研究発表会の記録 2019 年 9 月 3 日～5 日

令和元年度 土木学会全国大会（香川）

主催：公益社団法人 土木学会
会場：香川大学幸町キャンパス

Indah Sri Wahyuningtyas
修士課程二年

Vivian Njambi Gathuka
修士課程二年

田中 健造
TANAKA Kenzo
修士課程一年

2019 年 9 月 3 日から 5 日にかけて，香川大学（幸町キャンパス）にて開催された令和元年度土木学会全国大会年次学術講演会に参加した．各自**表 1** に示すとおりに研究内容を発表するとともに，関連分野において，活発なディスカッションのための議論を行った．以下に，発表時に頂いた質疑と回答，および各自ディスカッションの内容を記載する．

表 1 発表論文タイトル

Indah Sri Wahyuningtyas	【国際セッション（2）】 STUDY OF TUNNEL BEHAVIOR LOCATED IN DIFFERENT SOIL CONDITION UNDER TRANSVERSAL SEISMIC LOAD
Vivian Njambi Gathuka	【国際セッション（3）】 Influence of fine shredded paper on the compaction properties of natural soil
田中 健造	【透水・浸透（1）】 浸透-変形連成解析法による木津川堤防のパイピング現象の数値解析

Indah Sri Wahyuningtyas（M2）

＊Questions you received and Answers

9 月 3 日 10:25～11:55 【国際セッション（2）】

CS2-012 STUDY OF TUNNEL BEHAVIOR LOCATED IN DIFFERENT SOIL CONDITION UNDER TRANSVERSAL SEISMIC LOAD

(a) From Goit Chandra Shekhar (埼玉大学)

Q: Did you consider the construction process in your analysis?

A: In this analysis, I didn't consider the construction process, I analyzed the final condition of tunnel behavior and compared between all the cases, also I used elastic numerical model for the analysis.

Q: What do you think about the result if you consider the construction process and the elasto-plastic of the soil? Will it be different from the current result?

A: Because in this analysis I want to study about the behavior of tunnel in different soil condition, so I take in general view of the behavior comparison, not in specifically in the internal force of each section. Therefore, I think the general

conclusion will be same, but not the number of each internal forces, the specific result will be different because the behavior of elastic model and elasto-plastic model is different.

(b) From 崔 瑛 (横浜国立大学)

Q: There will be different result of elastic model and elasto-plastic model of soil to the tunnel, because tunnel will behave according to soil around it.

A: Elasto-plastic soil model will be better to represent the actual condition, so here in my next study after this, I will also consider the elasto-plastic behavior of the soil.

(c) From Goit Chandra Shekhar (埼玉大学)

Q: In the conclusion, you mention about the recommendation for future study in which better be conducted in three-dimensional analysis. Why do you think this is important?

A: I mentioned that one of my background research is there are ring cracks in the tunnel located in the interface between different soil condition. Ring crack is occurred when there is different behavior of tunnel in longitudinal direction, so it cannot be distinguished it by using transversal analysis. Furthermore, we also need to analyze the seismic wave direction, because in reality tunnel will face not just transversal direction of seismic wave.

＊Questions you asked and Answers

9 月 3 日 10:25 ~ 11:55 【国際セッション（2)】

CS2-009 A COMPARATIVE STUDY ON LIQUEFACTION PREVENTION APPROACHES

Q: The study is about comparison between two different codes (Euro code and Japan code), and the result is there is not much different result between the codes. Which one is easier? Which one is applied in the project?

A: According to the formulas, Japanese code is simpler. However, usually after comparing the codes, we will choose them by the economical reason, which one will be more cost effective.

9 月 4 日 08:40 ~ 10:10 【国際セッション（3)】

CS2-031 Wave velocity affected by soil moisture and shear deformation in multi-layer shear model tests

Q: This study is about finding out the relationship of the elastic wave velocity with soil moisture and shear deformation so can be applied to early warning system to predict slope failure. In the analysis there is also graph about relationship between slope angle and volume water content, also in relationship with wave velocities. So, the result of wave velocity that will be used for early warning system also depend to the slope angle of the soil slope? In the experiment did you conduct the analysis by changing the soil slope?

A: In the analysis, the soil was subjected to shear force which represent the weight of soil and the slope angle (W sin θ). So, here soil slope was representing the shear deformation and affected wave velocity. So, there was no change of soil model by changing the slope, it was represented by horizontal force W sin θ.

9 月 4 日 10:25 ~ 11:55【セッション④マネージメント】

CS2-034 PHYSICAL MODELING OF TSUNAMI FLOW THROUGH DISCONTINUOUS VEGETATION

Q: In your modelling, did you consider tsunami which higher than the vegetation? If you did, how was the behavior?

A: In the analysis, vegetation that been mentioned was very tall Palm Tree which usually exist in Japanese beach area, so the tsunami will not be higher than the palm tree. In conclusion, the analysis was not considering the condition when tsunami is higher than the vegetation.

＊Impression

In this JSCE Conference, I gave presentation about my study. At first, I was nervous because this will be my first presentation in the International Symposium. Luckily, I could manage it quite well with the help from the Sensei(s) and lab mates for the preparation. I was happy because I could get some feedbacks which will be helpful for my further understanding in my study. In the International Program, I also had a change to do the workshop with others participant, it was fun. Furthermore, as usual, conference is always be fun place to broaden my knowledge. I would like to give my gratitude to Sensei and all the people who give me this opportunity and help me during preparation until the conference day. I had a good time at the conference, I hope the experience I got can be useful. If I have another chance to attend the conference, I will accept it happily.

Vivian Njambi Gathuka（M2）

＊Questions you received and Answers

9 月 4 日 8:40～10:10 【国際セッション（3)】

CS2-029 Influence of fine shredded paper on the compaction properties of natural soil

(a) From: **Weichen LIU**

Q: Have you considered the influence of decomposition of the FSP?

A: Yes, It's actually the area of focus at the moment. Decomposition of fiber in this case FSP is influenced by micro-organisms in soil, temperature, PH among other factors. I am currently doing research and experiments focusing on the influence of micro-organisms on decomposition of FSP.

(b) From: G**oit Chandra Shekhar**

Q: Leaching process has an effect on organic materials, have you considered it's influence on the FSP?

A: A factor that causes the leaching effecting in organic materials is acidity. However, from an experiment I conducted to check the interaction FSP of acidic and alkaline solutions, it was discovered that FSP has a neutralizing effect and neutralizes a solution of pH 2 and makes it pH 6. However, there was no change in alkaline solutions since FSP is considered to be a hydrophilic material.

＊Questions you asked and Answers

9 月 04 日 08:40～10:10【国際セッション（3)】

CS2-032 Effectiveness of coconut coir utilization in peat stabilization

Q: Coconut coir is an organic material and will decompose, have you considered the rate of decomposition and secondly how does change in environmental condition such as hot temperature and cold temperature affect the strength of the stabilized peat?

A: Coconut coir has higher percentage of lignin compounds as compared to other fibers hence this is assumed to reduce the decomposition rate. The rate hasn't been considered yet nor the effect of environmental conditions since we are working now with dry coir.

9 月 4 日 10:25～11:55【セッション④マネージメント】

CS2-034 PHYSICAL MODELING OF TSUNAMI FLOW THROUGH DISCONTINOUS VEGETATION

Q: Do you work with a standardized spacing between the vegetation elements and also it influences on the energy loss if the spacing is big or small?

A: In this research, the vegetation spacing was considered as sparse case and dense case, since in previous research dense case was considered however in the actual field it is difficult to construct a dense emergent forest. But I have a secondary model to factor in the energy loss in a dense emergent forest.

9 月 4 日 10:25～11:55【セッション④マネージメント】

CS2-037 DEMONSTRATION STUDY CONCRETE SUSTAINABILITY EVALUATION USING PARTIAL LEAST SQUARES STRUCTURAL EQUATION MODELING (PLS-SEM)

Q: Does the sample size affect the PLS-SEM algorithm and is there a standardized sample size?

A: Currently there is no standardized sample size established, however it was discovered that for smaller sample sizes the PLS-SEM algorithm works better and it's applicable.

＊Impression

This JSCE conference has been a great opportunity for me as I was able to present my research and received some feedback from other student/researchers in the same field. Other than that, I participated in the International Workshop for Young Engineers and played the role of a Mayor in a Town. This gave me some exposure on critical thinking as well how we can handle natural disasters with the knowledge gained in our respective fields. I am grateful to Kido-sensei who guided me to prepare a good presentation, Kimura-sensei for this opportunity and all other people involved who made this experience fruitful.

<u>田中　健造（M1）</u>

＊質問された内容

9 月 3 日 8:40～10:10 【透水・浸透（1）】

III-059 浸透-変形連成解析法による木津川堤防のパイピング現象の数値解析

(a) 大林組 杉江茂彦様より

Q: 塑性論を取り入れることは局所動水勾配の増大に対してどの程度寄与していますか.

A: パイピングに対する解析は浸透流解析が一般的です．局所動水勾配に対する塑性論の寄与は確かにそれほどないと考えられますが， 変形連成で解析でき，ひずみが求められる点が本研究の利点です.

(b) 大成ジオテック 福田光治様より

Q: 内部浸食の影響はどのようにして考慮するつもりですか．また，内部浸食に伴う土の物性の変化を考慮することが大切です.

A: 連続体の重ね合わせに，固相，液相に加えて流動化した土骨格の細粒分からなる流動化土粒子相という概念を加えることで内部浸食を表現しようと考えています.

＊質問した内容

9 月 3 日 8:40～10:10 【透水・浸透（1）】

III-062 堤体の局所浸透流を考慮したパイピング発生条件に関する研究

Q: Case-10 と Case-11 の透水係数などの条件がすべて同じですが，何が異なっているのですか.

A: 表の中には示していないのですが，透水係数が同じの違う材料を使用しています.

9 月 4 日 10:25～11:55 【土壌地下水汚染】

III-216 アルカリ土類金属型（Ca 型）ベントナイトを用いたソイルベントナイト鉛直遮水壁の基礎的検討

Q: 一般的に鉛直遮水壁に用いられる Na 型ベントナイトの代わりに Ca 型ベントナイトに改質剤を混合した材料を用いることで，Na 型と同程度の膨潤性および透水係数が得られるとのことですが，Na 型より優れている点を教えてください.

A: Ca 型ベントナイトを使用することで材料が高濃度化するという点と，Na 型ベントナイトよりも安価であり入手しやすいという点が Ca 型の優れている点です.

9 月 5 日 8:40～10:10 【不飽和土】

III-537 不飽和シルトの体積圧縮時の水分特性に関する実験的研究

Q: スライド 18 枚目の体積変化率のグラフに関して，30kPa と 50kPa の実験値と計算値の勾配が逆になっていますが，その原因は何ですか.

A: 本研究では実験値と計算値とをなるべく合わせることができるよう試行錯誤しておりますが，こちらはまだ正確に表現しきれていない部分です.

＊感想

本学会では 3 日間というスケジュールの中で，学生の方の発表とともに様々な企業の方の発表をお聞きする機会が豊富に頂けたということに感謝したい．実現場に即した研究，それに基づいた実験方法について見識を深めることができた．学会発表は二度目ということもあり，それほど緊張せずに望むことができた．聞く人が理解しやすいような説明の仕方，言葉の選び方について深く考える良い機会となった.