



**2014 3rd International Conference on Micro Nano Devices,
Structure and Computing Systems(MNDSCS 2014)**

**2014 International Conference on Power Engineering,
Energy and Electrical Drives (PEE 2014)**

March 1-2, 2014, Singapore

Conference Program Guide

Co-sponsors

**Information Engineering Research Institute, USA
Trans tech publications inc.**

MNDSCS 2014

**2014 3rd International Conference on
Micro Nano Devices, Structure and Computing Systems**

Abstract

March 1-2, 2014, Singapore

Table of Contents

Part I Conference Schedule

Part II Plenary Speech

Plenary Speech: Prof. Gerald Schaefer

Part III Oral Session

Oral Session 1

Oral Session 2

Part IV Conference Venue

Part V Instructions for Presentations

Part VI Contact Us

Certificate

Part I Conference Schedule

Singapore, February 28, 2014		
<i>Time</i>	<i>Activity</i>	<i>Location</i>
10:00-17:30	Registration	Holiday Inn Singapore Atrium
Singapore, March 1, 2014		
<i>Time</i>	<i>Activity</i>	<i>Location</i>
09:00-09:30	Opening Ceremony	Holiday Inn Singapore Atrium
09:30-10:20	Plenary Speech Prof. Gerald Schaefer	
10:20-10:40	Coffee Break	
10:40-12:00	Oral Session 1 PEE 2014	
12:00-13:00	Lunch Buffet	
14:00-18:00	Oral Session 2 MNDSCS 2014	
Singapore, March 2, 2014		
<i>Time</i>	<i>Activity</i>	<i>Location</i>
09:00-12:00	Free Talk	Holiday Inn Singapore Atrium

Part III Oral Sessions

Oral Session 1: PEE 2014

Time: 10: 40 - 12: 00 March 1

Research on Dispatching Problem of Maintenance Personnel

Dandan Niu, Zengshou Dong 2

Chinese Electric Vehicles (EVs) and Internal Combustion Engine Vehicles (ICEVs) Prediction Based on the Double Species Model

Shijun Fu 5

An Experimental Study of Low-frequency Vibration-based Electromagnetic Energy Harvesters Used While Walking

Min-Chie Chiu, Ying-Chun Chang, Long-Jyi Yeh, Chiu-Hung Chung and Chen-Hsin Chu 8

Time Series Analysis and Data Prediction: An ECM Neuronal Approach Applied to EUR/USD Currency

Dusan Marcek 11

Multi-agent Design for the Micro-grid Demonstration Project

I-Hsin Chou, Hsueh-Wei Hsiao, Chih-Chieh Ma and I-Tao Lung 16

MPPT Control Method Using Boost Type DC-DC Converter for PV Generation System with Mismatched Modules

Chengyang Huang, Kazutaka Itako, Takeaki Mori and Qiang Ge 17

Effects of Nitrogen Doping on Nanocrystalline Diamond/P-Type Si toward Solar Cell Applications

Chii-Ruey Lin, Da-Hua Wei and Minh-Khoa BenDao 18

Very-Short-Term Load Forecast for Individual Household Based on Behavior Pattern Induction

Yu-Hsiang Hsiao 19

Electro-thermal Design of Smart Power Devices and Integrated Circuits

Konstantin O. Petrosyants, Igor A. Kharitonov and Nikita I. Ryabov 21

Life Cycle Assessment of Battery Electric Vehicles (BEVs) Using eBlance

Zhe Liu and Weihua Zeng E007

Oral Session 2: MNDSCS 2014**Time: 14: 00 - 18: 00 March 1**

Study on Security of Based on Android Third-party Software Detection

Ming-li Ding 15

Cetyltrimethylammonium Bromide-Assisted Hydrothermal Synthesis of Mixed-phase TiO₂ Nanorod and Its Photocatalytic Activity

Bin Sun, Xiuling Xu and Guowei Zhou 42

3D Simulation of Heavy-Ion Induced Charge Collection in Sub-100nm MOS-FETs Using Strained Silicon-Germanium

Bin Zhou, Xin-chun Wu, and Ming-xue Huo 47

The Estimation of Thermal Conductivity for Alumina-Epoxy Composite Material with High Filling Volume Fraction

Chen-Kang Huang and YunChing Leong 50

Applying of Piston Mechanism Design used in the Wavelength Electrical Generating of Ocean for Fishing Communities

Hendra, Anizar Indriani and Hernadewita 51

Design of Self-Alignment Devices with Fluidic Self-Assembly for Flip Chip Packages in Batch Processing

Tien-Li Chang, Chieh-Fu Chang, Ya-Wei Lee, Chun-Hu Cheng, Cheng-Ying Chou and Meng-Chi Huang 52

Model Predictions for New Iron Ore Sintering Process Technology Based on Biomass and Gaseous Fuels

Jose Adilson de Castro 58

Bioconversion of Water Hyacinth to Ethanol by Using Cellulase from *Trichoderma atroviride* AD-130

Rajesh Dhankhar and Anil Dhaka, Sakshi 74

The Formation of Cooper Pairs and Their Role in Nondissipative Diamagnetic Currents in the Micro- and Macro-Scopic Sized Graphene Materials; Towards High-Temperature Superconductivity

Takashi Kato 80

Implementation and detection tests for countermeasure-annulled hardware Trojan on FPGA

Masaya Yoshikawa and Takaya Tukadaira 81

Mitral Valve Annulus Matching over Time Based on Image Intensities

Wan Zhang, Yunfeng Wei, Menghong Wang, Zeqi Zheng, Jintian Peng and Yipeng Li 84

A Simple Way to Compute Parameters for Load Balancer in Optical Networks

Chia-Sheng Tsai and Sun-Wei Cho 94

Numerical Analysis of Temperature Field of Vertical Frozen Soil Wall Reinforcement at Shield Shaft

Jun Hu, Xiaobin Wang and Birong Jiang 96

Comparative Studies of Boiling and Electrolysis on Micro Bubble Generation

Wenbo Luo, Xinxin Zhang, Xin Cui and Haibo Yuan 106

MNDSCS 2014 Content

Photoanode of Photoelectrochemical Biofuel Cell Sensitized by Magnesium Tetraphenylporphyrin <i>Kunqi Wang, Weiling Wang, Qifan Zhu and Huanxin Yang</i>	1
Synthesis of Straight Rod-Shaped Mesoporous Silica Templated with Polyvinylpyrrolidone and P123 for Controlled Ibuprofen Release <i>Jinyu Zhang, Bin Jiang and Guowei Zhou</i>	1
Cetyltrimethylammonium Bromide-Assisted Hydrothermal Synthesis of Mixed-phase TiO₂ Nanorod and Its Photocatalytic Activity <i>Bin Sun, Xiuling Xu and Guowei Zhou</i>	1
Hydrothermal Synthesis and Photocatalytic Activity of Mesoporous TiO₂ with High Surface Area and Different Pore Size <i>Fengjiao Chen, Zhaosheng Bu and Guowei Zhou</i>	1
The Estimation of Thermal Conductivity for Alumina-Epoxy Composite Material with High Filling Volume Fraction <i>Chen-Kang Huang and YunChing Leong</i>	2
Study of N-TiO₂ Photocatalysts and Their Catalytic Activities under Simulated Sunlight <i>Shengjun Wang, Linlin Wang and Wenyu Zhang</i>	2
Study on Biomaterials of Anti-gastric Trametenolic acid B Semi-synthetic Derivatives <i>Ximing Yan, Mingruo Ding, Mingguo Liu, Junzhi Wang and Nianyu Huang</i>	2
The Formation of Cooper Pairs and Their Role in Nondissipative Diamagnetic Currents in the Micro- and Macro-Scopic Sized Graphene Materials; Towards High-Temperature Superconductivity <i>Takashi Kato</i>	2
Development and Application of Nanotechnology in Sports <i>Peng Wang and Jiyan Wang</i>	3
Support Vehicles Allocation Method Set Based on Feature <i>Yongtao Yu and Ying Ding</i>	3
Applying of Piston Mechanism Design used in the Wavelength Electrical Generating of Ocean for Fishing Communities <i>Hendra, Anizar Indriani and Hernadewita</i>	3
Design of Self-Alignment Devices with Fluidic Self-Assembly for Flip Chip Packages in Batch Processing <i>Tien-Li Chang, Chieh-Fu Chang, Ya-Wei Lee, Chun-Hu Cheng, Cheng-Ying Chou and Meng-Chi Huang</i>	3
Life Cycle Assessment of Impacts of PHEVs on GHGs Emissions <i>Shuyi Zhou, Dongxiao Niu and Qiong Wang</i>	4
Application Topsis Analysis on Aviation Anti-submarine Aircraft Performance Evaluation <i>Ming-hua Yang, Guo-gang Wang, Ling Zhang, Xiao-ping Han and Tao Liang</i>	4
Systematic Planning and Design of a System to Facilitate the Adjustment of Grain Transport Vanes in a Combine Harvester <i>Marco A. de Carvalho and Felipe B. Ramina</i>	4
Finite Element Analysis on the Structure Strength of Air Cushion Vehicle <i>Ning Liu, Huilong Ren, Jianzhang Li and Lianhui Jia</i>	4
Numerical Analysis of Temperature Field of Vertical Frozen Soil Wall Reinforcement at Shield Shaft <i>Jun Hu, Xiaobin Wang and Birong Jiang</i>	4
Comparative Studies of Boiling and Electrolysis on Micro Bubble Generation <i>Wenbo Luo, Xinxin Zhang, Xin Cui and Haibo Yuan</i>	5
The Optimization Methods Based on Big Data Technologies of Power System Protection <i>Haoran Xue, Bin Li, Kun Ji, Zhiqiang Wang and Xiaojun Kong</i>	5
Model Predictions for New Iron Ore Sintering Process Technology Based on Biomass and Gaseous Fuels <i>Jose Adilson de Castro</i>	5
Bioconversion of Water Hyacinth to Ethanol by Using Cellulase from <i>Trichoderma atroviride</i> AD-130 <i>Rajesh Dhankhar, Anil Dhaka and Sakshi</i>	6

A Way to Chips Diagnosis by Short Circuits <i>Nikolay V. Kinsht and Natalia N. Petrun'ko</i>	6
Study on Measures for Solving Accident of Water Distribution System <i>Wei-zhuo Wang and Jian-min Bian</i>	6
Low Voltage FGMOS Four Quadrants Analog Multiplier <i>Jesús de la Cruz-Alejo and L. Noe Oliva-Moreno</i>	6
Study on Security of Based on Android Third-party Software Detection <i>Ming-li Ding</i>	6
The Empirical Study on the Relation between Finance and Investment Based on ARDL Model <i>Yanqiong Liu</i>	7
A New Calculation Model for Shipping Demand Based on Constraint <i>Yongtao Yu and Ying Ding</i>	7
Particle Swarm Optimization for position Control of Induction Motor <i>Chao-Lung Chiang</i>	7
3D Simulation of Heavy-Ion Induced Charge Collection in Sub-100nm MOS-FETs Using Strained Silicon-Germanium <i>Bin Zhou, Xin-chun Wu and Ming-xue Huo</i>	7
Association Rule Mining Based on Multidimensional Pattern Relations <i>Yuke Chen and Taixiang Zhao</i>	7
Electric Energy Information Collection System Based on SOA <i>Wenpeng Su, Zhonghua Yan and Chenghui Liang</i>	8
Application of 3D Virtual Scene Building Technology Based on OSG in Gas Station Training Simulation System <i>Jianmei Song, Zhonghua Yan and Hao Yuan</i>	8
Research and Analysis on Internet Public Opinion based on Web Mining <i>Ronghua Lu, Haiying Liu and Muqing Zhan</i>	8
The Study of Trust Evaluation Model based on Improved AHP and Cloud Model in IoT <i>Xiyu Pang and Cheng Wang</i>	8
Study on Optimization of Water Supply Network Topology <i>Wei-zhuo Wang and Ting-yu Zhang</i>	8
Implementation and Detection Tests for Countermeasure-Annulled Hardware Trojan on FPGA <i>Masaya Yoshikawa and Takaya Tukadaira</i>	9
Mitral Valve Annulus Matching over Time Based on Image Intensities <i>Wan Zhang, Yunfeng Wei, Menghong Wang, Zeqi Zheng, Jintian Peng and Yipeng Li</i>	9
The Determining of Basic Probability Assignment for D-S Evidential Theory Based on Rough Set <i>Ran Tian and Binyong Li</i>	9
Robust Optimization Study of Recycling Network for Electronic Waste <i>Zheng Zhang and Huimin Ma</i>	9
The Research on Intelligent Marking System for Examinations Based on Fuzzy Theory <i>Yi Chen</i>	9
Translation: The Construct of Sense and the Make of Meaning <i>Wengan Jiang</i>	9
A Simple Way to Compute Parameters for Load Balancer in Optical Networks <i>Chia-Sheng Tsai and Sun-Wei Cho</i>	10
Optical Properties of Black Silicon Using the Combination Method of KOH and Gold-assisted HF Etching <i>Guodong Zhao, Xinghua Zhu, You Yu and Xiaolin Zheng</i>	10
Tree-Structured Parallel Regeneration Based on Regenerating Codes for Multiple Data Losses in Distributed Storage Systems <i>Pengfei You, Yuxing Peng, Zhen Huang and Changjian Wang</i>	10

Applying of Piston Mechanism Design used in the Wavelength Electrical Generating of Ocean for Fishing Communities

Hendra^{1,a}, Anizar Indriani^{2,b,*} and Hernadewita³

¹Mechanical Engineering Dept University of Bengkulu, Indonesia

²Electrical Engineering Dept University of Bengkulu, Indonesia

³Sekolah Tinggi Manajemen Industri, Jakarta Indonesia

^ah7f1973@yahoo.com ^baniz_raimin@yahoo.com

Phone: +62-823 9186 9866

Keywords: Generator, Pneumatik, Turbine, Buoys, Ocean Wave Power Plant

Abstract. Pneumatic mechanism widely used in industrial, automotive, aerospace, and etc. The principle of pneumatic like piston is move up and down due to the air pressure inside the piston. Mechanism of piston can be applied to the power plant that utilizes the ocean waves where as use of piston mechanism is very helpful in solving the problem of fossil fuel scarcity as a source of energy in power plants. In this study we will focus on the pneumatic system which utilizing ocean wave that moves longitudinally to encourage buoy that located on the piston shaft to up and down and then the pressing of air out of piston. Output of the piston will be forwarded to the generator (rotor and stator) to produce a voltage. In this paper is focused on the manufacture of pneumatic systems and processes to produce the rotation and voltage. Material of piston tube component made of aluminum and rubber, buoys made of plastic and generator such as of metal and copper coils. Output of the piston will be forwarded to the generator (rotor and stator) to produce a voltage. In this paper is focused on the manufacture of pneumatic systems and processes to obtained the rotation and voltage with aluminum for piston tube material, buoys made of plastic and magnet rotor and copper coils of stator include on the generator and get the results of ocean wave power plant using piston mechanism is 1400 rpm with a voltage of 36 volt.

Introduction

Ocean wave [1, 2] is a resources the energy that can be used as an alternative source of power generation beside on hydropower [3], diesel, solar and others. Some devices of the ocean wave that can be used for ocean wave power plant [1, 2, 3, 4, 5] is Pelamis (Ocean Power Delivery), Oscillating Water Column [2, 6, 7], Wave Surge, Salter Duck, Cockerel Raft and Piston. Advantages of ocean wave power generation system is cheap and easy to manufactured, require no fuel and environmentally friendly [4] but the resulting voltage is unstable due to the movement of the waves are not constant. To overcome this drawback can be done by using battery or electrical energy storage.

Piston mechanism is a tool or machine which can be used for ocean wave power plant. The principle of piston mechanism is using height of ocean waves to push the buoy on the shaft moves up and down. The piston movement pushes the air in the tube piston to rotating rotor in the generator that mounted on the piston tube. Rotation of magnet of rotor and combination with the coils of stator on the generator will be converted into a voltage. The amount of rotation and voltage depends on the dimensions of the piston tube and generator system such as magnet of rotor and coils of stator. For the big dimension of piston tube and amount of high coils of stator and magnet of rotor would be resulting of high rotation and voltage. Therefore in this study we will focus on the manufacture of mechanical and electrical parts for machine of ocean wave power plant which consisting of a piston and a generator that was placed in the vessel.

In this research obtained the Performance of ocean wave power plant without loading test with highest rotation appears at 1400 rpm with a voltage of 36 volt

Components of Ocean Wave Power Plant

Power generation system has two main components: the mechanical and electrical components. The mechanical component is used for processing of the mechanical energy to electric energy through up and down motions of the piston shaft in the piston to push air out inside the piston and rotate the magnet of rotor in the generator. The generator has two main components: magnet of rotor and coils of stator. Mechanical energy resulting from the piston will rotate the magnet of rotor in the generator, and then by rotating the magnet of rotor and combining with the coils of stator can give the result of voltage.

The main components of the ocean wave power plant can be seen in Fig. 1 and the dimensions in Fig. 2. Figure 1 shows that the main components of the machine of ocean wave power plant such as a piston tube, piston shaft, buoy and generator (rotor and stator). Dimensions of the main components: piston tube diameter and height is 230 mm and 417.38 mm, for piston shaft is length 1.5 times the height of the tube axis, size of buoys is 112 mm in diameter and tube length 217.85 mm. The number of tubes is 3 pieces as shown in Fig. 2 and outlet diameter of air is half-inch of diameter 0.25 inch.

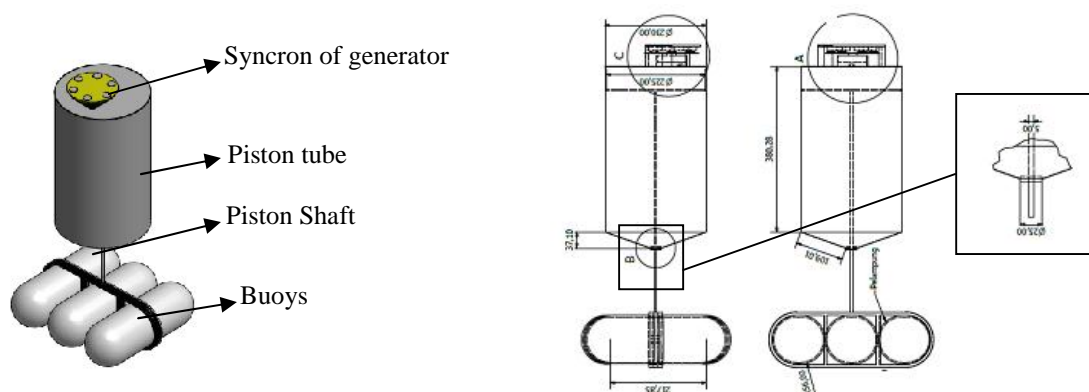


Figure 1. Piston and Generator Figure 2 Dimensions of Component Piston and

Manufacture Process of Mechanical Components on the Ocean Wave Power Plant

The manufacture process of mechanical component such as piston (see Fig. 3) is done with the cutting process, rolling process and soldering. Stages of the process are:

1. Manufacturing process of piston tube

The manufacturing process of piston tube is cutting of aluminum plate and then rolling process for shapes of cylindrical tube. Then connected the piston tube with close of piston tube by soldering and making hole in the center of piston tube about half of 0.25 inches diameter of outlet air in the piston tube.

2. Manufacturing process of piston shaft.

Piston shaft is made from steel mounted in the piston tube and having thin rubber or acrylic material as cylinder plate for push of air in the piston tube to outside the piston tube. Air flow from output of piston tube goes to generator and rotates the magnet of rotor. Cylinder plate of piston have dimension is 225 mm for diameter and 8 mm for thickness.

Rotation Testing of Mechanical Component on the Ocean Wave Power Plant

Measurements test of rotation will be done after mechanical components ocean wave power plant is assembled. Measurement process of mechanical components and rotate of rotor can be seen in Fig. 4. The results show that the value of rotation is 1400 rpm with outlet diameter of air 0.125 inches.

Electrical Component on the Ocean Wave Power Plant

Electrical component on the ocean wave power plant consisting of magnetic components, coil winding, battery and inverter where as this component is useful as a producer of voltage. Magnetic component is known as rotor and coils component is stator. Rotation of rotor is converted into a

voltage through the magnet and the coil windings are mounted on the top of the piston tube. Results of voltage are stored by the battery and will be converted to AC voltage through an inverter.

The output of voltage and current depends on the type of magnet and coil number of windings. In this study neodymium is used for type of magnet with dimension of diameter is 25 mm and thickness 2 mm. the number of magnet neodymium is 6 pieces and also coils of rotor same as amount of magnet neodymium. For coils of rotor have 5000 and 6000 winding with different diameter of coil such as 18 mm, 20 mm, 12 mm and 15 mm for inner diameter coils and 40 mm, 35 mm, 41 mm and 51 mm for outer diameter of coils. Figure 5 and Fig. 6a show the shape and size of the coil windings and neodymium magnet and testing of performance of magnet of neodymium is seen in Fig. 6b. Figure 6a shows the mechanical and electrical components of ocean wave power plant that is assembled. In Figure 6a shows that the rotor and magnet mounted on top of piston tube and coil of stator placed on the top of magnet of rotor.

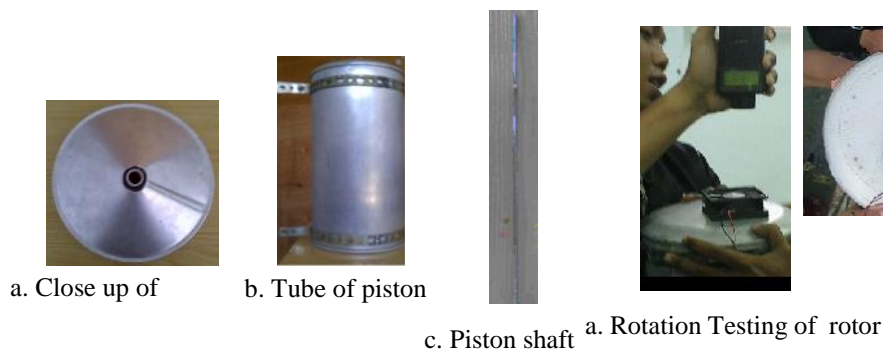


Figure 3. Component of Piston

Figure 4. Rotation Testing of rotor

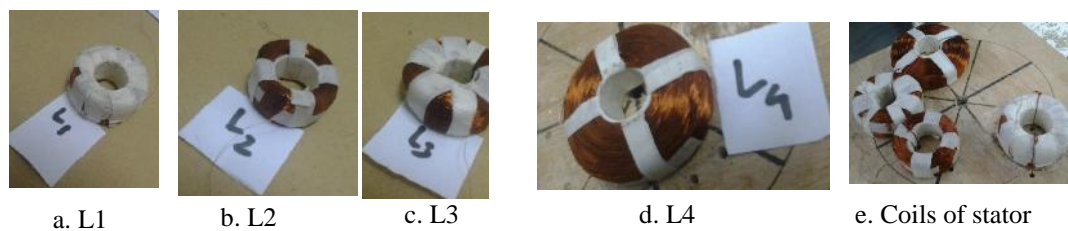


Figure 5. Coils of Stator

The battery are used in this study for anticipate unstable voltage fluctuations caused by the ocean wave conditions. It is may influence electrical equipment such as lights. The battery has specifications voltage and capacity 12 Volt 18 AH. DC voltage from the battery is converted into AC by using an inverter. Inverters specifications are 12-volt DC voltage and 220 -volt AC voltage with a capacity of 150 watts. Figure 7 shows the battery and the inverter used in this testing of performance of ocean wave power plant.

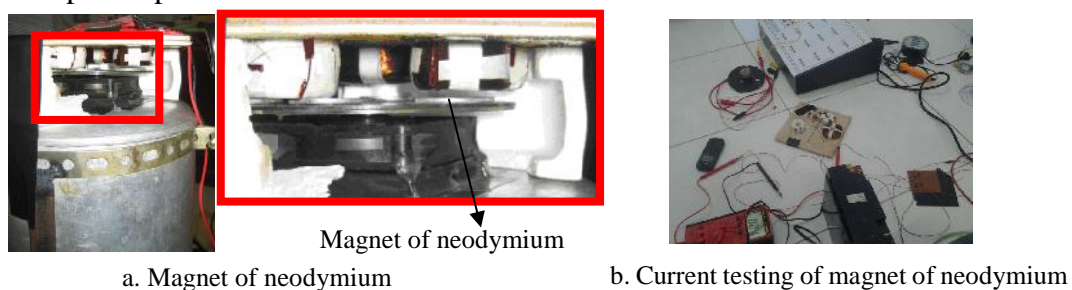


Figure 6. Testing of Rotation and currents of magnet

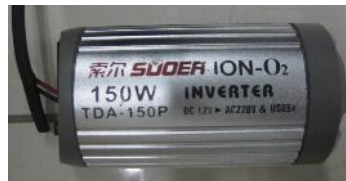
Performance testing of Ocean Wave Power Plant

The process of testing electrical component on ocean wave power plant is seen in Fig. 8. Table 1 show the value of rotate of magnet of rotor and voltage results from ocean wave power plant with piston mechanism. The Performance of ocean wave power plant without loading test indicated that

the highest rotate appears at 1400 rpm with a voltage of 36.1 volts. Figure 8 show the results of ocean wave power plant with electrical equipment such as light 35 w.



a. Battery



b. Inverter

Figure 7. Batere dan Inverter



Figure 8. Testing with Light 35w

Table 1 Data of Testing without load

No.	Putaran (Rpm)	Tegangan (v)	No.	Putaran (Rpm)	Tegangan (v)
1	500	13.48	6	1000	26.4
2	600	15.78	7	1100	29.9
3	700	18.7	8	1200	33.4
4	800	21.6	9	1300	34.5
5	900	23.5	10	1400	36.1

Conclusions

The Performance of ocean wave power plant without loading test indicated that the highest rotation appears at 1400 rpm with a voltage of 36.1 volts with the 23000 coils of stator and 6 magnet of rotor and diameter of coil winding is 0.15 mm. The output of voltage and current depends on the type of magnet and number of coil windings where as the increasing the number of magnet of rotor and coils of stator will be obtained the output of voltage and current become high.

Acknowledgement

This research was financially supported by the Ministry of Education and Culture of Republic Indonesia.

References

- [1] Falcao, A. F., *Wave Energy Utilization: A Review of the Technologies*, Renewable and Sustainable Energy Reviews, 2010, 14, pp. 899-918.
- [2] Al-Habaibeh A., Su D., McCague J., Knight A., *An innovative approach for energy generation from waves*, Energy Conversion and Management, 2010, 51(8), pp. 1664-1668.
- [3] Langhamer O., Haikonen K., Sundberg J., *Wave power—Sustainable energy or environmentally costly? A review with special emphasis on linear wave energy converters*, Renewable and Sustainable Energy Reviews, 2010, 14(4), pp. 1329-1335.
- [4] Zhang D., Li W., Lin Y., *Wave energy in China: Current status and perspectives*, Renewable Energy, 34 (10), pp. 2089-2092.
- [5] Goncalves F.V., Ramos H.M., Reis L.F.R., *Hybrid energy system evaluation in water supply system production: neural network approach*, International Journal of Energy and Environment, 2010, 1(1), pp. 21-30.
- [6] Rodrigues, L., *Wave Power Conversion Systems for Electrical Energy Production*, Dept of Electrical Engineering, Faculty of Sciences and Technology, Nova University Lisbon, Portugal.
- [7] Amundarain, M., Alberdi, M., Garrido, J., and Garido, I., *Modeling and Simulation of Wave Energy Generation Plants: Output Power Control*, IEEE Transactions on Industrial Electronics, 2011, Vol. 58, and No.1.