



E-Defense Today

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中村いずみ主任研究員が「ASME PVP2015 Outstanding Conference Paper Award」を受賞しました 受賞論文名：

Excitation tests on elbow pipe specimens to investigate failure behavior under excessive seismic loads

賞の概要：

2016年7月17日から21日まで、カナダ・バンクーバーにて米国機械学会（以下 ASME）による圧力容器および配管の国際会議（2016 ASME Pressure Vessels & Piping Conference、以下 PVP2016）が開催されました。PVP Conference は、毎年7月下旬頃、ASME の PVP Division が開催している国際会議で、圧力容器および配管に関するテーマについて、基礎研究から規格基準への反映に至るまで横断的で活発な議論が行われます。

PVP Conference は、大きく下記の 10 のトピックから構成されています。

1. Codes & Standards
2. Computer Technology & Bolted Joints
3. Design & Analysis
4. Fluid-Structure Interaction
5. High Pressure Technology
6. Materials & Fabrication
7. Operations, Applications & Components
8. Seismic Engineering
9. Nondestructive Evaluation
10. The Rudy Scavuzzo Student Paper Competition

PVP Conference では、前年の PVP Conference で発表された論文を対象とし、各分野における Outstanding Conference Paper を選出し、表彰します。この賞は各部門の最優秀論文 1 編のみに与えられる賞で、会議参加者全員の評価や各部門の Technical Committee の推薦を経て、Honors & Awards

Committee の審査に基づき選定されます。中村いずみ主任研究員は Seismic Engineering 部門の Outstanding Conference Papers for PVP2015 を受賞しました。



(左) PVP Honors & Awards Committee Chair
の Trevor Seipp 氏

(中央) 中村いずみ主任研究員

(右) 共同受賞者の笠原直人東大教授

受賞コメント：

本研究は単純な形状の重錘付きエルボ配管を振動荷重により破壊させた実験結果に基づく弾塑性挙動の考察と、実験結果から現行の耐震設計基準に対する裕度評価を試みたものです。単純な実験ながら配管系の弾塑性振動応答挙動の予測や破損モードを取得する難しさを痛感した実験だったため、このような形で評価されたことを嬉しく思います。

この研究を実施するにあたってお世話になった皆様に改めて感謝申し上げますとともに、今回の受賞を励みにさらに研究を進めるよう努力していきたいと思っております。

(文責：研究推進室)

Academic conference participation report by a naive pen

International conferences facilitate a platform for exchanging the ideas on recent developments in respective field. 12th World Congress on Computational Mechanics (WCCM-2016), jointly organized with 6th Asia-Pacific Congress on Computational Mechanics APCOM, and 7th International Conference on Computational Methods (ICCM-2016) were not indifferent. Wide range of research in computational field; ranging from simulation of drying phenomena of fruits to simulation of nuclear power plant (Fukuoka Nuclear power plant simulation by Prof. Seiichi Koshizuka of the University of Tokyo); from development and enhancement of numerical schemes to their implementation in large-scale-real problem in particular (Keynote lecture by Prof Daigoro Isobe of University of Tsukuba); from biomechanics and biomedical simulations to combustion and gasification simulation and many more, were accommodated at WCCM-2016 and ICCM-2016 as well. Such a huge bandwidth of topics enables researchers to foster and to conceive inter-disciplinary research collaborations.

Approximately, one thousand participants from all across the world attended the ICCM-2016, that was held at University of California, Berkeley, USA. And, more than three thousand researchers attended the WCCM-2016, held in Seoul, Republic of Korea. Not surprisingly, the number of participants from China was the most in both events. However, the number of researchers from Japan was 3rd highest after USA in both the conferences.

12th WCCM-2016 & 6th APCOM-2016 (24 – 29 July, 2016)

After a prolonged wait, I finally landed at Seoul; a must visit city in my bucket list on 25th July, 2016. Therefore, excitement was oblivious and it reached a level higher because it was first time for me to attend world congress on the discipline, I have been working for last five years. At the same time, I was bit nervous.

Each and every, Plenary and Semi-Plenary lecture at WCCM-2016 was unique, thought-provoking and had plenty amount of material to assimilate. The

major categories of mini-symposiums were biological system; covering the modeling of micro/Nano cell to simulation of biological process such as speech and swallowing, fluid mechanics, error estimation and uncertainty quantification, fluid-structure interactions, material science, multiscale Multiphysics problems, numerical methods and high performance computing, optimization and inverse problems, large scale simulation and many more.

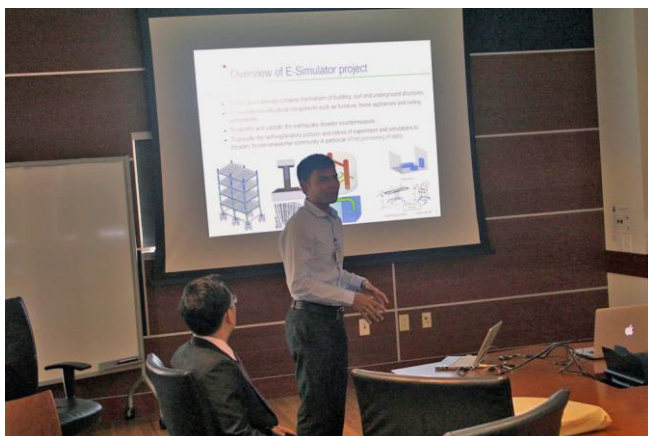
Recent advancement in computational methods, seismic response analysis and design of building structure, advances in computational earthquake engineering and advanced computing in social, traffic and economic



problems are few mini-symposium, which I attended.

My presentation was on the development and implementation of higher order Particle Discretization Scheme for crack problems and was included in the fracture and damage related mini-symposium. I presented a novel numerically efficient methodology to simulate the cracking phenomena. While, most of other presentations in that session were focused on application of various method to simulate damage and fracture. I did had a very nice discussion with attendees. At WCCM, I could not attend the presentation by Dr. Yamashita because our presentations were scheduled in the same time slot. After a day of sight-seeing, I flied back to Osaka.

7th ICCM-2016 (1st to 4th August, 2016)



I landed at San Francisco International Airport on 1st august and to attend the conference from 2nd August onward. It was not quite smooth and easy to be high energetic, as this trip came just after World Congress on Computational Mechanics (WCCM-2016), which held in Seoul, Republic of Korea. And now, I was jet-lacked. In spite of all these hiccups, interesting and cutting-edge research talks always help you feel more energetic.

However, I shall not forget to extend my sincere thanks to my dear “coffee”.

I attended many sessions in day #2 and #3 viz. Smooth Finite Element Methods: Theory and Applications, Large Scale Coupled problems and Related Topics, Advance Computational Modeling of Fracture and Damage, Numerical methods for structural dynamics, control and health monitoring, Computational methods for Images, Graphics, Business and 4D-data, Structural optimization methods and applications and many more. While most of the sessions had great presentations and made an impact, the sessions namely Recent Advances in Meshfree and Particle Methods, Computational Methods in Engineering and Large Scale Coupled Problems and related Topics encouraged me to envisage bigger. I got some goosebumps after listening the presentations likes Collapse analysis of high-rise building, simulation of Tsunami inundation of nuclear power-plant. That is not only because of the devastating nature of phenomena, being simulated, but the scale of analysis and size of data. These researches speak a volume about exponential growth and current state-of-art of Computational Modeling and Simulations.

My presentation was scheduled for last day (4th August) in the session titled as Direct Methods: computation and application. In this session, along with mine, four other presentations were made including one Keynote lecture. Most of the presentation in session were focused on the improvement and enhancement of algorithm to improve the determination of distance distribution by Pulsed Diapolar ESR Spectroscopy and Tangency portfolio. Which is quite different topic than what I do. But, it is always interesting to listen to people from other majors to get better prospective in large.

After conference, I had an opportunity to visit the MAE Center (Center for Multi-Hazard Approach to Engineering) of Illinois University at Urbana-Champaign. The center was established with an aim to facilitate earthquake related researches, but their mission has evolved over the time and expanded its domain to accommodate all kinds of natural disasters and man-made hazards. They are working towards developing a

comprehensive and integrated system to minimize the consequences of catastrophic natural disasters. It was interesting to learn about them and their research interest. The most important aspect is that they are trying to disseminate the research outcomes through education and outreach. Which is very much similar to our mission. While, the quantity and quality of disseminated information can always be debated. Differences are very obvious. That is because, they are more inclined towards the numerical simulations, while we maintain a proper balance between experiment and numerical simulations. At the same time, scale of data is another major difference. MAE center hosts a program for visiting scholars, to do research at center and to use their resources and facilities. Selection is obviously competitive and requires a peer-review of research plan. Upon admission, visiting researchers are requested to pay a pre-decided amount as resources utilization fee. This is an interesting idea to attract many researchers/academicians, while generating some revenue for laboratory. Well, one can definitely debate the amount, though. Here at E-Defense, we may introduce such program (definitely a modified version) for example a paid internship scheme for graduate students.

In the time period of two and half week, I attended two conference and made presentations on two different topics; in first conference, development of numerical scheme was my topic, while application of existing method for large-scale analysis was main theme for later one. That has helped me in building a wider network.

Finally, I would like to thank my organization E-Defense and NIED for giving me the opportunity to attend WCCM-2016 and ICCM-2016 and fully reimbursing all my expenses. These conferences were very interesting, and enriched my experience with more information, knowledge and confidence. I would like to extend my sincere thanks to Dr. Takuzo Yamashita, Prof. Makoto Ohsaki, Prof. Tomoshi Miyamura and Prof. Lalith for their support and guidance. A special thanks to Junko Hirai San for doing all necessary paper-work required for these two trips.

(文責：研究員 Pal Mahendra Kumar)

「加振制御システム等の更新」工事について

平成 28 年 4 月 1 日から平成 29 年 1 月下旬頃までの予定で、現在「加振制御システム等の更新」工事を実施しています。加振制御システムは、E-ディフェンスの頭脳で、十数年使用し続けており、故障率も高くなってしまったため、昨年度に新しいシステムの設計、製作を行い、今年度は既存システムを撤去し、新システムを据付ける工事を実施することになりました。いよいよ 10 月下旬から調整運転が始まろうとしています。

加振制御システムの更新では、加振機 1 本ずつの調整が必要となるため、5 月中旬には、震動台を取り外す作業が行われました。震動台を取り外すためには三次元継手等も順番に取り外していかなくてはなりません。これだけでも 1 ヶ月半掛かる大仕事です。

いよいよ震動台を取り外す日。震動台は 800 t 以上もある重量物を天井クレーンで吊り上げることになるので、作業当日は何とも言えない緊張感が漂っています。

前日までに避難誘導訓練や手順の確認を何度も何度も行ってきていますし、私は、これだけ入念に準備してきたのだから、大丈夫！と言い聞かせて見守ることしかできませんでしたが、「作業は計画・準備がすべて」ということをこれほど実感する日ありません。

震動台の取り外しと並行して新しいシステムが据付けられ、単体での確認作業が始まりました。制御装置は更新されていますので、制御装置の心配よりも、他の機器にトラブルが起きませんように・・・と祈っていたのが本音のところですが、何とか無事に終了することができました。

9月上旬には、復旧に向けて、震動台を取り付ける作業が行われました。取り外したものを取り付けるだけ、と言ってしまうえばそうなのですが、これはこれでまた何とも言えない緊張感が漂っています。作業従事者の方々が自分の役割を果たすことに集中されておられたので、粛々と作業が進み、何事もなく震動台、三次元継手の取り付け作業を終えることができました。

このような大きな工事も終盤を迎え、もうこのようなことはしたくない、やりたくないと思わなくはないですが、E-ディフェンスを用いて地震による被害を軽減することができる研究が進み、少しでも多くの人命や財産を守ることができるようになるのであれば、これらの苦労は大した苦労でも何でもないと思います。そういう気持ちを作業に携わった一人一人が持ってくれているおかげで、本工事中の7月末には、平成18年4月1日から続いている、無事故・無災害記録が160万時間を超えることもできました。

本工事は、法令に基づく定期点検等も同時に実施しなくてはなりませんでしたが、構内での作業に携わった全員のご協力があったからこそ成し遂げられたものです。まだ工事が終わったわけではありませんが、作業従事者、関係者の皆様、お一人お一人に感謝申し上げます。ありがとうございました！

さて、これからいよいよシステム更新の仕上げとなる調整運転が始まろうとしています。制御系の技術者のさらなる戦いの始まりでもあるかもしれません。最後まで頑張りましょう！！



【震動台取り外し作業（平成28年5月18日）】



【構内作業従事者の方々（平成28年10月12日）】

（文責：安全管理室 坂口 智子）