	AE-06	Uniqueness Omah Dudur Dawa Architecture <i>Satrio HB Wibowo, Sudaryono, E. Pradipto</i>
6	10.15-10.30	AE-07	Global and Local, at the Same Time <i>Franky Liauw</i>
7	10.30-10.45	AE-08	Conducting Smart Programs in the Old Kampoeng Beyond the Modern Era City of Surabaya <i>Danny Santoso Mintorogo Wanda K. Widigdo, Liliany S. Arifin, Anik Yuniwati</i>
8	10.45-11.00	AE-09	Adaptation to Climate Change as the Controller of Disaster Vulnerability in Coastal Settlements in Mempawah Hilir, West Kalimantan <i>Ely Nurhidayati</i>
9	11.00-11.15	AE-13	Public Engagement in Public Space as the Elements of City Branding <i>Olga Nauli Komala</i>

PARALLEL SESSION SCHEDULE  
 23 October 2015

ROOM : 2  
 MODERATOR : Ir. Sofyan Djamil, M.Sc  
 SESSION : 3

No.	Time	Paper ID	Title/Author/Authors
1	09.00-09.15	CE-10	Influence of Economic External Factors on Construction Project Duration Identification <i>Basuki Anondho, Yusi Yusianto, Jemmy Wijaya</i>
2	09.15-09.30	ME-06	Analysis Energy Usage and OTTV in the University Building <i>Suci, Ery Djunaedy, M. Ramdhan Kirom</i>
3	09.30-09.45	ME-08	Design Can Cover for Feeding Conveyor for Closing Cans in Cans Machine Maker <i>Gusti Ryandi Arief, Agung, Wina Libyawati, Yohannes Dewanto</i>
4	09.45-10.00	ME-09	Design of Cessna Aircraft Model JD - 010 Use Scale 8:1 Based Radio Control <i>Muhammad Ahda, Ahmad Ilham Firdaus, Erick H.K., Yohannes Dewanto</i>
5	10.00-10.15	ME-10	Magnet for Generate Electric Power Applications <i>Dzulfi S Prihartanto, Alva Abdul Ganis, I.G.Eka Lesmana</i>
6	10.15-10.30	ME-11	Dynamic Analysis on Conditions For Stay off Airfoil, Flying and Landing <i>Bismil Rebeta, Aprilia Sakti, Erick H.K.</i>
7	10.30-10.45	ME-01	Study of the Phenomenon of Coliapse and Buckling the Car Body Frame <i>Didik Sugiyanto, Audri Deacy Cappeberg</i>
8	10.45-11.00	ME-22	Alitizing Process of Low Alloy Steel Emergency Doors in High Rise Building <i>Erwin Siahaan</i>

**PARALLEL SESSION SCHEDULE**  
 23 October 2015

ROOM : 3  
 MODERATOR : M. Agung Saryatmo, S.T., M.M.  
 SESSION : 3

No.	Time	Paper ID	Title/Author/Authors
1	09.00-09.15	IE-02	Workload Analysis of Manually Operator at Clean and Tidy Car Wash <i>Indra Surianto, I Wayan Sukania and Lamto Widodo</i>
2	09.15-09.30	IE-04	The Strategy for Improving the Quality of Printing Film Production at PT X <i>Lithrone Laricha S, Delvis Agusman, Lucky</i>
3	09.30-09.45	IE-05	Research Comparison Among Business Incubator Research Sample and Analysis in the World <i>Lina Gozali, Maslin Masrom, Habibah @ Norehan Haron, Teuku Yuri M. Zagloel</i>
4	09.45-10.00	IE-10	Optimization of Production Planning Using Goal Programming Method (Study in a Cement Plant) <i>Syamsul Anwar, Lonny Afrizalmi</i>
5	10.00-10.15	IE-11	Risk Assessment of Distal Upper Extremity by Strain Index Method in a Small Shoes-Making Industry <i>Syamsul Anwar, Yuri Fandi Tanjung</i>
6	10.15-10.30	IE-12	The Effect of Working Environment Conditions on Employees' Job Satisfaction in a Palm Oil Industry <i>Elsa Febriani, Musdirwan, Syamsul Anwar</i>
7	10.30-10.45	IE-15	Design of Eco-Friendly Dairy Farm Business Plan Using Business Canvas Model <i>Meity Martaleo, William Bobby Susanto, Marcellia Susan</i>
8	10.45-11.00	IE-17	Simulator of Pitot Tube, Using The Sensor MPX5100 in an Aircraft Model <i>Joko Sugiarto, Dwijati, Hendardi, Yohannes Dewanto</i>
9	11.00-11.15	IE-18	Ergonomic Aspect of Physical Environment in Junior High School (Between Individual Comfort and Saving Energy Behavior) <i>Lamto Widodo, Fransisca Iriani, Endah Setyaningsih</i>



PARALLEL SESSION SCHEDULE  
23 October 2015

ROOM : 4  
MODERATOR : I Wayan Sukania, S.T., M.T.  
SESSION : 3

No.	Time	Paper ID	Title/Author/Authors
1	09.00-09.15	UE-01	Decision Design Support System of Urban Landscape Planning Using 3D Interactive Visualization <i>Herry Santosa, Shinji Ikaruga, Takeshi Kobayashi</i>
2	09.15-09.30	UE-02	Sustainability Level of Settlement in Gajah Wong Riverside Area, Kotagede, Yogyakarta <i>Abraham Bhaskara Singgih</i>
3	09.30-09.45	CE-04	Analysis on the Needs of Bike Share in Institut Teknologi Sepuluh Nopember Surabaya <i>Siera Rozanah, Ervina Ahyudanari</i>
4	09.45-10.00	CE-08	DAB as an Effective Dispute Resolution in Construction Industry <i>Purnomo</i>
5	10.00-10.15	CE-12	Stabilization of Marine Dredged Sediment With Hydraulic Binders and Silica Fume <i>Ernesto Silitonga</i>
6	10.15-10.30	EE-02	GUI Applications on Ground Segment Research Rockets <i>Imam Sampurno Nugroho, Yahan Nuryad, Nanniek Andiani, Yohannes Dewanto</i>
7	10.30-10.45	EE-03	Document Subjectivity and Target Detection in Opinion Mining Using HMM Pos-Tagger <i>Amir Hamzah, Naniek Widyastuti</i>

# POTENTIAL TOUR TOWARD VILLAGE OF CULTURAL CONSERVATION OF BALUWERTI, SURAKARTA, JAWA TENGAH, INDONESIA

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## Abstract

In early *karaton* (or *royal palace*) formation, namely in the era of Javanese kingdom town possessing power region outside of castle town (*manca negara*), Baluwerti can function as "border-space" and "defense-space", besides it is one of components belonging to governance structure and *karaton* power during that time (*abdi dalem* and *sentana dalem*). This affected local culture hierarchy change due to physical development rate and its activities. Dynamics of social economy activities in Baluwerti, has besetted the obstructed urbanship system in the area. The fleeing image of cultural region image had been with weak visual access from the existing cultural artifacts. That development was less granting appreciation toward the established image of area providing the identity of The Royal Palace of Kasunanan (or *Karaton Kasunanan*) in particular and identity of Surakarta city in general. A method used was strategy grounded theory research (research granting strong base of a theory). Research was focussed on actors actively and passively getting involved in relevance in settlement change process. Data accumulated by "investigation focus" was directed on actors affecting that change either internal or external. Investigation outcome was coupled with field observation data, documentation, literature study, so that it gave rise to accurate findings. Finding were analyzed. In order to gain expected result it takes as follows; revamping on direction of social cultural development, and economy, by ways of; doing social cultural development strategy, economy and politics. To-do steps are; to hold socialization of Baluwerti development programme as tourist village, economy development of local society, regeneration pattern, filtration, and selectivity of tourist development, integrated planning system development, development with persuasive approach, regulation, *market mechanism*, social activities sector development, political development for area activity. Finding; Baluwerti has potential products as the appeal, holding human resource support, holding strong motivation from society still living in the settlement, holding facilities and infrastructure, holding facility supporting tourist events, holding institutionship of social cultural sector, availability of area/development area. In case it is managed and packaged attractively and naturally with its tourist support facility development, Baluwerti is ready to welcome both domestic and abroad tourists.

**Keywords:** Potency, Baluwerti, revamping

## INTRODUCTION

Writing of this background is taken from dissertation of Widayati (tested in University of Indonesia, 2015) and already modified as follows; Baluwerti is a part of *karaton* (royal palace) inseparable, as seen in Cosmology Concept of Behrend (1962: 182) applied into *Karaton Kasunanan* Surakarta. Baluwerti is seen on third circle, region part of state as *karaton* centre. Its site surrounds *Kedhaton*, society who live are *sentana dalem* and *abdi dalem* loyal to the king, there are some *Dalem Pangeran* within in the region of that Baluwerti.

In the beginning Baluwerti was established by King Paku Buwana II. Since then, conception of settlement space was based on Javanese culture. Using village name based on *toponymy* (village name is commensurate with the employment of village dwellers). Baluwerti has been one of "cultural tourist village" in Surakarta part of conservation area of *Karaton Kasunanan* Surakarta, in accordance with Decree of Surakarta Major No.646/116/1/1997.



In the beginning of karaton formation, namely Javanese royal town possessing power region outside the castle town (*manca negara*), Baluwerti could function as “border-space” and “defense-space”, besides it was one of components from governance structure and karaton power at that time (*abdi dalem* and *sentana dalem*). Post Independence of Indonesia of 1945 “Royal Town” converted its political status into part of democratic city managed in accordance with constitution enactment based on its classification.

The latter took impact on local culture hierarchy change due to activity and physical development rate. Dynamics of social economical activities in Baluwerti surrounded by this Complex of Karaton Kasunan had besetted the obstructed urban system in that area. The fleeing image of cultural area had been with the weal visual access from existing cultural artifacts. That development is less granting appreciation on the established area image presenting identity of Karaton Kasunan in particular and identity of Surakarta city in general.

Baluwerti is one of royal villages sustainable and worth for visit of society of all around the world as research materials possessing great potency for cultural tourist visit.

## MATERIAL AND METHOD

Method used is the strategy grounded theory research (research presenting strong base of a theory). Research focussed on actors actively and passively getting involved in relevance on royal village conversion. Data accumulated by “investigation focuss” was directed on actors affecting that change/conversion either internal or external. Investigation outcome was coupled with field observation data, documentation, literature study, therefore it gave rise to accurate findings.

Data obtained was able to analyze. In order to have the expected outcome it took as follows; revamping on social cultural development direction, and economy, technology, by ways of; doing social cultural development strategy, without ignoring political elements. To-do steps are; to hold socialization of Baluwerti development program as “tourist village”, Economical development of local society, regeneration pattern, filtration and selectivity of tourist development, integrated planning system development, development with persuasive approach, regulation, market mechanism, social cultural activity sector, political development for region activity sector.

Findings; Royal village or *Kampung karaton* has potential products as an appeal, having human resource support, having strong motivation from the society still living in the settlement, having supports of facilities and infrastructures, having facilities supporting tourist activity, having institutionship of cultural art sector, land availability/development area.

## Potential Culture Possessed

Outside of *kedhaton*'s wall, and inside of the wall surrounding *Karaton Kasunan*, there was Baluwerti settlement named as in a group of settlement according to *toponymy* (settlement name is commensurate with occupation or task of the dweller) upon the king's order as the single ruler by using concept *Sabdo Pandito Ratu*, yet village names are such as; Tamtaman (residence of regular-ranked soldier), Baluwerti village (residence of *abdi dalem* in service within the *keputren*, most of *abdi dalems* are female), Carangan (*abdi dalem* whose duty as soldier keeping security of *kedhaton* and its surroundings. Gondorasan (meaning that whether the food is delicious or not). Dwelled by *abdi dalem* of daily cooks of *kedhaton*. The female *Abdi dalem* serving the dish in *kedhaton* chaired by Nyai Lurah Gandarasa and Nyai Lurah Sekullanggi. That place is located in the east and links to *kedhaton*. Lumbung (as food stuff godown belonging to karaton), consisting of 2



groups namely; (1) *Bumi Narawito*; it is the crops from the soil in particular for the need of the ruling king (just like *ex officio*); (2) *Bumi Pangrembe*; it is crops used to suffice the food stuff of *priyantun dalem* (concubine). There lives the indoor staff or *abdi dalem Gedong* in duty of arranging the household of *kedhaton*. Wirengan (residence of soldier *abdi dalem* of Wira Tamtama *karaton*, whose duty is as king private guard, and keeps the security of *karaton*), Brajanalan (dwelled by guard of Brajanala door), Hordenasan (dwelled by Javanese soldier in costume of Dutch soldiers of 33 persons. The difference of this soldier costumes is to differentiate with other soldiers in terms of service. Hordenas soldier has duty to escort the mountains of Sekaten program. Accompanying the heirloom during carnival (*kirab*) at the night of one month As Syura, there is circumcision or wedding ceremony or *khitanan* or *pengantenan* of son or daughter of the king. But in fact previously they were Dutch spies whose duty were to oversee activities inside the wall and report to the Dutch colonialist), Gambuhan (residence of *abdi dalem niyogo* expert in arrangement of *gending*).

During king Paku Buwana VI ruled there is local rule to keep the area typicality inside the Baluwerti (buildings besides *karaton* and *dalem pangeran*), as follows:

- 1) Building with wall is not allowed;
- 2) Building is white-paint colorized;
- 3) House fence is with herb plants; and
- 4) Building is not storey or higher than Panggung Sanggabuwana (tower in height of 34 meters located in *kedhaton*).

In general houses in Baluwerti can be classified into three groups. **First**, *Dalem Pangeran*; that building has type of Javanese house complete with Joglo shape with *pendapa*, *pringgitan*, *dalem ageng*, added with rows of houses on the right and on the left, even sometimes also in front of the main building. Those living in the vicinity of *dalem pangeran* have status of *magersari* (namely occupying building by not hiring but loyal and obedient to the owner, has status as servant or *abdi*). This house type in general was founded in the wide yard, surrounded by a bit high wall and given *regol* in the midst. *Dalem Pangeran* surrounding *kedhaton* has a number of 18 units. **Second** group, occupying by *sentana dalem* (royal relatives or *karaton* relatives); residence with Javanese house type with pyramid shape. **Third** Group, occupying by *abdi dalem*; village-shaped residence as well as other shapes more simple. In general houses in Royal Village or *Kampung Karaton* are included as type of simple house.

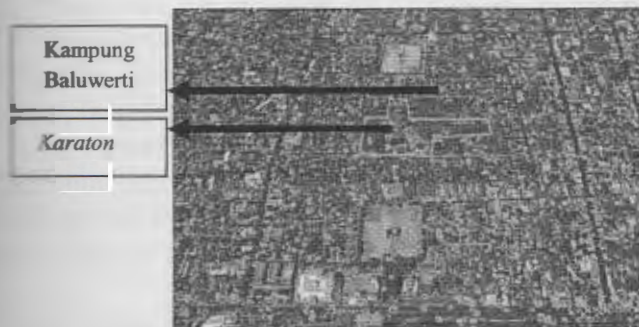


Figure 1. Map of Complex Karaton  
(Google Earth, 2012, in Widayati, 2015)

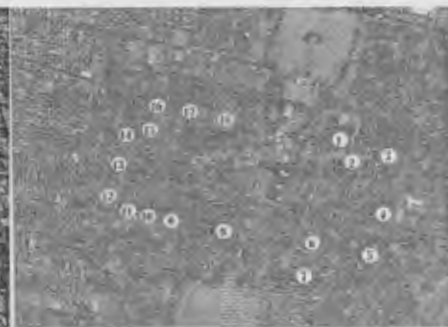


Figure 2. Map of Dalem Pangeran  
Kasunanan Surakarta Google Earth,  
2009, modified by writer. (PEMDA  
Surakarta, RTBL Baluwerti Village  
Surakarta City of 2010)



Figure 3. Prototype of Dalem Pangeran (Modifikasi Penulis)  
(District Administration of Surakarta, RTBL Baluwerti Village of Surakarta City of 2010)



Figure 4. Prototype of Residences of *Abdi Dalem* and *Sentana Dalem*  
(Personal Data, 2014)

During Karaton as administration centre thus street access surrounding karaton follows direction of *pradaksina* (clockwise direction). The street surrounding karaton may only be passed by pedestrian, cyclist, and horse carriage. Nowadays since karaton village location is strategic thus indirectly it makes this area as liaison area between the north and the south of Slamet Riyadi street (center of Surakarta city). Likewise with numerous facilities spread over in the vicinity of the area, then ample vehicles using royal village or karaton village as connection with the nearby environment, as a result the pedestrians are not comfortable and threatened their safety, street layer is swiftly damaged, the atmosphere becomes hustle and bustle and is not comfortable. Besides, along the street there grows commercial activities not guided well and having impact on karaton corridor countenance.



Figure 5. Prototype of Street at hand in the vicinity of Karaton (Modified by Writer)  
(PEMDA Surakarta, RTBL of Baluwerti Village of Surakarta City of 2010)





Figure 6. Prototype of Entry Door of Complex Karaton Kasunan Surakarta  
(Modified by Writer)  
(PEMDA Surakarta, RTBL of Baluwerti Village of Surakarta City of 2010)

## RESULTS AND DISCUSSION

### Legal Regulation and Legislation

Once the Act No 11 of 2010 was published, thus all buildings or Cultural Conservation area always refers to the Act.

### Stake Holders

In theory, there has been enough ample resources discussion on management or cultural conservation management in general, or urban cultural conservation in particular. In overall all theories highlights the most important of being identified, mainly for the *actors* doing the matter of this cultural heritage management are called as *stake holders*.

Based on recommendation of UNESCO-ICOMOS on *Heritage Management* this the *stake holders* are as follows:

1. It is they who instantly gain personal profit from the object or cultural conservation site (as direct holder or direct owner) and those bearing maintenance costs/object sustainability and that conservation site.
2. They who gain benefit due to object heritage or cultural conservation site (*public good*) or become the pride of societal belongings.
3. They who bear part of aid or aid collective for object maintenance or that cultural conservation site (it relates to tax, subsidy, and so forth).
4. They who act as decision grantor in policy of handling-out renovation and object conservation or that cultural conservation site.

From the aforementioned description, "service" can opt the to-do role, for instance: as owner, facilitator, operator, coordinator, and so forth.

According to UNESCO, a bit ample data proves that success of event of environmental conservation and city cultural conservation building, in its implementation is supported by *community based actions*, where societal participation as *stake holders* has great potency to be the to-do partner.

### Cultural Heritage Potency

Cultural conservation heritage pertaining to life in the city, is a very typical field and well-known as "*urban heritage*" or "*man built heritage*". Architectural heritage and city square are the most visual and tangible physical embodiment. Basically in assessment of conservation targets or sustainability of that cultural heritage legacy, thus the to-do approaches are as follows:

1. Approach as economical capital



- b. Approach as technological capital
- c. Approach as cultural capital

Those above orders are dynamical changed in accordance with situation and the pertaining condition.

#### **Ad. a. Approach as economical capital**

Ample cultural conservation in the past time architecture form assessed by the owner as object *non-marketed good*, but moreover some owners see in vice versa namely asset marketable after through conservation process. From perspectives of *stake holders* those classified as owner and cost bearer for maintenance therefore economic perspective becomes the determinant.

In terms of the latter, ICOMOS-UNESCO in 1993 (re-reviewed in 1998) had made recommendation on Cost Benefit Analysis for the Cultural Built Heritage by taking four possibilities of case in terms of environment and cultural conservation building with the owner as well as the visitor. The four possibilities in its original terminology are named as:

##### 1. Basic Model Maximizing Welfare

Such a circumstance where cultural conservation owner will not depend himself on visitors, either from side of number or gain of that visit, even visitor is not incurred with cost.

##### 2. Profit-Maximizing Supply of Cultural Heritage

In this case visitor is willing to pay (*willingness to pay*) in order to visit that cultural heritage. But willingness to pay shall be balances with certain facility from that cultural heritage owner.

##### 3. Supply Under a Zero-profit Restriction

Owner can ask subsidy from other parties, whilst visitor's entry cost is determined by other parties. In case there is extra profit from visit outcome exceeding subsidy accepted by the owner, thus the extra belongs to subsidy provider.

##### 4. Supply with a Fixed Cost Subsidy

In this case there is differentiation between physical maintenance cost from the individual owner and subsidy received restrictively from other sources. As well as cost to grant service to visitor based on their willingness to pay during the visit.

#### **Ad. b. Approach as Technology Capital**

Present time technology grants opportunities in order to technically apply whatever it is finest and most sophisticated like employment, rehabilitation, restoration, renovation, or revitalization. Technological capital is often related to economy or cost in case in developed countries this is something to get advance and as prequalification in renovation process.

A format suggested by ICOMOS-UNESCO to calculate cost in renovation implementation particularly within in concern of architects, designer, or consultant, is *check-list* on spatial element and building element related to cost in renovation planning.

- Space element. Namely all cost pertained or in association with space creation.
- *Building element*. Namely all cost pertained with needs of building expense physically.
- Building element *related to space* and affects building expense.

Another side in technological capital interest is necessary to make a research action of archeologist and part-time information data search and documentation-making for the future. This is inseparable part of renovation activities.

### **Ad. c. Approach as Cultural Capital**

Art, culture, civilization, and history are key words in biography depiction of human beings and society inherited by the past time generation to the next generation. Advantages of art and culture as well as human civilization are tangible in its heritage and some are heritage intangible. In case both are combined, in fact sold as the appeal to grant the added value to environment and cultural conservation building as tourist commodity or *heritage tourism*.

### **Society Companion**

In case coupled with field observation result all around countries thus there is one dominant point namely how much the local society gets participated in implementation of renovation project, either as organization or individual based on the expected benefit. They can be engaged in terms of deciding, implementing and taking benefit on cultural conservation projects managed by the pertaining city. The approach is "*community based actions*" there are renovation implementation or environment sustainability and cultural conservation building, indeed suggested by UNESCO.

In order to increase awareness of society broadly and all around the ages, UNESCO holds campaign regarding love of cultural heritage via programs through schools starting from Kindergarten to Colleges, with name: *Heritage In Young Hands*.

In this respect, in Indonesia this program exists but looks to exist as if with the engagement of National Education Department without participation of District Administration proactively.

UNESCO also leave messages to all politicians/decision maker/Pemda, for the implementation of cultural heritage implementation it takes society to nearby to get involved with that project and turns the project into joint project with society if the project wishes to really success.

## **CONCLUSION**

### **Concept of Tourist Village**

In Plan of Building Arrangement and Environment of Kampung Baluwerti (2010) it comprises such as; In theory, potency of cultural tourist village can be defined as an area or village holding potential uniqueness and typical tourist attraction, either physical character of nature environment or societal social culture life, managed and packed attractively and naturally with its tourist support development, in such a harmonious, planned and fine environment arrangement therefore ready to welcome visit of domestic and foreign tourists.

From analysis of 2009, served in Building Arrangement Plan and Environment of Kampung Baluwerti (2010), it results in criteria that must be owned by Baluwerti tourist village as follows;

1. Holding appeal
2. Holding human resource
3. Holding local society motivation
4. Holding supports of facilities and infrastructures
5. Holding tourist-support facilities
6. Holding institution of art and culture
7. Availability of land/development area.

Existence of Supporting Factors in Baluwerti as follows:

1. In area of Kampung Baluwerti people can find as follows; Physical cultural asset such as complex of Dalem and griya/ancient building, non-Physical cultural asset; art event, traditional handicraft making; typical food cooking tradition, and so forth



2. Baluwerti residents get participated actively in support of cultural tourism
3. Baluwerti residents has motivation of turning their village into cultural tourist village
4. There is mobility space, yet it takes rearrangement of event and micro spatiality pattern, there are carriages already being the special transportation mode for tourist activity service, environment infrastructure relative sufficiently
5. Tourist support facility lacks of facilities
6. Holding institution of art and culture
7. Certain buildings are of *dalem pangeran*, *rumah sentana* and *abdi dalem* (namely conservation building) can be taken into benefit for cultural activities.
8. Residence settlement is enabled for function-transfer as tourist event support facilities.

From the above description in general Baluwerti is enabled or potential to develop as Tourist Village with the renovation or revamping in some points.

### To-do Steps

Referring to field data and some theories on potential tourist villages, rooted conclusively from observation, interview on actors undergoing changes in research sector either physical and non-physical change, for instance interview with stake holder of Spatial Service Office representing PEMDA Surakarta (Surakarta District Administration), karaton relatives holding competence in history and spatiality therefore it concludes in Concept of Tourist Village Arrangement.

Arrangement is divided into twofold namely non-physic and physic concepts. Yet the description is as follows:

1. Non-physical concept is such as Core Management (Cooperation of Karaton and District Administration), makes management system appropriate, solid, and honest, handling as follows:
  - a. Kamandungan in the east is used as tourist center,
  - b. Street located between two walls surrounding *kedhaton* and karaton is nor used as public street,
  - c. Open space on the left and on the right of Pagelaran (Performance) is used as vehicle parking place (bus, cars, motors),
  - d. Visitor enters from parking place into complex karaton can go with; walking, cycling (bicycle is provided in vehicle parking place by hiring system), or with Indonesian tricycle (becak) already provided,
  - e. Becak (tricycle) rider serves visitor in knowledge of history, Good and correct Indonesian language, English in general, well-versed to know names of place within karaton area. Becak riders also use local custom (special design from thin material to avoid from the sultry),
  - f. Tour guide is made into group shall master 2 foreign languages in minimum from some foreign languages such as; Chinese, Japanese, English, German, Korea. Besides, tour guide must master history of Mataram, name and meaning of sites as well as artifacts, therefore in explaining to visitors there will no mistakes. Tour guide in addition must also wears Javanese traditional fashion,
  - g. Determining *Dalem Pangeran* open for visitor. *Dalem* that can be visited is complete with interior furniture with time period and residence of the prince. Yard is treated, high plant already dead started to plant again therefore shady atmosphere is attainable. There is gamelan stuff commonly owned by prince. The guard who wear the fashion of *abdi dalem*. At the certain moment visitors can enjoy dinner with dance service, accompanied by prince and empress with complete fashion (it



- can be done by the real prince or actor figure). This is important to ask the visitor in past time nostalgia room when karaton as administration center,
- h. Opening souvenir shop selling numerous traditional goods as souvenir. They can sell duplicate object showed-off in museum with certificate of duplicate indication,
  - i. Each settlement has name with toponymy with one house is open as *sentana dalem* and one house of *abdi dalem* filled with furniture adapted with the past time and the dwellers will costume based on the duty that they implement, and given clear signage (visible from the distance),
  - j. Gondorasan village is commensurate with its toponymy functioned as royal kitchen of karaton kitchen able to provide royal food like sekulanggi (such a *rijtafel*) sold to visitors,
  - k. Re-arrangement is necessary for traditional food vendor at hand in Kamandungan, either location site, service, or cleanliness,
  - l. Night-out culinary tour with bicycle attraction and lamplight tricycle or becak in the southern square are necessary to re-arrange in terms of traffic and vehicle parking, therefore getting rid of jamming. Food cleanliness and its presentation need the escort,
  - m. Tour guide at hand in karaton museum is necessary to increase in terms of their knowledge about history of Mataram, as well as foreign language,
  - n. At 22.00 at the bell rings as signal of not only closure of Brajanala doors (North, South, West, and East) but also small doors (*butulan*).
2. Physical concept done by District Administration by holding consultancy with Karaton parties.
- a. Replacing materials on the streets in the vicinity of karaton including its settlement from asphalt material replaced with conblok,
  - b. Rejuvenating old concept (era of King Paku Buwana VI) namely all houses of *abdi dalem* and *sentana dalem* are given with herb plant fence, with the height of 90cm,
  - c. All yards of houses in border with the street are given *hardware* plant and high plant therefore the street in front of the plants becomes shady,
  - d. Depot (without wall) in every corner of environmental street functioning for passing-by or a break of visitor as pedestrian,
  - e. Every corner of street is given with *signage* of place remark and street direction. In some places are given tourist indication map.

Conclusion; in case revamping is done comprehensively as in the above description by getting the society involved as subject in the settlement (active participation in the field), managed and packed atratively and naturally with tourist support development facilities, Baluwerti Kasunanan Surakarta is ready to welcome the visit of abroad and domestic tourists.



Figure 7. Sample of Direction Indication Map for Visitor  
(Personal Data, 2015)

## REFERENCES

- [1] Behrend, Timothy Earl. (1983) *Kraton and Cosmos in Traditional Java*. (Madison: an unpublished Master's thesis, University of Wisconsin).
- [2] Bonafice. P. cs. (1993). *Heritage and tourism in the global village*, London: Routledge.
- [3] Box. P. (1999). *Cultural resource management*, Unesco Publication.
- [4] "Building Arrangement Planning and Environment of Kampung Baluwerti, Surakarta City. 2010. (Yogyakarta Province)"
- [5] Budihardjo, Eko and Sidharta. (1989) *Environmental Conservation and Historical Building in Surakarta*. (Yogyakarta: Gadjah Mada Press).
- [6] Creswell, John W. (1968) *Qualitative Inquiry and Research Design, Choosing Among Five Traditions*. (Sage Publication, California).
- [7] Garnham, Harry Launce. (1985) *Maintaining The Spirit of Place*. (PDA Publishers Corporation, Mesa).
- [8] Guinness, Patrick. (1986) *Harmony and Hierarchy in a Javanese Kampung*. (Asian Studies Association of Australia, Southeast Asia Publications Series No. 11. Singapore, Oxford, dan New York: Oxford University Press).
- [9] Hutter. M, I. Rizzo. (1997). *Economic Perspective On Cultural Heritage*, Macmillan Press, Ltd.
- [10] Kerber, Jordan E. (Ed.) (1994). *Cultural Resource Management: Archaeological Research, Preservation Planning, and Public Education in the Northeastern United States*. (Wesport, Connecticut, London: Bergin & Garvey).
- [11] Naniek Widayati (2015). *Baluwerti going to be an "Independent Village", Study on Settlement of Abdi Dalem (Internal Servant) and Sentana Dalem at Kasunanan Surakarta*. (Dissertation, unpublished. Jakarta: Universitas Indonesia).
- [12] Our Heritage Is In Our Hands. (1999). *Conservation Technical Leaflets. Urban Redevelopment Authority*.
- [13] Pickard. R.P. (1996). *Conservation in the Built Environment*, Singapore: Longman.
- [14] Paul Box. (1999). *GIS and Cultural Resource Management*. UNESCO Publication.