

# FRIEDMAN FAMILY VISITING PROFESIONALS PROGRAM



## Visit to University of Victoria: April 26<sup>th</sup>-27<sup>th</sup>, 2022

This report summarizes the visit of **John Hooper** from Magnusson Klemencic Associates (MKA) that took place at the University of Victoria (UVIC) on April 26<sup>th</sup>-27<sup>th</sup>, 2022.

### ITINERARY

TIME:	ACTIVITY:
<b>Tuesday, April 26<sup>th</sup></b>	
2:00 PM	Student Chapter Vice President meets & welcomes Visiting Professional to campus
2:00 PM – 3:15 PM	Brief campus tour and informal discussion with Student Chapter Vice President and team member
3:30 – 5:00 PM	Guest Lecture by Visiting Professional, supplemented by informal Q&A and discussions with faculty/graduate students
5:30 – 6:00 PM	Geotechnical Lab Tour
7:15 PM	Dinner at local restaurant in downtown Victoria
<b>Wednesday, April 27<sup>th</sup></b>	
9:30 – 10:00 AM	Informal discussion and Student Chapter lab overview
10:00 – 10:30 AM	New Shaketable overview

### STUDENT CHAPTER VISIT PLANNING COMMITTEE

#### LEAD ORGANIZER:

Josh Zakala, Vice President, Team Captain, EERI UVIC Student Chapter, [joshzak@telus.net](mailto:joshzak@telus.net)  
Lina Zhou, Assistant Professor, Team Faculty Advisor, [linazhou@uvic.ca](mailto:linazhou@uvic.ca)

### VISITING PROFESSIONAL LECTURE OVERVIEW

Mr. Hooper's presentation engaged students and faculty alike into the aspect of engineering where typical codes cannot provide the most efficient solution in tall-building design. MKA, a leader in Performance-Based Seismic Design, fully embraces this design approach in projects that are susceptible to seismic events, as well as performance-based design for wind events. The beginning of the presentation gave an overview of EERI, its mission statement, and the importance of joining the club, especially in areas of high seismicity. Then, Mr. Hooper discussed that structural components is not only the main consideration – building recovery, expected injuries, and repair costs are of importance in performance-based design.

Around 25 people attended Mr. Hooper's presentation. Mr. Cheng Lin, Assistant Professor and lead of the geotechnical lab, was able to bring his graduate team to the presentation, which provided to be invaluable to have some knowledge of seismic design with respect to geotechnical investigations.

## Lecture Abstract

Performance-Based Seismic Design (PBSD) has been used for decades for the seismic retrofit of existing buildings and the design of new structures. Today's PBSD approaches focus on providing a design that typically targets one of the following performance levels for a one of several ground shaking hazard levels:

- Operational
- Immediate Occupancy
- Life Safety
- Collapse Prevention

The building code performance objective for new, ordinary (Risk Category II) buildings is to provide Life Safety for Design Earthquake (DE) ground shaking and Collapse Prevention for Maximum Considered Earthquake (MCE) ground shaking. PBSD for new buildings typically targets performance equivalent to a code-prescriptive design.

Moving beyond solely using collapse as the metric for whether a design is acceptable is the vision for the future. A FEMA-sponsored, Applied Technology Council-managed research effort has been underway for over 15 years developing the methodology. The results of this effort have been published in FEMA P-58 Seismic Performance Assessment of Buildings. The final portion of the presentation will focus on this new approach, which will allow engineers to estimate the following loss information for their buildings:

- Repair costs
- Repair time
- Unsafe placards
- Embodied energy and carbon
- Casualties

A new concept to be implemented into performance goals later this year is functional recovery. Functional recovery is the state of a building post-earthquake in which capacity is restored to maintain pre-earthquake functionality. The concept moves beyond construction cost or standard code-based performance, but rather prioritizes safety and recovery time.

## Professional Bio

John Hooper is a Senior principal and the Director of earthquake engineering at Magnusson Klemencic Associates, a consulting structural and civil engineering firm in Seattle, Washington. He received his Bachelor of Civil Engineering from Seattle University and a Master of Science from the University of California at Berkeley.

John has over 40 years of engineering experience in the fields of seismic retrofits, earthquake engineering, and structural analysis and has been involved in the majority of MKA's performance-based designs for high-rises. His scope is not only limited to North America; he has also completed design for buildings in the Philippines!

He is the Chair of the American Society of Civil Engineer (ASCE 7's) Seismic Subcommittee and is a member of the Main Committee, and a member of the Building Seismic Safety Council (BSSC) NEHRP Provisions Update Committee. He has contributed significantly to the development of the seismic design code.

## SUPPLEMENTAL ACTIVITES

### Geotechnical Lab Overview

Mr. Hooper was taken on a tour of the geotechnical lab that are operated by Mr. Cheng Lin and his team of graduate students. Mr. Lin's graduate team were also able to attend Mr. Hooper's presentation prior to the lab

visit. Here, current research and projects inside the lab were discussed. In-house apparatuses were developed to test freeze-thaw and compaction for asphalt roads in Alberta.

### Shake-table Overview

The University of Victoria was able to acquire a joint purchase between the university, the club, and a generous donor for a new shake-table. We were able to secure the Quanser model shake table, which is the same model use in competition, which will prove to be invaluable in preparation for the competition. Here, we were able to preview the shake-table to Mr. Hooper and demonstrate how it will be able to benefit the engineering department for the next generation of students to come.

### Dinner with Student Leadership Team

Five undergraduate members met with Mr. Hooper for dinner at a local restaurant – 10 Acres Bistro. The goal was for the undergraduate students to have informal conversations with Mr. Hooper about professional development, work-life balance, and interesting projects he was worked on. We were also able to discuss our career aspirations and receive professional advice.



## RESULTS, FEEDBACK AND LESSONS LEARNED

As the majority of the coronavirus restrictions have been lifted, we were able to have an in-person campus visit with Mr. Hooper at the end of April. Despite the challenges involved with planning an in-person event, which has not been conducted for a while, Mr. Hooper's visit was greatly appreciated. All events were interactive, and Mr. Hooper proved to be very approachable and insightful.

### **Topics to cover in future visits:**

The University of Victoria recently showcased their new Student Housing building on campus which features the use of mass timber products local to British Columbia. UVIC has plans for two new building also featuring mass timber components, including a new engineering wing and an Indigenous law building. UVIC's Civil Engineering Department is a green civil engineering program, with goals of emphasizes sustainable development, renewable energy and resources, and environmental policy. We would love to have visits from professionals currently working in the seismic design of mass timber structures, including logistics, policy-making, and challenges and limitations.

## ACKNOWLEDGEMENTS

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We owe a big thank you to Mr. John Hooper for such an insightful and engaging presentation and in-depth answers to all questions asked. His knowledge and passion for structural engineering, not to mention his charisma, made this visit a memorable experience.