DIRECTOR’S SPEECH ON 7TH ASAIS 2018

Assalamualaikum Wr Wb.
Honorable Mayor of Bogor city,
Honorable Director of General of Research and Development,
Honorable Director of Research and Community Services,
Honorable Director of Vocational Program of Universitas Indonesia,
Honorable Keynote Speakers,
Honorable Guests, Presenters and Participants.

It is my pleasure to welcome all of you to The 7th ASAIS 2018 here in this lovely city. Under the theme of: “Strengthening Environment and Innovation System on Vocational Education in Supporting 4.0 Industrial Revolution which is in line with the current issue happening in global world, I particularly believe that this seminar will be very beneficial for us in order to make us ready and aware in entering Asian Free Trade Community (AFTA).

I also strongly believe that the development of technology will bring us into the borderless world which eases us to perform our daily activities. Furthermore, it assists us in satisfying global demands which are now becoming very crucial in order to catch up with the changes of the world. It will even help us improve the quality of our teaching and learning process. As long as we live within society, we must do something beneficial for our society.

The Honorable guests, speakers and participants,
As the Director of PNJ, I would wish to state once again that this international seminar offers several informative talks as well as networking opportunities. It implies that we welcome all of you to initiate collaborations in research and community services. I wish all of you the best and could enrich yourselves with seminar experience.

Please enjoy the seminar today and find something useful.
Thank you very much.

Wassalam Wr Wb..
CHAIR SPEECH ON 7TH ASAIS 2018

Assalamualaikum Wr Wb.
Good Morning,
Honourable Director of Politeknik Negeri Jakarta,
Honourable Keynote Speakers,
Honourable Guests, Presenters and Participants.

In this lovely morning in Bogor, the rainy city in West Java, I am extremely delighted to welcome all of you in the 7th ASAIS 2018 organized by The Center of Research and Community Services (P3M) of Politeknik Negeri Jakarta.

The Seminar has been conducted annually since 2011. In our view there is a significant improvement in the program seen in the increase number of presenters and participants which reflect their good responses. This year, the theme of this international seminar is in line with the development of Industrial Revolution 4.0 which gives good impacts to all sectors, such as: education, telecommunications, engineering, commerce, and communications. The theme is: Strengthening Environment and Innovation System on Vocational Education in Supporting 4.0 Industrial Revolution.

As lecturers, it becomes our prime responsibility to produce qualified human resources who are able to grasp the complexity of knowledge and express themselves with greater understanding, clarity and ethical responsibility.

Please allow me to say that ASAIS 2018 will not be going smoothly without full supports from Director of PNJ, Deputy Directors, colleagues, reviewers, speakers, sponsors, and all committees. I would like to deliver my great thanks for all supports.

As the Chair of the 7th ASAIS 2018, I would like to congratulate presenters and participants for taking up this challenge to discuss on the nature of professional communications in domains of Humanities, Language, Business, Engineering and Technology.

Last but not least, please enjoy the seminar and get the most benefit of it.
Thank You.

Please enjoy the seminar today and find something useful.
Thank you very much.

Wassalam Wr Wb..
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PREFACE

This proceedings contain sorted papers from Annual South East Asian International Seminar (ASAIS) 2018. ASAIS 2018 is the seventh annual international event organized by Pusat Penelitian dan Pengabdian (P3M) Politeknik Negeri Jakarta Indonesia. This event is a forum for researchers for discussing and exchanging the information and knowledge in their areas of interest. It aims to promote activities in research, development and application on technology, commerce, and humanities. We would like to express our gratitude to all technical committee members who have given their efforts to support this seminar. We also would like to express our sincere gratitude to Higher Education Republic of Indonesia. Finally we also would to like to thank to all of the keynote speakers, the authors, the participant and all parties for the success of ASAIS 2018.

Editorial Team.
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Performance of Porous Asphalt with Gislonite Additive

Tetra Oktaviani¹, Suherman Sulaiman²

¹Post-Graduate Student of Infrastructure Engineering Study Program, Applied Master Program, Politeknik Negeri Bandung, Bandung, Indonesia
²Civil Engineering Department, Politeknik Negeri Bandung, Bandung, Indonesia

*tetraokta@gmail.com

Abstract. Porous asphalt is a mixture of asphalt that consist more void than the surface layer of a general pavement structure. Porous asphalt mixture can be a surface layer of a flexible pavement structure that is environmentally friendly. Modification of porous asphalt mixtures using Gilsonite additive aims to help overcome the damage caused by deformation. The method used in this study is an experimental method. The tests use two gradations, namely the gradations of Japan and Australia. Dynamic stability test of 5.5% gilsonite content and 0% as control specimens was carried out in this research. The results showed that a mixture of modified porous asphalt with Japanese and Australia gradations increased the value of dynamic stability by 13.04% and 28% at temperature of 45°C. Whereas at 60°C the value of dynamic stability increases significantly. The dynamic stability of porous asphalt mixture modification of Japanese and Australian gradations increased by 71.74% and 74.13%, respectively.

1. Introduction
Porous asphalt is a mixture of asphalt which has more void than the surface layer of a general pavement structure. The porous asphalt mixture can be a surface layer of a flexible pavement structure that is environmentally friendly and very well used in vehicle parking areas, hereinafter known as part of a porous pavement structure [7]. The U.S Department of Transportation and the Federal Highway Administration (FHWA) stated that porous pavement structures consist of 3 (three) layers, namely; surface layers, filter layers, and shelter layers, all built on permeable subgrade [10]. While the planning method of porous pavement structures was first published in 1977 by researchers from Franklin Institute Research Laboratories in Philadelphia [7] [10].

The porous asphalt mixture has several advantages, as follows; the void in the porous asphalt serves to help drain water vertically and horizontally, providing greater resistance to slippage, and it can also improve the safety for road users. Besides its advantages, the shortcomings which become the main constraints on porous asphalt mixtures are low stability values caused by a large number of void. This can affect the structural performance of the porous asphalt mixture in the form of resistance in holding the wheel tracks and changing the shape, known as rutting.

2. Literature Review
A number of improvements have been made toward the performance of porous asphalt mixtures, one of them is by adding certain ingredients to it. The efforts made are in the form of the type of aggregate used, the type of binding the material, and the addition of a substance into the mixture. There are also
efforts to increase Marshall's stability value, by adding a substance to the porous asphalt mixture which has been conducted by several researchers. There are also various additives used.

Efforts to improve stability on porous asphalt have been carried out by Ramadhan and Reza [8] by adding Gilsonite HMA Modifier Grade in order to increase adhesion in aggregates. The gradation of porous asphalt used is British (BS) using asphalt content variations of 4%-7% and Gilsonite variation of 6%-10%. The result of this study indicates that in the presence of ingredients, Gilsonite has a significant increase in the value of stability.

The use of Gilsonite as an added ingredient can increase viscosity, reduce penetration, and strengthen bonds between aggregates [3]. In addition, Gilsonite can also help to overcome the damage caused by deformation, cracking, and rising asphalt to the surface [4]. The same thing was concluded that the addition of Gilsonite in modified bitumen produced a stronger and longer lasting mixture in tropical climate conditions [9]. This shows that in tropical climates, Gilsonite can be used to improve the stiffness characteristics and resistance to permanent deformation of the mixture used. Furthermore, Liu and Li (2008) [5] reported similar conclusions when they modified Alaskan asphalt cement with Gilsonite.

Gilsonite is a black hydrocarbon mineral with asphaltene content of 71%, maltene of 27%, and oil of 2%. Gilsonite has several features including the composition of physical and chemical properties as well as the content of asphaltene, nitrogen content, molecular weight, and high purity. The chemical feature of Gilsonite can be seen in Table 1.

<table>
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<th>No.</th>
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<tr>
<td>1</td>
<td>Carbon</td>
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<tr>
<td>2</td>
<td>Hydrogen</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>Nitrogen</td>
<td>3.3</td>
</tr>
<tr>
<td>4</td>
<td>Sulfur</td>
<td>0.3</td>
</tr>
<tr>
<td>5</td>
<td>Oxygen</td>
<td>1.4</td>
</tr>
<tr>
<td>6</td>
<td>Etc</td>
<td>0.1</td>
</tr>
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Source: Ziegler Chemical & Mineral Corporation

Research on the effect of adding additives on Marshall’s performance on porous asphalt mixture was conducted by comparing additives between Gilsonite and latex. This study was designed by varying the levels of Gilsonite and latex and then by analyzing which ingredients produced high stability values. The results of this study obtained the value of flow porous asphalt mixture with the added Gilsonite ingredients at 910 cm³/second, the obtained stability of 937 kg with an optimum Gilsonite level of 9%, while the stability value of porous asphalt mixture with the added latex material obtained a flow discharge of 1024 cm³/second, the stability of 627 kg, and optimum latex content of 2% [2].

Wang (2011) conducted a study of porous asphalt mixture by adding Recycle Asphalt Shingle. The results showed that the performance of the porous asphalt mixture shown by the rutting parameter gave a value of 4.287 mm in the testing of 8,000 load cycles at a temperature of 64°C. Whereas, with the addition of granite and steel slag material, they were successively produced rutting of 6.0 mm and 2.0 mm. Furthermore, for the additional material in the form of a recycled tire rubber into the porous asphalt mixture, it gave a greater rutting value of 9.318 mm [11]. The limit of the rutting value was 7.0 mm to 8.0 mm [10].

3. Methodology
In general, this study consists of several preparations and tests, as follows:

2.1 Material
Materials (fine and coarse aggregates) used in this study came from a region in Bandung, West Java. While the asphalt used was Pertamina asphalt with 60/70 penetration. Furthermore, the added ingredients (Gilsonite) were ordered from a distributor from Bandung.

2.2 Specimens
The specimens used in the study used the middle boundary of two gradations, namely Japanese gradation and Australian gradation. The asphalt content used was 5.5%, while Gilsonite levels were 5.5% and 0% as a comparison.

2.3 Dynamic Stability Testing
This test was conducted to provide a description of the mixture's resistance in holding the wheel traces and changes in shape that will be received by pavement in the field. The ability to hold the wheel trace is expressed with dynamic stability using a wheel tracking tool. Wheel tracking tools can be seen in Figure 1.

![Figure 1. (a) Wheel Tracking Tools; (b) Test Objects on Wheel Tracking Tools](image)

The size of the test object needed for dynamic stability testing is 30 x 30 x 5 cm as shown in Figure 1. Wheel Speed of the Wheel Tracking tool is 21 tracks / minute. The test was conducted in 1 hour, so the total track was 1260 tracks. The temperature used in this test is 45°C and 60°C. This temperature of 45°C is used based on the temperature of the daytime heat, while the temperature of 60°C is used during the extreme conditions.

4. Result and Discussion
The test results obtained the value of dynamic deformation and stability which can be seen in Figure 2 and Figure 3.
Figure 2 shows that the value of deformation velocity is directly proportional to temperature. The deformation velocity generated from a mixture of Japanese gradation test specimens has a lower value than the mixture of test specimens with Australian gradations. As the temperature increases, the greater the deformation velocity value occurs. The addition of Gilsonite has been proven to reduce the deformation velocity.

Figure 3. Comparison of Dynamic Stability Values

Based on Figure 3, the value of dynamic stability generated by both gradations is at a temperature of 45°C. However, this value cannot be compared with the specifications because the specification of dynamic stability values for porous asphalt mixtures is not written in Rancangan 2 Indonesia, AAPA 2004, and Japan Road. Japanese gradation test specimens have higher values than Australian gradation test specimens. This value is inversely proportional to the value of the deformation velocity, this is because the mixture of Japanese gradation test specimens has a better density than the mixture of Australian garage test items. The addition of Gilsonite has affected the value of dynamic stability.
generated. It is proven that Gilsonite causes the dynamic stability value of each gradation to increase. Thus, it can be concluded that the mixture of specimens added by Gilsonite using Japanese gradation has a better performance than the mixture of Australian gradation test specimens.

The performance of the flexible pavement structure can be shown by one type of distress or type of damage. In this section, the distress parameters discussed are rutting or traces of the vehicle's ruts. Test results using Wheel Tracking Machine showed that the value of rutting had increased for Japanese and Australian gradations with the addition of gilsonite respectively at temperatures of 45°C and 60°C.

**Figure 4.** Relationship between Number of Passing and Total Deformation at 45°C

Based on **Figure 4.,** a mixture of conventional porous asphalt using Japanese gradation produces a smaller groove depth compared to a mixture of conventional porous asphalt with Australian gradations and modified porous asphalt mixtures. When viewed from the picture, a mixture of conventional porous asphalt using Australian gradation has a depth of groove that is almost the same as the depth of the groove produced by a modified porous asphalt mixture with Japanese gradation. This is inversely proportional to the depth of the groove produced by a mixture of modified porous asphalt with Australian gradation. The depth of the groove produced by a mixture of modified porous asphalt with Australian gradation has a smaller value than the mixture of conventional Australian porous asphalt pavement. From the whole picture, it can be concluded that the depth value of the grooves produced by a mixture of conventional porous asphalt (without the added Gilsonite) and modification (using the added Gilsonite) between the two gradations produces a value that is inversely proportional.
Furthermore, Figure 5. shows the depth of grooves generated from a mixture of conventional porous asphalt using Japanese and Australian gradations resulting a smaller value than the modification porous asphalt mixture. However, if the groove depth value is in the same mixture compared to 45°C and 60°C, then the depth of the groove produced from the modified porous asphalt mixture using both gradations has a better performance. The best performance is produced from porous asphalt mixture using Japanese gradation. A mixture of modified porous asphalt with Japanese gradation has increased only by approximately 1.0.

Therefore, the structural performance of modified porous asphalt has decreased with the addition of Gilsonite. Matthew (2013) conducted field tests on the structure of pavement asphalt pavement parameters and obtained rutting values of 0.45 inches or 1.103 cm for the amount of loading of 40,000 Esal [10].

5. Conclusion

Based on the results of the study it was found that:

- At a temperature of 45°C a mixture of modified porous asphalt with Japanese gradation provides an increasing of dynamic stability value from 2423.1 passing/mm to 2739.1 passing/mm, the increasing is 13.04%. The same thing happened in the Australian gradation from 1968.8 mm to 2520.0 passing / mm, with an increasing is 28%. While at a temperature of 60°C the dynamic stability value of a mixture of modified porous asphalt with Japanese gradation having a significant increasing from 797.5 passing / mm to 1369.6 passing/mm with an increasing 71.74% and for Australian gradation the initial dynamic stability value was 623.8 the trajectory/mm becomes 1086.2 passing/mm, an increasing is 74.13%.

- The structural performance of mixture of modified porous asphalt in terms of the type of groove damage of the vehicle’s wheels/ rutting at a temperature of testing 45°C for Japanese gradation decreased from 1.88 mm to 4.07 mm. However, at a temperature of testing 60°C, the structural performance of the porous asphalt mixture increasing by 1.8% or from 6.09 mm to 5.98 mm.

- The structural performance of modified porous asphalt pavement in terms of the type of groove damage of the vehicle’s wheels/ rutting at a temperature of 45°C for Australian gradation increased by 8.2% or from 4.28 mm to 3.93 mm. However, at a temperature of 60°C, the structural performance of a mixture of modified porous asphalt decreased from 6.83 mm to 7.84 mm.
References


Acknowledgment

The author acknowledges to UPPM POLBAN that already support the funding for commencement the research and Bandung Research Center of Roads and Bridges that support the laboratory for the research.
Performance Decrease Preventive of Steel Bridge Beam Due to Fire using Fire Resistant Coating Method

Riawan Gunadi¹, Moeljono¹, Fisca Igustiany¹, Mujiman¹, and Fajar Fikriyansyah Sidik²

¹Department of Civil Engineering, Politeknik Negeri Bandung, Indonesia.
²Post-Graduate Student of Applied Master Infrastructure Engineering Study Program, Politeknik Negeri Bandung, Indonesia.

*fajarfikriyansyahsidik@yahoo.com

Abstract. The collapse of Krasak bridge in 1990 due to fire proved that steel bridge is susceptible to high temperature. It needs a protection on steel beam to defend the resistance of the structure caused by high temperature, one of the protection is fire resistant coating such as graphite resistant paint. This research divided by the steel without paint and the steel with paint post-fire, both research are analyzed experimental and numerical. Eight specimens were burned at temperature of 20, 550 and 1000 °C. Loads were applied during combustion by 0, 19, and 38 kN. Afterward, post-fire specimens were tested for flexural and tension test. The result of experimental test proved that the combustion process is influenced by several factors such as temperature, initial load and duration. The addition of paint can defend the yield strength by 3.8%. The result of numerical analysis showed that the addition of 1 mm thickness of paint increase 1°C temperature to reach collapse compared to specimen without paint. Hence, the addition of this type of paint slightly improves the performance of steel beam.

1. Introduction

The case of a steel bridge fire that occurred on the Krasak bridge in 1990 proved that steel is weak to high temperature. The structural failure of the steel bridge is occured at temperature of 1125°C[1], [2]. During a fire, steel increased temperature, material properties and shape is changed. The modulus of elasticity and the yield strength decreased rapidly while the temperature increased more than 400°C[3], [4]. Fire decreased the strength of steel structure so that the structure was unstable and collapsed[5], [4]. The collapse of steel bridge caused a loss, so it will be necessary to consider the effect of fire when designing a particular steel bridge. One method that can be done to reduce the influence of high temperature on steel after fire. One of fire protection that can be used is fire-resistant coating such as heat resistant paint.

Information and research on the behavior of steel bridge with and without fire-resistant coating when receiving heat are still lacking. Therefore, experimental do to obtain the behavior of steel when receiving thermal load and flexible load on a bridge structure. On the other side the numerical analysis obtain the required temperature of steel to collapse and increase the resistance of steel with the addition of coating to fire. The results of this research can be used as a consideration of designing steel bridge also limit load on girder with and without fire-resistant coating.
2. Literature review

The Krasak Bridge is one example of a construction failure caused by a fire. Research on bridge collapse has been carried out by several researchers as follows:

2.1 Netriady, 2010

Netriady’s (2010) research aimed to find the pattern of the Krasak bridge collapse which approached the actual situation in the field through prototypes and numerical simulations.

The method used is a prototype modeling of the Krasak bridge with a 1:17 scale and the results of the experiment are simulated in numerical analysis using ANSYS V11.00. The simulated location is in accordance with the conditions in the field.

From the results of Netriady’s (2010) study, it can be concluded that the structural behavior that occurs in the bridge simulation results of the Krasak prototype approaches the true state, both in the value or pattern of collapse, until the moment before collapse, more precisely around the 43rd minute and temperature ± 600 °C.

2.2 Imansyah et al. 2016

Imansyah et al. (2016) conducted a research which one of the objectives was to find out the time needed by the bridge to collapse when a fire occurred on the bridge.

The method used numerical analysis with STAAD Pro, ANSYS and Fire Dynamic Simulator software.

The results of analysis fire on the bridge, when there is a fire in the middle of the span, the total time needed until the stress of the diagonal member reaches fracture at 19.23 minutes. When there is a fire on the edge of the span, the time it takes for the bridge to collapse is faster. Based on calculations, the diagonal member reaches fracture at 17.95 minutes.

While research on the behavior of steel during a fire was carried out by several researchers as follows:

2.3 Choe et al. 2011

This study aims to develop knowledge from research data and measurements of: (1) fundamental behavior of axial force-moment-curvature-temperature (P-M-ϕ-T) of steel beam-column; and (2) Inelastic buckling behavior of steel columns that occur due to a combination of axial load and temperature from fire loading.

This study uses an experimental method developed from Hong (2007). A total of 11 (eleven) steel specimens of beam-columns and columns, with full scale. Five specimens W10x68 tested at temperatures of 300 and 500 ºC and were simultaneously loaded with axial loads with different axial load levels (P / Po = 0.15 and P / Po = 0.3). Six specimens column steel (W8 x 35 and W14 x 53) tested for inelastic buckling behavior and displacement of axial loads at high temperatures. The results of the research and behavior calculation of steel beam-column and column specimens were compared with 3D finite element analysis, namely ABAQUS version 6.10-1.

The results of specimen testing are shown in the picture below.
Figure 1. Response of Lateral force-displacement-temperature load (F-Δ-T) from beam-column specimens in (a) P / Po = 0.15 and (b) P / Po = 0.3; response of moment-curvature-temperature (M-f-T) from beam-column specimens in (c) P / Po = 0.15 and (d) P / Po = 0.3. 

Source: Choe et al. 2011

Figures 1 (a) and (b) show the lateral load response - temperature - displacement (F-Δ-T) of the five specimens W10 x 68. Typical behavior of steel beam specimen is as follows:

a. The lateral response F-Δ-T is linear at the initial stage of lateral loading and becomes nonlinear with increasing lateral loads. In specimens with a heating temperature of 500 °C initiate nonlinearly at the initial stage with a very small lateral load displacement of less than 10 mm.

b. The lateral load capacity decreased significantly with the addition of temperatures from 300 to 500 °C.

2.4 Kodur et al. 2010

The research conducted aims to demonstrate the high temperature constitutive relationship to steel compared to each other and provide recommendations that can be applied to design structural fire safety.

The figure below shows the yield strength and elastic modulus of steel as a function of temperature. Test data plotted in images are compiled from various high temperature property tests as shown in the figure. Both yield strength and elastic modulus decrease with increasing temperature.

From the results of the study found that Eurocode 3 is the formulation that is closest to the situation in the field.

The calculation formula for the modulus of elasticity and yield stress in steel based on Eurocode 3 is as follows:
2.5 Davidson, et al. 2013

The aim of the paper is to create a datum for the level of fire protection currently provided to infrastructure through the use of fire-resistant materials. Furthermore, the paper is intended to provide a springboard to identify strong fire protection materials in subsequent studies.

The method used is an analysis of the collection of literature studies or research that has been carried out regarding steel protection against fire.

From the results of the analysis, one of the topics discussed was about steel protection against fire using paint coatings.

When exposed to temperatures of around 300 °C or greater, intumescent material undergoes a significant transformation, forming a carbonaceous char layer shown in Figure 2 (b). Carbon materials expand volumetrically with sizes 25-50 times thicker than the volume of material applied (Sakumoto et al., 2001 in Davidson et al., 2013). Highly expanded char materials have strong insulation properties, and therefore, fire protection applications involving intumescent layers only require the application of a 2 mm thin layer.

![Figure 2. Response of intumescent layer fires [adapted from Mather (2006) with permission from PCI Magazine] (a) under room conditions; (b) after exposure to fire](source: Davidson, et al. 2013)

### 3. Methodology

#### 3.1 Specimen

The dimension of the specimen is 1/3 scale result of the full scale (Table 1). Specimens will be made of 8 (eight) pieces, it consists of 7 (seven) specimens that are steel without coating, and 1 (one) specimen is steel with fire-resistant coating. The varying load of 0, 19 and 38 kN were applied during the combustion process. The number of specimens detail are shown in Table 2.
### Table 1. Comparison of Prototype to Specimen (mm)

<table>
<thead>
<tr>
<th></th>
<th>H (Height)</th>
<th>B (width)</th>
<th>t_w (web thickness)</th>
<th>t_f (flens thickness)</th>
<th>Span</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prototype</td>
<td>800</td>
<td>300</td>
<td>16</td>
<td>30</td>
<td>9000</td>
</tr>
<tr>
<td>Specimen</td>
<td>250</td>
<td>125</td>
<td>6</td>
<td>9</td>
<td>3000</td>
</tr>
</tbody>
</table>

### Table 2. Number of Specimen

<table>
<thead>
<tr>
<th>Specimen Code</th>
<th>Temperature</th>
<th>Load</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0 kN</td>
<td>19 kN</td>
</tr>
<tr>
<td>S/20C/0</td>
<td>Ambient (20°C)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>S/550C/0</td>
<td>550°C</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>S/550C/19</td>
<td>550°C</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>S/550C/38</td>
<td>550°C</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>S/1000C/0</td>
<td>1000°C</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>S/1000C/19</td>
<td>1000°C</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>S/1000C/38</td>
<td>1000°C</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>SC/1000C/38</td>
<td>1000°C</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

3.2 Combustion

The furnace used ASTM E119 standard[6]. The furnace is shown in Figure 3.

![Figure 3. The Furnace](image)

3.3 Flexural Test

The type load that applied during flexural test is monotonic static loading. The load located in the middle of specimen. The loading of all specimens are carried out by control displacement method. Flexural test used the UTM (Universal Testing Machine) machine with a capacity of 50 tons (Figure 4).
3.4 Instrumentation

Strain measurement used 4 pieces of strain gauge on the steel surface as a data sensor. While the measurement of vertical and horizontal displacement used 3 LVDT (Linear Voltage Displacement Transducers). Illustration of loading, strain gauge placement and LVDT placement are shown in Figure 5.

![Figure 5. Illustration of Flexural Test Instrumentation](image)

3.5 Strength Tensile Test

Tensile strength testing carried out at the Research and Development Center for Housing and Settlements. The form of the test sample is made based on ASTM E8 / E8M-09 standard[7].

3.6 Numerical Analysis of Heat Transfer

The uncoated steel showed the condition of steel which is at an initial temperature $T_i$ and the surface temperature suddenly rise up to be $T_0$. The function of time and depth of steel are one of the variable in the process of temperature distribution on steel[8]. The depth of steel analyzed both on flange and web is 1 mm. The formulation used in the numerical analysis is as follows[8]:

$$T(x,t) = T_0 + (T_i - T_0) \frac{x}{2 \sqrt{\alpha t}}$$  \hspace{1cm} (2)
4. Result and Discussion

4.1 Combustion

Specimens were burned in two temperature groups, namely 550 & 1000. The results of combustion of the specimens are shown in Figure 6.

![Figure 6. Merging Graph of Average Furnace Temperature - Time on All Specimens](image)

From Figure 6 it can be seen that the specimen with a temperature of 550°C has a longer burning duration (120 minutes) than the specimen with a combustion temperature of 1000°C (20 minutes).

4.2 Flexural Test

The incorporation of flexural test result of the specimen without coating is contained in the load and displacement load graph shown in Figure 7.

![Figure 7. Load-Deflection Curve of All Specimen](image)

From the graph of Figure 7 it is seen that the variations in temperature, duration and auxiliary load during combustion did not significantly affect load capacity. Exception to specimen S/1000C/19 which experience a very steep reduction in load capacity due to buckling caused by permanent deformation after burned. Failure on specimen S/1000C/19 showed a significant effect on structural behavior after combustion due to applied of load during combustion and high temperature change. Significant effect were seen in the varied softening area. The effect of temperature during combustion causes the decrease of the structure in load capacity and stiffness, this can be seen in the specimen of
S/20C/0, S/550C/0, and S/1000C/0. The load, that applied during combustion on specimen S/550C/19 and S/550C/38 showed a significant decrease in stiffness at the end of the specimen S/550C/38 due to the higher load applied. Anomalous behavior occurs in the specimen S/550C/0, which is characterized by a worse behavior compared to specimen that have the same temperature, although applied the smallest load during combustion.

### 4.3 Tensile Test

The post-fire steel tensile test is shown in Figure 8.

![Figure 8. Curve of Stress-Strain All Specimens](image)

Material performance decreased, it caused condition even combustion (temperature and duration of combustion). From the graph in Figure 8, it can be seen that the sample M/20C (without combustion) has the highest yield strength value. Sample M/550C/120 and M/1000C/120 have the same combustion duration and different temperature, show that increase of temperature affect the yield strength of 53.47%. When M/1000C/20 compared to M/1000C/120, it could be seen that the change of yield strength was 45.15%. When M/1000C/120 compared to MC/1000C/120, it could be seen that the addition of coating could increase the yield strength value was 3.8%.

### 4.4 Numerical Without Coating

The experimental result analyzed numerically. The numerical analysis of the specimen S/1000C/0, S/1000C/19 & S/1000C/38 are shown in Figure 9 and in the specimen S/550C/0, S/550C/19 and S/550C/38 are shown in Figure 10.
Figure 9. Curve Moment – Time of Specimen S/1000C/0, S/1000C/19, & S/1000C/38

From Figure 9, the collapse temperature of specimen S/1000C/0, S/1000C/19 and S/1000C/38 are 874.5°C, 783.5°C, and 689.4°C, respectively.

Figure 10. Curve Moment – Time of Specimen S/550C/0, 19, & 38

From Figure 10, the collapse temperature of specimen S/550C/0, S/550C/19 and S/550C/38 are 676.6°C, 657.7°C, and 613.3°C, respectively.

Numerical With Coating

The variable of coating thickness is from 1 mm to 5 mm, with the combustion condition of experimental coating specimen. The result of numerical coating analysis is shown in Figure 11, and the detail graph is shown in Figure 12.
From Figure 11 & 12, the collapse temperature of specimen SC/1000C/19 with paint thickness 1, 2, 3, 4, and 5 were 783.9°C, 784.9°C, 786.1°C, 787.2°C and 788.7°C, respectively.

5. **Conclusion**

From the experimental and numerical analysis results that have been carried out, it can be concluded as follows:

1) The combustion process of steel show that the collapse of steel beam is affected by temperature, duration and initial load. At a relatively small initial load or temperature, the steel beam did not collapse but have residual deformation.

2) The tensile test result of post-combustion steel show that the temperature and duration of combustion affect the material properties. The yield strength and strain hardening behavior decrease as the temperature and duration increase.

3) Flexural test result show that the factor of temperature, initial load, and duration do not have a significant effect on peak load capacity of the post-combustion beam structure, unless there is a very large residual deformation due to the combustion process (S/1000C/19, S/1000C/38, and SC/1000C/19). On the other side the capacity of behavior at the softening level, these three factors have a significant effect on the deformation capacity reduction.
4) The addition of coating on the steel material surface also affect the yield strength after combustion, even it is not significant, it is increasing of 3.8%.

5) Numerical analysis result show that the greater the initial load given the smaller the temperature required for the structure to collapse. Furthermore the longer duration of combustion, the smaller temperature required for the structure to collapse. The temperature change 1°C in every 1 mm applied.

6) It can be said that the addition of coating in this research did not provide a large increase in performance on steel beam.

References

Acknowledgment: The authors acknowledge to DIKTI and UPPM POLBAN that support the funding of the research, PU department of residential and residential research center that has assisted in the entire testing process and the support from Department of Civil Engineering Polytechnic of Bandung that provide the laboratory facility for the research.
THE EFFECT LEARNING THEMATIC ASSISTED OF INTERACTIVE MULTIMEDIA ON THE LEARNING OUTCOME CHANGE IN THE EARTH CLASS III IN BASIC SCHOOL

Faisal Azmi Bakhtiar¹, Yufiarti², Rusmono³

¹Department of Basic Education, Jakarta State University
²Department of Early Childhood Education, Jakarta State University
³Department of Electronical Engineering Education, Jakarta State University

¹faisalazmi648@gmail.com, ²yufiarti@yahoo.co.id, ³rusmono@ft.unj.ac.id

Abstract. The purpose of this study was to examine the effect of thematic learning assisted by interactive multimedia on the learning outcomes of Change in the Earth of third grade elementary school students. This method uses experimental research. The research sample was 125 in five elementary schools in Bumiayu Subdistrict, Brebes Regency. The sampling technique used purposive sampling using two control classes and two experimental classes. Data collection techniques with data testing and analysis methods using t-test with SPSS 16.0. The results of the data analysis showed that the significance value was smaller than α (0.000 <0.05) and the average score in the experimental group was greater than the control, which was 76.87> 58.34. The conclusions from this study there is a significant positive effect of thematic learning assisted by interactive multimedia on the learning outcomes of "Change in the Earth" in third grade elementary school students.

Keywords: interactive, experimental, thematic, learning outcomes Multimedia

1. Introduction
The Indonesian government is currently developing a new curriculum known as the 2013 curriculum. The aim is to respond to one of the external challenges, which is related to the low quality of international education, especially in ASEAN countries. This curriculum is formulated in an integrated manner including the competencies of attitudes, knowledge, and skills that students must master. In the 2013 curriculum, it is regulated that the curriculum for SD / MI uses an integrative thematic approach from class I to class VI.

Sutirjo and Sri Istuti Mamik (2004: 6) state that thematic learning is an attempt to integrate learning knowledge, skills, values, or attitudes, as well as creative thinking using themes. Thematic learning is learning that uses themes in linking several subjects so that they can provide meaningful experiences to
students (Effendi, 2009: 129). Meanwhile, according to Trianto (2010: 78), thematic learning is defined as learning designed based on certain themes, in the discussion the theme is reviewed from various subjects.

Based on the description of the above theory, it can be concluded that thematic is a model of learning activities approach used to associate several subject concepts into a theme that is familiar to students. The purpose of this learning is to provide knowledge, skills, and attitudes by integrating them into a theme that the child understands both in school, community, and family. For example, the theme “Environment” can be viewed from language and citizenship subjects. More broadly, the theme can be viewed from other subjects, such as cultural arts and mathematics.

Munasik (2014: 112) states that in the application of thematic learning teachers still have difficulties. Determination of methods and learning media that are in accordance with the theme is still a major problem in the application of thematic learning. In addition, Suwardi (2015: 272) also mentions that the obstacles faced in the application of thematic learning are the low ability of teachers in designing and implementing thematic learning, and the lack of infrastructure that supports thematic learning. This problem was supported by survey data conducted on 29 teachers of grade III elementary schools in the District of Bumiayu, Brebes Regency which showed that 76% of teachers are constrained in the thematic learning process. Besides that, the theme that was felt difficult based on the survey there were two themes that were most chosen by the third-grade elementary school teachers. The theme, namely the theme of Change in nature 22%, and the theme of the earth and universe 20%. When viewed from the sub-themes in thematic learning, the highest percentage is in the sub-theme of changes in the earth's shape by 8% on the theme of the earth and the universe. Changes in the appearance of the earth are the third subtheme of learning contained in the theme of the earth and the universe of thematic books in class III of Primary Schools (Sonya, et al. 2015: 149-212).

A follow-up survey was conducted to determine the solutions used to minimize problems in thematic learning, especially sub-themes of changes in earth appearance, from the results of questionnaires showing that 84% of teachers prefer multimedia learning in thematic learning rather than other media. Multimedia advantages strengthened by research by Leon and Akio (2013: 303) states that the use of multimedia in learning can increase quite a high trust in the work of students. In addition, according to Orhan (2014: 618), technology in the present has developed in every element of society. Current generation students are more positive in responding to multimedia in the surrounding environment. The use of multimedia in learning can change behavior and improve student learning outcomes, especially in science lessons.

Multimedia concepts are defined in many ways. Most definitions agree on the characteristics that multimedia contains in the integrated text, graphics, animation, video and sound, and the content can be compiled and presented in different ways (Bent and Katja, 2013: 21). In general, multimedia can be interpreted as a combination of several media to present certain content or information to the audience. Wolfgang (2008: 17) understands it more than that, he mentions that: The term ‘multimedia’ usually referring to a combination of multiple technical devices such as computers, information transfer networks, an electronic display in order to present information through multiple presentations such as texts, picture or graphs through multiple sensory modalities. Multimedia is very important to be developed in the field of education given that in the present century multimedia has become a basic skill parallel to reading. The advantage of Multimedia is that it makes it easier for someone to find and deliver information. In addition, multimedia provides comprehensive information through what is seen, heard and done (2003: 21-23). While the weaknesses of interactive multimedia are expensive production costs, rigidity (once in manufacture cannot be changed causing the material to expire) (Smaldino, et al in Anitah, 2009: 185).
The objectives of this study are: 1) Is there an Influence of Earth Change Learning Outcomes by using Multimedia Assisted Learning Thematic Approach to Third Grade Students in Primary Schools. 2) How the Multimedia-Assisted Thematic Learning approach can influence the Learning Outcomes of Change in Earth Class Students in Third Class in Primary Schools.

2. Methodology
This research was carried out in elementary schools in the Bumiayu sub-district of Brebes Regency for 6 months, from March to August 2017. This study was a quantitative type of experimental research with experimental research design with a pretest-posttest control group design research design. The independent variable in this study is the use of a thematic approach assisted by interactive multimedia and as a comparison is the use of a simple media-assisted thematic approach of monomedia. The dependent variable in this study is the result of learning changes in the Earth’s Form.

The population in this study were all third-grade elementary school students in the Bumiayu sub-district of Brebes Regency, totaling 150 students in 6 elementary schools in the Bumiayu sub-district of Brebes Regency. Sampling using purposive sampling technique. Data collection techniques used in this study are test techniques in the form of objective tests, and documentation techniques.

Based on the results of the content validity test, there are 25 valid questions in the test while there are 5 invalid questions. Data analysis techniques include prerequisite test analysis techniques and hypothesis testing. Analysis prerequisite tests include normality test and homogeneity test. Normality test using Lilliefors test and homogeneity test using Bartlett test. Hypothesis testing is done after all data has been collected and the prerequisite test is completed, testing the hypothesis using the t-test.

3. Results and Discussion
Before conducting the pretest, the test questions that will be given are tested first in the trial group or instrument try out, namely the third-grade students of Penggartan Elementary School 02. After the data is validated, the questions are then given to the control group and the experimental group to determine the initial ability of the two groups of research samples. The complete value of the pretest control group data can be seen in Table 1 as follows.

<table>
<thead>
<tr>
<th>No.</th>
<th>Interval</th>
<th>Freqeusi</th>
<th>Prosentase</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>12 - 22</td>
<td>3</td>
<td>6%</td>
</tr>
<tr>
<td>2.</td>
<td>23 - 33</td>
<td>2</td>
<td>4%</td>
</tr>
<tr>
<td>3.</td>
<td>34 - 44</td>
<td>9</td>
<td>17%</td>
</tr>
<tr>
<td>4.</td>
<td>45 - 55</td>
<td>10</td>
<td>19%</td>
</tr>
</tbody>
</table>

The data of the initial ability score of the control group, the highest value was 84 and the lowest value was 12. Overall data was obtained by the average of the control group's initial ability score of 53.58. The complete data on the ability scores of the experimental group can be seen in Table 2 below.

<table>
<thead>
<tr>
<th>No.</th>
<th>Interval</th>
<th>Freqeusi</th>
<th>Prosentase</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.</td>
<td>56 - 66</td>
<td>17</td>
<td>32%</td>
</tr>
<tr>
<td>6.</td>
<td>67 - 77</td>
<td>11</td>
<td>21%</td>
</tr>
<tr>
<td>7.</td>
<td>78 - 88</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>53</td>
<td>100%</td>
</tr>
</tbody>
</table>

Experimental Group Data of the experimental group's initial ability value, the highest value is 88 and the lowest value is 20. The overall data on the average value of the initial ability of the experimental group was 52.87.
Balance testing is done by using the initial ability data in the control group and the experimental group to find out that the two groups have the same initial ability. The balance test in this study uses t-test or t-test. The results of this balancing test can be briefly seen in Table 3 as follows.

<table>
<thead>
<tr>
<th>Table 3. Initial Ability Balance Test Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nilai Equal variances assumed</td>
</tr>
<tr>
<td>Kelompok</td>
</tr>
</tbody>
</table>

Based on the results of the initial ability balance test between the control group and the experimental group can be described as follows: Sig. (2-tailed) > α = 0.821 > 0.05 then the test decision is to accept H0. It was concluded that the two groups had the same initial ability.

After the initial ability data collection was carried out, the next stage the researcher gave treatment to the experimental group with thematic learning assisted by interactive multimedia and as a comparison of the control group using monomedia in the form of image, video and audio media. This treatment was carried out in six meetings in each group. After the treatment is completed, then each group takes data on learning outcomes to find out the final results. Full control group learning outcome data values can be seen in the following table.

<table>
<thead>
<tr>
<th>Table 4. Control Group Learning Results Value Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
</tr>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
</tr>
</tbody>
</table>

Based on the value of the learning outcomes of the control group, the highest value is 92 and the lowest value is 20. The average value of the learning outcomes of the control group is 58.34. While the value of the experimental group learning outcomes, the highest value is 100 and the lowest value is 36. The average value of the experimental group learning outcomes is 76.87. The complete value of the experimental group learning outcomes can be seen in Table 5 as follows.

<table>
<thead>
<tr>
<th>Table 5. Data of Experimental Group Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
</tr>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
</tr>
</tbody>
</table>

Analysis prerequisite tests include normality test and homogeneity test. The results of the normality test use the SPSS 16.0 formula with the Analyze steps > Descriptive Statistic > Explore. The results can be seen in Table 6 as follows.

<table>
<thead>
<tr>
<th>Table 6. Tests of Normality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nilai</td>
</tr>
<tr>
<td>Statistic</td>
</tr>
<tr>
<td>Eksperimen</td>
</tr>
<tr>
<td>Kontrol</td>
</tr>
</tbody>
</table>

Based on the results of the normality test of the learning outcomes of the control and experimental groups above using Lilliefors Significance Correction (Kolmogorov-Smirnov) shows that the control group has significance > α that is 0.200 > 0.05 the test decision is to accept H0, it can be concluded that the control
group comes from a normal distribution. As for the experimental group has significance $> \alpha$ that is 0.074 $< 0.05$ the test decision is to accept $H_0$, it can be concluded that the experimental group comes from a normal distribution.

Homogeneity test in this study using SPSS 16.0 with Analyze steps $>$ Compare Means $>$ One-Way Anova. The results can be seen in Table 7 as follows.

<table>
<thead>
<tr>
<th>Nilai Equal variances assumed</th>
<th>$t$-test for Equality of Means</th>
<th>$\alpha$ Keputusan Uji</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kelompok Kontrol dan Eksperimen</td>
<td>6,084</td>
<td>97</td>
</tr>
</tbody>
</table>

Based on Table 8 above the results of hypothesis testing data on learning outcomes using the $t$-test between the control group and the experimental group can be described as follows: significance $\geq \alpha$ that is 0.000 $< 0.05$ then the test decision is to reject $H_0$. It was concluded that there was a significant effect of thematic interactive multimedia assisted learning on the learning outcomes of changes in the earth.

The results of hypothesis testing carried out on the control group and the experimental group showed that there was a positive and significant influence of interactive multimedia-assisted thematic learning on learning outcomes of Change in Earth in third-grade elementary school students. This is in line with the results of a study by Nourmaningrum DM, Chumdari, and Hartono (2013) which concluded that the use of interactive multimedia had an effect on the learning outcomes of science in fourth-grade elementary school students. Before being given treatment between the control group and the experimental group a balance test was performed, the results showed that the two groups were balanced.

After the experimental group was treated in the form of learning using interactive multimedia, from the learning outcomes data showed that there was a significant influence between the learning outcomes of the control group and the experimental group learning outcomes. This is because learning using interactive multimedia is more interesting and leads to student-centered learning, so students are more active and easy to understand the material.

Interactive multimedia used in the experimental group has the advantage of attracting students' attention, being able to present events that are not able to be presented at school directly, and being independent. This is in accordance with the opinion of Daryanto (2016: 70) the advantages of interactive multimedia are as follows: 1) Enlarge very small objects and vice versa; 2) Presenting complex objects or events; 3) Presenting distant objects; 4) Presenting objects that are prohibited or dangerous; 5) Presenting past events that we could not have seen clearly; 6) Increase student attraction and attention.

The use of interactive multimedia is able to facilitate students to find their own knowledge so that the knowledge gained is more meaningful. Whereas in learning that uses monomedia learning gets bored faster because it only uses images, videos, and audio without students participating directly in learning. In reality, the Change in Earth Forms sub-theme is very complex requiring a medium that can help the learning so that students are easier to understand and absorb the material. Interactive multimedia is able to act as a learning medium that makes it easier for students to learn independently and master technology competently, besides interactive multimedia is also more enjoyable for students in its use.
4. Conclusion
Based on the results of the data analysis above, it can be concluded that there is a positive and significant effect of interactive multimedia-assisted thematic learning on the results of learning changes in Earth in third-grade elementary school students in Bumiayu Subdistrict, Brebes Regency 2017/2018 namely significance $<\alpha$ $(0,000 < 0,05)$. Other influences from the use of interactive multimedia are better Earth Change learning outcomes, high student motivation, more interesting teaching, and learning activities, students more active in learning, this shows that effective and fun creative innovative learning (PAIKEM) is realized. The acquisition of the average value in the experimental group was greater than the acquisition of the average value in the control group, namely 76.87 $> 58.34$.

5. Reference
Aspects of Physical Image in Translation of Image of Women on the Novel “LelakiHarimau” by EkaKurniawan: A Case Study in Translation into German

CicuFinalia¹, M R Nababan², RiyadiSantosa³, Djatmika⁴
Doctoral Program of Linguistics Majoring Translation Studies, UniversitasSebelasMaret, Surakarta, Indonesia

*cicu.finalia@gmail.com

Abstract. There are some challenges that arise when translating aspects of physical image, such as the image of women, into target languages which, of course, have different cultural contexts. The challenges lie in the selection of translation techniques from the source language into the target language. This study discusses the translation techniques used in translating aspects of physical image related to image of women in EkaKurniawan’s “LelakiHarimau” novel into German, and describes the types of attitude associated with the physical image of women. Using Martin & Rose’s theory of appraisal (2007) and Molina & Hurtado Albir’s theory of translation techniques (2002), aspects of physical image compiled grammatical items, lexical items or metaphors related to image of women in the novel into domains to classify the aspects of physical image and the translation techniques used to translate the aspects of physical image. From the results of the initial and earlier discussion it was found that the translator of the novel “LelakiHarimau” into German are using nine translation techniques – mostly established equivalent and modulation. The use of these certain translation techniques is one indicator that translation technique determines the attitude markers shift.

1. Introduction
1.1. Background of Problem
Women's issues in literary work have always been an interesting topic to study. In Indonesia, women's issues were raised in literary works from the 1920s with the publication of the novel AzabdanSengsara written by MerariSiregar. From that time until now, the issue of women is still a popular topic in Indonesian literary works, especially novels. These women's issues are usually expressed or portrayed through the lives of female characters, how they interact with the environment and their fellow human beings, so that the depiction or imaging of female characters in a literary work is very important. Through the image of women can be seen a conception held by a society or group in society or, at least, one image that is strongly modified by the norms owned by the community[1].

Image of women can be understood as all forms of women's mental, spiritual, and daily behaviors that show women's "faces" and characteristics [2]. This image usually describes the characteristics and environmental conditions that actually appear to exist or are considered to exist as moral codes. In addition, image of women also produces information about trends or developments, about social changes or moral codes, and about efforts to change and influence social awareness [1].
In this article we discuss the physical image of women in the novel *LelakiHarimau* and how they are translated into German. This novel and its translation are also sources of research data that are considered very useful to answer all the problems that have been formulated.

1.2. Research Questions
The focus of this research is the aspects that portray the physical image of women found in the novel *LelakiHarimau* and the examination of how these aspects were translated into German and the markers shift in aspects of the physical image. Therefore, this study was conducted to answer the following questions:
(a) what aspects portray the physical image of women in the novel *LelakiHarimau*;
(b) how are these aspects evaluated and amplified;
(c) what translation techniques are used in translating these aspects from Indonesian into German;
(d) how is the impact of translation techniques used on markers shifts in aspects of the physical image.

2. Literature Review
2.1. Physical Image of Women
At present it is a little difficult to give a "portrait" of women and their personality as a whole because women always present themselves in various ways. Especially since the 1960s feminists have distinguished gender as a biological category and gender as a social or cultural category. This difference in definition of sex/gender shows the basic framework in feminist theory and has been widely accepted by the general public [3]. This can be the basis for "portraying" or imaging women as a whole.

Based on exposure to women, feminine, femininity and feminism above, we can portray women based on their biological categories and socio-cultural categories. Departing from this view, in this article we focus on how the physic of women are imaged in the novel *LelakiHarimau* and its translation in German *Tigermann*. [4] argues that the external appearance of a character or can also be referred to as a physical image, including sex, age, appearance, body shape, height, hair style, hair color, and clothing. In this category, aspects that describe the physical character of a character need to be re-detailed by adding aspects that have not been mentioned by Gigl, such as face, skin, and other body parts (eyes, nose, lips, cheeks, ears, neck, chest, breasts, hands, legs, etc.).

2.2. Appraisal Theory and Its Application
According to [5] appraisal is concerned with evaluation – the kinds of attitude that are negotiated in a text, the strength of the feelings involved and the ways in which values are source and readers aligned. They introduce the three main types of attitude – beginning with affect (people’s feeling), then judgement (people’s character) and finally appreciation (the value of things). It is considered the way in which attitudes can be amplified and hedged, developing force and focus as complementary dimensions of the system of graduation. They turn into source of attitude the ways in which quoting and reporting, modality and concession constitute an engagement system which can be used to introduce a range of voices into a text.

The appraisal theory is applied by a lot of scholars to various discourse, such in daily conversion, in literature, in language teaching and in academic discussion. [6]. A scholar tracks down the translator’s subjectivity in popular science translation and suggests that the translator’s subjectivity can be found in shifts in evaluative expressions between source text and target text, which he calls evaluative shifts[6]. The appraisal theory can also be applied in assessing translation quality and determining the pattern used by text speakers in realizing text’s purposes while anticipating and controlling the effect after these purposes are achieved [7], [8]. Through appraisal system and resources, the writer’s attitudes and meaning potential embedded in texts can be investigated [9]. Some scholars [10] propose an analysis of the first chapter of Mansfield Park that addresses the dialogic dimension by focusing on the resources of engagement, the subsystem of Appraisal Theory.
with which speakers/writers express their commitment to the truth of a proposition and their willingness to open the negotiation space to other voices. Another application of the appraisal theory in translation research has been done by [11]. He investigates “unfaithful” translation especially in terms of the linguistic expressions and compares English translations with the source texts according to the appraisal theory. Meanwhile, [12] make a contrastive analysis of chines and English forewords of academic monographs based upon the attitude of appraisal system by using SPSS 22.0 and investigate the resource types and realizations of attitude. Then, the exploration of the distribution of appraisal resources in translation of literary works has been carried out concentrating on a comparative analysis and finding out the similarity and differences of the translated poems [13].

Based on several translation studies researches using the appraisal theory mentioned, we see that appraisal theory can also applicable on portraying characters in literary works, such as their physical image.

2.3. Translation Techniques
To analyze translation, the categories used allow researchers in this field to learn how translations function. These categories are related to text, context, and process. Textual categories describe the mechanism of coherence, cohesion and thematic progression. Contextual categories introduce all extra-textual elements related to the context of the source text and translation production. The process category is designed to answer the following two basic questions: Which option has the translator chosen to carry out the translation project, that is, which method has been chosen? How the translator has solved the problems that arise during the translation process, that is, which strategy has been chosen? However, the requirements of research (or teaching) might make it important to consider a textual micro unit as well, that is to say, how the translation function results in relation to the appropriate unit in the source text. To do that, translation techniques are needed [14].

However, until now there are still differences of opinion among translation experts regarding translation techniques. This difference in opinion is not only in terminology but also conceptually. There is no agreement on what name should be given to mention this category. There are various labels used to mention this category (procedures, techniques, strategies).

3. Methodology
This research is a descriptive qualitative research in the field of translation that is product-oriented. In addition to the translation theory regarding translation techniques[14], in this study also used the Functional Systemic Linguistic approach (abbreviated as SFL), especially the appraisal theory[5], to examine aspects that portray physical image of women.

The data collected are qualitative data extracted in the form of: (a) linguistic data in the form of aspects that portray physical image of women that is realized through the language units in the novel *LelakiHarimau* and its translation *Tigermann* (German version); (b) translation data in the form of translation techniques used to translate aspects that portray physical image of women.

Data collection techniques in this study were purposive sampling. That is, we as a researcher who is a key instrument for selecting linguistic data and translation data carefully, directed, and carefully on the primary data sources in order to obtain the desired data. In this study the primary data source in question is the *LelakiHarimau* document and its translation of *Tigermann*.

To validate the data, we use source and method triangulation. That is, we use different types of data sources to extract data in this study, namely the novel *LelakiHarimau* document and its translation of the German version *Tigermann* in the form of aspects of women's physical image that are depicted through language units so that the data sources obtained are the results of the study documents compared to the results of the focus group discussion on informants (translation experts). Meanwhile, for data derived from data sources contained in the document, data is obtained by content analysis techniques. For participant data sources (translation experts), data is obtained through focus group discussions. Furthermore, the results of the application of these two methods are compared to obtain valid data.
4. Findings and Discussion
As mentioned earlier, this study will be limited to aspects that portray physical image of women found in the novel *LelakiHarimau* and the examination of how these aspects were translated into German and the markers shift of the physical image of women. In Figure 1 it can be seen that physical characteristics of the female characters are constructed by aspects of appearance, breast, hair, cheek, nose, skin, eyes, eyelashes, calf, hip, jaw, legs, lip and thigh. It can be concluded that physical image in the novel “LelakiHarimau” is constructed by the aspects of appearance and body parts.

![Figure 1: Aspects of physical image of women](image)

**Table 1.** Distribution of type of attitude and its polarity in appearance and body parts

<table>
<thead>
<tr>
<th>Aspect of Physical Image</th>
<th>Type of Attitude</th>
<th>Polarity</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Appreciation:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reaction, Quality</td>
<td>Positive</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Negative</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Judgement:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normality, Fate</td>
<td>Positive</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Negative</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Propriety, Ethics</td>
<td>Positive</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Negative</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Veracity, Truth</td>
<td>Positive</td>
<td>1</td>
</tr>
<tr>
<td>Body parts</td>
<td>Appreciation:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reaction, Quality</td>
<td>Positive</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Negative</td>
<td>12</td>
</tr>
</tbody>
</table>

Then Figure 2 shows the distribution of amplification and its markers of the physical image of women. In the novel “LelakiHarimau”, the aspects of physical image of women are amplified through force as resource of amplification. It means this choice turns the volume up in form attitudinal lexis, metaphor and intensifier. Attitudinal lexis plays a very important role in the physical image of women’s narrative. It is most used to turn the volume up, followed by metaphor and intensifier.
In Table 2 can be seen the translation techniques that are used in translating the aspects of physical image of women from Bahasa Indonesia into German. Established equivalent is most often used with a frequency of 62, followed by modulation with the number of frequencies 18. The other seven translation techniques (e.g. explicitation, addition, discursive creation, transposition, implicitation, deletion and reduction) have a fairly low usage frequency below 10.

<table>
<thead>
<tr>
<th>Translation Techniques</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Established Equivalent</td>
<td>62</td>
</tr>
<tr>
<td>Modulation</td>
<td>18</td>
</tr>
<tr>
<td>Explicitation</td>
<td>7</td>
</tr>
<tr>
<td>Addition</td>
<td>5</td>
</tr>
<tr>
<td>Discursive Creation</td>
<td>5</td>
</tr>
<tr>
<td>Transposition</td>
<td>5</td>
</tr>
<tr>
<td>Implicitation</td>
<td>4</td>
</tr>
<tr>
<td>Deletion</td>
<td>2</td>
</tr>
<tr>
<td>Reduction</td>
<td>1</td>
</tr>
</tbody>
</table>

As mentioned above, amplification resource, such as force, can be in form of intensifier, attitudinal lexis, metaphor and swearing. Intensifiers make it possible for us to compare things – to say how strongly we feel about someone or something, by comparison to something else. Attitudinal lexis, i.e. ‘lexis with attitude’ refers to vocabulary items that include degrees of intensity. Metaphor can also amplify the attitudes. These forms of force can be shifted from one to another: from intensifier to attitudinal lexis, from attitudinal lexis to metaphor, from metaphor to attitudinal lexis.

According to examination we’ve carried out, the using of certain translation techniques, such as modulation and explicitation, cause amplification markers shift that indicates image shift.

The comprehension of the original novel is the first and the most important step during translation. It is the cultural background of ST and TT that we have to consider as the first factor. Female characters in novel LelakiHarimau represent Sundanese women with certain physical characteristics that is beautiful with a physical image as follows: Sundanese women skin has usually a little shade of brownish tone with long unraveled hair. Their body shape is plump and they have plump breast too. The Sundanese women are famous for their typical beauty. It is very important that translators have good understanding with the concepts and images of women in Sundanese culture.

Meanwhile, source language is also important factor for translation of the physical image of women associated the image of Indonesian women, such as Sundanese. The author of the novel LelakiHarimau creates considerably his own metaphors and vocabulary that is not common to use to
expressed certain things. There is other possible reason for the shift in translation of physical aspect related to image of women in the novel *LelakiHarimau*. However, due to the limitation of space, this paper will not analyze them in detail.

5. Conclusion

This paper studies aspects of physical image of women, translation techniques used to translate the aspects and the impact of translation techniques in used on markers shift in translation of image of women in the novel *LelakiHarimau*. The study finds that: firstly, there are five physical aspects associated to image of women, such as appearance, body part, hair, skin and eyelashes. These aspects are mostly evaluated with types of attitudes of judgements (normality) and appreciation (reaction: quality). Secondly, there are nine techniques used to translate the physical aspects of image of women, such as established equivalent, modulation, addition, discursive creation, reduction including implicitation, amplification including explicitation, description, deletion and transposition. Lastly, the using of certain translation techniques in translation of physical aspects related to image of women in the novel *LelakiHarimau* cause shift in amplification markers that indicates image shift, such as modulation and explicitation.

There are some limitations and suggestions for further study. Firstly, the study only analyzes one type of image of women, the corpus is inadequate. The further study can take more types of image of women into consideration. Secondly, due to the limited space, the paper mainly studies the physical aspects of image of women and its translation techniques.

References


The Experiment Study of Sound Absorption Characteristic of Synthesis Composite Materials of Zeolite and Banana Steam Fiber

Nanang Rohadi¹, Sutanto², Hidjan³

¹, ² Electrical Department, The Jakarta State of Polytechnic (PoliteknikNegeri Jakarta).
³Civil Department, The Jakarta State of Polytechnic (PoliteknikNegeri Jakarta).
Jl. Dr. G.A. Siwabessy, KampusBaru UI Depok 16424

Email: ¹nnng_rohadi@yahoo.com

Abstract. This paper presents the steps of the experimental testing of synthesis composite materials of zeolite and banana stem fiber. The structure of zeolite is a porous material and it is possible to be manipulated while the fiber of banana stems gives reinforcement, so it is very good as a composite material for sound absorbent. The acoustic absorption coefficient of the composite materials is measured using the technique of impedance tube where the transfer function between two microphones based on the standing wave tube method is applied using a frequency of testing from 125 Hz to 6 kHz. Measurement results of maximum absorption coefficient (α) of the tested samples are varied in the range of frequencies from 1 kHz to 2.5 kHz. It is indicated that the composite of zeolite with 11 gram of banana stem fiber has the maximum absorption coefficient (α)0.9 at a frequency of 1.5 kHz, while with 6 gram of banana stem fiber the coefficient is about 0.5 at a frequency of 1.25 kHz.

Keywords- Zeolite, banana stem fiber, absorption coefficient, impedance tube

1. Introduction
Zeolite is a natural material and of a silica aluminous porous crystal which is arranged by a three-dimensional structure of tetrahedral [AlO4] 5- and [SiO4] 4- and is connected by oxygen atoms, so that an open three-dimensional framework containing canals is formed and filled with ions in the form of alkali metals and water molecules that can move freely [1]. This material is widely used as catalyst material, ion exchangers, etc. [2]. In this research, the characteristics possessed by zeolites are tested experimentally with the fiber of banana stems as a noise-suppressing material.

Natural zeolite from the area of Lampung is used as experimental materials for sound absorbing materials. This zeolite is obtained easily and cheaply but as for sound absorber it contains impurities such as Natrium (Na), Potassium (K), Calcium (Ca), Magnesium (Mg), and Iron (Fe)[3] so that the crystallinity is not good and thus it cannot be directly used. In this case, the activation process for natural zeolite needs to be carried out so that impurities that can reduce the noise reduction process can be increased. This is caused by changes in the surface and cavity of the active zeolite material and it would be very good for the sound suppression process. Detailed studies have been carried out regarding the damping process with zeolite material [4], but composite synthesis with banana stem fiber has never been carried out.

To further improve the damping process, in this research, banana stem fiber was used as a mixture.
One of the reasons for using banana stem fiber is the most abundant and easily available natural fiber in Indonesia. This fiber was originally widely used one of them for the purposes of making household appliances, but for other applications this fiber has been used as a material for sound absorbing [2]. As a composite of sound absorbing materials, this fiber has several advantages such as: quite available, cheap, has no impact on health. Further, a number of researchers have developed a mixture of materials for the damping process, for example in a sound absorption tests on fibrous materials using impedance tubes [5].

In this research, experimental studies were carried out for active zeolite mixed with banana stem fibers. The testing method is carried out using impedance tube for the purpose of seeing the level of sound absorption coefficient ($\alpha$) of the composite material. A porous material of zeolite and with good flexibility of banana steam fiber, thus it is expected to be a good material as for a silencer.

2. Material and Sound Absorption Testing

Samples of material for the purpose of absorbing noise is composed from activated zeolite which is originating from area of Lampung and combined with banana fibers stem. The prepared samples are tested to see the properties of the acoustic absorption. Figure 1 is an example of slurry of banana stems, which is soaked in liquid of NaOH and the dried fiber of banana stems. The activated zeolite as shown in Figure 2 is the process where the zeolite powder is soaked in liquid of Hydrochloric acid (HCL) 6M in approximately 13 hours and then cleaned with an aquadest to remove chemical liquid of HCL. Dried activated zeolite obtained from the heated of actived zeolites with temperature of approximately 225 ° C.

![Image](image1.png)

(a) The slurry of banana steam in NaOH

(b) Dried banana steam fiber

Figure 1. Banana steam fiber

![Image](image2.png)

(a) Activated Zeolite using HCL

(b) Dried Activated Zeolite

Figure 2. Zeolite
Composite synthesis material from a mixture of activated zeolite base material and dried banana stem fiber and glued with polyvinylacetate (PVAc), Calcium Oxide (CaO) and distilled water. The use of PVAc and CaO materials is very good as an adhesive material for sound absorption, while the disadvantages arising from PVAc is to contribute to blockage of composite pores. Next, all composite materials are mixed (see Figure 3a). The final result of the silencer composite synthesis material (samples) is tested using impedance tube to see the damping coefficient ($\alpha$) of each sample, see (Fig. 3b), with the range of the damping coefficient value is from $\alpha = 0\% - 100\%$. The $\alpha$ is directly proportional to the absorption strength of the material against the noise tested in 125 Hz - 6 kHz of the frequency range.

![Row material of sample](image1)

![Sample](image2)

Figure 3. Samples of composite zeolite

Material characteristics of the noise absorption can be seen from the damping coefficient value using a measurement with impedance tube. The test was carried out with an impedance tube equipped with a noise generator and two system data acquisition channels, the two microphones in each tube, and a software package for the control process. ISO 10534-2 (1998) is used as a reference standard.

![Impedance Tube](image3)

Figure 4. Impedance Tube

In Figure 4 of impedance tube, the random noise is generated in the range frequency of 100 Hz to >
6 kHz and is channeled through the tube. Two microphones record the noise spectrum for modeling the noise. In this case, microphone calibration needs to be done before used to record the data. Noise flow models (through data from two microphone outputs) and sound absorption analysis of the tested samples (synthesis of natural zeolite composites and banana stem fibers) were carried out using Delany and Bazley models [6]. Through the testing the damping coefficient (\( \alpha \)) can be predicted by calculating the empirical equation for impedance with the wave number expressed by [6]:

\[
Z_e = \rho c_0 \left( 1 + 0.0571 \xi^{-0.754} - j0.0871 \xi^{-0.777} \right)
\]

\[
k_e = \frac{\omega \left( 1 + 0.0978 \xi^{-0.7} - j0.189 \xi^{-0.595} \right)}{c_0}
\]

where \( \rho \) and \( c_0 \) is respectively as the sound density and velocity in the air and \( \omega \) is the frequency angle. The value of \( \xi = \rho \sigma f / c_0 \) with \( f \) is the frequency of the sound wave with \( \sigma \) is the fibrous material resistance. \( Z_e \) and \( k_e \) are complex numbers while \( \text{Im}(Z_e) \) and \( \text{Im}(k_e) \) are as imaginary part of each stored energy and attenuation energy in the material.

3. Results and Discussion

Figure 5 shows the variations in the measurement results of the noise damping coefficient function of the test signal using frequency range of 100 Hz -> 6 kHz and are applied using impedance tubes. Measurement of damping coefficients is grouped into zeolite material with the composition of banana stem fibers composite of 11 grams and 6 grams. The tests are carried out for three samples (see Fig.3b) with the same composition of banana stem fibers while the zeolite is kept constant about 33 grams.

For zeolite composite materials with banana stem fibers of 11 grams (in figure 5a), the highest absorption is about 0.9 and it occurs at a frequency of 1.25 kHz while for the average absorption for all of three samples is identified about 0.7 in the frequency range for maximum absorption is around 800 Hz to 1.5 kHz.

Different results were obtained for a composition of 6 grams of banana fiber stem (see Figure 5b). From the testing, the highest absorption of this sample is identified at 0.5 and it occurs at a frequency of 1.7 kHz. The average absorption for this testing of the three samples is about 0.3 on the same frequency while high absorption is obtained in the frequency range of 1.5 kHz to 2 kHz.

(a) Zeolite with 11 gram of banana steam

(b) Zeolite with 6 gram of banana steam

Figure 5. Sound absorption curve
Comparing to the three samples, which is tested in 11 grams of fiber (figure 5a) and 6 grams of fiber (figure 5b), it was identified that there is a shift in the peak value of the frequency function. A number of factors may be the cause of this shift, one of which may be due to uneven mixture of the samples.

4. Conclusion
In this study the synthesis of Lampung zeolite composites with the composition of a mixture of banana stem fibers on noise absorption was observed. From the testing, it was found that zeolite as a porous material can be used as a silencer. The damping coefficient also changes for a mixture composition of banana stem fibers, which gives an effect to changes in attenuation and test frequency. The highest attenuation is obtained for a fiber mixture of 11 grams and occurs at a frequency of about 1.2 kHz. While as for the mixture of 6 grams, the attenuation is lower but the peak attenuation occurs at a higher frequency of around 1.8 kHz.

Acknowledgement
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References
Toughness and Fracture Surface of Frame of Drone Based on Green Composite Materials

Mastariyanto Perdana1*, Nurzal1, Rozi Saferi1

1Mechanical Engineering Department, Institut Teknologi Padang, Indonesia
*mastariyanto.perdana@gmail.com

Abstract. Green composite is one of engineering materials that can be used on frame of drone. Waste material consist of styrofoam, bagasse, and eggshell were investigated to applied on green composite. The investigation focused on measuring toughness and observing the fracture surface of frame of drone that made of styrofoam, bagasse, and eggshell powder. Volume fraction was varied to study its effect on toughness and structure of green composite. This study showed that addition of bagasse and eggshell powder in composites up 25% by volume result in increasing the toughness value. The highest toughness of green composite was recorded as 138 kJ/m³. The fracture surface was analyzed to observe morphology of green composite. The result showed that addition of bagasse and eggshell powder in composites up 25% by volume result in decreasing the porous of green composite. Porous structure affect the toughness of green composite. Green composite based on styrofoam, bagasse and eggshell can be used for frame of drone.

Keywords: toughness, fracture surface, green composite, frame, drone

1. Introduction
Waste has become a very serious problem for people in the whole world. Population growth, changes in consumption patterns and people's lifestyles have increased the amount of landfill, type and diversity of waste. At the present time, many studies have concentrated on utilizing waste as a useful product or waste recycling. Waste can be used in the field of engineering.

One of studies about waste materials is the use of natural fibers for composite materials. Natural fiber composite is widely developed in the automotive as a substitute for synthetic composites made in fiberglass [1][2].

Some of the wastes that can be utilized are styrofoam, bagasse and eggshell. The garbage if processed can be used as material used in field of engineering. One of them is a green hybrid composite material [3]. Polymer composites are the most widely used for engineering materials. The advantage of polymer composite materials is the high strength to weight ratio compared to metals or ceramics. The use of synthetic fibers for polymer composite materials is reduced by replacing with natural fibers. Natural fibers generally have low density, low cost, high specific properties and biodegradable [4][5][6].

Bagasse fiber has been widely used as a basic material for green composite materials. The previous research was investigated at the physical and mechanical properties of the bagasse fiber-based composites...
Modification of bagasse size has also been carried out, using bagasse powder will increase the strength of the composite compared to bagasse fiber [9]. Eggshell is a waste material that has not been optimized as recycled material. Eggshell has been used as a catalyst for the synthesis of biodiesel from used cooking oil [10]. Eggshells have calcium carbonate compounds (CaCO₃) around 94%. Characterizations of Calcium carbonate are light, strong and rigid. It can be used as a reinforcement of composite. It can be connected with bagasse to replacing calcium carbonate derived from limestone. Material for binders of green composites can be used from styrofoam. Styrofoam or polystyrene is a product that used by humans in daily lives. Polystyrene is one of the polymers that made with polymerization process by means of suspension. Many people choose Styrofoam to ready-to-eat foods pack. Styrofoam for packaging often causes problems in the environment. This is due to difficult to biological degradation. The use of styrofoam as reinforcing material in the composite has been studied. In the last five years, researchers have conducted research on applications for composite materials, there are applications in the fields of automotive, marine, furniture, sound suppression and materials for building construction [11][12][13][14][15].

One of application of composite materials is the material for drone frames. The use of drones is in great demand both in the field of military mapping, tourism, disaster response, event coverage and just hobby. With the presence of drones, an aerial device equipped with a 4k camera with very high pixel resolution that can record both still images and videos develops into a tool that can perform very useful data collection within the scope of architectural development, especially data collection and digitization of heritage buildings [16]. Design and material system drone comprised of these engineering materials: carbon fiber, fiber plastic, Balsa, Thermocol, rubber, Aluminium alloy, alloy steel, thin plywood. The system performed well and stood true on all its expectations. There are off-the-shelf materials available for their respective tasks but they lack on one parameter or other [17].

Drone research has been carried out on the control and stability of flying drones. Drone control uses remote control, wireless communications and automatic algorithms. The control system for drones uses neuro fuzzy controller, Internal Measurement Unit (IMU) sensor, wireless control with self-balancing system, PID control law [18][19][20][21].

Research on materials for drone bodies has been developed much. The estimation of the spar strength I beam profile using composite material is proposed. It was found that the maximum strength of the spar design is 6000 N. It can be seen that the manufacturing process of the spar structure by using composite materials in this research gives high strength value [22].

Drone frame usually made of synthetic composite materials. Material of drone frame generally use nylon 6.6, Acrylic, derlyn, stainless steel 404, carbon fiber and aluminum. The material has weaknesses in costs and environmental problems. The material for the drone frame has a relatively high price. And in terms of environmental problems, these materials have an effect on environmental pollution if the material is discharged into the environment, this is due to difficult to decompose in the environment. Especially for drones that use stainless steel and aluminum material, it has weaknesses in terms of weight so that it will speed up the drone batteries or reduce the flying time drones.

So in this study the author will apply the green composite materials become a drone frame based on waste material from styrofoam, bagasse, and eggshells. In this study, drones will be investigated on toughness and fracture surface of the drone frame made from the waste material. The drone frame of green composite material is expected to be better than composite made from synthetic material in toughness of the drone.
2. Methodology

In this study, materials used were styrofoam, bagasse and eggshell. Styrofoam serves as binder material for composite. Bagasse and eggshells serve as a reinforcement material for composite. The styrofoam used was unused styrofoam. Styrofoam is dissolved in an acetone solution to make styrofoam turn into a liquid. Bagasses were taken in lawang district, West Sumatera. Eggshells were taken in Payakumbuh district, West Sumatera. Bagasse and eggshells which still contain impurities cleaned using clean water. After cleaned, then bagasse and eggshell were drained and dried. After bagasse and eggshells was dried, then the process of blending up bagasse and eggshells into powder with size 125-149 µm. Prepare a mold to make drone frame. The shape and size of the drone frame is shown in Figure 1. Combine styrofoam that has been diluted with the powder of bagasse and eggshell powder, then stirred using mixer for 10 minutes until mixed evenly. Mixing was done at room temperature. Pour mixture of styrofoam powder of bagasse and eggshell into mold. The volume fraction between styrofoam (matrix) and bagasse/eggshell powder (reinforcement) is 50:25:25, 55:22.5:22.5, 60:20:20 and 65:17.5:17.5. Figure 2 shown drone frame of grenn composites material.

Note: unit in mm

**Figure 1.** The shape and dimension of the drone frame

**Figure 2.** Drone frame of green composites material
Toughness testing uses the principle of free fall on a material. Toughness testing was carried out at Mechanical Engineering Laboratory Institut Teknologi Padang. Toughness test was done by dropping the drone frame from a height of 4.7 m. In testing the toughness of the drone frame ignores the frame fall position and air velocity when conducting testing. The toughness value of drone frame was determined using equations (1):

\[ Er = \frac{E}{v_s} \]  

(1)

Where \( E_r \) is toughness value in kJ/m³, \( E \) is absorbed energy by material in kJ and \( v_s \) is volume of material in m³. The drone frame was dropped from certain height, then absorbed energy similar with potential energy. Potential energy was determinated using equations (2):

\[ E_p = m \times g \times h \]  

(2)

Where \( E_p \) is potential energy in kJ, \( m \) is mass of materials in kg, \( g \) is gravitational acceleration in m/s² and \( h \) is height in meters.

3. Discussion
The investigation showed that addition of bagasse and eggshell powder in composites up 25% by volume result in increasing the toughness value. The average of toughness of drone frame based from styrofoam, eggshell and bagasse powder with volume fraction of 50:25:25 was recorded as 138.34 kJ/m³. The frame with volume fraction of 50:25:25 was a frame that has the highest toughness value. Furthermore, the toughness value with a volume fraction of 55:22.5:22.5, 60:20:20 and 65:17.5:17.5 was recorded as 137.34 kJ/m³, 131.98 kJ/m³ and 129.17 kJ/m³, respectively. Acrylic material was used as comparison material. Drone frame made of acrylic has a toughness of 126.33 kJ/m³. Table 1 shows the mass and toughness value of the drone frame made from composites based waste material from styrofoam, bagasse and eggshell for each volume fraction. All of volume fraction of the drone frame based waste material from styrofoam, eggshell and bagasse has a lower value in toughness of the comparison frame (acrylic). Figure 3 shows a graph of the relations between the mass with volume fraction of the drone frame.

<table>
<thead>
<tr>
<th>Volume Fraction of Green Composite</th>
<th>Mass of Drone (gr)</th>
<th>Toughness (kJ/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50:25:25</td>
<td>146.45</td>
<td>138.34</td>
</tr>
<tr>
<td>55:22.5:22.5</td>
<td>145.40</td>
<td>137.43</td>
</tr>
<tr>
<td>60:20:20</td>
<td>139.72</td>
<td>131.98</td>
</tr>
<tr>
<td>65:17.5:17.5</td>
<td>136.11</td>
<td>129.17</td>
</tr>
<tr>
<td>Acrylic</td>
<td>133.74</td>
<td>126.33</td>
</tr>
</tbody>
</table>

The result showed that addition of reinforcement material in composites up 25% by volume result in increasing mass of drones frame. But, in this study that effect on mass of drone was addition of eggshell powder in composites up 25% by volume fraction. This is due to the relationship of density with mass of material. Density of material increases, the mass of material also increases. Density of eggshell is higher than styrofoam and bagasse. Density of eggshell, styrofoam and bagasse are 2.83 gr/cm³, 1 gr/cm³ and 0.12 gr/cm³, respectively. So that, addition of eggshell composition result in increasing mass of drones frame.
The toughness value of drone frame from composite materials based styrofoam, bagasse and eggshell is influenced by the mass of the drone frame. The toughness of drone frame was tested with the free fall method so that the mass of drone and height have a greatly affects on toughness value. Investigate of toughness showed that linear correlation between the mass of drone with the toughness of drone frame. The higher the frame mass, the higher the toughness value. The toughness of drone frame for each volume fraction is shown in Figure 4.

![Graph showing the relationship between mass of drone and volume fraction of drone frame](image1)

**Figure 3.** Relationship between mass of drone and volume fraction of drone frame

![Graph showing the relationship between toughness of drone frame and volume fraction of drone frame](image2)
Correlation of drone mass with toughness, showed that linear correlation. Drone frame with a volume fraction of 50:25:25 has the highest mass so that toughness of drone frame also has the highest toughness. Observed on the drone frame after toughness test with the free fall method, the frame was broken into several parts for each volume fraction. Eggshells have calcium carbonate compounds (CaCO₃) around 94%. A characterization of Calcium carbonate is rigid. Addition of eggshell in green composites material causes the drone frame to become more brittle so that the drone frame is easily fracture. Fracture of Drone frame after toughness test with the free fall method is shown in Figure 5.

Acrylic material as comparison frame, after testing the toughness with the free fall method, it was not fracture. Although the toughness of drone frame based Styrofoam, bagasse and eggshell was higher than the comparison material (acrylic). The drone frame made of green composite based styrofoam, bagasse and eggshell was broken after being dropped at an altitude of 4.7 meter. This is caused the drone frame based styrofoam, bagasse and eggshell has many porosity. Porosity in composite causes stress concentration on the drone frame. Stress concentration is initiator the appearance of cracks and eventually fracture in the drone frame.

The fracture surface was analyzed to observe morphology of green composite. The result showed that addition of bagasse and eggshell powder in composites up 25% by volume result in decreasing the porous of green composite. Similarity with previous research, green composite with volume fraction of 80:10:10 based on styrofoam, bagasse and eggshell powder has much and big porous [3]. Porosity in composite, can be done by compression moulding, resin transfer moulding, vacuum forming and extrusion moulding method on composite manufacturing process [23][24][25]. The fracture section on the drone frame is carried out macro photos. The fracture shape the drone frame for each volume fraction is shown in Figure 6.

The results of the macro photo of drone frame showed that porous formed in drone frame. Addition of styrofoam until 65% due to increasing the porosity in green composite. The more porous formed, the frame drone easier of the drone will fracture.
Figure 6. Macro photos of fracture of drone frame (a) 50:25:25, (b) 55:22.5:22.5, (c) 60:20:20 and (d) 65:17.5:17.5

In macro photos, addition of styrofoam in composites up to 65% by volume result in increasing the porous of green composite. This phenomena that affects of drone frame mass. The more porous in green composite will cause the mass of drone frame to be decreases. Porous in green composite material give effect the toughness of the drone. Drone frame will be broken easily. Porous is initiator of stress concentration in composite material. Area of composite that have high stress concentrations are the initial trigger for cracks.

4. Conclusion
Addition of the composition of the binder material (styrofoam) or reduction in the composition of the reinforcing material (eggshell) in order to reduce the value of the drone frame toughness, the highest toughness in the frame with a volume fraction of 50:25:25 which is 138.34 kJ/m³, while the lowest toughness in the frame with fraction volume 65:17.5:17.5 which is 128.77 kJ/m³. Observations with macro photos, addition of bagasse and eggshell powder in composites up to 25% by volume result in decreasing the porous of green composite.

5. Acknowledgement
The authors are grateful to Directorate General of Research, Technology and Higher Education (Ristekdikti), Indonesia for the financial support of this research. We are also appreciative to all Mechanical Engineering students of Institut Teknologi Padang who have assisted in completion of the present work.
6. Reference


Reducing Ammonia Gas from Chicken Manure with Lime and Soybean Plants

Abustan*1, Asri Pudjirahaju.2

Affiliations:
1Program Studi Pendidikan Fisika, Universitas Palangkaraya
2Program Studi Ilmu Peternakan, Universitas Palangkaraya

Abstract. This research is aimed at overcoming the complaints of the local people living around the farm and who feel disturbed by the smell caused by livestock activities (mainly ammonia gas from chicken manure). The farm's location is difficult to change due to the costs involved and the difficulty of getting permits from of land owners. Adding lime by scattering it over the surface of the soil or planting soybeans around the cage are both expected to reduce the intensity of the smell of ammonia gas. The reduction of this odor reduction is determined by using an ammonia gas detector model AR8500 during the maintenance period. The results obtained showed a reduction in the levels of ammonia gas by 57.48% (from 1.67 ppm in the untreated cage to 0.71 ppm in the best case). The sample treated by the addition of soybean plants showed a reduction in the levels of ammonia gas by 50.30% (from 1.67 ppm to 0.78 ppm). It was found that spreading lime evenly over the chicken manure was the most effective method to be applied by farmers. The results of interviews with residents living around the farm site showed that there was less perceived odour from the chicken manure whenever lime was being spread under the cage. However, the high levels of flies, especially before harvest and post-harvest, was not ameliorated affected by these treatments, and it is expected that there will be follow-up project to address this issue.

Keyword: Ammonia Gas, Limestone, Soybean, odor

1. Introduction

The development of boiler chicken farms in Central Kalimantan, especially in Palangka Raya, especially in the last five years, is quite encouraging, and it helps to meet the needs of broiler chicken meat in Palangka Raya and its surroundings, which has reached 24 tons per. This figure is an increase of up to 30% compared to the demand previously in 2011 (Provincial Livestock Service Office of Central Kalimantan, 2015)1. Along with the development of the need for chicken meat, new problems arise from this livestock activity. The negative impacts that can be caused to the environment in the production process of chicken farms are most commonly associated with the amount of waste produced (Yusrini, 2002)2.

Most of the people who live around the location of broiler chicken farms are disturbed by livestock activities due to the appearance of unpleasant smells at certain times, especially from chickens aged 25 to 40 days. The main source of odor is caused by waste produced by poultry every day. This increases with increasing age of chickens raised. As an illustration, the manure produced...
by each chicken until the harvest age is around 0.5 - 0.8 kg / head. This figure is equivalent to 4,000 kg per 5,000 chickens.

The location of the farm was initially established in a place that was relatively far from the settlement and considered very safe from the aspect of air pollution. This has changed due to population development, and the corresponding development of settlement needs. Eventually the settlements shifted close to the farm location, and this creates new problems for both farmers and residents living around the farm, a problem which is often experienced by farmers and investors (partners) who invest in this agribusiness.

Ammonia can be very toxic to various organisms (Brigden and Stringer, 2000)[3]. Besides causing respiratory problems in humans, there are also problems that effect the farmers, namely high chicken mortality rates at the age of 30 to 40 days. This high mortality was also triggered by the high intensity of odors from under the cage with an average height of the cage from the ground surface being only around 140 cm to 150 cm. The ammonia from chicken manure that collects under the cage will be inhaled freely by livestock and have an impact on chicken respiratory tract disease, causing a range of problems from poor chicken growth to death. This kind of problem is expected by the breeders, and they are able to implement practices so that their livestock production does not experience a high mortality rate. Farmers can however experience a loss that is not small because the mortality rate exceeds 5% for each maintenance period.

The formation of ammonia is caused by urea and uric acid (C₅H₄O₃N₄) as the end product of purine metabolism (Ngili, 2009)[4], and results from waste manure or chicken feces that has not been handled properly. Most cages made for farms in Palangka Raya are in the form of a stilt house so that it allows the waste from the chicken to fall directly to the ground and mix with nutrients in it. In some cases the condition of dirt is slow to dry due to moisture in the soil structure.

An average day chicken produces 0.15 kg of waste with total nitrogen contained ± 2.94% which can later become a source of ammonia when the sludge slowly dries in the high humidity under the cage (Rachmawati, 2000)[5]. Pain (1999)[6] states that odor disorders from the farming system are very high. The smell of livestock manure is the result of biotransformation of livestock manure by the activity of aerobic and anaerobic bacteria. The sharp odor of ammonia produced from chicken manure is due to the lack of ability of nitrozomonas and nitrobacter bacteria in the nitrification reaction which is to convert ammonia into NO₂⁻ and NO₃⁻ nitrite compounds (Marsidi & Herlambang, 2002)[7]. This bacterium is mostly contained in fertile soil which allows the plants to process naturally this nitrification process, but in contrast to the soil in Palangka Raya the category of peat soils with less nutrient and fertility levels (acidic conditions) and high humidity due to the category of watery soils year. Different pH conditions at each place also contributes to the soil not being able to process ammonia properly.

The use of lime and leguminous plants (soybeans) planted on the outskirts of the cage can be used as an effort to reduce the smell of ammonia. This amount of lime applied is based on the ratio of the area of the cage occupied by poultry manure. The selection of lime and soybean plants was made after learning more about their characteristics as ingredients that can be used to speed up the process of drying cattle dung and is expected to reduce levels of ammonia odor.

2. Literature Review

Ammonia (NH₃) is a gas that is produced from the process of dissolving the remaining nitrogen in feces by decomposing bacteria. Ammonia is toxic, colorless, can cause rust on some materials and has a distinctive sharp odor. Ammonia is also a compound that causes odors from chicken manure (Korner et al., 2005)[8]. The formation of NH₃ is influenced by several factors, including temperature, humidity, the content of nitrogen in the litter or manure, and the population of microorganisms. In addition to humidity and ambient temperature, the relative concentration of each type depends on pH. The toxic properties of ammonia are related to the concentration of the non-ionized form (NH₃). The toxic properties of this non-ionized ammonia will be high in environments with low temperatures and high pH. While at a low pH most of the ammonia will be ionized into ammonium ions (NH₄⁺) (Brigden and Stringer, 2000)[3].

The chicken manure contains a nitrogen level of 13-17 g/kg of dry matter, consisting of 60% - 75% in uric acid, 0% -3% in ammonium, and 25% -34% in the form of non-digestive proteins (Patterson and Adrizal, 2005)[9]. The high levels of ammonia gases in manure indicate the inadequacy...
of digestive processes, or of excessive protein in the animal feed, so that it can not be absorbed and is released as ammonia in manure (Rohaeni, 2005)[10]. The source of NH₃ emissions from human activities is estimated to be 50% derived from livestock activities. Production of chicken farms is estimated to produce ammonia emissions of 1.9 million metric tons per year or 2.1x10⁹ kg per year. NH₃ emissions can quickly react with atmospheric acid components, such as nitric acid and sulfuric acid, and turn into ammonium aerosol particles, such as ammonium sulfate and ammonium nitrate (Ritz et al., 2004)[11]. Ammonia emissions in the atmosphere are influenced by livestock age, maintenance systems, environmental temperature and humidity, wind speed, and rain. Differences in climatic conditions, such as temperature, frequency and intensity of rainfall, wind speed, topography, and soil, all affect emissions generated from livestock (National Research Council, 2002)[12].

Ammonia and dust have both been discussed as potential problems with poultry house exhausts. Litter treatment usage is an important management tool for suppressing ammonia emissions and contributing to bird health. Using a litter treatment will have a direct effect on improving litter management, nutrient enrichment, and reducing ammonia volatilization from poultry house litter. The routine of cleaning and disinfecting equipment and the poultry house between production cycles is key to controlling disease. In addition to the cleaning and disinfecting process, producers can use lime in poultry houses to control pathogens (and reduce fly problems) (Blake, JP. et al, 2008)[13].

Nitrogen bacteria (also known as nitrogen-fixing bacteria) are a group of bacteria that can bind free nitrogen in the air and reduce it to ammonium (NH₄) compounds, nitrite ions (NO₂⁻) and nitrate ions (NO₃⁻) with the help of nitrogenase enzymes. One of these bacteria is the type of Rhizobium which is usually symbiotic with legumes, for example soybeans, which are food crops in the form of shrubs that grow upright which have a type of taproot, lateral roots, and fibrous roots. In loose soil, this root can penetrate the soil to a depth of 1.5 m. At the lateral root root there is a root nodule which is a collection of N-binding rhizobium bacteria from the air which generally cannot be used directly by most organisms. These root canes are usually roots formed 15-20 days after planting, in addition to absorbing nutrients and plant supports, the roots are the site of formation of root nodules, that is nodules which function as natural plants fixing air nitrogen by the activity of Rhizobium bacteria. Rhizobium which can effectively modulate soybean plants is known as Bradyrhizobium japonicum. Symbiotic associations of soybean plants with B. Japonicum bacteria can fix nitrogen at a level of over 200 kg/ha per year. Nitrogen needed by soybean plants can be supplied through nitrogen biological fixation by choosing effective B. Japonicum lines (Javaid and Nasir, 2010)[14].

3. Methods

Experimental methods with field observation techniques and laboratory analysis were used in this study. The experimental method with field observation techniques was carried out to collect data on chicken manure samples starting from the chicken/DOC for the first time entering the cage until harvest (35-40 days). The first year’s research was carried out in Kereng Bangkirai, Palangka Raya city. Samples were taken at 8 different sampling sites (with four sample places being given special treatment with the surrounding enclosure planted with soybean). In the second year, the research sample was expanded to several villages (Kereng Bangkirai and Tangkilang in Palangka Raya; and Pilang in Pulang Pisau Regency) whose livestock locations are close to residential areas. In these locations, it will be tested again with the same treatment by considering the size of the cage or the capacity of the chicken in the cage.

The following research samples are used: farms that are only given lime and without soybean plants around the cage; farms that are not given lime and only given soybean plants; farms treated with lime and soybean plants, and farms that is not given treatment (control variable). The treatment by planting soybean plants has the aim of estimating the nitrogen gas absorption power in soybean plants so that it can be determined what the ability of this plant to reduce the intensity of ammonia odor is. Lime can be sprinkled on the surface of poultry droppings or else thawed the lime and then sprayed on the dirt so that the smell of ammonia disappears. Soybean plants are planted around the cage (planted by surrounding the livestock cage) which reaches an area of (4 × 7) m + (4 × 85) m = 36.8 m². Planting is done a week before the cage is filled with chicken seeds, so assuming that the plant has grown before chicken dung falls under the cage when the chicken is 14 days old.

Ammonia levels are measured every 5 days after the 12th day (day 1 to day 12 chicken manure does not fall to the ground but remains above on the wood powder that has been prepared during the
nursery). Sowing lime on the chicken manure starts when the chicken reaches 20 days. Once a week soil samples are taken around the soybean plants to analyze the bacterial decomposition. The first treatment was to spread 25 kg of lime in an area of 65% of the enclosure area (595 m²) with a capacity of 5000 chickens. Second, third, fourth and fifth measurements, the addition of lime composition rose to 50 kg, 100 kg, 150 kg and 200 kg, with the coverage area already reaching 100% of the total area of the cage. These measurements were carried out 4 points, with distance of 0 m, 25 m, 50 m, 75 m and 100 m from the cage in each sample.

Figure 1. Research Flow Chart

4. Discussion

Cages sampling location

1. Cage A (Kereng Bangkirai). The treatment was applying lime. The condition under the cage is sandy soil where water infiltration dries out faster than for other soils. The sanitation are more open (no trees) on average 10 m to 30 m. There are no trees, so allowing more sunlight, which causes the dirt under the cage to dry faster. Air temperature ranges from 30°C to 35°C. This temperature contributed to a more intense ammonia odor because it slowed the drying of impurities under the cage.

2. Cage B (Kereng Bangkirai). The treatment here was the planting of soybeans surrounding the cage. Conditions around the cage are more open to the front for air circulation. But the left, right and back sides are still covered with trees whose height exceeds the height of the cage. The soil condition around the cage is dry soil.

3. Cage C (Tangkiling). The treatment was both lime and soybeans around the cage. The soil condition under the cage is relatively sandy. This type of soil can also accelerate the process of water infiltration, if there is spilled water or falling chicken manure allows a faster drying process. Rainfall in this farm area is relatively high compared to other cages. This has an impact on sanitation under the cage. Rainwater can be mixed with manure either because of the rising surface of the water around the cage or the infiltration of rainwater that enters the cage.

4. Cage D (Pilang). The treatment was applying lime. The structure of the soil under the cages are peat mixed with clay. Around the cage is trees covering the left, right and back of the cage. The air temperature during the day is relatively high, especially at 11.00 - 14.00 WIB (Indonesia Time) reaching 37°C, because the position of the cage will be exposed to full sunlight, while in the morning until 10:00 WIB and in the afternoon starting at 15.00 WIB is relatively protected from the trees on the left and right.

Ammonia Measurement Results

Ammonia gas measurement results vary in each of the measurements, even when the treatment is the same at every age of livestock raising. This difference can be caused by several factors: (1)
environmental conditions around the cage, such as the possibility of free air circulation at any time due to trees growing around the cage; 2) air humidity that tends to be affected by the number of trees around the cage, so that the cattle shed is slightly illuminated by the sun. The intensity of the smell of ammonia gas is triggered by high humidity levels; (3) the high ammonia gas detected is affected by the soil conditions under the cage. Stagnant water, especially in the rainy season, at some point is formed if the soil surface below the cage is quite low.

The factors of environmental conditions due to the number of trees and low surface soil under the cage were not used as indicators in this study. However, these factors were finding in the field research as several additional factors causing increased humidity around the cage. Disruption of community activities that exist around the location of the farm increased chicken mortality and decreased growth of chicken weight due to reduced appetite of animals. The appearance of symptoms of the disease is also caused by an increase in the smell of ammonia.

Table 1. Combined Observation Results at 30 Days Old Chickens

<table>
<thead>
<tr>
<th>Distance from cage</th>
<th>Cage A</th>
<th>Cage B</th>
<th>Cage C</th>
<th>Cage D</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 m</td>
<td>0.23 ppm</td>
<td>0.33 ppm</td>
<td>0.31 ppm</td>
<td>0.30 ppm</td>
</tr>
<tr>
<td>25 m</td>
<td>0.11 ppm</td>
<td>0.19 ppm</td>
<td>0.18 ppm</td>
<td>0.21 ppm</td>
</tr>
<tr>
<td>50 m</td>
<td>0.09 ppm</td>
<td>0.00 ppm</td>
<td>0.09 ppm</td>
<td>0.10 ppm</td>
</tr>
<tr>
<td>75 m</td>
<td>0.00 ppm</td>
<td>0.00 ppm</td>
<td>0.00 ppm</td>
<td>0.02 ppm</td>
</tr>
<tr>
<td>100 m</td>
<td>0.00 ppm</td>
<td>0.00 ppm</td>
<td>0.00 ppm</td>
<td>0.00 ppm</td>
</tr>
</tbody>
</table>

The measurement results from four farms have been collected at the time of chicken age 30 days. The odor that is generated is still low (far below the threshold) with the highest measurement being in cage B which reaches 0.33 ppm. The farthest distance at which the odor was still detected was 25 m, the measurements ranged from 0.11 ppm - 0.21 ppm, with the highest measurements found in the enclosure of D Piliang Village.

Table 2. Combined Observation Results at 35 Days Old Chickens

<table>
<thead>
<tr>
<th>Distance from cage</th>
<th>Cage A</th>
<th>Cage B</th>
<th>Cage C</th>
<th>Cage D</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 m</td>
<td>0.40 ppm</td>
<td>0.51 ppm</td>
<td>0.48 ppm</td>
<td>0.48 ppm</td>
</tr>
<tr>
<td>25 m</td>
<td>0.18 ppm</td>
<td>0.30 ppm</td>
<td>0.21 ppm</td>
<td>0.32 ppm</td>
</tr>
<tr>
<td>50 m</td>
<td>0.12 ppm</td>
<td>0.09 ppm</td>
<td>0.18 ppm</td>
<td>0.18 ppm</td>
</tr>
<tr>
<td>75 m</td>
<td>0.00 ppm</td>
<td>0.00 ppm</td>
<td>0.09 ppm</td>
<td>0.02 ppm</td>
</tr>
<tr>
<td>100 m</td>
<td>0.00 ppm</td>
<td>0.00 ppm</td>
<td>0.00 ppm</td>
<td>0.00 ppm</td>
</tr>
</tbody>
</table>

At 35 days, the smell of ammonia is increased up to a radius of 50 meters. The intensity of odors in four locations ranged from 0.09 ppm - 0.18 ppm (highest intensity in cage B). The results differ at a distance of 75 meters, it is known that the intensity of odors in Cages C and D is still detected on a low scale even though in the cages A and B have not been detected.

Table 3. Combined Observation Results at 40 Days Old Chickens

<table>
<thead>
<tr>
<th>Distance from cage</th>
<th>Cage A</th>
<th>Cage B</th>
<th>Cage C</th>
<th>Cage D</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 m</td>
<td>0.71 ppm</td>
<td>0.83 ppm</td>
<td>0.82 ppm</td>
<td>0.84 ppm</td>
</tr>
<tr>
<td>25 m</td>
<td>0.59 ppm</td>
<td>0.68 ppm</td>
<td>0.68 ppm</td>
<td>0.63 ppm</td>
</tr>
<tr>
<td>50 m</td>
<td>0.40 ppm</td>
<td>0.43 ppm</td>
<td>0.50 ppm</td>
<td>0.41 ppm</td>
</tr>
<tr>
<td>75 m</td>
<td>0.03 ppm</td>
<td>0.03 ppm</td>
<td>0.11 ppm</td>
<td>0.22 ppm</td>
</tr>
<tr>
<td>100 m</td>
<td>0.00 ppm</td>
<td>0.00 ppm</td>
<td>0.00 ppm</td>
<td>0.00 ppm</td>
</tr>
</tbody>
</table>

At the age of 40 days, the intensity of ammonia increased sharply. This condition is affected by the thickness of chicken manure under the cage increasing to reach 10-15 cm above the soil surface. It is this condition that the spread of ammonia gas to the people environment cannot be anticipated.
threshold according to Government Regulation No. 21 of 2008 of 0.5 ppm was not reached at a radius of 25 meters, but was reached at maximum conditions at a distance of 50 meters (0.5 ppm at Cage C Tangkiling enclosure). However, the smell of ammonia will still be detectable when a breeze came from the direction of the cage to the settlement.

The livestock location in a radius of 100 m from settlements, none of the three treatments (spread the lime to the manure) given to the cages were detected by the ammonia gas detector. It can be concluded that if livestock activities carried out in one place, as long as residential areas further than 100 meters from the location of livestock, it is still relatively safe, excepting when there are other factors such as air movements towards residential settlements.

Figure 2. Comparison of ammonia measurements (ppm)

Figure 3. Level of ammonia odour in cage as control sample (location Kereng Bangkirai with 5000 chickens) (Abustan & Asri P., 2017)
As shown in fig. 2, the measurement of Ammonia odours in all cages still showed increased by the age of chickens. However, compared to fig. 3, all treatments given to the chicken manure can reduced ammonia odour. It is also found that at a distance of 50 m or above resulted no more than 0.55 ppm of the level of Ammonia odour (based on the Indonesia Minister of the Environment Decree No. 8 of 2008, the standard of Ammonia pollution in the air is allowed up to 0.55 ppm). Based on these results, it can also be recommended to farmers if they are going to build a new cage, they should build at least 50 meters away from the settlement with consideration as to not disturb the community due to side effect (air pollution) of the farm activities.

**Condition of Soybean plants**

Soybean plants were planted covering areas of (4 x 7) m + (4 x 85) m = 368 m² around the farm location. This plant is expected to reduce ammonia gas that arises from livestock manure.

The reason for using soybean plants (legumes) is because this plant has a symbiotic relationship with nitrogen bacteria (nitrogen fixing bacteria), for example Rhizobium, which are able to extract free nitrogen in the air and reduce it to ammonium compounds (NH₃), nitrite ions (NO₂⁻) and nitrate ions (NO₃⁻) by the help of nitrogenase enzymes.

Soybean plants are much cheaper than using lime as a means to reduce the smell of ammonia gas in livestock locations. This type of plant is relatively cheap to purchase and easy to plant and grow. The plant also provides added value to farmers, as it can be used for vegetables. However, in field results, the plant is known to be vulnerable to red ants. The red ant appeared on the plant from early ages. This condition was not anticipated, and affected the growth of the soybean plant, making some dead or stunted.

Another obstacle was that the growth of this plant was not good if used as research material in reducing ammonia gas during the rainy season. The plants cannot grow perfectly, and even if they grow, they will not reach up to 50% because the soil is always moist. The process of absorbing ammonia gas to the roots (marked by the appearance of root nodules) cannot run well and the gas absorption process may not occur.

The absorption of ammonia by utilizing this soybean plant when it thrives and does not consume excessive rain will be marked by the appearance of small pimples or coils on the roots indicating that the process of absorption of ammonia worked. This root spot is a swollen plant root tissue that contains bacteria. More nitrogen content in the root nodules can improve the nitrogen fixation process, which provides nutrients directly for plant development (Carter and Tegeder, 2015)⁠[16]. In this case the bacteria play a role in the fixation of nitrogen to get carbohydrates in the root tissue, while the plant uses some nitrogenous material made by bacteria from the nitrogen in the air above the soil particles (Ramdana and Retno, 2015)⁠[17]. Indradewa et al. (2004)⁠[18] stated that legumes with root nodules can utilize both nitrogen gas from air and inorganic nitrogen from the soil. It means that the longer the plant grows around the cage and allows the process of absorption of ammonia in chicken manure that falls naturally into the soil, the more nodules are found in the roots of these plants. But because the research took place during the rainy season where the soil was moist and wet throughout the day, the growth of soybeans was less than the maximum impact on the ability of plants to absorb ammonia accumulated in the soil. This result is supported by Indradewa et al. (2004)⁠[18] who...
stated that nitrogen absorption decreases mainly because the lower roots in the soil are saturated with water and the surface areas of the root decreased. Whereas in water-saturated soils it can be said that many photosynthates are used for the growth of plant parts in the soil, especially nodules that can cause nodule activity to start earlier and at a faster rate.

In this research, especially in cages which are planted entirely with soybean plants around the livestock without any other treatment, the results are no better than that in cages given chalk. Although the detection results of the detector device at the source of the ammonia gas odor are not below the quality standard, the data shown by the treatment of lime is still better than that planting soybeans. The smell in the cages planted with soybeans still can be detected at a distance of 75 meters.

**Interview Results**

The results of community interviews at the three study sites concluded that generally, after the lime has been put under the cage during the livestock activities, the smell of chicken manure that usually reaches the houses was reduced, and tends not to smell anymore, unless there is a breeze blowing from the direction of the cage to the settlement. In addition to the smell of poultry manure, residents also complained that there were still many flies that spread to the houses from the cages especially when chicken were from 30 days old up to a week after harvest.

5. **References**


Acknowledgment

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Analysis Of Mechanical Properties Of Epoxy Resin Reinforced With Betel Fiber And Glass Fiber

Hendriwan Fahmi1,*, Ade Indra1, Syafrul Hadi1, Sulaeman1, Adi Subardi2
1 Department of mechanical engineering, Insitut Teknologi Padang ‘ Padang, Indonesia
2Departement of Mechanical Engineering, Sekolah Tinggi Teknologi Nasional (STTNAS), Yogyakarta 55281, Indonesia

* hendriwan.basyaruddin@gmail.com

Abstract. In this study, the fiber used is a combination of betel fiber with glass fiber and the matrix used is the epoxy resin. The purpose of this research is to know the bending and tensile strength of glass fiber hybrid composite with fiber reinforcement with 70/30, 80/20 and 90/10 composition. For testing conducted is Bending test with ASTM D790-02 standard and tensile test with ASTM D638-02 standard. The result of the highest tensile test was 306.78 MPa on the composition of the 70/30 fiber variation, while the lowest bending test value was 0.918 MPa at composition 90/10, this was due to the smaller fiber value compared to the resin value in specimen or material so the value of tensile test results smaller than the composition 70 / 30. The result of bending test is got the highest bending of bending value possessed by test specimens with 70/30 fiber variation 3.105 MPa while in a tensile test the biggest tensile strength value is owned by 70/30 fiber variation 306.78 MPa.

1. Introduction
The use of composite materials, especially in the manufacturing industry, is increasingly developing the use of composites is basic human needs in all fields, both in the field of simple industry and in large manufacturing industries. Composites have their own advantages compared to other alternative materials such as strong, lightweight, economic corrosion resistant and so on. The advantages of other composite materials are low density non-abrasive, cheaper prices, environmentally friendly, and not harmful to health. Some advantages of composites, among others, are easy in shape, lightweight remains strong without form, electrical insulation is good anti-wrinkle and easy to combine with other materials. Areca nut fiber is one of the natural fibers in the manufacture of composites scientifically, its use is still being developed because it has not been found material that uses areca fiber, areca nut is widely used in household furniture and handicraft industries as well as traditional medicine because it is easy to get, cheap can reducing environmental pollution so that it can overcome environmental problems, and does not endanger health, and the availability of raw materials is quite abundant. Composite polymer reinforced glass fiber is one of them where the fiber is used for filler as a filling. Composite material reinforced glass fiber is known as glass reinforced plastic (glass reinforced plastic, GRP) or epoxy reinforced glass fiber (GRE)[1].
examined the tensile strength and flexural strength of bagasse filled epoxy fiber with alkaline treatment variations of 0%, 1%, 2%, and 3% with a fraction of bagasse volume variation of 0%, 30%, 40%, and 50% yields the maximum tensile strength value obtained at the composition of Epoxy: bagasse 70:30 with a concentration of 2% NaOH of 23.26 MPa while the value of maximum flexural strength is obtained in the composition of epoxy: bagasse 70:30 with a concentration of 2% NaOH of 50, 17 MPa. [3]

examined the effect of alakalization with NaOH through immersion for 2 hours on composite structures reinforced by natural fibers (coconut fiber, banana fiber and rice fiber) on tensile strength, where the highest value of tensile strength testing was obtained in composites with coconut fibers of 60, 18 kg/cm, while for rice fiber is 34.91 kg/cm and banana midrib fibers are 50.07 kg/cm. [4], examined the bending strength and tensile strength of reinforced coconut shell powder and rice husk ash combined with epoxy produced the following data, for coconut shell powder composites had a tensile strength of 21,055 MPa and bending strength of 31,716 MPa. While composite rice husk ash powder has a tensile strength of 18,836 MPa, and bending strength is 31,716 MPa. [5] has examined the effect of NaOH chemical soaking time on the physical and mechanical properties of goat fiber fibers as fiber with polyester matrices, with variations in the immersion time in 5% NaOH solution for 0, 30, 60, 90 and 120 minutes obtained maximum results in soaking fiber of goat hair for 60 minutes that is equal to 19.254 N / mm. Roseno (2003) uses the analysis of the microstructure of fibers, cellulose/lignin content, and orientation of natural fibers to make a mechanical model of natural fibers.

said the tensile strength of the fiber will increase when given NaOH treatment, the tensile strength obtained against fiber composites with a percentage of 5% NaOH is 195 MPa, while at the time of treatment without tensile strength only 84 MPa. [7], carried out research on the characteristics of epoxy resin with hemp fiber, with a composition of 40% v and 50% v obtained a tensile strength of 232 MPa for 40% v and when the composition was 50% v is 260 MPa. [8], conducted a research on the tensile strength of a polyester resin matrix reinforced with pineapple leaf fiber. From the results of the study, the maximum tensile strength was found in pineapple fiber reinforced resin composites with an orientation of 0° fiber; 45° where the tensile strength is 41.81 N / mm2 greater than the orientation of the 0° and 0°; 90°. [9] stated that the results of bending tests on bamboo charcoal powder composites showed the bending stress of the average bamboo charcoal composite 5%v, 10%v, 15%v, 20%v, and 25%v that is 31.48 MPa, 28,102 MPa, 12,327 MPa, 5,531 MPa, and 5,008 MPa. Modulus of elasticity 1021.89 MPa, 1368.38 MPa, 892.08 MPa, 181.32 MPa, and 204.50 MPa. From the above data, it is known that the highest average bending stress is in the volume fraction of 5%, namely 31.48 MPa and the lowest bending stress at a volume fraction of 25%, namely 5.008 MPa, while the highest elasticity modulus is at 10% volume fraction, namely 1368.38 MPa and the lowest modulus of elasticity, a 20% volume fraction of 181.32 MPa. Impact strength for epoxy bamboo opus charcoal powder with 5%v, 10%v, 15%v, 20%v and 25%v that is 0.013 J / mm2, 0.012 J / mm2, 0.014 J / mm2, 0.015 J / mm2. The results of the impact research obtained the highest impact price at a volume fraction of 20% which is 0.015 J / mm2 and the lowest impact price on the Alapis fraction has a tensile strength of 45.44 MPa, epoxy-fiber 3-layer banana has a tensile strength of 30.47 MPa, while for polyester 3-layer banana fiber only has a tensile strength of 15.62 MPa [10].[11], analyzed the mechanical properties of epoxy composites with palm tree fiber reinforcement, when the composite composition of 40% vf obtained tensile strength results of 5,538 kgf / mm2.[12] conducted a study with polyester composites with sisal fiber reinforcement with a volume fraction of 40%, 50% and 60%, obtaining the following bending test results; the increase in composite strength from 40% volume fraction to 50% volume fraction of 3.12 Mpa to 3.72 MPa and decreased composite strength at 60% volume fraction to 2.92 MPa. [13] where variations in volume fraction of a coconut saw blade and coconut fiber on polyester resin have an effect on increasing the tensile strength and composite toughness of a hybrid polyester coconut and fiber sawdust called maximum value in the volume fraction (30/10). The results of the research on the strength of pineapple fiber composite strength
of tensile and shear strength with epoxy adhesive showed that the strength of pineapple-polyester fiber composites was lower than the strength of adhesive epoxy, this was indicated by the damage in the 3 areas that occurred on the composite [14] Research on pineapple-polyester fiber composites showed that the treatment of pineapple fiber with immersion in alkaline (NaOH) 10%, 20%, 30% and 40% for 2 hours had better tensile strength compared to the tensile strength of the same treatment for 4 hour. Pineapple fiber treatment by soaking in 10%, 20%, 30% and 40% ethanol solutions for 2 hours is also better.

2. Metodology

2.1. Preparation of composite materials

2.1.1. Betel nut fiber

The betel nut fiber is used as a natural fiber in the manufacture of composites. Ripe areca nut skin is dried, then a fine fiber is selected. The fiber is then cut 1 cm long, the orientation of the fiber in the composite is random.

![Figure 1. Betel nut fiber](image)

2.1.2. Fiber Glass

Glass fiber serves as an amplifier on the composite. The fiber is cut 1 cm long, the orientation of the fiber in the composite is random.

![Figure 2. Fiber Glass](image)

2.1.3. Epoxy Resin

Epoxy resin is the most commonly used resin. Epoxy resins are low molecular weight organic liquids containing epoxide groups. Epoxide has three members in the ring: one oxygen and two carbon atoms. Epichlorohydrin reactions with phenols or aromatic amines make a lot of epoxies. Hardener, softener (plasticizer), and filler are also added to produce epoxy with various kinds of viscosity, impact, degradation.

2.1.4. NaOH

This NaOH solution is used as a treatment process on the surface of the fiber to remove hemicellulose substances, lignin, and waxes which can reduce the strength of betel fiber and the binding capacity of betel fiber with the matrix. This treatment process is carried out by soaking the fiber in a 30% NaOH solution for 30 minutes, then followed by cleaning the fiber with clean water. To get this 30% NaOH solution is by dissolving 300 grams of NaOH powder in 1 kg of water.
2.2. Specimen preparation
The hybrid composite matrix of epoxy resin reinforced by areca fiber and glass fiber was made with a composition of 70/15/15% v, 80/10/10% v and 90/5/5% v with random fiber orientation. Making green body was done by the uniaxial pressing method at a pressure of 100 MPa. Furthermore, tensile test specimens are made according to ASTM D 638 02 and bending test specimens according to ASTM D790-02.

3. Results and Discussion
Figure 3 shows the results of tensile testing for composites made from betel fiber and glass fiber with a composition of 70/15/15% v, 80/10/10% v and 90/5/5% v.

![Figure 3. Relationship of composite composition to tensile strength](image)

From the graph above shows that the variation of fiber is perpendicular to the load in nature. Where the greatest tensile stress is experienced by specimens with a variation of 70/30 the stress is 306.78 MPa. The lowest tensile stress in the natural 90/10 is 177.83 MPa. Drag decreases with the small variation of fiber that is used on composites. because the mixture of betel fiber and fiberglass fiber with epoxy resin is very good and efficient and from the graph shows the smaller / less resin with composites the greater the voltage it gets, the more resin and a little fiber will experience a decrease in stress. [15] said tensile strength in fiber will increase if, given NaOH treatment, tensile strength obtained against fiber composites with 5% NaOH percentage is 195 MPa, while at the time without treatment the tensile strength is only 84 MPa. Decrease in the value of tensile strength due to the presence of air bubbles, so that the composite shape becomes hollow and its strength will decrease. In addition to air bubbles, fiber defects also affect the strength of the composite. When the test object is given a force load, the fiber that is not straight will result in a buildup of stress on only one fiber area. In a straight fiber, stress will be received by the whole fiber length, causing the area to experience a gap between fiber and matrix. This stretch becomes the factor of a composite very quickly experiencing cracks and becomes broken. In composite tensile testing will result in the escape of fibers from the matrix. This is due to the strength or bond between matrix and fiber that are not large enough [16].

Figure 4 shows the results of bending testing for composites made from betel fiber and glass fiber with a composition of 70/15/15% v, 80/10/10% v and 90/5/5% v with random fiber orientation. Tests are carried out based on ASTM D790-02.
The picture above shows the magnitude of the stress on bending testing on areca fiber composites and fiberglass fibers with epoxy resin where the composition used varies for 70/15/15 %v fiber couplings with a voltage of 3.105 MPa, the composition of the 80/10/10 %v voltage is 2.727 MPa and the composition is 90/5/5 %v the voltage is 0.918 MPa. From the graph shows the smaller the amount of fiber in the composite, the bending strength will decrease.

4. Conclusion
In tensile testing the load is reduced by variations in fiber, where from the results of the research the highest tensile test value of 306.78 MPa in the composition of 70/15/15 fiber variations, while the lowest bending test value is 177.83 MPa on the composition of 90/5/5, this is because the fiber value is smaller compared to the resin value in the specimen or material so that the tensile test results are smaller than the 70/15/15 composition. In bending, load testing is influenced by fiber variations where the value of the bending test results in the composition of 70/15/15, 80/10/10 and 90/5/5 where the highest bending test value is 3.105 MPa at 70/15/15 composition.

5. References


Development of A New Generation of Synchromesh Mechanism to Optimization Manual Transmission’s Electric Vehicle

Fachruddin1; FuadZainuri1,2*; Danardono .A. Sumarsono2; Muhammad Adhitya1; AsepApriana1; Emir Ridwan1

1Department of Mechanical Engineering Politeknik Negeri Jakarta 16425, Indonesia,
2Department of Mechanical Engineering Universitas Indonesia 16424, Indonesia;

* fzainuri@yahoo.co.id.

Abstract. The development of environmentally friendly technology is carried out through the development of electric vehicles with storage of the main energy source, so that air pollution from the vehicle is zero. However, efforts to further optimize the performance of electric vehicles through several parts of the vehicle so that the energy consumption needed is more efficient. Through the power train the optimal design of electric vehicles is one of the best ways to save battery energy consumption. Transmission is one part of the power train that is very influential on vehicle performance. In this paper we will discuss the transmission of electric vehicles from the power train system. There are several main things that are the reference for the power train transmission design to be carried out, the first is that wheel traction must have the same value as conventional vehicle traction, and the second is the transmission of the power train model should be simpler than the fuel motor power train transmission to meet the criteria use of electric motorized vehicles. The new generation of Synchromesh is one of the constituent elements of the power train transmission that serves to soften gear shifting so that there is an increase in driving comfort. Furthermore, a new generation of Synchromesh development is carried out to get a power train transmission construction that is simpler, easier to produce, and easy to use. Smooth shifting power train transmission still relies on the clutch to replace gears where electromechanical is used to replace the clutch pedal. Because of this, power train transmissions are considered too complex for electric vehicle power train transmissions, but the mechanism is considered to be very appropriate for improving the transmission of power train efficiency. Starting from the power train transmission, an innovation of the new transmission train design for electric cars was carried out. The combination of the new generation of Synchromesh with a smooth shift mechanism for manual power train transmission is an ideal power train transmission to increase efficiency in the power train. Installing a new generation of Synchromesh on the zero shift mechanism with the addition of cones is expected to replace the function of the Clutch Manual Transmission in the power train (MT), and is assisted by motor torque regulation when changing gears. This research presents an analysis of the design of transmission performance in electric vehicles.

1. Introduction

Electric vehicles do not have an internal combustion engine so the fuel consumption is zero. Therefore, the use of electric vehicles is one of the best solutions to reduce fuel consumption.
Governments in many countries have applied many rules to make electric vehicles suitable for use in every area. Indonesia is one of the countries that has conducted research on electric vehicles. Broadly speaking, the benefits of using electric vehicles compared to conventional vehicles are unnecessary fossil fuels, zero emissions, and saving energy costs (MING & CIN, 2010). Replacing the engine used by a vehicle combustion engine with an electric motor as a power train movement source is an initial research effort carried out on electric vehicles. Electric motors can be operated through existing battery sources by calculating the appropriate specifications, then the rotation produced by an electric motor is used to drive the vehicle's power train system to traction on the wheels. The driving source of the transmission power train rotation is the rotational movement of the electric motor output shaft whose speed can be adjusted based on the voltage regulated by motor control. Transmission is designed to get more performance that is suitable for electric vehicles. Transmission of the power train system is one of the main components that affect the electrical power consumption stored in batteries from electric vehicles.

The transmission design is carried out by considering several things including: gear efficiency, noise and comfort during gearshift. The development of power train transmissions has been carried out to meet consumer needs ranging from manual power train model transmissions, automatic transmissions, dual clutch transmissions, and Automatic Manual Transmission. Transmission efficiency in the power train is one of the most widely carried out studies such as the Power Train (DCT) Clutch and Wet Synchronizer for Electric Seamless Gear Transmission Control Strategies. This study aims to produce a new transmission power train design by engineering the new generation Synchromesh mechanism through the addition of swipe cone so it is more efficient. The main thing that will be engineered is the transmission of geometry, the concept of work, the time of shifting and will automatically increase the efficiency of motor power in electric vehicles.

2. Methodology

There are three types of vehicle transmissions, namely manual power train (MT) transmission, automatic power train (AT) transmission, and continuously variable transmission of power train (CVT). Manual power train (MT) transmission is the most efficient type of transmission in fuel consumption, while the automatic power train transmission and Continuous Variable Transmission of power train are easier to use [1]. Manual transmission power train efficiency levels are 96.2 percent, Automatic Transmission efficiency is 86 percent, CVT type transmissions are 84.6 percent, and Automatic Power Manual transmission is equivalent to Manual Transmission [2]. The rider's expertise is also the main factor in the use of power train transmissions to get the optimum level of fuel efficiency. In this paper, there will be more presenting a manual power train transmission and its development because manual transmission is considered more suitable for electric cars.

Manual power train transmission is a component that serves to forward torque from the engine to the drive wheel. The gear box in the power train transmission system functions to combine the rotation ratio at the vehicle speed against the motor rotation. The manual shift speed is carried out by the driver by using the shift lever. There are several types of constant power train manual transmissions and a new generation of Synchromesh. The new generation MT Synchromesh power train is widely used in vehicles. Synchronizer is a key element that serves to harmonize the rotation between elements so that it can be done with the smooth gear shift involved. Some transmissions on power train systems, such as manual transmission (MT), Dual Clutch Transmission (DCT), and Automatic Manual Transmission (AMT) and there is a manual Transmission Synchronizer [3]. In Figure 1 a Synchronizer manual transmission is displayed.
Figure 1. Exploded view a new generation of Synchromesh manual transmission of power train[4].

Based on Figure 1, it is explained that the synchronization ring is an element that harmonizes the rotational speed when the sliding arm installed is moved between pairs of sliding sleeves, cone friction and hubs. The synchronizer works by utilizing friction in the cone, so synchronization engineering must be considered to reduce the negative impact of friction.

The latest development regarding manual power train transmission is the creation of an automatic power train manual transmission (AMT), broadly AMT is interpreted as a manual power train transmission without clutch because clutch movement is regulated by electronic sensors, processors, actuators (hydraulic or electromechanical) and when changing gears adjusted to the driver's order. Figure 2 shows the schematic of AMT [5].

Figure 2. Mind map research question

AMT has developed a very smooth shift transmission from the power train type that can move gears with very short time (a few seconds) [6]. This power train transmission offers convenience to produce, the price is cheaper than AT, fuel economy, no torque interruption on one shaft when changing gears and smooth (seamless). In Figure 3 it shows zero AMT shifts.

Figure 3. Mind map research question

Zero shift mechanism is replace the components a new generation of Synchromesh on manual transmission of power train by using zero shift ring.
3. Result and Discussion


Based on concept zero shift transmission of power train which has advantages such as fuel economy, performance, shift quality, and easy to manufacture then created a new transmission of powertrain for electric cars. The main concept is to eliminate the clutch to the transmission of power train system then its function replaced by cone friction and torque setting of the motor. Simplicity of design and working mechanism that is simple is one of the considerations to obtain an effective transmission of power train of the electric car. The following schematic working mechanism of transmission of power train is made as shown in Figure 4.

Figure 4. Publication Per-Year

Selection lever is a lever operated by the driver to change gear. When the lever is moved, the sensor will send a signal to the ECU and signal to be transmitted to the motor to regulate the torque. Torque motor that has declined is the right time to change gear. Display electrical transmission of power train vehicle can be seen in Figure 5.

Figure 5. Manual transmission of power train EV

Clutch manual transmission of power train has been eliminated so that the working mechanism is simpler and easier to use. Such transmission of power train will be lighter when compared with a conventional transmission. Gear ratios are such that they can be used for roads that need major traction as well as for highspeed. To see more detail the concept of this transmission of power train work, it can be shown describing elements to change gear as in Figure 6.

Figure 6. Element a new generation of Synchromesh

Based on Figure 6 can be explained that the shaft merges with the main connecting the hub so that the gear is a hub through the shaft rotation. Sleeve is an element that can be moved by the operator to change gear. When the sleeve has been shifted then the synchronizer cone will move simultaneously pressing the friction cone and the cone friction cone will hit the gears which aims to adjust the rotational speed, so that the synchronizer can be paired with the gears. For more details on how to change gear between two gears consists of several stages. The first stage is the sleeve is shifted by the driver via the gearshift lever so that the sleeve is pushed synchronizer cone and rotates together (Figure 7.a).
Thenextstageisadjustmentroundbyutilizingthefrictiononthecone(Figure 7.b).Coneisthefriction betweenelementsofconesynchronizerfrictionconemadewithdifferentsizesaccordingtotherequired largefriction. Where things should be considered is how such friction does not cause serious problems such as lifetime due to wear, temperature and theother.

Thenethecone friction elements will rub against the gear cone element to add to the reduction of rotation between elements (Figure 8.a).

Cone on the gear elements are expected not easy to wear because it includes vital category. After the rotation of the cone reduction gear element, all elements will be paired to one level gear rotation (see Figure 8.b). It can be concluded that the synchronization is done by utilizing some friction, it is to replace the function of a conventional clutch transmission of powertrain that shifts gear can be carried out smoothly.

3.2. Ratio gear transmission of power train design

Design of the gear ratio of the vehicle can be done by performing the maximum wheel torque calculations required to drive the vehicle on the road with maximum road slope. The loading on the vehicle has a major effect on the required torque. The vehicle load is passenger, baggage, wind resistance, and so forth. The ability of electric vehicles in a certain distance to be an important thing to know considering the primary energy source of electric vehicles is a battery that can be recharged, so that by knowing the maximum distance that can be taken by electric vehicles will be easier in determining the position of charging station is located. Table 1 shows the required vehicle specifications.

<table>
<thead>
<tr>
<th>No</th>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Speed attainable</td>
<td>100 km/h</td>
</tr>
<tr>
<td>2</td>
<td>Slope of the road</td>
<td>5%</td>
</tr>
<tr>
<td>3</td>
<td>Gross vehicle weight</td>
<td>1100 kg</td>
</tr>
<tr>
<td>4</td>
<td>Mileage Electric Vehicle</td>
<td>400 km</td>
</tr>
<tr>
<td>5</td>
<td>Wheel Radius</td>
<td>0.32</td>
</tr>
</tbody>
</table>
Furthermore, the motor specifications are determined based on the calculation of the vehicle load, either the load due to rolling resistance, aerodynamic load, acceleration load, and the load of the road. From the calculation of the load obtained motor power required to drive the vehicle at a speed of 100 km/h for 70 HP. The specification of electric motors selected to meet these needs is HPEVS AC-75 with 78 HP power. The motor power properties can be seen in Figure 11.

![Figure 11](image)

**Figure 11.** Specification of electric motor with maximum power of 78.84 HP

Determination of tooth ratio can be done with approach to minimum speed of vehicle and range of angular velocity of motor. The relationship between angular velocity to motor power is a variable of tooth ratio. If the accumulated acceleration is equal to zero at a maximum speed of 50 m/s and the maximum angular velocity limit is 4000 RPM and the minimum angular velocity is 1900 RPM, then the gear ratio is obtained as in Table 2.

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratio 1st Gear G1</td>
<td>3.2</td>
</tr>
<tr>
<td>Ratio 2nd Gear G2</td>
<td>1.5</td>
</tr>
<tr>
<td>Ratio reverse Gear GR</td>
<td>2.3</td>
</tr>
<tr>
<td>Ratio differential</td>
<td>1.7</td>
</tr>
</tbody>
</table>

Graph gear-speed on the transmission of power train of electric vehicles obtained can be seen in Figure 9.

![Figure 9](image)

**Figure 9.** Specification of electric motor with maximum power of 78.84 HP

**Table 2.** Gear Ratio Electric Vehicle

![Figure 10](image)

**Figure 10.** The gear-speed for 2 speed transmission of power train EV
Based on the graph in Figure 10 that the minimum speed of the vehicle is 40 km / h which is slightly different from the actual because in the calculation in theory there are still many idealization. The speed of the vehicle that can be achieved is 100 km / h occurs in the second gear. The maximum speed of a vehicle with a critical condition is 180 km / h but this is rare in the actual conditions. The result of transmission of power train design can be seen in Figure 11.

![Figure 11. EV gear transmission of New Design](image)

**Table 3. Gear Ratio Electric Vehicle**

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>PART NUMBER</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>POROS-D30</td>
<td>1</td>
</tr>
<tr>
<td>19</td>
<td>Y hinge</td>
<td>1</td>
</tr>
<tr>
<td>18</td>
<td>hollow40x40x300</td>
<td>1</td>
</tr>
<tr>
<td>17</td>
<td>hollow40x40</td>
<td>2</td>
</tr>
<tr>
<td>16</td>
<td>shifter lever</td>
<td>2</td>
</tr>
<tr>
<td>15</td>
<td>PIN shifter</td>
<td>2</td>
</tr>
<tr>
<td>14</td>
<td>shifter</td>
<td>2</td>
</tr>
<tr>
<td>13</td>
<td>Gear drive 1</td>
<td>1</td>
</tr>
<tr>
<td>12</td>
<td>Base motor-r1</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>motor_63</td>
<td>1</td>
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<tr>
<td>10</td>
<td>PDR30_set screw</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>Pillow Block ID30</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>Gear drive</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>SLEEVE-1</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Hub-1</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Gear cones</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>dummy Gear wheel</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>CONE FRICITION-1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>SYNCHRONIZER CONE-1</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>Base</td>
<td>2</td>
</tr>
</tbody>
</table>

3.3. Calculation of Synchronization

Source of the work force is the force exerted by the operator in the direction of the horizontal axis on the sleeve element of F. Large forces acting on the cone friction is the normal direction F1 sin θ. Due to the friction at each cone, the rotational speed will be reduced from the first friction elements that experience to other elements. In Figure 14 displayed the forces acting on the system synchronizer.

![Figure 12. Forces acting on the synchronizer system](image)

Based on Figure 14 it can be seen that the force that acts on the sleeve is F1 sin θ working on the x-axis gear. Rotational speed is also experiencing the same thing that will break down into 3 due to the friction that arises. Furthermore, torque and frictional forces acting on the gear can be shown in Figure 15.
4. Conclusion

Based on the results of the literature survey and the design carried out, the concept for the transmission of electric power train cars has been obtained. Additions to the new generation of Synchromesh transmission from the power train mechanism with the addition of cone friction as the main topic for the development of new ideas for this research. The new generation of Synchromesh serves to reduce synchronous time on the cone element by utilizing friction in several sleeve hubs and cone cones. The working mechanism of the manual power train transmission without using a clutch is the main goal by utilizing the new generation of Synchromesh and motor torque settings as a substitute for MT clutch. This design will be a distinct advantage because it will be very effective for the character of electric motors. The number of changes in teeth made into two (2 accelerations) useful for obtaining power efficiency has been considered from various factors. Gear ratio one is 3.2, second gear ratio is 1.5 reverse gear ratio 2.3, and differential ratio 1.7.

Power train transmission is one of the considerations to improve the performance of electric motors, in addition, ease of manufacture, ease of installation of electric motors, and ease of use by drivers is also a matter of concern to obtain new transmission performance values from the power train system suitable for vehicles electricity. It is hoped that the search for the electric vehicle power train transmission will help solve energy availability problems that specifically affect transportation.

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References


Design of Batch System Investigation Software based on Visual Studio

Teguh Yulianto¹, Tossin Alamsyah², Benny Rusadi³

¹Applied Master of Electrical Engineering, Politeknik Negeri Jakarta, Indonesia
²Departement of Electrical Engineering, Politeknik Negeri Jakarta, Indonesia
³Project Engineering Departement, PT EPC Indonesia, Bekasi, Jawa Barat, Indonesia

*teguh.y@gmail.com

Abstract. The production process in the manufacturing industry such as the manufacturer of skin care products is one example of a process that uses a Batch processing System. Batch Processing is the process by which a computer completes batches of jobs, often simultaneously, in non-stop, sequential order. Although the system has been running full automation but there is still a risk of product failure. So this requires a system of supervisory control that can see the characteristics of the process to get good and uniform results in every batch. The system supervisory control that is the software could be communicate with the existing system SCADA which we named the Batch System Investigation Software. The Software will be planted on a PC or computer separate from the SCADA Computer so that it will not affect the production process controlled by SCADA. This investigation software is expected to find the cause of product failure, can be used as a reference for operators so that they can produce products that have quality in accordance with the target and ultimately can get savings and Energy Efficiency 10% until 20%.

1. Introduction

According to definition introduced by professor Durlik [1] process is defined as orderly series of actions, in result of which the consumer (user) receives a product. Business process is typically described as a series of interconnected activities executed by resources [2]. This definition is commonly known and quoted by many authors [3]. According to Brzeziński [4] production process is defined as entirety of actions, leading to creation of final product of defined value from raw material or materials.

Two forms of production organization can be distinguished [3]-[4]:

- Batch production process
- Line production process

Batch processing is defined as processing a number of cases simultaneously[5]-[6]. The same can be done in the Service process, as an example of information provided to several
customers simultaneously and not individually [7]. Batch processes are characterised by a beginning, when the raw materials are loaded into a reactor vessel, a finite period of transformation or growth, and an end when the finished product is harvested from the reactor [8]. The production process in the manufacturing industry such as the manufacturer of skin care products is one example of a process that uses a Batch processing System. Although the system has been running full automation but there is still a risk of product failure.

Current conditions, which occur in several industries which use batch systems or batch processing as a production process, for example at Unilever Indonesia - Skin Care Factory Cikarang, has difficulty monitoring or investigating the cause of product failure. So this requires a system of supervisory control that can see the characteristics of the process to get good and uniform results in every batch. The system supervisory control that is the software could be communicate with the existing system SCADA which we named the Batch System Investigation Software. The Software will be planted on a PC or computer separate from the SCADA Computer so that it will not affect the production process controlled by SCADA. The Software will get all of big data from SCADA via OPC (Ole Process Control). Massive amount of data are generated by various sensing devices and is typically referred to as big data [9].

2. Hypothesis Development

Batch processes provide the flexibility required for multipurpose facilities and have been widely applied to the manufacture of low-volume, high-value and products, such as specialty chemicals, pharmaceuticals, food and consumer products [10]. Batch processing in the manufacturing industry such as in the skin care factory like in Unilever Indonesia Cikarang Factory definitely has something that can be improved. One of the improvement that we manage are how to make the product output become better and homogen (good quality) and also reduce the energy usage. A primary challenge for batch process monitoring techniques is to define “normal” operation, i.e., the “yardstick” by which operating cycles are evaluated and can be identified as successful or failed. The states of a batch system are constantly changing and the system may go through multiple phases involving multiple unit operations [11]. As a consequence, there is no nominal steady-state to refer to (as in the case of continuous systems). Rather, the control, monitoring and performance evaluation methodologies developed for batch processes must account for their transient, dynamic nature [12].

The hypothesis that we made from the observation and interviews with the operator and engineer are in order to produce good quality product we must follow all the process with detailed terms such as Temperature, Ampere and Speed related motor during the process. The rpm speed motor scrapper and rpm speed motor dissolver during process can be seen in Figure 1. Ampere motor scrapper and Ampere motor dissolver during process can be seen in Figure 2.
Figure 1. Speed related motor during process

Figure 2. Speed related motor during process
The Conclusion of hypothesis based on several samples that we took from the process of cooking a skin care product in Unilever Indonesia - cikarang factory can be seen at Table 1.

Table 1. Hypothesis based on time and pattern on production process

<table>
<thead>
<tr>
<th>Time</th>
<th>Ok</th>
<th>Ok</th>
<th>Not Ok</th>
<th>Not Ok</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pattern</td>
<td>Ok</td>
<td>Not Ok</td>
<td>Ok</td>
<td>Not Ok</td>
</tr>
<tr>
<td>Result</td>
<td>Ok</td>
<td>? Floating</td>
<td>? Floating</td>
<td>Failure</td>
</tr>
</tbody>
</table>

3. Methodology
To take in the realtime data from the existing system that already using SCADA or DCS to control the process, we need a software who can receive and process into a pattern that later this pattern will be used as a reference by the operator in making a good product.

The software will be planted on a PC or computer separate from the SCADA Computer so that it will not affect the production process controlled by SCADA. The system supervisory control that is the software could be communicate with the existing system SCADA which we named the Batch System Investigation Software. The Architecture diagram existing SCADA and location PC Batch System Investigation software can be seen in Figure 3.

The main task of the Batch System Investigation Software is to retrieve data from the SCADA / DCS server and then process it into a pattern which then from the pattern the operator can take an action so that the ongoing production process can match with predetermined pattern defined by the engineer process and us previously.

Figure 3. Existing SCADA/DCS and Batch System Investigation Software Location
4. **Result & Discussion**

The flowchart data from sensor and actuator to controller PLC/DCS and then to Server and to Operator Client and Batch System Investigation Software can see at Figure 4.

![Flowchart Data from field to Batch System Investigation Software](image)

**Figure 4.** Flowchart Data from field to Batch System Investigation Software

The operator will take action when alarm coming indicate that current process is not match with pattern that already defined. with this situation, the production process can be controlled properly so that the products produced are also in accordance with the predetermined quality targets. By using Batch System Investigation Software, energy usage can be reduced by 10% to 20% because the production process time is reduced by at least 10% from the previous production without software. On the other hand, factory management can also have a time allocation for other production processes because the Batch Investigation software has saved production time in one batch. So management can also reduce the CAPEX to buy a new production machine if it wants to increase production capacity.

Figure 5 are the result of Batch System Investigation Software implemented in skin care factory. In Figure 5 we can see that Ampere motor disolver at batch no. 67074074 B 50 V are match both Pattern and time.

![Ampere Dissolver Motor which Match Pattern and Time](image)

**Figure 5.** Ampere Dissolver Motor which Match Pattern and Time

In Figure 6 we can see that Ampere motor scrapper at batch no. 67074074 B 50 V are match both Pattern and time. We can see also in Figure 7 that at batch 67512810 B 02 V Temperatur during process match pattern and time.

![Ampere Tempuratur Match Pattern and Time](image)
In Figure 8 we can see that Temperature during process at batch no. 67512810 B 03V are match for the Pattern and but not match in time. The result of this batch is OK. Quality of product was OK.

5. Conclusion
This Study aims to get how we can investigate the production process that use Batch Systems using Visual Studio software that commonly used in the market. The method used was we put separate computer server in the plant to get all data from the process and after that we compare whether the data that we got from one batch process is already match with reference data to make a good product.
Batch System investigation software can be use to find the cause of product failure in the manufacturing process that using batch processing. This Software can be used also as a reference for operators so that they can produce products that have quality in accordance with the target and ultimately can get savings and Energy Efficiency 10% until 20%.

References

Evaluation of Undrained Shear Strength ($c_u$) using CPT Data

Putera Agung, M A; Suripto S; and Sasmita E

Civil Engineering Department, State Polytechnic of Jakarta (PNJ)
Jl. Prof.Dr.G.A Siwabessy, Kampus Baru UI, Kota Depok (16425), Indonesia

Abstract. A number of mechanical cone penetration tests (CPT) have been carried out within a 70 m by 70 m area of the Southern Tangerang District in order to evaluate the small-scale variation of undrained shear strength ($c_u$) of a medium-stiff to very-stiff and overconsolidated clay. The tests were conducted at a grid spacing of either one from 15 to 50 metres, were taken to a typical depth of (1) one to 5 (five) metres. Measurement of cone tip resistance and sleeve friction were recorded at intervals of 200 mm. This paper examines only the results of CPT tests to determine the undrained shear strength ($c_u$), and applies the technique of spatial statistics is an analysis which takes the effect of spatial in its analysis. In spatial statistics, it can use spatial interpolation techniques of Ordinary Kriging (OK) and Inverse Distance Weighted (IDW) to obtain the other some points or grids information in area study by using CPT data. These methods can evaluate true of $c_u$ values from triaxial test results based on both methods. In this research, the accuracy of method in the estimation process is reviewed based on Root Mean Square Error (RMSE).

Keywords: medium-stiff, overconsolidated, clay, shear strength, geostastistic.

1. Introduction

A site selected in the area of Southern Tangerang sizes 70 m by 70 m, at the study area relatively has low contour and near by Cisadane river; Location of site as shown in Fig. 1, has the coordinate position around 6°19'30" - 6°22'12" South Lattitude (SL) and 106°38'24"-106°41'06" East Longitude (EL). Topographically, the study area and its surroundings are located at an altitude between 44 m to 88 m above the average sea level. The study area is included in the Cisauk sub-district, closing to Setu regency, Banten Province, West Java Province. Specifically, the location of this road is adjacent to the Cisadane river and drainage channels from housing around this road.

Much of Southern Tangerang district is underlain by a medium – stiff to very-stiff layers or overconsolidated clay as Tangerang clay which was deposited during the Miocene-Pleistocene period (Bojongmanik to Serpong formations) (Bemmelen, 1949) shown Fig. 1. The Tangerang clay is locally significant because at this location exists an important access road between Kranggan to Suradita (Lintas Selatan road) with very heavy traffic and many type of moda transporation. Tangerang clay layers located relatively closes to ground surface, is free of fill and previous construction; is clear access to site; and is easy to be reached from public services.
2. Research method
2.1. Cone penetration test (CPT) data
In order to accurately undrained shear strength (c_u) data for shallow foundation system until 4.0 m depth to reinforce soil must obtain a large number of field and or laboratory test results. However, a few data sample are conducted only randomly and very irregular locations. Cone penetration test (CPT) by virtue of its continuous and simultaneous recording of cone tip resistance (q_c) and sleeve friction (f_s) is able to provide for evaluating the c_u value. Several study were performed by Orchant et al., 1988. Coefficient of variation for the CPT is in the range between 5 – 5%, and the CPT has a very low random testing errors than laboratory triaxial test. It was largely reasons that the CPT was used to evaluate the spatial variability of the Tangerang clay.

Soil mechanics and Foundation Laboratory of Civil Engineering Department, State Polytechnic of Jakarta has carried out some mechanical cone penetration tests (CPT); and sampling of disturbed and undisturbed was implemented. All soil layers obtained and observed by the core boxes of disturbed sample were compared to CPT data, and classified by CH and MH. Typical of CPT data is shown as Fig. 2. The depth of penetrometer is decided to an accuracy of 0.5%. Measurement of cone resistance, sleeve friction and depth were recorded at every 200 mm increments of the penetrometer travel.

![Figure 1. Study area and geology map for Tangerang District (Bemmelen, 1949) and location of access road of Suradita-Kranggan](image1)

![Figure 2. Typical CPT data results (S-1)](image2)

The layout of cone penetration tests (CPT), 6 (six) in all, is shown in Fig. 3. The cone penetrations were arranged at an area of 70 m by 70 m in a grid where tests located, the letters A – H and 1 – 8 indicating...
the grid reference. In addition, all tests were carried out in a cross formation, each test of CPT was located at 10 m to 25 m centres. Table 1 shows the results of triaxial laboratory tests. Visual inspection of these cores indicated that Tangerang clay is overlain by alluvium soil layers consisting of red – brown and sandy clay as shown as from core box (Fig. 4). The standard penetration tests (SPT) and sampling were driven to a depth of 10.0 m below ground level by a mechanical mounted drilling rigs. During this time period, weather condition were relatively constant and it is assumed that measurements data obtained by the CPT do not include variations due to climatic change. It was observed only the undrained shear strenght \( c_u \) values at the depth 4.0 m of all CPT data for a shallow foundation design as an alternative of reinforcement of soil foundation in supporting the rigid pavement structure since the road was always damaged in the winter season.

**Table 1.** Triaxial undisturbed sample test results

<table>
<thead>
<tr>
<th>BORE</th>
<th>DEPTH</th>
<th>USCH</th>
<th>G</th>
<th>( \text{Gt} )</th>
<th>( \text{Gt} )</th>
<th>( \text{Gt} )</th>
<th>( \text{n} )</th>
<th>( \text{a} )</th>
<th>( \text{b} )</th>
<th>( \text{c} )</th>
<th>( \text{d} )</th>
<th>( \text{e} )</th>
<th>( \text{f} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>BH-01</td>
<td>10.00 m</td>
<td>CH</td>
<td>2.684</td>
<td>1.562</td>
<td>1.872</td>
<td>1.016</td>
<td>0.08</td>
<td>0.06</td>
<td>0.03</td>
<td>0.05</td>
<td>0.30</td>
<td>2.75</td>
<td>18.60</td>
</tr>
<tr>
<td>BH-02</td>
<td>10.00 m</td>
<td>CH</td>
<td>2.890</td>
<td>1.570</td>
<td>1.964</td>
<td>1.016</td>
<td>0.02</td>
<td>0.02</td>
<td>0.01</td>
<td>0.01</td>
<td>0.30</td>
<td>2.75</td>
<td>18.60</td>
</tr>
<tr>
<td>BH-03</td>
<td>10.00 m</td>
<td>CH</td>
<td>2.684</td>
<td>1.562</td>
<td>1.872</td>
<td>1.016</td>
<td>0.08</td>
<td>0.06</td>
<td>0.03</td>
<td>0.05</td>
<td>0.30</td>
<td>2.75</td>
<td>18.60</td>
</tr>
<tr>
<td>BH-04</td>
<td>10.00 m</td>
<td>CH</td>
<td>2.890</td>
<td>1.570</td>
<td>1.964</td>
<td>1.016</td>
<td>0.02</td>
<td>0.02</td>
<td>0.01</td>
<td>0.01</td>
<td>0.30</td>
<td>2.75</td>
<td>18.60</td>
</tr>
</tbody>
</table>

*Figure 3. Layout of cone penetration test (CPT) and depth of triaxial undisturbed samples*

*Figure 4. Typical of core box (e.g. BH-02)*
2.2. Undrained shear strength \((c_u)\) and cone factor \((N_k)\)

As undrained shear strength \((c_u)\) depend on testing method (Mayne et al, 2009), it is important to define which \(c_u\) is in use. Empirical correlations have been used to estimate the undrained shear strength of clays (Baligh et al, 1980); mostly based on Terzaghi’s bearing capacity theory (1943) rewritten as the relationship between the undrained shear strength of a clay \((c_u)\) and the cone tip resistance \((q_c)\) by the following:

\[
    c_u = \frac{q_c - \sigma_{vo}}{N_k}
\]

\(\sigma_{vo}\) is the overburden pressure, and \(N_k\) is the cone factor.

The wide scatter in the \(N_k\) values in literature shows that no single value of the \(N_k\) covers all types of clays, test conditions and penetrometers (Schmertmann, 1975); as demonstrated by Stark and Delshaw (1990). At the time of recording of mechanical penetration tests, some triaxial laboratory tests were carried out from BH-01 to BH-06 at the depth of 4.0 metres to 4.50 metres to find the value of \(c_u\). Even value of \(N_k\) is not known with great precision, since it is difficult to determine the value of \(N_k\) of CPT. However, CPT field data is better than laboratory triaxial data Lunne et al (1976) stated that the value of \(N_k\) is 15 to 20 for overconsolidated clays, number of 15 was selected on this research. It is well known that many data from triaxial laboratory tests have inaccuracies or errors rather than CPT test results. Thus, the resulting CPT data will be used to validate triaxial data at a depth of 4.0 meters. Begemann (1965) suggested that range of \(c_u\) values from medium – stiff to very – stiff clay is 2.5 to 20 t/m² or 0.25 kg to 2.0 kg/cm² based on correlation between consistency and cone resistance of CPT.

2.3. Geostatistics and spatial variability analysis

Analysis of the spatial variability of undrained shear strength, has almost exclusively developed by Li and White (1987). Similar to the autocorrelation function of random variables, the semivariogram requires stationarity, that is, the semivariogram depends on the separation and not on the locality of the pairs. As a result, if a drift, or trend, exists in the data. Before the interpolation model is used, it is necessary to know in advance how accurate the model is used. Procedure of cross validation method is to eliminate one data and use the remaining samples as data to predict the data that is removed using the model. If the trend is substracted from regionalised variable, the residuals will themselves be a regionalised variable and will have local mean values of zero.

There are several theoretical semivariogram models including spherical, exponential, gaussian, linear, hole effect, etc. (Rota 2007). Stages of data analysis using Ordinary Kriging (Krige, 1951; Duval et al, 1955) developed by some researchers. The semivariogram is calculated in the direction different, semivariogram sometimes generate several different parameters from some of these directions, it was called anisotropic semivariogram (Armstrong, 1998). Anisotropic semivariogram can be distinguished into 2 types, such as: geometry and zonal anisotropics. The main factor influencing accuracy of Inverse Distance Weighted (IDW) is Power parameter (Yasreby et al, 2009). The smaller the RMSE value of a model indicates that the model is more accurate. Furthermore, The CPT data is used to selected semivarioigram model. Then, the selected semivarioigram will be used to determine the value of \(c_u\) at a depth of 4.0 m and find the \(c_u\) values at the other coordinate points in Fig. 3.

3. Results

In this section, the results of the descriptive analysis will be explained in the \(c_u\) data. Then, the application of the ordinary kriging method for estimation of \(c_u\) according to Fig. 3. The data used is processed using GS+ software packages to calculate the experimental semivariogram value and also to
estimate the location which is not sampled. Microsoft Excel is used to create a display the data of CPT at the depth of 4.0 m. The results of CPT data would be evaluated by using Equation (1) and $N_k$ of 15.

3.1 Descriptive analysis
Descriptive analysis is used to observed generally a picture of CPT data in general. Descriptive analysis used in $c_u$ data consists of average, median, variance, standard deviation, maximum value, minimum value, and range. Results of descriptive analysis shows in Table 2. From table 2, it can be identified that the average and standard deviation values have no a significant difference between all depths from recorded at every 200 mm increments of the penetrometer travel and depth of 4.0 m, but instead the variance and range values have more significant differences. Obviously, it can be realized that there are differences in the amount of data from the results of CPT investigations significantly.

3.2 Ordinary kriging method
The steps for applying the method ordinary kriging is as follows:
1. Examination of data stationary
Observation for data stationary are carried out by making a plot of the distribution of the yield points survey measurements of $c_u$. In the method ordinary kriging data is required stationary data. Data stationary will not indicate in a certain trend. The following is the results of the distribution survey point plotted of $c_u$ results.
   a. Observation value plotted versus X-axis (Easting) (also see Fig. 3) as shown as Fig. 5.
   b. Observation value plotted against absis (Northing) (also see Fig. 3) as shown as Fig. 6.
   Figs. 5 and 6 show that the observation plot of CPT data values versus both axes (Easting & Northing) has no tendency certain trends.
   c. 3 – dimensional plotting of CPT data at depth of 4.0 m as shown as Fig. 7. Based on Figs. 5, 6 and 7 show that the measurement of CPT data has no specific trends. Thus, it can be classified as a stationary data.
2. Calculation of experimental variogram

From $c_u$ measurement based on CPT data, experimental semivariogram was analyzed with using GS+ software based on 4 direction. The direction used is North – South $\theta = 0^\circ$, Northeast –Southwest $\theta = 45^\circ$, West – East $\theta = 90^\circ$, Southeast – Northwest $\theta = 135^\circ$. Active lag and interval distances used in this study are 70 m and 10 m, respectively according to Fig. 3. Direction tolerance used in this study was more or less 22.5°. Based on the results of the experimental semivariogram calculation, an experimental semivariogram plotted from 4 directions was used as follows:

---

**Figure 6.** Plot of observation of CPT data in 2 – dimensional at the depth of 4.0 m versus Y-axis (Northing).

**Figure 7.** Plotting of observation CPT data in 3 – dimensional at the depth of 4.0 m.

**Figure 8.** Plotting of experimental semivariogram
The theoretical semivariogram model used as a comparison in this study is spherical model; exponential; and Gaussian models, as shown as Table 3. Based on the results cross validation calculation, RMSE value of the three models is shown in Table 4.

### Table 3. Parameters belonging to the variogram models at depth of CPT 4.0 m

<table>
<thead>
<tr>
<th>Model</th>
<th>Nugget</th>
<th>Sill</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spherical</td>
<td>0.000100</td>
<td>0.259200</td>
<td>44.8000</td>
</tr>
<tr>
<td>Exponential</td>
<td>0.000100</td>
<td>0.313200</td>
<td>86.1000</td>
</tr>
<tr>
<td>Gaussian</td>
<td>0.000100</td>
<td>0.271200</td>
<td>40.3568</td>
</tr>
</tbody>
</table>

### Table 4. RMSE calculation results for semivariogram model

<table>
<thead>
<tr>
<th>No.</th>
<th>Model</th>
<th>RMSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Spherical</td>
<td>0.476</td>
</tr>
<tr>
<td>2</td>
<td>Exponential</td>
<td>0.333</td>
</tr>
<tr>
<td>3</td>
<td>Gaussian</td>
<td>0.455</td>
</tr>
</tbody>
</table>

Based on Table 4, the results of RMSE calculation from three models shows that the model spherical and exponential models were models best for estimation of $c_u$ data in the area of Tangerang clay. The spherical and exponential models produces the value of the RMSE not significantly different, that is equal to 0.476 and 0.455.

3. Selection of the best interpolation method

   Based on the results of cross validation calculations, it represented that the estimation results generated by the best model in the ordinary kriging method and the optimal power parameters in the IDW method as shown as Fig. 9. Table 5 indicates the results of cross validation calculations using the best models and optimal power parameters.

![Figure 9](image)

**Figure 9.** Results of cross validation calculations of $c_u$ parameters at depth of 4.0 m generated by the best model in the ordinary kriging (a) and the optimal power parameters in the IDW (b) methods.

4. Conclusion and discussion

   Some conclusion obtained by this research, these are:

   1. According to the cross validation, there is no significantly difference between CPT and triaxial data results with using ordinary origing dan IDW methods as shown as Table 5. Table 5 shows conservatively that the $c_u$ value from laboratory triaxial test are lower than in situ test of CPT.
Table 5. The results of cross validation calculations using the best models and optimal Power parameters

<table>
<thead>
<tr>
<th>No.</th>
<th>Soil type</th>
<th>$c_u$ based on the triaxial test results (kg/cm$^2$)</th>
<th>Estimated of $c_u$ (kg/cm$^2$) by using Ordinary Kriging</th>
<th>Estimated of $c_u$ (kg/cm$^2$) by using IDW</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Spherical</td>
<td>Gaussian</td>
</tr>
<tr>
<td>BH-01</td>
<td>CH</td>
<td>1.396</td>
<td>1.52</td>
<td>1.52</td>
</tr>
<tr>
<td>BH-02</td>
<td>CH</td>
<td>1.291</td>
<td>1.62</td>
<td>1.62</td>
</tr>
<tr>
<td>BH-03</td>
<td>CH</td>
<td>1.361</td>
<td>1.59</td>
<td>1.59</td>
</tr>
<tr>
<td>BH-04</td>
<td>MH</td>
<td>1.272</td>
<td>1.20</td>
<td>1.20</td>
</tr>
<tr>
<td>BH-05</td>
<td>MH</td>
<td>1.268</td>
<td>1.74</td>
<td>1.74</td>
</tr>
</tbody>
</table>

2. The ordinary kriging method provides some estimation more accurate than IDW methods. It can be indicated by RMSE values obtained using ordinary kriging method equal of 0.476 dan 0.455 more minimum than RMSE values from optimal power parameters using IDW method equal of 0.481.

3. It was considered that the results obtained from 6 (six) data of CPT can evaluate 5 (five) data of the true triaxial values of this study can be useful for pre-evaluation of the subsurface strength in the area. The results of this study can be used to estimate undrained shear strength related to the CPT and Triaxial test number inside the area. It should be underlined that, the database in this study should be broadened to increase the modelling ability of the method. Further tests should be conducted in northing and easting of the area for more reliable estimations of this parameter.

4. Generally, data – based geostatistics, and in particular the semivariogram, has been shown to be a useful technique in the assessment of the range of correlation of the undrained shear strength of clays. However, a larger amount of data is still required to reduce errors in the preparation of soil parameters in design work. From Tangerang clay at depth of 4000 mm implies that samples are correlated within this range and should not be treated as uncorrelated random.

5. References

**Acknowledgements**
The authors gratefully acknowledge the assistance of the IBIKK and P3M PNJ for the use of the field data results, such as: CPT and triaxial laboratory testing data, for without whose generosity this research could not be taken place, and for their significant contribution to this research.
The Effect of The Mass Amount of Refrigerant In The Freezer Equipped with Receiver on The Performance of Refrigeration System Cycle

Paulus Sukusno1*, Radite Praeko Agus Setiawan2, Yohanes Aris Purwanto2, Armansyah Halomoan Tambunan2

1IPB Postgraduate Student and Lecturer in Mechanical Engineering Department, State Polytechnic of Jakarta, Indonesia.
*Email: p.sukusno.100@gmail.com
2Department of Mechanical Engineering and Biosystems, Faculty of Agricultural Technology, Bogor Agricultural Institute, Indonesia.

Abstract. The mass of refrigerant is vital when filling refrigerant into a refrigeration system in a freezer that is equipped with a receiver. It can improve the performance of the refrigeration system if the mass of refrigerant conforms to the specification (standard) of the system. This research aims to analyze a phenomenon concerning performance of refrigeration system cycle as a result of filling refrigerant (a certain mass of refrigerant) into the refrigeration system of freezer equipped with receiver. The research was conducted on a laboratory-scale freezer that was used to cool water with a mass of 1 kg from a temperature of 27°C to -22°C. The data sample was taken when the machine had been operating for 30 minutes. The freezer was operated (tested) by varying the mass of refrigerant filled into the freezer. The mass of refrigerant in the receiver tank can be discovered from refrigerant temperature and pressure outlet. The result of the research indicates the effect of the mass of refrigerant on the performance of the refrigeration system cycle (compressor work, refrigeration capacity, and COP). The effect can be visually demonstrated by the presence of ice on the outside of pipeline and compressor input.

Keywords: Receiver, mass variation of refrigerant, refrigeration system, freezer.

1. Introduction

Freezing technology requires a lot of energy because it requires an energy-saving freezer. A research analyzing performance parameters such as entropy generation, COP, and continuous efficiency examined on different environmental condition has been conducted by [1], by using three ozone-friendly hydrofluorocarbon (HFC) refrigerants (R32, R134a and R152a) in a vapor-compression refrigeration system. [2],[3] presented a method to analyze energy which is applicable to indicate cooling potential and irreversibility of cycle by utilizing heat source at low temperature.

The technology of food preservation by freezing requires more energy than other technology of food preservation such as curing and canning as revealed by [4]. [5] stated that freezing machine with vapor-compression refrigeration is the most commonly used means in the food
freezing process. An analysis of energy and exergy for refrigeration system on domestic products conducted by [6] is a method to find out the amount of energy consumption of freezing and the effect of equipment replenishment to increase the energy efficiency in a freezing process. Therefore, energy-saving freezing machine or effort to save energy is required.

Experiments assessing exergetic efficiency on freezing process with various gradual temperature of freezing media conducted by [7],[8]. The experiment indicated that exergy loss on each stage of freezing process can be calculated and temperature setting on each stage of the process is vital to diminish the irreversibility of the process.

[9] conducted researches analyzing energy loss in the components of refrigeration system such as compressor, condenser, evaporator and expansion valve. In their research, they recommended a model of low temperature freezer which is able to save energy in the freezing process.

This research aims to analyze a phenomenon concerning performance of refrigeration system cycle as a result of filling refrigerant (a certain mass of refrigerant) into the refrigeration system of freezer equipped with a receiver. By discovering the phenomenon occured, the mass of refrigerant should always be noticed when filling the refrigerant into the freezer.

2. Theory

Thermodynamics equations are required to determine the coefficient of performance of the refrigeration system. Coefficient Of Performance (COP) is a coefficient indicating energy changes (enthalpy) occured on working fluid (refrigerant) and is defined as the ratio of the magnitude of the refrigeration effect (RE) to the compressor work ($w_K$) based on enthalpy changes on p-h diagram for refrigerant (R404A) and thus expressed in equation 5.

Compressor

$$w_K = (h_2 - h_1)$$  \hspace{1cm} (1)

Condenser

$$q_{HP} = (h_2 - h_3)$$  \hspace{1cm} (2)

Expansion valve

$$h_3 = h_4 \text{ (assumed)}$$  \hspace{1cm} (3)

Evaporator

$$q_{RE} = (h_1 - h_4)$$  \hspace{1cm} (4)

Coefficient of Performance

$$COP = \frac{q_{RE}}{w_K} = \frac{(h_1 - h_4)}{(h_2 - h_1)}$$  \hspace{1cm} (5)

Annotation:

$h_1$: enthalpy at compressor inlet [kJ kg$^{-1}$].  \hspace{1cm} $h_4$: enthalpy at evaporator outlet [kJ kg$^{-1}$].

$h_2$: enthalpy at compressor outlet [kJ kg$^{-1}$].  \hspace{1cm} $w_K$: enthalpy due to compressor work [kJ kg$^{-1}$].

$h_3$: enthalpy at condenser outlet [kJ kg$^{-1}$].  \hspace{1cm} $q_{HP}$: enthalpy due to heating effect [kJ kg$^{-1}$].

$h_4$: enthalpy at receiver outlet [kJ kg$^{-1}$]  \hspace{1cm} $q_{RE}$: enthalpy due to cooling effect [kJ kg$^{-1}$].
Figure 1 shows the diagram of refrigeration system of freezing machine equipped with a receiver. The outflow of refrigerant from condenser flows into the larger volume receiver, resulting in a decrease in temperature and pressure. The decrease of temperature and pressure of refrigerant in the receiver is indicated by a shift from point 3 to point 3’ on the diagram as shown in at Figure 3.

Figure 2 is how refrigeration system of the freezer works. The compressor pulls in refrigerant to compress (point 1 to 2). The condenser cools the refrigerant by flowing air (point 2 to 3). The receiver ensures the refrigerant enters the expansion valve in saturated liquid phase that allows pressure and temperature to decrease (point 3 to 3’). Then, the evaporator vaporizes the refrigerant by absorbing heat through object (for example, water to ice at point 5) in the evaporator (point 4 to 1). And so on, the refrigeration system works in a closed cycle.

3. Research Methodology

This research uses a laboratory-scale freezer with R-404A refrigerant. The specification details of the freezer are presented in Table 1. The freezer is equipped with receiver and three expansion valves (nozzle number 01, 02 and 03) used to adjust the gradual temperature in the evaporator. The freezer is used to test the cooling process of one kilogram of water into ice.
Table 1. Specification of the freezer

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressor</td>
<td>Type: SC12CL, 220-240V/50Hz, n = 2900 rpm, Ve 12 cm³/rev.</td>
</tr>
<tr>
<td>Evaporator</td>
<td>Type; plate touch (210 x 210 x 3) mm³</td>
</tr>
<tr>
<td>Condenser</td>
<td>Type; Tinned Tube n 30, d 3/8”, air conditioner</td>
</tr>
<tr>
<td>Expansion Valve</td>
<td>Danfoss TS2: Orifice No. 02</td>
</tr>
<tr>
<td>Refrigerants</td>
<td>R 404A</td>
</tr>
<tr>
<td>Receiver</td>
<td>Merk; Airmender, A 127 mm, L 240 mm.</td>
</tr>
<tr>
<td>Pressure gauge</td>
<td>Bourdon Barometer Type analog</td>
</tr>
<tr>
<td>Thermometer</td>
<td>Thermocouple digital type TC4Y Accuracy ± 2°C</td>
</tr>
<tr>
<td>Wattmeter</td>
<td>Multifunction Mini Ammeter D02A, Accuracy ± 1 %</td>
</tr>
</tbody>
</table>

4. Result and Discussion

Table 2. Sample of measuring data of the research on refrigeration system with various masses of refrigerant in the system of freezer equipped with receiver.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Normal</td>
<td>1</td>
<td>14.8</td>
<td>14.6</td>
<td>4.8</td>
<td>-20</td>
<td>63</td>
<td>34</td>
<td>0</td>
<td>-26</td>
<td>530</td>
</tr>
<tr>
<td>2.</td>
<td>Less</td>
<td>1.6</td>
<td>15.0</td>
<td>14.8</td>
<td>1.8</td>
<td>11</td>
<td>82</td>
<td>36</td>
<td>-25</td>
<td>3</td>
<td>515</td>
</tr>
<tr>
<td>3.</td>
<td>More</td>
<td>4</td>
<td>19.2</td>
<td>19.0</td>
<td>19.0</td>
<td>-2</td>
<td>40</td>
<td>34</td>
<td>30</td>
<td>-6</td>
<td>623</td>
</tr>
</tbody>
</table>

Annotation: The measurement data was collected when the freezer has been operating for 30 minutes.

P₁ = Refrigerant pressure at compressor inlet [Bar]
P₂ = Refrigerant pressure at compressor outlet [Bar]
P₃ = Refrigerant pressure at condenser outlet [Bar]
P₃’ = Refrigerant pressure at receiver outlet [Bar]
T₁ = Refrigerant temperature at compressor inlet [°C]
T₂ = Refrigerant temperature at compressor outlet [°C]
T₃ = Refrigerant temperature at condenser outlet [°C]
T₃’ = Refrigerant temperature at receiver outlet [°C]
T₄ = Refrigerant temperature at evaporator inlet [°C]
T₅ = Temperature of product (water-ice) [°C]
Pᵥ = Real electrical power driving the compressor [W]

The measurement data in Table 2 is plotted in a R-404A p-h diagram by Coolpack © and then is analyzed based on equations. The results as diagram are shown in Figure 3 and 4.

Figure 3 (a) shows that a p-h diagram of refrigeration system filled with refrigerant with a mass conforms to standard (the augment of refrigerant mass is as much as 20% to 80% of receiver tank volume) results in lower temperature at the evaporator that provides higher refrigeration capacity (qRE). Figure 3 (b) indicates that a p-h diagram of refrigeration system filled with refrigerant with a mass less than standard produces lower outlet receiver refrigerant temperature and pressure resulting in lower refrigeration capacity (qRE). Meanwhile, Figure 3 (c) points out that a p-h diagram of refrigeration system filled with refrigerant with a mass more than standard produces compression of saturated gas resulting in greater compressor work (electrical power driving the compressor).
Figure 3. P-h diagram of R-404A taken from EES software as a result of plotting data in Table 2.

Figure 4. P-h diagram of R-404A in a freezer with various masses of refrigerant: (a) normal, (b) less, and (c) more

Table 3 provides refrigerant enthalpy on each measuring point plotted in p-h diagram. The results of compressor work, COP, and refrigeration effect analyzed using equation 1 to 5 are shown in the same table. The table indicates that freezer with normal mass of refrigerant in the system has higher refrigeration effect (qRE) and COP.

Table 3. The analysis result of COP, compressor work, and effect cooling the refrigeration system

<table>
<thead>
<tr>
<th>No.</th>
<th>The mass of refrigerant in the system</th>
<th>( h_1 ) [kJ.kg(^{-1})]</th>
<th>( h_2 ) [kJ.kg(^{-1})]</th>
<th>( h_3 ) [kJ.kg(^{-1})]</th>
<th>( h_4 ) [kJ.kg(^{-1})]</th>
<th>( w_K )</th>
<th>qRE [kJ.kg(^{-1})]</th>
<th>COP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Normal</td>
<td>358</td>
<td>414</td>
<td>255</td>
<td>198</td>
<td>198</td>
<td>46</td>
<td>160</td>
</tr>
<tr>
<td>2.</td>
<td>Less</td>
<td>384</td>
<td>433</td>
<td>356</td>
<td>356</td>
<td>375</td>
<td>49</td>
<td>9</td>
</tr>
<tr>
<td>3.</td>
<td>More</td>
<td>351</td>
<td>385</td>
<td>264</td>
<td>245</td>
<td>245</td>
<td>34</td>
<td>106</td>
</tr>
</tbody>
</table>
4. Conclusion and Recommendation

If the mass of refrigerant conforms to the standard when it is filled into the freezer equipped with receiver, it will increase the Coefficient Of Performance (COP). The freezer filled with refrigerant with a mass conforms to the standard has COP of 3.48 and electrical power of 530 W. Meanwhile, the freezer filled with refrigerant with less and more mass than the standard has COP of 0.18 & 3.12 and electrical power of 515 W & 623 W, respectively.

When filling refrigerant into a freezer equipped with a receiver, notice that the mass of the refrigerant must be 80% of the tank volume.

Acknowledgment


References

Smartphone Self Efficacy, Perceived Usefulness, Perceived Ease of Use, and Perceived Credibility affect significantly the use of online transportation application in Indonesia

Petrus Hari Kuncoro Seno¹, Rodiana Listiawati², Rahmanita Vidyasari³

¹,²,³Department of Accounting and Finance, Politeknik Negeri Jakarta

hariseno@yahoo.com, lilies@yahoo.com

Abstract. Retailing industry are facing competition from each other but also from non-traditional intermediaries such as e-commerce. Another strategic challenge facing online transportation application institutions today is the growing and changing needs and expectations of consumers in tandem with increased education levels and growing wealth. Consumers are becoming increasingly discerning and have become more involved in their consuming decision. This study aims to determine what factors affect customer acceptance of the services e-commerce. This study uses the framework of the Technology Acceptance Model (TAM), which has been modified by Wang et. al. (2003). As a result of hypothesis testing that has been conducted by using SEM analysis it turned out that of the nine hypothesis that were tested 7 of them were accepted, two hypotheses H3 and H6 are rejected. Hypothetical alternative 1a which stated that the Computer/smartphone Self Efficacy (CSE) has a significant effect on Perceived Usefulness (PU) turned out to be accepted. Hypothesis 1b stated that the Computer/smartphone Self-Efficacy (CSE) significantly effect on Perceived Ease of Use (PEU) turned out to be accepted. For hypothesis 1c, namely "Computer/Smartphone Self Efficacy (CSE) have significant effect on the Perceived Credibility (PC)" turned out to be accepted. Hypothesis 2 is written "Perceived Ease of Use (PEU) a significant effect on Perceived Usefulness (PU)" turned out to be acceptable. From the results of the LISREL output also it can be seen that hypothesis 3 which is "Perceived Ease of Use (PEU) have a significant effect on the Perceived Credibility (PC)" was rejected. For hypothesis 4, which states that "Perceived Credibility (PC) a significant effect on Perceived Usefulness (PU)" turned out to be accepted. Hypothesis 5, namely "Perceived Usefulness (PU) have a significant effect on interest in using online transportation application (BI)" was accepted. Hypothesis 6, which states that "Perceived Ease of Use (PEU) have a significant effect on interest in using online transportation application (BI)" turns out to be rejected. While hypothesis 7 is says that "Perceived Credibility (PC) have a significant effect on interest in using online transportation application (BI)" turned out to be acceptable. The overall path coefficient of H1a, H1b, H1c, H2, H4, H5 and H7 significant at p < 0.05, thus showing support for this hypotheses. From the results of this research there are some advice for the online transportation application industry namely it is important for the management of online transportation application to pay more attention to factors that significantly affect the usage of online transportation application by customers: Computer/smartphone Self Efficacy, Perceived Usefulness, Perceived Ease of Use, Perceived Credibility. It should be noted in this regard that the Perceived Usefulness and Perceived Credibility has a direct influence on the interest in using online transportation application while Perceived Ease use has an indirect influence of the interest in using online transportation application is through its influence on Perceived Usefulness.

Keywords: ecommerce, online transportation services, acceptance level, users opinion, users characteristics
1. INTRODUCTION

Increased competition and efforts to reduce operating costs as efficiently as possible to encourage companies to utilize the internet in doing business. In addition, the level of mobility in society is increasing from year to year, causing the providers of public services such as retailing companies to innovate in their service to customers. One application that is now starting to become a concern is online transportation application.

The emergence of e-commerce activities should be anticipated with proper and good in order not to miss the opportunity to earn a chance in the era of globalization, especially in the field of small and medium-sized companies. Businessmen in Indonesia are the main targets that must be nurtured and encouraged to take advantage of e-commerce, due to the strategic position of SMEs, among others, where the population reached 2.1 million units scattered throughout the archipelago and absorb 20 million workforces.

The fierce competition among retailers and the trend towards reducing operational retailing cost has forced companies to utilize internet in their business. Besides people’s mobility has grown from year to year, the service provider for the society such as retailing business to continuously innovate in serving their customers. One of the application which is getting more and more attention is e-commerce.

The rapid advancements in electronic distribution channels have produced tremendous changes in the transportation industry in recent years, with an increasing rate of change in technology, competition among players and consumer needs [1]. The proliferation of, and rapid advances in, technology-based systems, especially those related to the internet, are leading to fundamental changes in how companies interact with customers. In general, companies that use e-commerce will get benefits, namely (1) the opening of a new revenue stream (revenue streams) are more promising that can not be found in the system of traditional transaction, (2) increase market exposure, (3) lower operating costs (operating costs), (4) to widen the range of (global reach), (5) improve customer loyalty (customer loyalty), (6) improving supplier management (supplier management), (6) shorten the production time and (7) improving the value chain (value chain). The purpose of this paper is to determine what factors affect customer acceptance of the services e-commerce. The study will determine factors which affect the customers acceptance of the online transportation application in Indonesia.

Writer Zakariya Belkhamza and Syed Azizi Wafa in his article entitled "The Effect of Perceived Risk on the Intention to Use E-commerce: The Case of Algeria" published in the Journal of Internet Banking and Commerce edition April 2009, vol. 14, no. 1 stated that although lately a decline in economic activity on the Internet and ICT sector, concerns about privacy and trust (trust) remains an obstacle to growth and the important issues of both individuals and organizations. [2]

Study of existing studies on the adoption of e-commerce business to consumer (B2C) yet simultaneously consider trust and risk as an important determinant of behavior adoption. The conceptual model of this study lead us to believe that the risk of e-commerce system is a major determinant of behavior adoption. Based on the technology acceptance model (Technology Acceptance Model = TAM), this study aimed to examine the effects of the perception (perceived) risk systems on the behavior of tourism organizations willingness to use e-commerce.

The researchers expect to be able to provide both theoretical and empirical validation explanation on the adoption of e-commerce, and offer explanations and recommendations for the business organizations and service providers of e-commerce system regarding the implementation of e-commerce and security issues and risks. The second article written by David Gefen, Elena Karahanna, Detmar W. Straub entitled "Trust and TAM in Online Shopping: An Integrated Model" in the journal MIS Quarterly, Vol. 27, No. 1 published in March 2003 and published by Management Information Systems Research Center, University of Minnesota wrote that an interaction that is separate and distinct from both the e-vendor or actual interface Web site of its IT is the most important thing in shopping online. [3] In the previous studies has been established, that the intention of purchasing online is the result of consumers' assessment of IT itself-especially the perceived benefits and ease of use (TAM) as well as trust in the e-vendor. So far this perspective has been examined separately by IS researchers. Integrating both perspectives and examines the factors that build trust online in an environment that does not have the typical human interaction that could lead to confidence in other situations, will improve the understanding of the construct (construct) and its relationship to behavior.
Results of the study the researchers of online shoppers experienced and repeatedly showed that consumer confidence is just as important for online trading with the perceived benefits and perceived ease of use as it has been studied by TAM previous approach. Taken together, the set of these variables was able to explain a certain proportion of the variance in behavior mentioned above.

This study also provides evidence that online trust built through (1) the belief that the vendors have nothing to gain by cheating , (2) a belief that there is a secure mechanism that is built into the Web site , and (3) to have a certain interfaces , (4) easy to use. From the second article that has been discussed above it can be concluded that the role of trust in e-commerce is quite significant in the adoption of e-commerce which includes the factor of how payments online ( e-payments ) was conducted, which play a pivotal role in the process of e-commerce transactions.

2. METHODOLOGY

This study employed the method of personal interview for data collection using a close-ended questionnaire as the research instrument. Respondents of this study consisted of customers of several online transportation application in Jakarta, Depok, Tangerang all in Indonesia. A total of 100 respondents were selected and interviewed for a period of two month. The questionnaire is divided into three sections. Section A is designed to solicit information regarding online transportation application activities and category of adopters. Section B consisted of questions on perception of the online transportation application based on the products characteristics attributes. In this section, respondents were asked to indicate the degree to which they agreed with each statements on a 5 point Likert-scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Section C is on demographic factors which seek to obtain responses based on factors such as gender, town, and education level. The data solicited were then analyzed by using the Structural Equation Modelling (SEM). using LISTREL to test the 9 hypotheses on Technology Acceptance Model of online transportation application in Indonesia. These hypotheses are:

Hypothesis 1: the Computer/smartphone Self Efficacy (CSE) has a significant effect on Perceived Usefulness (PU).
Hypothesis 1b: the Computer/smartphone Self-Efficacy (CSE) significantly effect on Perceived Ease of Use (PEU).
Hypothesis 1c: "Computer/smartphone Self Efficacy (CSE) have significant effect on the Perceived Credibility (PC)."
Hypothesis 2: "Perceived Ease of Use (PEU) a significant effect on Perceived Usefulness (PU)."
Hypothesis 3: "Perceived Ease of Use (PEU) have a significant effect on the Perceived Credibility (PC)."
Hypothesis 4: "Perceived Credibility (PC) a significant effect on Perceived Usefulness (PU)."
Hypothesis 5: "Perceived Usefulness (PU) have a significant effect on interest in using online transportation application (BI)."
Hypothesis 6: "Perceived Ease of Use (PEU) have a significant effect on interest in using online transportation application (BI)."
Hypothesis 7: "Perceived Credibility (PC) have a significant effect on interest in using online transportation application (BI)."

Some operational definitions which are used in this article are: Self Efficacy:" judgments of how well one can execute courses of action required to deal with prospective situations" [4]. Perceived usefulness - "the degree to which a person believes that using a particular system would enhance his or her job performance" [5]. Perceived ease-of-use - Davis defined this as "the degree to which a person believes that using a particular system would be free from effort".
3. RESULT AND DISCUSSION

The Customers’ Occupation

Based on the data which have been collected it is revealed that majority of the respondents were university students (44.0%) and then company workers (20.0%), self employed (8.0%). A complete account of the customers’ occupation can be found on table 1.

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers</td>
<td>4.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Housewives</td>
<td>6.0</td>
<td>10.0</td>
</tr>
<tr>
<td>Company workers</td>
<td>20.0</td>
<td>30.0</td>
</tr>
<tr>
<td>Tax consultant</td>
<td>2.0</td>
<td>32.0</td>
</tr>
<tr>
<td>University Students</td>
<td>44.0</td>
<td>76.0</td>
</tr>
<tr>
<td>Public servants</td>
<td>4.0</td>
<td>80.0</td>
</tr>
<tr>
<td>High School Students</td>
<td>8.0</td>
<td>88.0</td>
</tr>
<tr>
<td>Seamen</td>
<td>2.0</td>
<td>90.0</td>
</tr>
<tr>
<td>Police</td>
<td>2.0</td>
<td>92.0</td>
</tr>
<tr>
<td>Self employed</td>
<td>8.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

The Customers’ Gender, The Customers’ Education and The Age of the Customers

In this study there is a more female in the online transportation application customers under study. The male customers are 38.0% and the female customers are 62.0%). The education level of the online transportation application customers under study were mostly bachelor degree graduate (38.0%) followed by high school graduate (34.0%) and then three years diploma (16.0%) and other education level are less than 12 %. The median age of the online transportation application customers in this study is 25.5 years old. The youngest was 12 years old and the oldest was 58 years old.

The online transportation application Services Chosen by the Customers

The online transportation application service providers which are chosen by the customers were dominated the two big online transportation application companies in Indonesia which are Gojek (20%) and Grab (10%).

<table>
<thead>
<tr>
<th>E commerce Application</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grab</td>
<td>10%</td>
</tr>
<tr>
<td>Gojek</td>
<td>20%</td>
</tr>
<tr>
<td>Gojek and Grab</td>
<td>70%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

The Computer/smartphone Self Efficacy

Based on the questions which are used to measure the computer/smartphone self efficacy it is revealed that the median values were 3.84 (“sure”) for learning availability and 3.92 for help availability and 3.84 (“sure”) for the manual availability.
The Perceived Value

The median value for the customers perceived value for online transportation application was 4 (“sure”) for Speed of transaction, and  easier transaction and usefulness.

Table 4 Perceived Value

<table>
<thead>
<tr>
<th></th>
<th>Speed up transaction</th>
<th>Easier transaction</th>
<th>Usefulness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>3.90</td>
<td>3.98</td>
<td>4.08</td>
</tr>
<tr>
<td>Median</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>.877</td>
<td>.845</td>
<td>.724</td>
</tr>
</tbody>
</table>

The Perceived Ease of use

The median value for the perceived ease of use for online transportation application was 4 (“sure”) for user friendliness, easy to learn, fast learning and easy to use.

Table 5. Perceived Ease of use

<table>
<thead>
<tr>
<th></th>
<th>User Friendly</th>
<th>Easy to learn</th>
<th>Fast learning</th>
<th>Easy to use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>3.56</td>
<td>3.62</td>
<td>3.66</td>
<td>3.66</td>
</tr>
<tr>
<td>Median</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
<td>4.00</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>.951</td>
<td>.942</td>
<td>.964</td>
<td>.982</td>
</tr>
</tbody>
</table>

The Perceived Credibility

The median value for perceived credibility for online transportation application was 3.5 (“not sure”) for privacy and secure transaction.

Table 6 Perceived Credibility

<table>
<thead>
<tr>
<th></th>
<th>Privacy</th>
<th>Secure Transaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>3.46</td>
<td>3.54</td>
</tr>
<tr>
<td>Median</td>
<td>3.50</td>
<td>3.50</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>.947</td>
<td>.862</td>
</tr>
</tbody>
</table>

The Behavioral Intention

The median value for the behavioral intention was 4 (“sure”) for willingness to use and use of online transportation application in the future.

Table 7 Behavioral Intention

<table>
<thead>
<tr>
<th></th>
<th>Willingness to Use</th>
<th>Use in the future</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Mean</td>
<td>3.76</td>
<td>4.04</td>
</tr>
<tr>
<td>Median</td>
<td>4.00</td>
<td>4.00</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>.744</td>
<td>.755</td>
</tr>
</tbody>
</table>
Test of Hypotheses

As a result of hypothesis testing that has been conducted by using SEM analysis it turned out that of the nine hypotheses that were tested 7 of them were accepted two hypotheses H3 and H6 are rejected. Hypothetical alternative 1a which stated that the Computer/smartphone Self Efficacy (CSE) has a significant effect on Perceived Usefulness (PU) turned out to be acceptable. Hypothesis 1b stated that the Computer/smartphone Self-Efficacy (CSE) significantly affects on Perceived Ease of Use (PEU) turned out to be accepted. For hypothesis 1c, namely "Computer Self Efficacy (CSE) have significant effect on the Perceived Credibility (PC)" turns out to be accepted. Hypothesis 2 is written "Perceived Ease of Use (PEU) a significant effect on Perceived Usefulness (PU)" turned out to be acceptable. From the results of the LISREL output also it can be seen that hypothesis 3 which is "Perceived Ease of Use (PEU) have a significant effect on the Perceived Credibility (PC)" was rejected. For hypothesis 4 which states that "Perceived Credibility (PC) have a significant effect on Perceived Usefulness (PU)" turned out to be accepted. Hypothesis 5, namely "Perceived Usefulness (PU) have a significant effect on interest in using online transportation application (BI)" was accepted. Hypothesis 6, which states that "Perceived Ease of Use (PEU) have a significant effect on interest in using online transportation application (BI)" turns out to be rejected. While hypothesis 7 is says that "Perceived Credibility (PC) have a significant effect on interest in using online transportation application (BI)" turned out to be acceptable. The overall path coefficient of H1a, H1b, H1c, H2, H4, H5 and H7 significant at p < 0.05, thus showing support for this hypotheses. From the results of this research there are some advice for the online transportation application industry namely it is important for the management of online transportation application to pay more attention to factors that significantly affect the usage of Online transportation application by customers: Computer/smartphone Self Efficacy, Perceived Usefulness, Perceived Ease of Use, Perceived Credibility. It should be noted in this regard that the Perceived Usefulness and Perceived Credibility has a direct influence on the interest in using online transportation application while Perceived Ease use has an indirect influence of the interest in using online transportation application is through its influence on Perceived Usefulness.

4. CONCLUSION

The demographic profile of the online transportation application customer which has been explored in this article revealed that the majority of the respondents were university students (44.0%) and then company workers (20.0%), self employed (8.0%) The median age of the online transportation application customers in this study is 25.5 years old. The online transportation application service providers which are chosen by the custumers were dominated by the two big online transportation application companies in Indonesia which are Grab (10%), Gojek (20%). The education level of the online transportation application customers were mostly bachelor degree graduate (38.0%) followed by high school graduate (34.0%) and then three years diploma (16.0%) and other education level are less than 12%. Based on the questions which are used to measure the computer/smartphone self efficacy it is revealed that the median values were 3.84 ("sure") for learning availability and 3.92 for help availability and 3.84 ("sure") for the manual availability. The median value for the customers perceived value for online transportation application was 4 ("sure") for speed of transaction, and easier transaction and usefulness. The median value for the perceived ease of use for online transportation application was 4 ("sure") for user friendliness, easy to learn, fast learning and easy to use. The median value for perceived credibility for online transportation application was 3.5 ("not sure") for privacy and secure transaction. The median value for the perceived ease of use for online transportation application was 4 ("sure") for user friendliness, easy to learn, fast learning and easy to use. The median value for the behavioral intention was 4 ("sure") for willingness to use and use of online transportation application in the future. As a result of hypothesis testing that has been conducted by using SEM analysis it turned out that of the nine hypotheses that were tested 7 of them were accepted two hypotheses H3 and H6 are rejected. Hypothetical alternative 1a which states that the Computer/smartphone Self Efficacy (CSE) has a
significant effect on Perceived Usefulness (PU) turned out to be acceptable. Hypothesis 1b stated that the Computer Self-Efficacy (CSE) significantly effect on Perceived Ease of Use (PEU) turned out to be accepted. For hypothesis 1c, namely "Computer/smartphone Self Efficacy (CSE) have significant effect on the Perceived Credibility (PC)" turns out to be accepted. Hypothesis 2 is written "Perceived Ease of Use (PEU) a significant effect on Perceived Usefulness (PU)" turned out to be acceptable. From the results of the LISREL output also it can be seen that hypothesis 3 which is "Perceived Ease of Use (PEU) have a significant effect on the Perceived Credibility (PC)" was rejected. For hypothesis 4, which states that "Perceived Credibility (PC) a significant effect on Perceived Usefulness (PU)" turned out to be accepted. Hypothesis 5, namely "Perceived Usefulness (PU) have a significant effect on interest in using online transportation application (BI)" was accepted. Hypothesis 6, which states that "Perceived Ease of Use (PEU) have a significant effect on interest in using online transportation application (BI)" turns out to be rejected. While hypothesis 7 is says that "Perceived Credibility (PC) have a significant effect on interest in using online transportation application (BI)" turned out to be acceptable. The overall path coefficient of H1a, H1b, H1c, H2, H4, H5 and H7 significant at p < 0.05, thus showing support for this hypotheses. From the results of this research there are some advice for the commerce industry namely it is important for the management of online transportation application to pay more attention to factors that significantly affect the usage of Online transportation application by customers: Computer/smartphone Self Efficacy, Perceived Usefulness, Perceived Ease of Use, Perceived Credibility. It should be noted in this regard that the Perceived Usefulness and Perceived Credibility has a direct influence on the interest in using online transportation application while Perceived Ease use has an indirect influence of the interest in using online transportation application is through its influence on Perceived Usefulness.

References

ASSESSING THE INTENSITY OF WRITER’S OPINION BY USING “AMPLIFICATION” AS A PART OF APPRAISAL DEVICES

Lenny Brida¹, M.R. Nababan², Riyadi Santosa³, Djatmika⁴

¹Business Administration Department, Politeknik Negeri Jakarta
²,³,⁴Postgraduate Program in Linguistics, Sebelas Maret University

lennybrida@gmail.com, Andrean_Nababan@yahoo.com, riyadisantosa1960@gmail.com, djatmika@uns.ac.id

Abstract. The aim of this research is to find out how an English writer intensify meanings and how strongly the writer’s feel about someone or something. The failure to understand the amplification devices will cause distortion of communication between the writer/speaker and the reader/listener. Therefore, this research is an afford: (a) to analyze the characteristics of force amplification used by the writer, whether it is intensifier, attitudinal lexis, metaphors or swearing, (b) to assess/evaluate the degrees of intensity of scalable categories (up-scaling and downscaling, (c) to identify types of focus (sharpen and soften) that are used by the writer to negotiate his opinion, (d) to analyze the strategy of the writer in negotiating his opinion, principles and values? It is expected that the results of this research will be a valuable contribution to non-native English readers to understand the intensity of the writer’s opinion about someone or something.

The main Source of data for this study is the text that contain “Appraisal” in the Book of “The 7 Habits of Highly Effective People”, written by Stephen R. Covey. This book is chosen because the writer uses plenty of amplification elements that can be identified, starting from the title until the content.

This research applied a descriptive qualitative design and the data were obtained through purposive sampling and analyzed with a content analysis technique by developing Focus Group Discussion (FGD) with experts and readers. As Cresswell (1994:145) explained that “Qualitative research is descriptive in that the researcher is interested in process, meaning and understanding gained through words or pictures. The data of this research were analyzed by adopting Spradley model.

The analysis provides insights into how a writer convinces the readers with varying amplification devices to engage with Appraisal. The result of assessment shows that the writer uses amplification of “Force” (95%) and Focus (5%). It indicates that Stephen R. Covey explained his opinions, principles and values to the readers, mostly using “gradable Force” (95%) and non-gradable Focus (only 5%). The gradability analysis of the data consists of different types of up-scaling and down-scaling of the force types, they are; 1) Intensifiers, up-scaling (141 : 26%) and downscaling (40 : 7%), 2) Attitudinal lexis, up-scaling (266 : 49%) and down-scaling (61:...
11%), metaphors and Simile (13 : 2%), but there is no swearing (0%). The focus types : 1) sharpen (16: 3%) & soften (13: 2%) of experiential categories which are classified as non-gradable context, are not many used in Covey’s book. It can be concluded that “The 7 habits of highly effective people” are introduced mostly in attitudinal lexis (60%) and intensifiers (33%).

Keywords: Amplification, up-scaling, down-scaling, sharpening, and softening.

1. Introduction
1.1 Back Ground of The Study
Communication, written or spoken is essential to every aspect of human life. The process cannot be regarded as a simple phenomenon but it should be seen as a process that involves participants (senders and receivers). A successful communication will happen if the senders and receivers have “equal perception” in their mind. The failure to achieve equal perception will cause “distortion of communication”. That is why, it is important to consider how we can develop a communication strategy of producing equal perception. In other words, the desired outcome of any kind of communication process is “understanding” among the participants of the communication.

From the perspective of Appraisal theory, one of the convincing strategy of negotiating “meaning” (opinions, principles or values) is by analyzing the “intensity” of graduation, because the attitudes, whether it is in the type of affect, judgment or appreciation, they are gradable, their volume can be turned up and down depending how intensely we feel. We can refer to the resources we use to show how strong our reaction are as amplification (Martin and Rose, 2007:27).

Amplification as attitudinal assessments are divided into two categories, they are force and focus. Force is for up-scaling or down-scaling, to show how strongly we feel about people and things. The types of force consist of four categories (intensifier, attitudinal lexis, metaphors, and swearing). It seems that in English there are many choices for turning the volume up than down, and use them more often (Martin and Rose, 2007:42). The second types of amplification is focus, that is sharpening and softening experiential categories.

As senders and receivers are vital in communication, the study of this topic consider both sides, the writer and the readers position. Therefore, this paper addresses how a writer convince the readers about his opinions, principles and values that he is going to negotiate to the readers and at the same time, the readers also can assess and understand the message by analyzing and investigating the amplification of force and focus.

There are many ways and strategies that the participants develop when they communicate with others, perhaps even unintentionally, for example the tone of the voice can give clues to our mood and emotional state, while hand signals and gestures can add to spoken message. In written communication, the sender and receiver are more distinct. We can not see the gestures or the voice tone. In this situation, we can catch the “meaning” by assessing/evaluating the intensity of the opinions.

The data for this research is in the form of media. The writer selected a motivational book written by Steven R. Covey : “The 7 habit of highly effective people” (1990) as a resource media, due to the sufficient availability of the data needed for this research. Beside that, the writer is interested to choose this book, because it is one of international best sellers in the world, the 12th rank out of 100 books. This book has been chosen as 25 influencing books by Time magazine (Gordon, 2007; Jabeen, 2016).

The investigation to this research is analyzed by adopting Spradley systematic approach (1980), starting from domain analysis, taxonomy analysis, componential analysis and finding fact/cultural value, as it is
quoted by Sugiyono (2006:284). Hopefully, the result of this research will be a valuable contribution to non-native English Readers to evaluate and understand the intensity of the writer’s opinion about someone or something.

1.2 Research Question
Based on the background of this research, this study is an investigation to answer the following questions:

1. What types of amplifying force that can be used to assess/evaluate the writer’s opinions?
2. How is the degree of intensity of the writer’s opinions (up-scaling and down-scaling)?
3. What types of amplifying focus (sharpen and soften) that are used by the writer to convey his opinions?
4. How is the strategy of the writer in negotiating his opinions, principles and values?

2. Theory
2.1 Amplification as sub-system of Appraisal
Appraisal describes how language is used to express an attitude towards some kind or some target. It is concerned with evaluation — the kind of attitude that are negotiated in a text, the strength of the feelings involved and the ways in which values are sourced and readers aligned (Martin and Rose, 2007:25). Appraisal as a comprising of three main linguistic systems consists of (1) “Attitude”, which distinguishes different kinds of feeling (affect, judgment and appreciation) that can be expressed (including attitude taxonomy and orientation); (2) “Amplification”, which enables strengthening or weakening such expression (including Force and Focus); and (3) “Engagement”, which conveys different possible degrees of commitment to the opinion expressed (including identification and relation of the speaker/writer to the source of an attributed evaluation).

Since this study is focused on the assessing/evaluating things, people’s opinion and character and their feelings, the basic theory to be referred is amplification sub-system of Appraisal, which describe grading; up-scaling or down-scaling (force) of attitude and sharpen and softening attitude (focus). The grading operates across two axes of scalability, that of grading according to intensity or amount, and that of grading according to proto-typicality and the preciseness by which category boundaries to drawn. (Martin & White, 2005:137). The gradibility of attitudinal meanings for the attitude system can be seen in the following table.

<table>
<thead>
<tr>
<th>No</th>
<th>Attitude sub-system</th>
<th>Low Degree</th>
<th>High Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Affect</td>
<td>Contentedly</td>
<td>happily</td>
</tr>
<tr>
<td>2</td>
<td>Judgment</td>
<td>Competent player</td>
<td>Good player</td>
</tr>
<tr>
<td></td>
<td>Reasonably good player</td>
<td>Quite good player</td>
<td>Very good player</td>
</tr>
<tr>
<td>3</td>
<td>Appreciation</td>
<td>A bit untidy</td>
<td>Somewhat untidy</td>
</tr>
<tr>
<td></td>
<td>attractive</td>
<td>beautiful</td>
<td></td>
</tr>
</tbody>
</table>

2.2 The Semantics of Graduation

The semantics of graduation, is central to the appraisal system. It might be said that attitude and engagement are domains of graduation which differ according to the nature of the meanings being scaled. Graduation resources are divided into force and focus, with the former describing “grading according to intensity or amount” of scalable categories (e.g., somewhat abruptly, greatly hindered), and the latter “grading according to proto-typicality and the preciseness” of typically non-scalable categories (e.g., a true friend, an apology of sorts; Martin & White, 2005 : 137). Graduation resources can add personal meaning to otherwise non-evaluative utterances (e.g., they play jazz, sort of).

Graduation is largely expressed via modifiers such as ‘very’ (increased force), ‘slightly’ (decreased force), ‘truly’ (sharpened focus), or ‘sort of’ (softened focus), but may also be expressed lexically in a head adjective, e.g., ‘greatest’ vs. ‘great’ vs. ‘good’.

2.2.1 Amplifying Force of Attitude (Assessments of Intensification and quantification)

Force describes the intensity of the appraisal being expressed. Force may be realized via modifiers such as very/really/extremely/sharply (increased force) or slightly (decreased force). These kinds of words are known as intensifiers. Intensifiers make it possible for us to compare things, to say how strongly we feel about someone or something, by comparison to something else (Martin and Rose, 2007:42).

Force covers assessments as to degree of intensity and as to amount. Assessments as to degree of intensity can operate over qualities (e.g. slightly foolish, extremely foolish, it stopped somewhat abruptly, it stopped very abruptly), over processes (e.g. slightly hindered us, or over the verbal modalities of likelihood, usually inclination and obligation (e.g. it’s just possible that …., it’s very possible that ….). Intensification is used to refer to the scaling of qualities and process (Martin and White 2005:140).

Assessment of amount apply to entities, rather than to qualities and processes. We term such assessments, “quantification”. This provide the imprecise measuring of number (e.g. a few miles, many miles) and imprecise measuring of the presences or mass of entities according to such features as the size, weight, distribution or proximity (e.g. a small amount, a large amount, nearby mountain, distant mountain (Martin and White 2005:141).

The assessment of degree of intensity of qualities and processes is termed “Intensification”. They are divided into two broad lexico-grammatical classes : isolating and infusing. The distinction turn on whether up-scaling or down-scaling is realized by an isolated, individual item which solely, or at least primarily, performs the function of setting the level of intensity, or whether the sense of up/downscaling is fused with a meaning which serves some of semantic function.

<table>
<thead>
<tr>
<th>NO</th>
<th>Modes of Intensifiers-(Isolating)</th>
<th>Gradation</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Up/down scaling of qualities</td>
<td>Utterly miserable</td>
<td>High grading</td>
</tr>
<tr>
<td></td>
<td>Pre-modification of an adjective</td>
<td>Extremely miserable</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Very miserable</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rather miserable</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fairly miserable</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relatively miserable</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Somewhat miserable</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A bit miserable</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Low grading</td>
</tr>
</tbody>
</table>
2.2.2 Modes of Intensification-Infusion

Infused intensification has no separate lexical form conveying the sense of up-scaling or down-scaling. Rather the scaling is conveyed as but one aspect of the meaning of a single term. Intensification can also be realized by repetition, by repeating or by assembling of list of terms which are closely related semantically.


<table>
<thead>
<tr>
<th>NO</th>
<th>Modes of Intensifiers</th>
<th>Infusion</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Quality</td>
<td>Contented, happy, joyous&lt;br&gt;(She performed) competently, skillfully, brilliantly&lt;br&gt;Warm, hot, scalding</td>
<td>There is no separate lexical form conveying the sense of up-scaling or down-scaling.</td>
</tr>
<tr>
<td>2</td>
<td>Process</td>
<td>This <em>disquieted</em> me, this <em>startled</em> me, this <em>frightened</em> me, this <em>terrified</em> me.&lt;br&gt;I glanced over the manuscript.</td>
<td>There is no separate lexical form</td>
</tr>
<tr>
<td>3</td>
<td>Modality</td>
<td>1. Possible, probable, certain,&lt;br&gt;2. Rarely, occasionally, sometimes, often, always</td>
<td>Gradable in a sequence of semantically related terms Degree of intensity is conveyed as individual terms in a sequence.</td>
</tr>
<tr>
<td>4</td>
<td>Repetition</td>
<td>1. It’s <em>hot hot hot</em>&lt;br&gt;2. We <em>laughed and laughed and laughed</em>&lt;br&gt;3. In fact it was probably the most immature, irresponsible, disgraceful and misleading address ever given by a British Prime Minister.</td>
<td>Intensification can also be realized by repetition, either by repeating or by assembling of list of terms which are closely related semantically.</td>
</tr>
</tbody>
</table>

Resource: Martin & White 2005 :143-.145

### 2.2.3 Amplifying the Focus of Attitude

Focus is the sharpening and softening of experiential categories. If the force shows intensity or amount of scalable categories, it’s contrary to “focus” which is inherently non-gradable context, it “has the effect of adjusting the strength of boundaries between categories, constructing core and peripheral types of things” (Martin & White, 2005, p. 37). It is subdivided into sharpen (e.g. a real teacher, a true friend, etc.) and soften is not straight forward (e.g. they are kind of crazy, it was an apology of sorts, somewhat like etc.). Grading resources of this kind doesn’t so much turn the volume up and down as sharpen and soften the boundaries between things. Graduation, according to prototypically, however, is not confined to experiential categories. To make it clear, the options of the graduation can be identified in the following table. (Martin & Rose, 2007:46).

<table>
<thead>
<tr>
<th>NO</th>
<th>Types of Graduation</th>
<th>Options</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Force</td>
<td>Intensifiers</td>
<td>He still plays <em>great</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(raise/lower)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Attitudinal lexis</td>
<td>The second part is <em>fantastic</em></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(raise/lower)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Metaphors</td>
<td><em>Ice</em> cold in a sweltering night</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(raise/lower)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Swearing</td>
<td><em>Dammit</em>, that must be a clique</td>
</tr>
<tr>
<td>2</td>
<td>Focus</td>
<td>Sharpening</td>
<td>A <em>true</em> guitar legend</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Softening</td>
<td>A <em>part-time</em> blues fan</td>
</tr>
</tbody>
</table>

The complete schematic diagram of graduation system and all the elements and their interconnections can be seen clearly in the following figure.

![Diagram of Graduation System](image)

Figure 1. Options for Graduation
(Resource : Martin and Rose, 2007 : 48)

2.3 The short review of the book ; The 7 Habits of Highly Effective People

The book, “The 7 Habits of Highly Effective People” was published in 1992. This book was selected for this research, due to its popularity as one of international best seller in the world and in Indonesia. It was created in the awake of conditions of 90s when America and its citizens needed higher productivity in business. Covey convinced his readers that habits develop as a result of repeated actions and at certain level of commitment. Habits pass through the maturity continuum to become permanent part of life. Human habit takes shape based on knowledge learnt (what to do and why), skill acquired (how to do) and spirit of motivation developed (want to do). This book is full of ideas relating to human life, habits, personal vision, principle-centered approach and individual leadership. The 7 habits deliver a range of empowerment to individuals, families, business and organizations in their respective circle of life. (Covey, 1993:361).

This book is based on Stephen R. Covey’s research on personality and perceptions. It guides about self improvement, self help and popular psychology for a successful living in the world. It discusses problems and techniques to tackle different situations and finally focuses to integrate certain principles and habits into human nature and basic character. Each word, concept discussed in this book itself demands full book on it. This book contains advice about conducting management development training, which is useful to implement in developing countries to enhance efficacy of training.

The book illustrates common human values such as moral up gradation and gives a message to be a good and proactive to deal with daily life issues. It was written for bringing moral change in western
society. This is an interesting book that has clear objectivity, conciseness and usefulness for the
generations to come. Principles discussed by the writer are universal in nature and inspire every one.
This book discusses about human conditions, their inter-relationship, values, family system, and
interpersonal communication in business and organization.

3. Methodology

This research applied a descriptive qualitative design and the data of amplification were obtained
through purposive sampling and analyzed with a content analysis technique by referring to one sub-
system of Appraisal Theory, that is “Amplification/Graduation”. From the Analysis of the
Amplification/intensification, it was found 550 data from the book; “The 7 habits of Highly Effective
People”.

To assess/evaluate the intensity of a writer’s opinion about “meaning” that he is going to convey to the
reader, it was referred to the force and focus as the sub-system of graduation. Force is divided into up-
scaling and down-scaling (Intensifier, attitudinal lexis, metaphor, and swearing) and focus is about
resources for making something that is non-gradable gradable (sharpen and soften).

The data was analyzed by developing focus group discussion (FGD) with experts, raters and readers.
As cresswell (1994:145) explained that “qualitative research is descriptive in that the researcher is
interested in process, meaning and understanding gained through words or pictures.

In order to validate the data, the triangulation was done by checking the data from different resources,
different ways and different times, as stated by William Wiersma quoted by Sugiyono (2006:306)
“Triangulation is qualitative cross-validation. It assess the sufficiency of the data according to the
convergence of multiple data sources or multiple data collection procedures”. Triangulation methods
was done by checking through in-depth Interview and focus group discussion (FGD).

The data analysis technique was done by adopting Spradley model (1980) like what is quoted by
Sugiyono (2006:284). The analysis was developed through 4 steps in sequence: domain analysis,
taxonomy analysis, componential analysis and finding fact/cultural value. The sequence of the analysis
was developed since at the beginning of the process and on-going process until the writing of the report.
The sequence research was done in circulation and Repetition while the value/cultural theme was
“grounded” from the componential analysis.

4. Analysis and Discussion

As it is mentioned in the review of theory that amplification/graduation has a very crucial position in
appraisal system because it provides the intensity or the strength of the attitudes (affects, Judgment,
appraisal) and engagement of the Appraisal system. Therefore, the results of the analysis and the
discussion will be explained in the following sequences:

4.1 The Types of amplification (Force and Focus)

As it is mentioned in the previous part that this research has adopted Spradley Model and the first
research step was done through domain analysis, which separated “data” and “non- data”. From the
domain analysis which are applied to the book as the media of this research: “the 7 habits of highly
effective people”, the researcher has identified 550 data that can be classified as “Force” and “Focus”.
How strongly the writer of this book amplifies his opinions can be denoted from the types of amplification. The findings show that the highest frequency of the writer’s opinion is in the form of “Force” (95%) and Focus (5%). It indicates that Stephen R. Covey convey his opinions, principles and values to the readers, mostly using “gradable Force” (95%) and non-gradable Focus (only 5%). The comparison of force and focus can be seen in figure 1 below.

4.2 The up-scaling and down-scaling of the “Force”
From the tabulation of 550 data of the texts of Covey’s book, he presents his main opinions, principles and values by using Attitudinal lexis or lexis with attitude: 1). up-scaling (266 data) and 2). downscaling (61 data). It seems that Attitudinal lexis plays a very important role in a narrative writing like what Covey introduced to his readers. It tends to amplify much more, if it is compared to exposition writings. The second communication strategy of negotiating his opinion and believe, Covey strengthen his opinion by using intensifiers: 1) up-scaling (141 data) and down-scaling (40 data), The small number of metaphors & Simile are also introduced by covey (11 metaphors and 2 simile) but Covey does not use “swearing” in negotiating his opinion. Although the total number of the text are not significant, Covey also introduces “sharpen (16 data) and soften (13 data) as the focus of negotiating “meaning”, as it is denoted clearly in figure 2 below.
The gradability analysis of the data consists of different types of up-scaling and down-scaling of the force types, they are: 1) Intensifiers, up-scaling (141 : 26%) and down-scaling (40:7%), 2) Attitudinal lexis, up-scaling (266 : 49%) and down-scaling (61:11%), metaphors and simile (13:2%), but there is no swearing (0%).

The focus types: 1) sharpen (16: 3%) & soften (13:2%) of experiential categories which are classified as non-gradable context, are not much used in Covey’s book. The 7 habits of highly effective people are introduced mostly in attitudinal lexis (60%) and intensifiers (33%). The distribution of percentage of each type can be seen in figure 3 below.

4.3 Amplifying Opinions by Intensifier (up-scaling & down-scaling)

The intensity of meaning in a text can be “turn up” and “turn down”. As can be seen from the research findings in figure 3 above, it is found that “Up-scaling” texts is used the highest frequency 75% (Attitudinal lexis 49%, and Intensifier 26%). As it is described that in English, it seem to have more resource for turning the volume up than down and they are used more often. (Martin and Rose, 2007:42). Intensifiers are used to compare things; to say how strongly the writer/speaker feels about someone or something, by comparison to something else and it is gradable (Martin and Rose, 2007:43). Some of the intensifier can be seen in table 5 (up-scaling) and in table 6 (down-scaling).

**Table 5. The Examples of Intensifiers (up-scaling)**

<table>
<thead>
<tr>
<th>Data No</th>
<th>Examples of texts</th>
<th>Intensifiers</th>
<th>Gradability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Praise for “The seventh Habits of Highly Effective People” by Stephan R. Covey.”</td>
<td>Highly effective people</td>
<td>High grading</td>
</tr>
<tr>
<td>9</td>
<td>I have never known any teacher or mentor on improving personal effectiveness to generate such an overwhelmingly positive reaction (p1/ph.2/11-2). John Pepper, Presidents of Procter and Gamble.</td>
<td>Overwhelmingly positive reaction</td>
<td>A very great degree</td>
</tr>
<tr>
<td>20</td>
<td>At a time when American organizations desperately need to energize people and produce leaders at all levels, Covey provides an empowering philosophy for life that is also the best guarantee of success in business, a perfect</td>
<td>Desperately need</td>
<td>an extreme degree</td>
</tr>
</tbody>
</table>

The best guaranty of success a highest grading

30 A wonderful contribution. Dr. Covey has synthesized the habits of our highest achievers and presented them in a powerful, easy to use program. (p.iii/ph.2/1.1-2) Charles Garfield, author of Peak Performer.

Our highest achievers a highest grading

39 The best way to accomplish this goal is through enhancing the human resource. (p.iii/ph.5/1.2-3) F.G. Buck Rodgers, author of The IBM Way

The best way a highest grading

149 We felt that if “success” were important in any area of life, it was supremely important in our role as parents. (part1/p.17/ph.1/l.1-3)

Supremely important The highest rank of authority

322 Each of us has many, many maps in our head, which can be divided into two categories : maps of the way things are, or realities, and maps of the way things should be, or values. (part 1/p.24/ph.2/1.1-3)

has many, many maps in our head Intensification is sown by repetition.

Because of our own pain, and because of similar pain I had seen the lives and relationships of many people I had worked with through the years, I began to feel more and more that much of the success literature of the past 50 years was superficial. (Part 1/p.18/ph.1.3-6)

to feel more and more Intensification is sown by repetition.

Perhaps the most important insight to be gained from the perception demonstration is in the area of “paradigm shifting”, what we might call the “AHA!”experience, when some one finally “sees” the composite picture in another way (part.1/p. 29/ph.3/1.1-4).

the most important insight The highest rank of authority

Since intensifier is a sub-system which describe grading; up-scaling or down-scaling of attitude, the grading operates by scalability showing intensity or amount. Some examples of gradibility of downscaling meanings can be seen in the following table.

<table>
<thead>
<tr>
<th>Data No</th>
<th>Examples of text</th>
<th>Intensifier</th>
<th>Gradability</th>
</tr>
</thead>
<tbody>
<tr>
<td>61</td>
<td>The material and arrangement has slowly evolved and has imbued those who have been sincerely and deeply immersed in the conviction, that the seven habits represent a holistic, integrated approach to personal and interpersonal effectiveness, and that more than in the individual habits themselves, the real key lies in the relationship among them and in how they are sequenced. (p.9/ph.3/1.5-10)</td>
<td>Slowly evolved</td>
<td>Intensifier of quality : “slowly” down-scaling the development</td>
</tr>
<tr>
<td>139</td>
<td>One of our sons was having a very difficult time in school. (part1/p.16/ph.9/1.2-3)</td>
<td>A very difficult time</td>
<td>Intensity of difficulty : very is down-grading the difficulties</td>
</tr>
</tbody>
</table>
If he did a little better, we would go to great lengths to reinforce him. (part1/p.17/ph.1/1.8-9)  

It simply makes no difference how good the rhetoric is or even how good the intention are; if there is little or no trust, there is no foundation for permanent success. (Part. 1/p.21/ph.3/L.7-10)  

Many people with secondary greatness—that is social recognition for their talents—lack primary greatness or goodness in their character. (Part. 1/p.22/ph.3/L.1-3)  

We seldom question their accuracy; we are usually even unaware that we have them. (part 1/p.24/ph.2/L.4-6)  

**4.4 Amplifying Opinion by Attitudinal Lexis**

Attitudinal lexis is evaluative lexis which according to appraisal theory inscribes attitude (Martin and White 2005 : 67). They should be understood as lexical items which mainly or almost exclusively express “attitudinal meaning”. The attitudinal meanings are usually expressed in “adjectives”, but other lexico-grammatical features can also realize the attitudinal values explicitly or implicitly. Some example of the text can be seen on table 7.

<table>
<thead>
<tr>
<th>Data No</th>
<th>Examples of Texts</th>
<th>Attitudinal lexis</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Stephen Covey has written a remarkable book about the human condition, <em>so elegantly written, so understanding of our embedded concerns, so useful for our organizational and personal lives, that it’s going to be my gift to everyone I know.</em> (p.i/ph.1/L.1-4) Warren Bennis, author of <em>On Becoming a Leader.</em></td>
<td>A remarkable book</td>
<td>Evaluate and up-scaling the quality” of the book</td>
</tr>
<tr>
<td>86</td>
<td>To my proactive literary agent Jan Miller, and my “can do” associate Greg Link and his assistant Stephanni Smith and Rallin Beckam Wahlin for their Creative and courageous marketing leadership (p.10/ph.4/L.1-3).</td>
<td>my proactive literary agent</td>
<td>Evaluate and up-scaling the quality” of the agent</td>
</tr>
<tr>
<td>90</td>
<td>To my Simon and Schuster editor Bob Asahina for his professional competence and project leadership, for his many excellent suggestions and for helping</td>
<td>professional competence</td>
<td>Evaluate and up-scaling the quality of competence.</td>
</tr>
</tbody>
</table>
Some attitudinal lexis are not always up-scaling or evaluate in the positive consideration but some of the attitudinal meaning are downscaling and realized in negative polarity. Some example of the text can be seen on table 8.

<table>
<thead>
<tr>
<th>Data No</th>
<th>Examples of Texts</th>
<th>Attitudinal lexis</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>112</td>
<td>After a few weeks, I <strong>fizzle</strong>. I just can’t seem to keep a promise I make to myself. (part1/p.15/ph.4/1.4-5)</td>
<td>I fizzle: Failed</td>
<td>Evaluate and down-scaling the characteristic of my attitude</td>
</tr>
<tr>
<td>119</td>
<td><strong>I feel pressured and hassled</strong> all day, every day, seven days a week. (part1/p.16/ph.2/1.1-2)</td>
<td>feel <strong>pressured</strong> and <strong>hassled</strong></td>
<td>Evaluative condition that downscaling the pressure.</td>
</tr>
<tr>
<td>130</td>
<td>I have a <strong>forceful personality</strong>. I know in almost interaction I can control the outcome. (part1/p.16/ph.6/1.1-2)</td>
<td>a <strong>forceful personality</strong></td>
<td>Forceful: Attitudinal lexis that down-scaling the personality</td>
</tr>
<tr>
<td>140</td>
<td>He was doing <strong>poorly academically</strong>, he didn’t even know how to follow the instructions on the tests, let alone do well on them. (part1/p.16/ph.9/1.3-4)</td>
<td>poorly academically</td>
<td>Poorly: Attitudinal lexis and downscaling the son of Covey</td>
</tr>
<tr>
<td>143</td>
<td>Socially he was <strong>immature</strong>, often embarrassing those closest to him. (part1/p.16/ph.9/1.5-6)</td>
<td><strong>immature</strong>: attitudinal lexis</td>
<td>Downscaling the son of Covey</td>
</tr>
</tbody>
</table>

Table 8. Examples of Attitudinal Lexis (lower, downscaling)
As my study took me back through 200 years of writing about success, I noticed a startling pattern emerging in the content of the literature. (Part 1/p.18/ph3/l.1-3)

If I try to use human influence strategies and tactics of how to get other people to do what I want, to work better, to be more motivated, to like me and each other - while my character is fundamentally flawed, marked by duplicity and insincerity - then in the long run, I can not be successful (Part. 1/p.21/ph3/l.1-5)

**4.5 Intensification of Process – Metaphor & Simile**

Both metaphors and similes are literary devices used for figurative comparison between two things. A simile is a comparison that uses “like” or “as”, e.g. “You were as brave as a lion”. A metaphor is also figurative comparison between two things but does not use the words “like” or “as”, and the comparison is implied. Metaphor is a comparison that says something in something else, e.g. “Love is a battlefield”. The following examples in table 9 consists of figurative meanings (6 metaphors and 1 simile). In the following tables, the writers evaluate process by using metaphors and simile (raise and positive).

**Tabel 9. Amplifying Opinion by Metaphor or Simile (raise/positive)**

<table>
<thead>
<tr>
<th>Data No</th>
<th>Examples of texts</th>
<th>Figurative Comparison</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Stephen Covey is an American Socrates, opening your mind to permanent things’-values, family, relationships, communicating’. (p./ph.3/L.1)</td>
<td><strong>Metaphor</strong>: Covey is regarded an American Socrates</td>
<td>Raise/positive</td>
</tr>
<tr>
<td>49</td>
<td>Stephen Covey serves up a seven course meal on how to take control of one’s life and become the complete, fulfilling person one envisions. (p.v/ph.3/L.1-3)</td>
<td><strong>Metaphor</strong>: Covey’s 7 habits is regarded a 7 course meal</td>
<td>Raise/Positive</td>
</tr>
<tr>
<td>170, 172</td>
<td>At my fingertips was the sum and substance of what a free and democratic people considered to be the keys to successful living. (Part 1/p.18/ph.2/L6-7)</td>
<td><strong>Metaphor</strong>: At my finger tips is considered to be the keys to successful living.</td>
<td>Raise/Positive</td>
</tr>
<tr>
<td>239</td>
<td>He began to blossom, at his own pace and speed. (Part. 1/p.20/ph4/L2-3)</td>
<td><strong>Metaphor</strong>: human beings is regarded a flower to blossom</td>
<td>Raise/Positive</td>
</tr>
<tr>
<td>276</td>
<td>You always reap what you sow; there is no short cut. (Part. 1/p.22/ph.1/L4-5)</td>
<td><strong>Metaphor</strong>: Life is regarded farming</td>
<td>Raise/Positive</td>
</tr>
<tr>
<td>349</td>
<td>The more bound a person is by the initial perception, the more powerful the “AHA!” experience is, it’s “as though” a light were suddenly turned on inside. (Part 1/p.29/ph.3/L4-6)</td>
<td><strong>Simile</strong>: comparison using “as though”</td>
<td>Raise/Positive</td>
</tr>
<tr>
<td>544</td>
<td>Private victories precede public victories. You can not invert that process anymore than you can not harvest a crop before you plant it. It’s inside-out. (p.51/5)</td>
<td><strong>Metaphors</strong>: Life is regarded plantation</td>
<td>Raise/Positive</td>
</tr>
</tbody>
</table>

Both metaphors and simile are available and used to convey the writer’s opinion by giving figurative comparison. The following examples in table 10 consists of figurative meanings (4 metaphors and 1
simile). In the following tables, the writers evaluate process by using metaphors and simile (lower and negative).

4.6 Sharpening and Softening “Focus”
The second dimension of amplification is “focus”. Focus is related to sharpening and softening of experiential categories/taxonomies. To assess/evaluate something as a prototype of experiential products are done by sharpening or softening of a writer’s opinion about “a certain category/taxonomy” that he conveys to the reader. It is referred to focus that are not gradable/scalable via locutions such as true, real, genuine (e.g. : He’s a true friend), while the softening of opinion is making something blur (unclear) or what we call “vague language”, via locution, such as sort of, kind of, effectively, bordering on, the suffix -ish (e.g. They play jazz, sort of). Jazz music is regarded as a distinct category with in a taxonomy of music types. The rhetorical effect of sharpening and softening:

1. Under sharpening, the effect is to indicate maximal investment by the authorial voice in value position (either negative or positive) being advanced and hence to strongly align the reader into the value position being advanced.

2. Under softening, the effect is to indicate a lessening of the speaker/writer’s investment in a value position (for a negative one) and hence to offer a conciliatory gesture directed towards maintaining solidarity with those who hold contrary views/opinions. The effect of softening is not so straightforward when it is a positive one. (Martin and White, 2005:139). The precise communicative effect of the softening is difficult to articulate precisely and it seems it is part of the communication strategy of the writer/speaker to maintain solidarity. In general, softening of positive values occurs when the positive assessment is being construed as potentially problematic for writer-reader solidarity. (Martin and White, 2005:140)

The following table will show the amplifying opinions by sharpening categories/taxonomies.

<table>
<thead>
<tr>
<th>Data No</th>
<th>Examples of texts</th>
<th>Figurative Comparison</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>38</td>
<td>In the ‘90s, America needs to unlock the door to increase productivity both on a business and personal basis. (p.iii/ph.5/l.1-2) F.G. Buck Rodgers, author of The IBM Way</td>
<td>Metaphor: America is regarded a house that has to open the door</td>
<td>Lower/ Negative</td>
</tr>
<tr>
<td>129</td>
<td>But inside, I am eating my heart out. Why do I feel this way (part1/p.16/ph.5/l.3)</td>
<td>Metaphor: eating my heart is regarded sadness</td>
<td>Lower/ Negative</td>
</tr>
<tr>
<td>193</td>
<td>Reference to the character ethic became mostly lip service; the basic thrust was quick-fix influence techniques, power strategies, communication skills and positive attitudes. (Part 1/p.19/ph3/1.3-6)</td>
<td>Metaphor: Character ethic is regarded lips service</td>
<td>Lower/ Negative</td>
</tr>
<tr>
<td>272</td>
<td>To focus on technique is “like” cramming your way through school. (Part.1/p.21/ph4/1.1-2)</td>
<td>Simile: like cramming your way through school</td>
<td>Lower/ Negative</td>
</tr>
<tr>
<td>455</td>
<td>The seven habits are not a set of separate or piecemeal psych-up formulas. (P.48/2)</td>
<td>Metaphor: The 7 habits are not “piecemeal psych-up formulas</td>
<td>Lower/ negative</td>
</tr>
</tbody>
</table>
Table 11. Amplifying Opinions by Sharpening (Focus)

<table>
<thead>
<tr>
<th>Data No</th>
<th>Examples of texts</th>
<th>sharpen</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>65</td>
<td><em>The seven habits</em> represent a holistic, integrated approach to personal and interpersonal effectiveness, and that more than in the individual habits themselves, the real key lies in the relationship among them and in how they are sequenced.* (p.9/ph.3/l.5-10)</td>
<td>real key</td>
<td>Positive, strong alignment to the “value”: the seven habits introduced by Covey.</td>
</tr>
<tr>
<td>101</td>
<td>There is no real excellence in all this world which can be separated from right living. David Starr Jordan (part 1, p.15/1/1)</td>
<td>Real excellence</td>
<td>Positive, strong alignment to the value of right living.</td>
</tr>
<tr>
<td>183</td>
<td>The character Ethic taught that there are basic principles of effective living, and that people can only experience true success and enduring happiness as they learn and integrate this principles into their basic character(Part 1/p.18/ph5/l.1-4)</td>
<td>True success</td>
<td>Positive, strong alignment to the “value” of true success.</td>
</tr>
<tr>
<td>213</td>
<td>Through deep thought and the exercise of faith and prayer, we began to see our son in terms of his own uniqueness. (Part. 1/p.20/ph1/l.1-2)</td>
<td>his own uniqueness.</td>
<td>Positive and sharpen category to maximal investment</td>
</tr>
<tr>
<td>220</td>
<td><em>We also consciously worked on our motives and cultivated internal sources of security so that our own feelings of worth</em> were not dependent on our children’s acceptable behavior (Part. 1/p.20/ph1/1.7-9)</td>
<td>our own feelings of worth</td>
<td>Positive and sharpen category to maximal investment</td>
</tr>
<tr>
<td>273</td>
<td>You sometimes get by, perhaps even get good grades, but if you don’t pay the price day in and day out, you never achieve true mastery of the subjects you study or develop an educated mind. (Part. 1/p.21/ph4/1.2-5)</td>
<td>true mastery</td>
<td>Positive, strong alignment to the “value” of true mastery.</td>
</tr>
<tr>
<td>493</td>
<td>Mentally I could think my own thought, I could move from one level of abstraction to another. (P.50/1)</td>
<td>my own thought</td>
<td>Positive and sharpen category to maximal investment.</td>
</tr>
<tr>
<td>510</td>
<td><strong>True independence</strong> of character empowers us to act rather than be acted upon. (P. 50/8)</td>
<td>True Independent</td>
<td>Positive, strong alignment to the “value” of true independent.</td>
</tr>
<tr>
<td>545</td>
<td>As you become truly independent, you have the foundation for effective interdependence. (P.51/6)</td>
<td>Truly Independent</td>
<td>Positive, strong alignment to the “value” of effective interdependence.</td>
</tr>
</tbody>
</table>

The following examples show the softening values have been explored in the book “The 7 habits of highly effective people”. As explained in the previous part, softening is categorized as non-gradable amplification, and it can be identified all the statements are indirect strategy of communication. Table 12 will show the amplifying opinion by softening experiential categories/taxonomies.

Table 12. Amplifying Opinion by Softening (Focus)

<table>
<thead>
<tr>
<th>Data No</th>
<th>Examples of texts</th>
<th>Softening</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>This book contains the kind of penetrating truth about human nature that is usually found only in fiction.</td>
<td>The kind of penetrating truth</td>
<td>Indirect, blur and contrary views and negative response.</td>
</tr>
</tbody>
</table>
5. Conclusion

Based on the analysis on the previous description, some findings can be concluded as follows:

1. The writer’s opinions towards some issues can be clearly revealed from the types of amplification he used. The findings show that the highest frequency of the writer’s opinions is in the form of “Force” (95%) and Focus (5%). It can be concluded that Stephen R. Covey explained his opinions, principles and values to the readers, mostly using “gradable Force” (95%) and non-gradable Focus (only 5%).

2. The gradability analysis of the data consists of different types of up-scaling and down-scaling of the force types, they are: 1) Intensifiers, up-scaling (141: 26%) and downscaling (40: 7%), 2) Attitudinal lexis, up-scaling (266: 49%) and down-scaling (61: 11%), metaphors and Simile (13: 2%), but there is no swearing (0%).

3. The focus types: 1) sharpen (16: 3%) & soften (13: 2%) of experiential categories which are classified as non-gradable context, are not many used in Covey’s book.

4. The communication strategy used in Stephen R Covey’s book is “descriptive evaluative form” of introducing his opinions, principles and values. He convinced the reader about his 7 habits of highly effective people through attitudinal lexis (60%) and intensifier (33%), mostly in gradable force (95%).

6. References


Development Of Community Economy Through Agricultural Based Food Processing Diversification In Supporting Tourism Sectors In Pulau Adonara Flores Timur Regency

Hapsa Usman¹, Adrianus Amheka, Bernad Bowakh
¹Accounting department, Politeknik Negeri Kupang

¹hapsagemini1978@gmail.com

Abstract. Adonara Island is one of the islands in the Islands Region of East Flores Regency with an area of 509 km², and the highest point is 1,676 m. The island is bordered by the Flores Sea in the north, the Solor Straits in the south, and the Lowotobi Straits in the west. Adonara has eight subdistricts with several agricultural, animal husbandry and marine economic potentials. Besides that, Adonara is also known for its beautiful tourist beaches including Ina Bura Beach, Watotena Beach, Mekko Beach, White Sand Beach, Adonara Island famous for its regional peculiarities such as corn titi, Ikat Weaving Culture and rich with natural potential that is owned, but has not been managed and developed optimally.

The purpose of this study was to develop superior potential, agricultural base areas, fisheries and livestock as processed food diversification to support the development of the tourism sector in Adonara Island, East Flores Regency. This study uses quantitative and qualitative descriptive analysis methods, data collection techniques for interviews and document studies, focus group discussions, qualitative and quantitative data types, primary and secondary data sources, the data analysis technique used is SWOT analysis and Location Question (LQ) for knowing the potential of the region and the superior sector in Adonara Island which needs to be developed.

The results showed that Adonara Island had the first largest base sector in the field of food agriculture which needed to be developed by coconut, chocolate and corn. Second Leading Sector is the Fisheries and Marine Sector. Many healthy reefs with a relatively large number of fish populations, both for demersal (reef fish) and pelagic fish (deep sea fish) with a large number of catches are Tuna, Squid, Cikalang Fish, Grouper and Beronang. With 8 key preeminent villages such as Sagu village, Dani Bao Village, Samasoge Village, Waiwuring Village, Lite Village, Tabopali Village, Lambunga Village, and Lewokeleng Village while the superior Livestock Sector is in livestock and livestock cattle with excellent villages in Pledo village, Duablong village and Waiwadan village. All agricultural products from Adonara are more dominant in export out of the region without the development and touch of technology so that the economic value of the regional products is very low compared to other regions. While the tourism sector there are destinations for several iconic tourist attractions that are still natural from nature such as Mekko Beach tour, Watotena Beach, Ina Bura Beach and white sand beaches have not been touched by tourist products. Onstraints to the slow development of
Food Diversification and Travel Destinations on Adonara Island are the low level of technology and very little government support. one of the solutions to increase food security is the diversification of food products to increase tourism keratifitas and tourism food products. Development of economic potential can be done by increasing human resources, so that people are better prepared to face technology, develop existing potential, awareness of land use and the environment, as well as readiness to cooperate with government and private parties to develop regional food potential through diversification of food processing in leading sectors with superior regions on the island of Adonara thereby increasing the development of tourism destinations in the island of Adonara.

**Keywords:** Potential, Economy, Society, Food Diversification, Tourism Products, Adonara

1. **Introduction**

Adonara Island is one of the islands in the Islands Region of East Flores Regency with an area of 509 km², and the highest point is 1,676 m. The island is bordered by the Flores Sea in the north, Solor Strait in the south (separates with Solor Island), and the Lowotobi Strait in the west. Adonara Has eight sub-districts with several agricultural, animal husbandry and marine economic potentials. Besides that, Adonara is also known for its beautiful tourist beaches including Ina Bura Beach, Watotena Beach, Mekko Beach, White Sand Beach and others.

Adonara is known as the Coconut Area, Chocolate, as a result of agriculture, Seaweed and Tuna and Grouper are very potential marine commodities because there are large fishing grounds that have a lot of marine catches.

Coconut and Chocolate Agriculture Sector and Corn and Sweet Potatoes are the most widely produced local food from the Adonara region. In addition, the fishery sector is very promising, where fishermen consist of 22 species, and the most widely captured are tuna (18.65% of total production), tuna or cakalang (11.14%), tembang (6.65%), paperek (5.07%), julung julung (5.02%), and others under 5%. If the total fish production is distributed evenly to all residents, then fish will be 50.5 kg / person / year or 4.2 kg / month. However, fisheries and agricultural products have not been optimally and economically optimized so that the level of income per capita is still low. Besides that the potential of seaweed cultivation is also not inferior to other regions, which so far have not been optimally developed in the economic development of the community so that the community's income is still low, on the other hand Adonara also has some beautiful and interesting tourist coastal areas but tourist destinations and food it has not been touched well this has become an interesting breakthrough if a more in-depth study is carried out through the development of abundant local food diversification so that it can be developed in support of the Community Food Security and Tourism Sector.

The concept of local food development as one of the economic potential and factors of production. In economics Production Factors include natural resources or land, labor and capital. Based on these production factors, an area can have advantages over other regions. An area has a comparative advantage if the region has production commodities that can be developed for regional development (Ricardo in Tarigan, 2003)

Food diversification or food production, both related to national food security policies. Policy measures for food diversification have been implemented since the early 1960s to anticipate the need or demand for national food crops (Handewi and Ariani, 2008). In 1974, Presidential Instruction (Inpres) Number 14 of 1974 concerning the Improvement of the People's Food Menu (UPMMR) was issued which was further reaffirmed through Presidential Instruction No. 20 of 1979 concerning UPMMR. The purpose of the presidential instruction was to follow up on efforts to diversify food types in order to improve the nutritional quality of people's food, both in quantity and quality. In 1996, Law No. 7 of 1996 concerning Food was
issued which gave the mandate to realize national food security. Furthermore, Law No. 25 of 2000 concerning Propenas was also issued which began to signal efforts to diversify food crops, both for consumption and production.

Food security is organized to fulfill basic human needs that provide benefits fairly and equitably based on independence, and does not conflict with people's beliefs. The development of food security is carried out in stages through a process of empowering the community to recognize their potential abilities, problem solving opportunities, managing and utilizing natural resources effectively, efficiently and sustainably. The realization of community empowerment in the context of food self-sufficiency is carried out through empowering the poor in areas that are vulnerable to food insecurity in rural areas. Empowerment strategies are carried out through the twin track strategy, namely: (1) building an agriculture and rural based economy to provide employment and income and (2) fulfill food for poor groups in areas that are vulnerable to food insecurity through empowerment and assistance government as a trigger.

Kasryno, et al (1993) views food diversification as an effort that is closely related to improving the quality of human resources, agricultural development in the field of food and improving community nutrition. This food diversification includes aspects of production, consumption, marketing and distribution. From the aspect of production, diversification means the expansion of the spectrum of food commodities, both in terms of expanding resource utilization, commodity exploitation and the development of food commodity production. Therefore, from the aspect of production, diversification includes both horizontal and vertical diversification. In terms of consumption, food diversification includes aspects of behavior that are based on both economic considerations such as commodity income and prices, as well as non-economics such as habits, tastes and knowledge. The meeting between the production and consumption sectors is inseparable from the role of marketing and distribution of these food commodities. Likewise Suhardjo (1998) states that basically food diversification includes three spheres of interrelated understanding, namely (1) diversification of food consumption, (2) diversification of food availability, and (3) diversification of food production.

Implementation of diversification of food consumption related to the realization of resilience. food (Suyastiri, 2008). Referring to Law No. 7 of 1996 concerning Food, the concept of food diversification is in line with the concept of food security adopted from the definition of food security from the Food and Agricultural Organization (FAO). There are four main pillars needed to realize food security, namely: 1) Food Availability, 2) Stability of Supplies, 3) Affordability Aspects (Access to Supplies), 4) Food Consumption Aspects (Food Utilization) Based on the four pillars of food security above, the implementation of food consumption diversification is expected to be able to support all aspects of food security. Through diversification of food consumption will provide consumption choices, in accordance with income groups and local (regional) economic potential.

2. Methodology

This study uses a method of combining quantitative and qualitative descriptive research, data collection techniques for interviews and document studies, focus group discussions, qualitative and quantitative data types, primary and secondary data sources, the SWOT analysis model used in this research is introduced by Rangkuti in 1997. SWOT analysis is the identification of various factors systematically based on logic that can maximize strengths (Strengths) and opportunities (Opportunities), but simultaneously can minimize weaknesses (Weaknesses) and threats (Threats) (Rusdarti, 2010)

Location Question Analysis (LQ) Location Quotient (LQ) is an analytical tool for a particular region. With the LQ, the region sees the advantages of the sector that can be sold and developed to
encourage the economy in the region. The base sector is activities that export goods and services outside the economic boundaries of the region concerned. While non-base sectors are activities that provide goods and services to meet the needs of people who live within the economic boundaries of the region. In addition, this theory can also be used as an indication of the multiplier effect for the economic activities of the region (Ambardi & Socia, 2002).

\[
LQ = \frac{(E_{ij} / E_j)}{(E_{in} / E_n)}
\]

Where:
- \(E_{ij}\) = Job opportunities in sector i in the region j
- \(E_j\) = Job opportunities in the region j
- \(E_{in}\) = Job opportunities in the sector i nagara n
- \(E_n\) = Job opportunities in the country n

From this formula, the calculation results are obtained with the following classification:

- If the \(LQ\) value > 1, then j area for sector i there is specialization (regional specialization level > national specialization level)
- If the \(LQ\) = 1, then j > for sector i there is specialization (regional specialization level = national specialization level)
- If the \(LQ\) value is < 1, then area j for sector i has no specialization (regional specialization level < national level)

In this method is a calculation of the relative ratio of value added contribution of a sector in an area (Regency / City) to the value added contribution of the sector concerned at the provincial or national scale so that it can know the commodities that have prospects and not. The more basic sectors in an area will increase revenue flows to the region, increase demand for goods and services in them and generate non-base sector volumes. In other words, the base sector is directly related to external demand, while the non-base sector relates indirectly, namely through the base sector first (Glasson, 1977).

3. Result & Discussion

East Flores Regency, located at the eastern end of Flores Island, at 080.04 "LS - 080.40" LS and 1230.57 "BT-1720.38" BT. This regency has an area of 1,812.85 sq km and is administratively divided into 13 sub-districts and 219 villages / kelurahan. Livelihoods of farmers, fishermen and livestock. Adonara Island consists of 8 sub-districts with 119 villages with the potential of superior villages of agriculture and fisheries as many as 55 villages.

Agricultural and plantation wealth in Adonara Island can be a mainstay of the economy of East Flores Regency people. Further research needs to be done regarding the economic potential of Adonara Island in East Flores Regency based on Food diversification. Regional Economic Potential (Suparmoko, 2002: 99), namely: as an economic capability that exists in an area that is possible and feasible to be developed so that it will continue to develop into a source of livelihood for the local people and can even encourage the regional economy as a whole to develop itself and sustainably. Sumihardjo (2008: 114) describes the development of the sector of the area owned by the region reflected in the regional vision and mission contained in the Regional Long Term Development Plan (RPJPD), the Medium Term Development Plan (RPJMD) in the plan there are priority areas in the district or city to strengthen the development of leading sectors.

3.1 Economic Base Analysis (Location Quotient)

Location Quotient (LQ) is an analytical tool to determine whether there is a region's specialization for a particular (industry) sector. With LQ analysis is intended to look at sectors that are the base sector and so that the region sees the advantages of the sector that can be sold and developed to encourage the economy in the region or district.
a. Regional Revenue Base Sector

Calculation of base values (dynamic LQ and static LQ) in Table 1 shows that the sectors that are the base sector in the Adonara Island region are the sectors of Agriculture, Fisheries, Fisheries and Tourism, and services. The Agriculture Sector is a base sector with the predicate of Excellence for the last three years in 2015 to 2017. The transportation and communication sector is also a base sector with a prospective predicate. Then in other sectors in the Adonara Region which are the base sectors are the financial sector, leasing and corporate services and the services sector is the leading sector. Furthermore for sectors outside the base sector are non-base sectors which include the mining and quarrying sector, processing industry, clean water, buildings, and the trade sector, and restaurants. The agricultural sector is the flagship in the East Flores Regency Adonara Region, because this area has extensive and fertile agricultural land with abundant water content. In addition, some of the regions are mountainous areas that are suitable for agricultural development other than rice such as fruits, vegetables, horticulture, or other sub-sectors such as livestock.

**Table 1. Calculation of LQ Value in the Regional GDP Sector Adonara in 2015-2017**

<table>
<thead>
<tr>
<th>Lapangan Usaha</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>Basis</th>
<th>Keterangan</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DLQ SLQ</td>
<td>DLQ SLQ</td>
<td>DLQ SLQ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture</td>
<td>2.24 2.49</td>
<td>2.78 2.55</td>
<td>1.90 2.45</td>
<td>Base</td>
<td>Superior</td>
</tr>
<tr>
<td>Fishery</td>
<td>2.45 2.24</td>
<td>2.47 2.35</td>
<td>1.77 2.20</td>
<td>Base</td>
<td>Superior</td>
</tr>
<tr>
<td>Mining and excavation</td>
<td>0.89 1.41</td>
<td>0.76 0.67</td>
<td>1.81 0.77</td>
<td>Base</td>
<td>Prospectif</td>
</tr>
<tr>
<td>Processing industry</td>
<td>1.38 1.38</td>
<td>1.38 1.38</td>
<td>1.38 1.38</td>
<td>Base</td>
<td>Prospectif</td>
</tr>
<tr>
<td>Electricity and Clean Water</td>
<td>0.20 0.20</td>
<td>0.20 0.20</td>
<td>0.20 0.20</td>
<td>Base</td>
<td>Prospectif</td>
</tr>
<tr>
<td>Building</td>
<td>1.40 1.40</td>
<td>1.40 1.40</td>
<td>1.40 1.40</td>
<td>Base</td>
<td>Prospectif</td>
</tr>
<tr>
<td>Finance, Rent, Services</td>
<td>1.12 1.18</td>
<td>1.86 0.92</td>
<td>0.75 1.20</td>
<td>Base</td>
<td>Prospectif</td>
</tr>
<tr>
<td>Service Company</td>
<td>0.98 0.16</td>
<td>1.02 1.05</td>
<td>1.25 1.01</td>
<td>Base</td>
<td>Superior</td>
</tr>
</tbody>
</table>

Source: Kab. East Flores in 2015-2017 figures
Information:
U = Excellent, if you have SLQ and DLQ values more than 1 (one)
A = Mainstay, if you have DLQ value more than 1 (one)
P = Prospective if you have SLQ more than 1 (one)
B = Base, if you have an SLQ Value of more than 1 (one)

b. Agricultural Commodity Sector

**Table 2. Area and Production of Plantation Crops in East Flores Regency In 2016**

<table>
<thead>
<tr>
<th>No</th>
<th>Type Tanaman</th>
<th>Area Size (Ha)</th>
<th>Total Production (Tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Not Yet</td>
<td>have produced</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2,885.00</td>
<td>8,961.00</td>
</tr>
<tr>
<td>1</td>
<td>Coconut</td>
<td>303</td>
<td>1,836.00</td>
</tr>
<tr>
<td>2</td>
<td>Coffee</td>
<td>184</td>
<td>337</td>
</tr>
<tr>
<td>3</td>
<td>Clove</td>
<td>2,395.00</td>
<td>2,871.00</td>
</tr>
<tr>
<td>4</td>
<td>Cocoa</td>
<td>13,399.00</td>
<td>15,800.00</td>
</tr>
</tbody>
</table>
c. Livestock Commodity Sector

Table 3. Calculation of LQ Value in the Non-Poultry Farming Sector of Adonara Island in 2015 – 2017

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef cattle</td>
<td>0.21</td>
<td>0.24</td>
<td>1.71</td>
<td>0.88</td>
<td>1.96</td>
<td>1.98</td>
<td>NB</td>
</tr>
<tr>
<td>Superior</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dairy cows</td>
<td>0.37</td>
<td>0.42</td>
<td>0.56</td>
<td>0.71</td>
<td>0.45</td>
<td>1.88</td>
<td>NB</td>
</tr>
<tr>
<td>Superior</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goat</td>
<td>0.89</td>
<td>1.41</td>
<td>0.76</td>
<td>0.67</td>
<td>1.81</td>
<td>0.77</td>
<td>Base</td>
</tr>
<tr>
<td>Prospektus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sheep</td>
<td>1.38</td>
<td>1.38</td>
<td>1.38</td>
<td>1.38</td>
<td>1.38</td>
<td>1.38</td>
<td>Base</td>
</tr>
<tr>
<td>基普特斯</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Horse</td>
<td>1.61</td>
<td>1.55</td>
<td>1.20</td>
<td>3.20</td>
<td>1.67</td>
<td>2.1</td>
<td>Base</td>
</tr>
<tr>
<td>Superior</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: District Agriculture Office Flotim, 2017

d. SWOT Analysis

Internal Analysis (strengths and weaknesses) Development of Agricultural Potential, and Fisheries Adonara tourism area

Table 4. Strength and Weakness Analysis

<table>
<thead>
<tr>
<th>No.</th>
<th>Variabel Internal</th>
<th>Skor</th>
<th>Predicate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Potential attractiveness and beauty of the beach</td>
<td>3</td>
<td>Strength</td>
</tr>
<tr>
<td></td>
<td>Agricultural and fishery activities</td>
<td>2</td>
<td>Exquisite</td>
</tr>
<tr>
<td></td>
<td>Physical Conditions of Tourism</td>
<td>2</td>
<td>Very Potential</td>
</tr>
<tr>
<td></td>
<td>Agricultural Product Development Facility</td>
<td>2</td>
<td>Good condition</td>
</tr>
<tr>
<td></td>
<td>Fisheries product development facility</td>
<td>3</td>
<td>Enough available</td>
</tr>
<tr>
<td></td>
<td>Fishing activities</td>
<td>3</td>
<td>Very Original</td>
</tr>
<tr>
<td></td>
<td>Diverse Visitors and In Large Amounts</td>
<td>3</td>
<td>Active</td>
</tr>
<tr>
<td></td>
<td>Availability of Agricultural Sector Management</td>
<td>3</td>
<td>Very high</td>
</tr>
<tr>
<td></td>
<td>Government program for developing tourisme</td>
<td>3</td>
<td>Enough</td>
</tr>
<tr>
<td></td>
<td>Agricultural and fishery products</td>
<td>2</td>
<td>There Is Enough</td>
</tr>
<tr>
<td></td>
<td>Amount Of Value</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Environmental Hygiene Tourism Object</td>
<td>1</td>
<td>Poorly maintained</td>
</tr>
<tr>
<td></td>
<td>Attractions and Attractions Tour Packages</td>
<td>1</td>
<td>Less attractive</td>
</tr>
<tr>
<td></td>
<td>Tour Packages and the Right Day of Visit</td>
<td>1</td>
<td>Not scheduled yet</td>
</tr>
<tr>
<td></td>
<td>Available Restaurants with Local Cuisine</td>
<td>1</td>
<td>Not yet available</td>
</tr>
</tbody>
</table>
External Analysis (Opportunities and Threats) The Opportunities and Threats of Economic Development Food diversification Supports Tourism in Adonara as follows:

<table>
<thead>
<tr>
<th>No.</th>
<th>Variabel Ekternal</th>
<th>Skor</th>
<th>Predicate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Opportunity</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High Visitor Interest</td>
<td>3</td>
<td>Always Increase</td>
</tr>
<tr>
<td></td>
<td>Government Policy THAT development of Tourism Products</td>
<td>3</td>
<td>Long-term</td>
</tr>
<tr>
<td></td>
<td>Food product marketing</td>
<td>3</td>
<td>More Open</td>
</tr>
<tr>
<td></td>
<td>Creating Adonara Entrepreneurial Entrepreneurs</td>
<td>2</td>
<td>Change Economy</td>
</tr>
<tr>
<td></td>
<td>Increased Income of Fishermen and Coconut Farmers</td>
<td>3</td>
<td>Potensial enough</td>
</tr>
<tr>
<td></td>
<td>Enhancing the Skills of the Community of ADONARA</td>
<td>3</td>
<td>SKills</td>
</tr>
<tr>
<td></td>
<td>Creating Food Diversity Creativity and Productivity</td>
<td>3</td>
<td>Enough</td>
</tr>
<tr>
<td></td>
<td>Wide Open Tourism Village Market</td>
<td>3</td>
<td>Enough</td>
</tr>
<tr>
<td></td>
<td>Increased Accessibility and Amenities of Tourism Objects</td>
<td>3</td>
<td>Always Increase</td>
</tr>
<tr>
<td></td>
<td>Making tourism beaches superior and crowded</td>
<td>3</td>
<td>The best</td>
</tr>
<tr>
<td></td>
<td>Amount OF Value</td>
<td>30</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No.</th>
<th>Variabel Ekternal</th>
<th>Skor</th>
<th>Predicate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Threat</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tourism Market Competition</td>
<td>3</td>
<td>Very competitive</td>
</tr>
<tr>
<td></td>
<td>Economic and Political Conditions and security vulnerable to conflict</td>
<td>3</td>
<td>Weak</td>
</tr>
<tr>
<td></td>
<td>Space Conflict with fisheries activities</td>
<td>3</td>
<td>Not coordinated yet</td>
</tr>
<tr>
<td></td>
<td>Environmental pollution because there is no treatment</td>
<td>3</td>
<td>Not yet available</td>
</tr>
<tr>
<td></td>
<td>Coordination between business actors and several weak sectors</td>
<td>3</td>
<td>Not good</td>
</tr>
<tr>
<td></td>
<td>The Government Makes the Program Only a Slogan</td>
<td>3</td>
<td>Lack of firm</td>
</tr>
<tr>
<td></td>
<td>Coordination between Tourism Managers and Government is not in line</td>
<td>3</td>
<td>Differences in Perception</td>
</tr>
<tr>
<td></td>
<td>Softs kill and Low Tourism Community Hardskill</td>
<td>3</td>
<td>Low skills</td>
</tr>
<tr>
<td></td>
<td>Amount OF value</td>
<td>24</td>
<td></td>
</tr>
</tbody>
</table>

Data Source: 2018 Research results

4. Conclusion

Based on the results of the above research, it can be concluded that several important points in this study are as follows: 1. Geographically, the Adonara area is in an area that is very superior in agriculture and fisheries 2. The villages of Sagu, Lamahala, Withama and Lite are the most producing regions for coconuts and cocoa and seaweed 3. Coastal Coastal Areas in eight Sub-districts in the Adonara region have superior Fisheries Potential including Lamahala Jaya, Ulumando and Sagu 4. Based on the results of the analysis of economic, social and demographic potential, the Adonara region has the potential for the agricultural sector to be the most attractive Sagu, Kelubagolit, and local food crowded areas in Withama District with an average potential value of 37 of 21 Attributes and this has
the potential high, and on average 56% of respondents disagree with the current state of tourism in the area in Adonara, while the level of interest of tourists towards the development of Local Food is an average of 89% so the opportunity for developing Tourism Food on the coast of Wisata Adonara is very promising 5. Some potential priority variable points are the Coconut Agriculture Sector, Chocolate, transportation equipment, restaurants, tour guides, public transportation, parking lots, road guides, various local food restaurants and restaurants, availability of business locations is a point of meaningful weakness priority and attention.

Based on the above conclusions, there are several recommendations that can be given as follows, There needs to be cooperation between the parties of the East Flores district government, private and business institutions, banks, universities, tourism school entrepreneurs, community leaders, and all sub-district heads in the Adonara region in solving all the weakness points of community economic development in food diversification supporting tourism - Tourism in Adonara Region 2. There needs to be a scientific meeting through seminars or workshops to provide understanding and development models of food diversification as adonara tourism products

References

Policy Implementation Model In Management Of Village Tourism Of Green Tourism Based On Kreinova Community

Nining Latianingsih¹, Iis Mariam², Dewi Winarni Susyanti³

¹,²,³ Lecturer of Business Administration Department, Politeknik Negeri Jakarta

*nining.latianingsih@bisnis.pnj.ac.id

Abstract The sector tourism r is one of the country's most important sources of foreign exchange. Although tourism provides a significant contribution to development, at the same time it turns out that tourism industry activities also produce some negative impacts, such as the deterioration of environmental quality, shifting local culture and socio-economic disparities among the people. The adverse effects of tourism on the environment does not only occur in Indonesia but happens in almost the whole world. The result, there is a tendency for a shift in orientation and market preference in choosing tourism products. Conventional tourism products are starting to be abandoned a lot and tourists are turning to tourism products that value the environment, nature, culture, and attractions especially. The satisfaction of tourists no longer rests on the beauty of life and the completeness of tourist facilities but also the flexibility and intensity of interaction with the environment and local communities. Based on the facts above, the Innovative Tourism Village Business needs to form a form of policy (law) as more appropriate management of sustainable tourism development in the future so that the tourism business will increase again. The concept of rural tourism (rural tourism) with the characteristics of products that are unique, distinctive and environmentally friendly should be a new solution for the development of tourism in the world. In response to the shift in tourist interest, in Indonesia, there is also a growing choice of tourism in the form of tourist villages in various provinces in Indonesia.

Keywords: Tourism Policy, Management of tourist villages, business entities, Legal Entities, Business Law

1. Introduction

The sector tourism is one of the country's most important sources of foreign exchange. Although tourism provides a significant contribution to development, at the same time it turns out that tourism industry activities also produce some negative impacts, such as the deterioration of environmental quality, shifting local culture and socio-economic disparities among the people. The adverse effects of tourism on the environment does not only occur in Indonesia but happens in almost the whole world. The result, there is a tendency for a shift in orientation and market preference in choosing tourism products. Conventional
tourism products are starting to be abandoned a lot and tourists are turning to tourism products that value the environment, nature, culture, and attractions in a unique way. Tourist satisfaction no longer rests on the beauty of life and the completeness of tourist facilities but also the flexibility and intensity of interaction with the environment and the local community. Based on the facts above, it is necessary to formulate a more sustainable form of tourism development in the future.

2. Literature Review

Tourism villages must be well managed and supported by all residents of the town. To get population support, then from the beginning the planning of tourist villages must be arranged so that the majority of the population must be involved in this project. Residents must be prepared to be good hosts. They must be trained in empowerment, for example, from the tourist side, how to receive guests, arrange rooms, prepare houses so that they are clean and worthy of being inhabited by tourists, cook decent food, and revive the culture in the village which is almost extinct. The legal basis which is the basis for conducting research activities related to tourism villages, namely (1) Law Number 10 of 2008 concerning Tourism (2) Law Number 22 of 1999 concerning Regional Government, (3) Law Number 25 of 1999 concerning Financial Balance between the Central Government and the Regional Government.

Table 1. Results of previous research

<table>
<thead>
<tr>
<th>No</th>
<th>Name of researcher</th>
<th>Title</th>
<th>Results</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Felicia (2012)</td>
<td>Empowering rural communities to improve welfare</td>
<td>The village community is still very traditional, but they are already comfortable with the life they are living in right now. They trusted the manager of the tourist village</td>
<td>They do not need to know what tourists pay prices to the managers that are important homestay owners get a share of the amount paid</td>
</tr>
<tr>
<td>2</td>
<td>Christina (2013), Preparation and development of the Tourism Village curriculum</td>
<td>Training needs to be given to the community whose villages are used as tourist villages. The development of tourism villages as a tourist attraction should be followed up in line with the shift in tourism patterns that value the environment more</td>
<td>Training Guide, English language training, Food arrangement, Homestay room arrangement training</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Dewi (2013)</td>
<td>Tourism Village</td>
<td>The tourism village that is now only sectoral, there is nothing related to each other.</td>
<td>Still based on existing potential. Not yet integrated</td>
</tr>
<tr>
<td>4</td>
<td>Mastura Jaafar (2012)</td>
<td>Products and activities in the southern islands of Malaysia are related to the small and medium island Chalets SMICs economic sustainability)</td>
<td>popular products and events offered by SMICs, actively support the importance of tourism products and businesses in ensuring the sustainability of SMICs. The innovation and creativity of a SMICs will also be far in securing competitive advantages for SMICs.</td>
<td>The high correlation between environment and product development and the survival of SMICs is an advantage for the public sector and the private sector to join in preserving the environment to ensure the survival of small businesses in Malaysia</td>
</tr>
<tr>
<td>5</td>
<td>Ikapura, 1985).</td>
<td>Tourism Village</td>
<td>Tourism village is a form of residential environment that is by the demands of tourists in enjoying, knowing and living/learning the peculiarities of the town along with all its attractions</td>
<td>harmonious, recreational and integrated with the environment</td>
</tr>
<tr>
<td>6</td>
<td>BASUKI(1992)</td>
<td>Differences in tourist villages with village tourism</td>
<td>tourist villages are closely related to living activities, staying close to the lives of rural people, learning to know the village and local culture and the way of life of the community and often participating in agricultural activities</td>
<td>village tourism is a tourist activity that only conducts visits that take place in rural areas, but does not stay at the destination</td>
</tr>
</tbody>
</table>

Source: Data processed in 2018
3. Methodology

The method used in this study is divided into several stages, namely: As for the place of research for the first year of Bogor district. While the timing of this research was carried out for 6 (six) months, in preparation for the making of questionnaires, the implementation of surveys and data processing and data analysis. Whereas the Object of research is the policy issued by the Bogor Regency Regional Government relating to the problem of poverty reduction, empowerment of the tourism sector as well as in the respondents where it will be inventoried and grouped to find specific indications relating to tourism for the village community. The approach method used is a Sociological normative approach and empirical Normative, by collecting data not only from the literature but also in the field and field research, considering the problems studied are about the relationship of policies between sociological, psychological factors to juridical factors including customary law in the context of Government participation area and through community empowerment. In this study, the author tries to describe the socialization of tourism for rural communities in Bogor Regency. Therefore this research is descriptive analysis, how the participation of rural communities in developing tourism is a program of local government as a form of community empowerment in Indonesia. Interviews were conducted on three resource persons (in-depth discussion and AHP), namely: Mrs. Tatiek Kancaniati, founder of the Tegalwaru business tourism village. He is very concentrated in the field of community empowerment. Supiyah, chairman of MSMEs processed medicinal plants. As well as Hernawati, secretary of the Tegalwaru Village questionnaire and data obtained from the relevant agencies. Data collection techniques are carried out by Survey will be carried out by visiting several villages which are considered to be potential tourism villages and carrying out some main data support activities. Focus Group Discussion, to obtain input from best practices in the field of village tourism and community empowerment. Literature studies from various sources of information and data that we collect as a reference or guideline in analyzing these problems Data analysis is carried out qualitatively according to the type of data being examined.

Primary data obtained from the respondents will be inventoried and grouped to find specific indications relating to the case. For this study, it is divided into two stages as follows: Phase I detailed design or list, which villages have implemented the Green Tourism Village development management policy on the model carried out in Bogor district. While for phase II is to determine the criteria for tourism villages that have implemented the implementation of Green tourism village development management policy in Bogor Regency.

4. results and discussion

The activities of each Regional Government are related to the Development of Tourism Villages, with distinctive characteristics of each village. In Bogor Regency two tourist places/villages are unique, namely:

1. Village-based tourism that has the highest biodiversity wealth on the island of Java.
2. The business tourism village is located in Tegal Waru Village, Ciampea District, Bogor Regency, which is a rural tourism village that has various other agricultural production and entrepreneurial businesses.

Referring to the definition of a tourist village, villages that can be developed in a village tourism program will provide an excellent example for other communities. Determination of a town to be developed into a tourist village must fulfill the following characteristics:

1. Having attractions or exciting attractions in the form of nature, art, culture, legend, local food and so on to be developed as a tourist attraction.
2. Good accessibility, making it easy for tourists to visit by using various types of transportation.

3. The community and village officials receive and provide high support for tourist villages and tourists who come to their villages.

4. Village security is guaranteed. Village security is an important thing to note if a town wants to be developed into a tourist village because it involves the protection of tourists visiting a tourist village.

5. Accommodation, telecommunications, and labor are available. Although the tourist village is not a big city that has modern facilities and infrastructure, adequate accommodation facilities must still be owned by a tourist village. The form of accommodation that is held can be in the kind of a homestay, which is a resident's house that is provided for overnight stays by tourists. This place does not have to be modern, but it is kept clean.

6. The climate in the village supports tourism activities or activities. Climate-related to air or weather in a tourist area will affect the interest of tourists visiting tourist areas. Usually, for tourists from four seasons, the country will enjoy a refreshing tropical climate that is not too hot.

Connect with other attractions that are already known to the public. To arouse the interest of tourists coming to visit a newly developed tourist village, it would be excellent if the tourist village was connected to a well-known tourist attraction. So that tourists who come to the area that has a famous tourist attraction can be invited to visit the tourist village. Tourism in Bogor Regency has its characteristics. There are some rural tourist areas which are not less exciting tourism potential which is the result of a combination of the possibility of the rural regions with the culture of the local community, as stated in the Perda concerning Villages. One of the village tours is in Tegalwaru as an example of a rural tourism village that has various agricultural production businesses and other entrepreneurs. In this village community participation in developing rural tourism is very high, even this habit can make daily attractions to attract tourists to visit.

Principles of Community based development (CBT): (1) Small Scale: starting from the bottom layer, emphasizing the fulfillment of basic need and self-reliance; (2). The decision-making process is carried out by the community, where the highest authority is in the local community; (3). Hold the principles of equality as well as differences and inequality; (4). Optimal use of local resources; (5). Do not ignore local identity (local identity); (6). Emphasize on human capital, not financial capital; (7). Emphasizing the benefits and distribution of production, not capital/capital accumulation.

From the results of the research, it was obtained an illustration, and the fact that it was in the village of Tegal Waru was that it succeeded in realizing the community through empowerment. And not a few foreign tourists also come to this area, because it has its attraction, which includes:

1. Attractions and activities in tourism such as nature and the environment, exciting culture. Like there is an Entrepreneur training package, namely home industry business training activities are comprehensive because every participant or visitor gets a complete business picture, especially those in Tegalwaru. Besides that, there is also a tour package where visitors get demonstration services for the production process of SME products in Tegalwaru Village. Outbound activities are offered to Pengunjungan and wiatawan, which is a traditional outdoor game, which is to know the environment in the village of Tegalwaru. In addition to the package, there is also a food package that is offered to visitors. During the visit, this package is called the consumption package as a supporter of
the Tegalwaru business tourism village. Whereas the final box is a souvenir package, which is related to souvenirs that are produced typically of the tegal waru business tourism village.

2. Tourist attractions Tegalwaru business tourism village has tourist attractions in the form of some 35 MSMEs in various fields spread in the town of Tegalwaru. Some types of MSMEs include oyster mushrooms, processed medicinal plants, sheep and cattle farms, handicraft business, krupuk business, various handicraft skills, and processing of nata de coco.

3. The number of tourists visiting the tourist villages of this business is around 100-400 people per month. Local and foreign tourists such as Singapore and South Korea.

4. Accommodation, in the form of facilities for entering (homestay) that allow tourists to stay while doing tours. The available facilities are public transport and guest houses/homestays offered by the community.

5. Other facilities are available such as restaurants, souvenir shops, crafts and other unique items that are not found elsewhere.

6. Accessibility Location of Tegalwarudi Kampoeng Wisata Bisnis Tegalwaru village Ciampea Bogor has easy access because the Cibadak-Ciampea highway passes it. To reach Tegalwaru Village, you can use public transportation available from Laladon terminal or Bubulak terminal. The transport is in the form of public cars that are available starting at 4 am to 12 pm, with majors to Ciampea, Leuwiliang or Jasinga all three passing Jalan Raya Cibadak - Ciampea. Currently, to go to Kampong Tegalwaru Business Travel can open the google maps application and type Kampoeng Tegalwaru tourism in Bogor, the location will be shown correctly

7. Community participation in the development of rural tourism in the Tegalwaru village of Ciampea Bogor, initiated by the mother of Titiek applies as an agent of change that can empower the community in Tegalwaru village. The city participated in implementing the Tegalwaru business tourism village program because they felt the benefits of increasing their opinion and economic standard of living

Tourism Village tourism offered in Bogor Regency is community-based tourism (community) which is a form of tourism activity, where the local community has a very central control role, and involvement in development and management and that the city takes advantage of events that can be absorbed by the community/society.

5. Conclusion

Each Regency has a Village Policy set-up, one of which is the Bogor Regency Number 6 of 2015 concerning the village. However, until now the criteria and policies regarding tourism villages, still based on the development of tourist villages according to their standards, which are locally available, have not yet been thoroughly compiled. The contents of the regional regulations include the empowerment of village communities as an effort to develop community independence and prosperity by increasing knowledge, attitudes, skills, behaviors, abilities, awareness, and utilizing resources through the establishment of policies, programs, activities and mentoring in accordance with the essence of the problem and priority needs villagers.

The Tourism Village Program in Bogor district has been implemented in several villages including Malasari Tourism Village, Enchanting Indonesia in the West End of Java Island. One of the tourist villages that has the highest biodiversity wealth on the island of Java and the business tourism village is located in the town of Tegal Waru, Ciampea, Bogor Regency, a rural tourism village that has various agricultural production businesses and other entrepreneurs. Village
Tourism or community-based tourism (community) as a form of tourism activity, where the local community has a centralized role in the role and involvement in village development and management so that the local community can absorb the proportion until benefits.

Reference


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