研　究　発　表　会　の　記　録　　2016 年 12 月 3～5 日

The 29th KKHTCNN Symposium on Civil Engineering

Hong Kong

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2016年12月3日から12月5日まで，Hong Kong University of Science and Technologyで開催されたThe 29th KKHTCNN Symposium on Civil Engineeringに参加した．本会議は**K**yoto University, **K**orea Advanced Institute of Science and Technology, **H**ong Kong University of Science and Technology, **T**ongji University, **C**hulalongkorn University, **N**ational University of Singapore, **N**ational Taiwan University の計7つの大学により開催される国際シンポジウムである．

本研究室では地盤系セッションにおいて，**表1**に示すとおりに研究内容を発表するとともに，関連分野において議論を行った．以下に，各自の研究発表の質疑応答と議論の内容を記載する．

表1　発表論文タイトル

赤木　俊文	【Track 4, December 3, 14:00 – 15:30】 Numerical simulations of internal erosion during methane hydrate production under one dimensional axisymmetric condition
木戸　隆之祐	【Track 4, December 3, 15:45 – 17:30】 Microscopic observation of pore water distribution in strain localized region of partially saturated sand under triaxial compression
宮﨑　祐輔	【Track 3, December 3, 14:00 – 15:30】 Seismic performance in culvert longitudinal direction of precast arch culverts installed in embankments considering structural connectivity
Lai Van Qui	【Track 3, December 4, 9:00 – 10:30】 A revisit to the interaction factor of group piles considering reinforce effect
小西　陽太	【Track 3, December 4, 9:00 – 10:30】 Undrained triaxial compression tests for carbon dioxide hydrate-bearing sands
松下　麗菜	【Track 3, December 4, 15:45 – 17:30】 Experimental work on seismic damage progression of two-hinge precast arch culvert using strong earthquake response simulator
光吉　泰生	【Track 3, December 3, 15:45 – 17:30】 Dynamic centrifuge model tests on the seismic performance of box culverts considering the influence of cross-sectional shape and overburden

赤木　俊文 (D3)

＊質問頂いた内容

Q. How do you determine the material parameters?

A. From experimental data of soil samples given from seabed sediments and data of real gas production tests. However, all parameters are not accurately determined, thus the method is used to qualitatively understand characteristics of the phenomena.

＊質問した内容

Track 3, December 4, 9:00 – 10:30

Title: Development of slope stability program considering progressive failure.

Speaker: Jung-Tae Kim, Korea Advanced Institute of Science and Technology

Q. The assumed angles of the newly produced slopes have influence the calculation results as the

safety ratio?

A. Yes, the calculation results are sensitive to the new slope angle.

Track 3, December 4, 15:45 – 17:30

Title: A preliminary study on the micro-mechanism of macroscopic strength in dense bimodal mixtures using 2D DEM simulation.

Speaker: Xin Ju, Tongji University

Q. The weak force between fine particles become continuous? Is there weak force chains among the small particles or is the particle without the connecting forces is isolated?

A. Continuous weak chains are not found. These small particles are isolated.

＊感想

今回で KKHTCNN へは 3 回目の参加になる．各大学の学生が多岐にわたる内容を発表しており，非常に見ごたえのある学会だった．個人的には土石流など土粒子の超距離移動を伴う現象に DEM を応用した研究がおもしろく，自身の内部浸食の研究にも応用できそうで興味深く聞かせてもらった．香港の気温は 20 度前後と暖かく，食事もとても美味しかったため終始リラックスして臨めたと思う．

木戸　隆之祐 (D1)

＊質問された内容

Q: I understand that macroscopic stress after failure of partially saturated soils is occupied by microstructural changes in shear band. Does your investigation indicates that the opinion is incorrect?

A: Your opinion is correct. Actually, I focus on the difference of the number of meniscus water and contribution to stress between inside shear band and outside shear band. As conclusions, the lower number of meniscus water exists and contribution to stress is relatively lower at inside shear band than at outside shear band. It is probably therefore that strain softening of partially saturated soils occurs due to the dilation, while one of the other reason is loss of meniscus water, especially in shear band.

Q: In your study, strain softening looks like liner behavior. In the specimen, does meniscus water exist homogeneously?

A: I guess meniscus water doesn’t homogeneously exist due to heterogeneous existence of density, degree of saturation in the specimen..

Q: Please tell me why continuity of pore water increase at an axial strain of 2 %.

A: At the initial stage of compression, pore water probably does not exist in equilibrium so that each pore water connects and make volume of it larger due to the compression.

＊質問した内容

Track 3, December 3, 14:00 – 15:30

Title: Failure probability of axixially spatially embankments

Speaker: Szu Wei Lee, National Taiwan University

Q: I understand your new prediction method provides factor safety with more accuracy. Have you applied it to your actual soil structure design or simulation of the failure?

A: Now I have just improved this method considering several factor, a1~ a4, so that I haven't done. I would like to try it from now on.

Track 3, December 3, 14:00 – 15:30

Title: Soil spring stiffness based on coupling fluid-structure-soil for VIV free-span pipeline

Speaker: Erick Yusuf kencana, National University of Singapore

Q: In your result, only one of four lines strongly fluctuate. Why does it occur?

A: In this calculation of the vibration of the pile, I applied nonhomogeneous wave to pile model. And tips of the pile is completely fixed not to move, so that we can see this behavior for this case.

Track 3, December 3, 14:00 – 15:30

Title: The influence of upward groundwater between joints on the stability and the behavior of dip slope failures

Speaker: Cheng-Hsueh Wong, National Taiwan University

Q: You mentioned that this model test is only available for uniform soil particle. In the near future, if the test is available for materials including several size of soil particle, what kinds of improvements is required? Please tell me your current opinion if you have.

A: Actually, this test has been conducted to check the slope failure during upward of groundwater under the simple conditions and there are some limitations in this apparatus. Now, I don't have suitable ideas to improve it.

＊感想

KKHTCNN は今回で 2 度目となった．本国際会議では初めて座長を務め，司会・質疑応答の進行を行った．タイムマネジメントや司会進行時の言い回しに集中してしまい．肝心の発表内容が全く入ってこない状況もあったが，なんとか無事に終えることができ，今後につながる貴重な経験ができたと思う．英語での口頭発表は昨年から何度か経験したこともあ

り，程よい緊張感の中で落ち着ついて発表を行うことができた．一方，先生方の質問を正しく解釈し，正しい答えを提供することはまだ難しいと感じた．自分の伸びしろを信じ，次の国際会議までにステップアップできるよう精進していきたい．今回の発表で最も興味を抱いたのはDEMによる粒子モデルで，粗粒土と細粒土の半径比を変えた砂の詰まり方によるマクロな挙動の違いや，それらの土粒子の接触点部分における応力分布を得るものであった．ミクロに着目した研究の意義はマクロな挙動を裏付ける特性や現象を解明することであるが，実際のマクロな現象をどう落とし込むかが常に課題として付随する．この研究も自身の研究も，最終的にはその課題に対してどのようにアプローチするか明確なビジョンをもって研究を進めていく必要があると感じた．

宮﨑　祐輔 (D1)

＊質問された内容

From. Prof. Louis Ge, National Taiwan University

Q: In your experiment, you used rigid chamber or laminar shear box?

A: Rigid one.

Q: Then, How did you deal with the reflection wave from the side wall of the rigid chamber?

A: We insert the sponges between soil and chamber wall for canceling the reflection wave from the wall. And we validated the sponge performance by simple seismic test.

Q: Another question is about scaling. In your mortar arch model, what is different from reality?

A: Geometrical scaling in 50 G matches with reality. The material is different. Our model is made by mortar but the real one is made by RC. We simplified the arch model in order to understand the basic knowledge on the seismic behavior of arch culverts installed in embankment.

From. Prof. Yongsheng Li, Tongji University

Q: How long meters of the culverts were modeled in your experiment? And if the length of the culverts changes let me know how the result will be different.

A: The modeled culverts are just 10.5 m. In my opinion, the seismic behavior of separated culverts in the culver longitudinal direction will be largely influenced on by the length of culverts. Currently, it seems to mention how it will be different from my experiment in reality. But I agree your question is important. Because of the limitation of sand chamber, enlarging the length of culverts seems to be difficult so that we have to check the long version behavior by numerical analysis.

＊質問した内容

Session: Geotechnical Engineering, 3 Dec. 2016 15:45 – 17:30

Title: Comparison of disc cutter insulation materials for TBM tunnel ahead prediction using electromagnetic waves

Speaker: Chang Ho Hong, Korea Advanced Institute of Science and Technology

Q: In order to get further understanding of your research, could you share with us the experimental condition about the validation of disc cutter insulation materials?

A: Insulation of disc cutter is isolating disc cutter from cutter head which is high conductive material by replacing connecting element for fixing disc cutter to cutter head. Insulation materials are installed between disc cutter and cutter head. Exact shape of connecting element varies with TBM manufacturers.

Q: Do you have a plan to conduct this validation in situ?

A: If it is possible, we would like to conduct it. The issue is monetary provision.

＊感想

KKHTCNN29th に参加して，同年代の学生の発表を聴講したり，自分の研究発表に他大学の先生からフィードバックを貰ったりすることで，とても充実した数日間を過ごすことができた．また，簡単な座長の経験をすることもでき，より他の研究を理解し，発表者にフィードバックができるよう努めるという貴重な経験の機会を頂いた．最後に，KKHTCNN を通じて学んだ研究の多様性によって，今後ももっと自分の研究を面白くしていきたいと感じた．

<u>Lai Van Qui (D3)</u>

＊質問された内容

Q. The interaction factor considering reinforce effect have the significant effect to the response of pile foundation?

A. Yes, it had large in the response of pile foundation

＊感想

This conference is the good chance to practice for writing the paper as well as the presentation in English. So, I am very happy to attend this conference. Besides that, I hope base on this paper, I will improve it to be Journal.

小西　陽太 (M2)

＊質問された内容

Q: How long does it cost from making specimen to the end of the tests?

A: It costs from 7 days to 2 weeks.

Q: You have conducted them under undrained condition and excess pore water pressure results in negative. How large pressure have you applied for back pressure?

A: Back pressure is 10MPa in all cases.

Q: You have conducted them with the specimens whose void ratio are about 0.75. For Toyoura sand, how much dense is it, dense sands or loose sands?

A: It is middle. Relative density is from 60 to 65 %.

＊感想

初めての国際学会への参加，初めての英語発表の機会となった．日本以外の大学で行われている研究に触れる数少ない機会であり，課題の捉え方や特に解析での計算手法などその解決方法は新鮮であった．自身の発表では英語への自信の無さからかひどく緊張してしまった．せっかくご質問頂いたにも拘わらず，自分の考えを含め詳しいお答えをすることができなかったほか，フロアで議論が起こりながら，発表者の自分がそれに参加することができなかったのは非常にもどかしく口惜しいものがあった．どんな研究でもしっかりわかりやすく伝えることができなければ意味が無いということを改めて強く実感し，英語を初め国際的な舞台でのコミュニケーションの部分に関して研鑽に励まなければならないと痛感した．しかし，発表後，同済大学の学生さんから発表内容に興味があるといくつか質問を頂き，ハイドレート地盤に関して少し議論ができたのは嬉しく感じた．全体を通して口惜しさの残る発表となったが，それを含め貴重な経験となったと感じるので無駄にせぬよう精進したいと思う．

松下　麗菜 (M2)

＊質問された内容

Q: Does the Edosaki sand include silt?

A: Yes, Edosaki sand is silty sand. Particle size is small.

Q: Is the culvert with more and more hinges better? Which is better, the two-hinge arch culvert or the three-hinge arch culvert?

A: Each of precast arch culverts has merits and demerits. In this experiment, I think the reason why steels inside the sidewall yielded, like three-hinge arch culvert, is that both ends of invert behaved

as plastic hinges

＊感想

英語で流暢に発表をし，活発に議論をする周りの学生に非常に刺激を受けた．自分自身の発表では，質問を聞き取れず答えることができなかったので，非常に悔いの残る発表になってしまった．今後このような発表の場があれば，この経験を教訓にして，自分の言葉でしっかりと議論ができるようにしたいと思う．また，3 ヒンジと比べて 2 ヒンジはどのような特徴があるのか，実験で使用した砂はどのような特徴があるのかなど，改めて勉強しなおさなければならないと感じた．英語で発表をしたり，他国の学生と話をしたり，何もかもが貴重な経験であったので，この経験を今後に活かせるよう努力したいと思う．

光吉　泰生 (M2)

＊質問された内容

Q: What is the material of your models and which parameters are corresponded to the real-scale culverts?

A: The models are made from aluminum and the bending stiffness is the same between the models and real-scale culverts. The Young's modulus of aluminum is higher than that of reinforced concrete, so we can make the members of culverts thinner.

Q: Would you explain about your analysis more, especially about ADF-model?

A: This model is originally developed for the pile analysis. In this model, the cross-section of beam member is divided into many parts and each element has each stress-strain relation. So, we can consider the non-linearity of the reinforced concrete structures in this model.

＊感想

自分の発表では，出だしで少しつまずいたことで精神的に焦ってしまい，ジェスチャーを交えたり聴講者の反応を見ながら発表したりすることができず残念だった．英語の発表だからといって無理に早口でしゃべろうとせず，ゆっくりでもよいので堂々と発表できるようになりたいと感じた．聴講者からいくつか質問をいただいたが，何度か繰り返していただくことで意味を理解でき，完璧な回答ではないが自分の言葉で説明できたのはよかった．


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