

FRIEDMAN FAMILY VISITING PROFESIONALS PROGRAM



Visit to McMaster University: March 30-31, 2015

This report summarizes the visit of David Friedman from Forell/Elsesser Engineers Inc. that took place at McMaster University on March 30-31, 2015.

ITINERARY OR AGENDA

Monday, March 30

TIME:	ACTIVITY:
2:30 pm	Arrival at John Hodgins Engineering Building Annex
2:30 pm – 3:30 pm	Walking tour of campus
3:30 pm – 5:00 pm	Meet and Greet with the EERI members and laboratory tour with demonstrations
5:00 pm – 7:00 pm	Dinner with Faculty
7:00 pm – 9:00 pm	Guest Lecture 1: Introduction to Base Isolation
9:00 pm	Social

Tuesday, March 31

TIME:	ACTIVITY:
9:00 am	Arrival at John Hodgins Engineering Building Annex
9:30 am – 10:30 am	Guest Lecture 2: The Practice of Structural and Earthquake Engineering Today
10:30 am	Farewell

STUDENT CHAPTER VISIT PLANNING COMMITTEE

LEAD ORGANIZER: Niel Van Engelen, President, vanengn@mcmaster.ca

- Adrian Crowder, Undergraduate Liaison, adrian_crowder@live.com
- Ashkan Ezazi, Member, ezazia@mcmaster.ca
- Changxuan Zhang, Member, changxuanzhang@gmail.com
- Daniel Stevens, Member, steved3@mcmaster.ca
- Farzad Nikfar, Vice-President, nikfar@mcmaster.ca
- Mike Kovacs, Undergraduate Liaison, m.kovacs@live.ca
- Mustafa Siyam, Member, siyamm@mcmaster.ca
- Saman Rastgoo Moghadam, Member, rastgos@mcmaster.ca
- Taylor Steele, Treasurer, steeletc@mcmaster.ca
- Yasser Al-Anany, Member, alananym@mcmaster.ca

FACULTY ADVISORS:

- Dr. D. Konstantinidis
- Dr. L. Wiebe

VISITING PROFESSIONAL LECTURE OVERVIEW

David Friedman's offer to give two presentations was graciously accepted by EERI McMaster. It was agreed that the Monday evening presentation would be a technical presentation whereas the Tuesday morning presentation would be held in conjunction with a fourth year undergraduate course.

Detailed abstracts from both presentations are included in the attached documentation.

Introduction to Base Isolation

David's first lecture was held in McMaster's Council Chambers with light refreshments provided by the Faculty of Engineering and the Department of Civil Engineering. The attendance of approximately 50 people included more than 10 participants from industry and a strong undergraduate and graduate student presence.

David began his lecture by stating his passion for his work, which was subsequently reflected in his presentation. He provided an overview of EERI and the advantages that membership offers. This was particularly welcomed given EERI McMaster's status as a newly established chapter with goals to increase membership and the chapter's reputation in the community.

David progressed chronologically through major earthquakes which have significantly impacted the field of earthquake engineering and his own career before explaining and demonstrating the benefits of base isolation. David continued his presentation with unique case studies, such as San Francisco City Hall and the Asian Art Museum, where base isolation was implemented. The presentation was well received with David entertaining questions for 30 minutes and many questions after the formal end of the presentation.



David presenting an Introduction to Base Isolation

The Practice of Structural & Earthquake Engineering Today

David began his lecture reiterating his love for his work and the earthquakes which have significantly influenced the profession. While including technical explanations, David focused on specific challenges faced on several unique projects, such as the seismic retrofits made to California Memorial Stadium. David was able to give depth to the considerations and challenges faced by engineers that extend beyond the structural design while simultaneously explaining unique earthquake engineering designs. The lecture was held in conjunction with a fourth year design course and attended by approximately 60 people; primarily undergraduate students.

Although the question period was limited due to time considerations, EERI McMaster members have received numerous questions from undergraduate students on material from David's lecture.

Professional Bio – David Friedman

“David is a Senior Principal, Chair of the Board of Directors, and immediate past President and CEO with more than 34 years at Forell/Elsesser and almost 40 years in the industry. His strength is a holistic approach to a project's planning, design and construction, and the collaborative integration of creative structural solutions with architects, engineers, and builders. With a specialty in designated historic structures, David has creatively solved numerous engineering challenges. Principle examples of his solutions include the base isolation retrofits for both the San Francisco City Hall and Asian Art Museum, the adaptive reuse and retrofit for the San Francisco Conservatory of Music, and the seismic safety corrections and remodel of UC Berkeley's California Memorial Stadium. All of these projects received numerous design awards and State and National recognition, including Excellence in Structural Engineering from the Structural Engineers Association of California (SEAOOC).”

www.forell.com/staff/friedman-david/

SUPPLEMENTAL ACTIVITIES

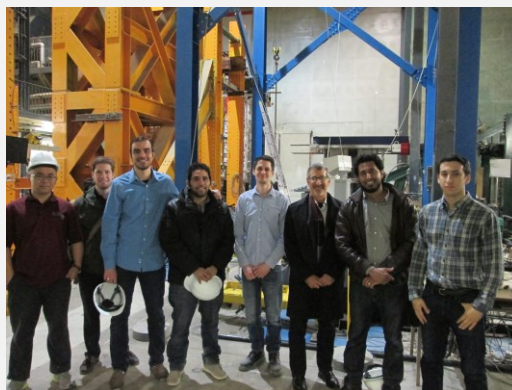
Campus Tour

David was taken on a walking tour of McMaster University when he first arrived. Despite poor weather, the tour highlighted interesting facts about McMaster University. Notably, the tour discussed the engineering culture in Canada, such as the iron ring and Kipling (i.e. the Ritual of the Calling of an Engineer). The tour was led by Niel Van Engelen, Taylor Steele and Farzad Nikfar.

Laboratory Tour and Demonstrations

The campus tour was followed by a tour of the Applied Dynamics Laboratory; the primary structural engineering laboratory at McMaster University. The tour was led by a technician who explained past research projects and the use of different apparatuses. EERI McMaster members discussed their individual projects and experiments when applicable.

Three demonstrations were conducted by EERI McMaster members. Niel Van Engelen conducted a horizontal cyclic test on a stable unbonded fiber-reinforced elastomeric isolator. Yasser Al-Anany presented a recently completed second-generation bearing testing apparatus. Farzad Nikfar conducted a shake table test of equipment in a seismically isolated hospital.



Tour of the Applied Dynamics Laboratory

Left-to-Right: Changxuan Zhang, Taylor Steele, Yasser Al-Anany, Mohamed Ezzeldin, Adrian Crowder, David Friedman, Mustafa Siyam, Farzad Nikfar

Dinner with Faculty

David was treated to dinner with faculty members from the Department of Civil Engineering conducting research in earthquake engineering. This event allowed faculty to meet with David while EERI McMaster members prepared the room for the upcoming presentation.

Social

A social event was held at the Phoenix Bar and Grill located on McMaster University's campus immediately following the lecture. The event was attended by approximately 20 individuals including EERI McMaster members, industry representatives, and faculty.

RESULTS, FEEDBACK AND LESSONS LEARNED

Overall, EERI McMaster was extremely pleased with the event and has only received positive feedback from those who attended. In particular, interest in the Chapter and earthquake engineering amongst undergraduate students has notably increased. The opportunity to meet, discuss research and related topics, and receive feedback from an industry professional was found to be invaluable by EERI McMaster members.

The primary challenge was to establish an itinerary that was mutually convenient for the visiting professional, members of EERI McMaster, and undergraduate student schedules. The date of the event was selected to accommodate David's travel to the EERI Annual Meeting in Boston and to occur before the end of the semester to increase undergraduate participation. Unfortunately, a significant number of EERI McMaster members, particularly undergraduate members, were absent. These members had already left for Boston to compete in the seismic design competition.

Establishing an accurate estimate of anticipated attendance also proved challenging. Although attendance by industry representatives was known, an open invitation was given to undergraduate students to attend and the overall interest remained an uncertainty throughout the planning phase. It is recommended that registration be used to establish attendance for planning purposes.

The laboratory tour and demonstrations proved to be valuable. The demonstrations provided a clear visualization of some of the research conducted at McMaster University. David asked relevant question and made excellent suggestions. It is recommended that future tours include demonstrations or short 5 minute presentations be conducted by EERI members in lieu. These demonstrations or presentations allow EERI members to communicate their research to the visiting professional with visual aids and to receive feedback on their projects.

It is also recommended that more photographs are taken at future events.

EERI McMaster intends to host four guest lectures per year and to continue to apply for the Friedman Family Visiting Professional Program annually. For future visits and guest lectures, EERI McMaster is interested in topics on:

- Controlled rocking systems
- Performance of nonstructural components and systems
- Masonry structures
- Base isolation
- Seismology
- Performance based design

ACKNOWLEDGEMENTS

The EERI McMaster University Student Chapter gratefully acknowledges the support of the Friedman Family for sponsoring the travel of David Friedman through their Friedman Family Visiting Professional Program endowment.

The support of the Faculty of Engineering and the Department of Civil Engineering at McMaster University is also gratefully acknowledged.

LIST OF ATTACHMENTS

- Item 1, Flier for Guest Lecture 1: Introduction to Base Isolation (Page 6)
- Item 2, Flier for Guest Lecture 2: The Practice of Structural & Earthquake Engineering Today (Page 7)



FORELL / ELSESSER ENGINEERS
Structural Engineers

David A. Friedman, SE

Senior Principle, Emeritus CEO & Chair of the Board

Introduction to Base Isolation

March 30, 7:00 pm, Council Chambers, Gilmour Hall 111



When David Friedman began working at Forell/Elseesser Engineers Inc. (F/E) in 1980, the firm was beginning to focus on high-performance earthquake engineering, with a keen interest in using seismic isolation to retrofit and protect old brittle historic buildings. Today, F/E has completed over 30 base isolated building projects, with the majority being retrofit projects. The presentation will include a basic primer on the whys and wherefores of base isolation. In most of the cases, the analysis and design difficulty was superseded by the careful construction sequencing and installation of the isolators. Project examples will highlight the seismic retrofit of two very large projects, San Francisco City Hall and San Francisco's Asian Art Museum. The third project example is a new research laboratory at UCSF Hospital, where the site and architecture dictated a unique application of base isolation.



San Francisco City Hall

Forell/Elseesser served as Prime Engineer for the complete repair and base isolation seismic upgrade of the 550,000 SF, 4-story City Hall. This essential facility is a classic steel framed structure with a 310-foot high dome clad with perimeter granite walls and with hollow clay tile interior walls. Base isolation was selected because it is cost-effective, allowed for minimum disruption to the ornate historic building, and provided maximum protection. The structural solution consisted of 530 isolators, concrete shear walls, steel collectors, reinforcement of rotunda tower walls and installation of steel braces and shotcrete walls were used at various levels of the dome.



UCSF Parnassus Ray & Dagmar Dolby Regeneration Medicine Building

The construction of this 68,500 SF stem cell research building utilized the design/build delivery system. The program included wet laboratories, laboratory support, offices, an auditorium, and "green roofs." This unique building, designed by the renowned and international architect, Rafael Viñoly, is situated on a steeply sloped site and terraces vertically through a series of steps along the building length. The structure is steel framed with special friction pendulum isolators that protect the structure and the sensitive equipment and research it houses from the effects of a major seismic event.



Asian Art Museum

Forell/Elseesser served as Engineer of Record for the 180,000 SF adaptive reuse and seismic isolation retrofit of the City's Old Main Library into a world class museum. Built in 1917, the building is one of the City's most important historic structures. The museum is seismically protected by a combination of base isolation and superstructure reinforcement. The base isolation bearings were placed over a reinforced foundation system below the current slab on grade. Reinforced concrete shear walls were constructed from the top of the basement floor to the roof level to provide a complete and rigid lateral load path for all sections of the building.

EERI McMaster University Student Chapter Guest Lecture Series

For more information contact Niel Van Engelen (vanengn@mcmaster.ca)



David A. Friedman, SE

Senior Principle, Emeritus CEO & Chair of the Board

The Practice of Structural & Earthquake Engineering Today

March 31, 9:30 am, IAHS 143



The practicing structural engineer today must not only have a broad understanding of structural engineering, but must be knowledgeable about architecture, construction delivery methodologies, and the construction process. All projects come with their own challenges and constraints, and the structural engineer is one of the key players in achieving the optimal solution. The project's budget, the selected performance and design criteria, the architectural form, and the operating systems all affect the selection of the appropriate structural materials. This all gives rise to the notion of today's structural engineer as a "Master Builder," one who can articulate their way through a complex labyrinth of form finding, criteria setting, risk evaluation, design and documentation, and construction (and hopefully not litigation). Some current projects that highlight these issues include:



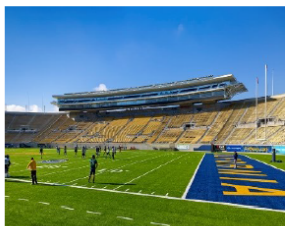
UC Berkeley Art Museum / Pacific Film Archive

This new visual arts center in downtown Berkeley is a state-of-the-art facility utilizing base isolators that will provide seismic protection. Located less than one kilometer from the active Hayward Fault, F/E collaborated with the internationally acclaimed architect Toyo Ito on this dynamic building that includes several gallery spaces, theater, sculpture gardens, spaces for teaching and studying, and a café. Another unique aspect of the structure was its extremely thin 5" composite steel plate bearing and shear walls that split the interior program elements, while enhancing the building's overall structural integrity.



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Berkeley California Memorial Stadium

This historic concrete football stadium was originally built in 1923 and was designed by John Galen Howard. The project included seismic strengthening and modernization of this non-ductile concrete frame structure with a seating capacity of 72,000-seats. The west bowl retrofit saved the perimeter historic wall of the stadium; provided a new seating bowl, press box, and 200,000 SF of game-day and programmatic improvements. The unusual aspect of the project was created by the challenged posed by the Stadium sitting atop the northern segment of the Hayward Fault, which runs approximately from end zone to end zone.

EERI McMaster University Student Chapter Guest Lecture Series

For more information contact Niel Van Engelen (vanengn@mcmaster.ca)

