

TRY BIG towards the Upcoming Presidential Election of ISSMGE V2

This is a revised version. The recent revisions are illustrated by yellow back ground.

Ikuo Towhata

Summary

Dear international geotechnical colleagues,

This document introduces me and my scopes as one of the candidates for ISSMGE Presidency for the term of 2017-2021. I believe that the International President should be chosen based on the candidate's past achievements, contributions, future scopes and capabilities. Therefore, I put emphasis here on those issues rather than my personal research histories. It is, however, important that my involvements in solving very practical problems caused by many geo-disasters are supporting my enthusiasm to work for the geotechnical community.

Geotechnical Engineering needs to make **big** challenges in order to survive the 21st Century in which global conditions are changing drastically. I put emphases here on "AVE" three issues;

- Achievements as the former President of Japanese Geotechnical Society and as the Vice President for Asia of ISSMGE,
- Vision of the future of geotechnical engineering and
- Energy to work for better future of 20,000 ISSMGE members, showing the colleague geotechnical engineers "YOU ARE VALUABLE, YOU ARE VERY GOOD, YOU DESERVE IT and YOU CAN DO IT."

The important points of my pledges are as what follows:

- **Experiences:** My pledge in what follows is based on my past experiences as a Vice President for Asia of ISSMGE, President of Japanese Geotechnical Society with more than 9000 members, Chief Editor of the Soils and Foundations Journal, Professor at the University of Tokyo and Distinguished Visiting Professor at Indian Institute of Technology Bombay as well as many international activities in the past 30 years. I am currently a Director of an architectural company and an advisor of a geotechnical consulting company. From these, I can get more experiences.
- **Public respect of geotechnical engineers:** I believe that geotechnical engineering deserves more public respect and can make more important and direct contributions to the development of human community.
- **Challenge for our better future:** Based on this belief, I will challenge big themes in order to create more respected life for the next generation of geotechnical engineers. If you like this idea, please vote for me.

For better communication with international people, I studied basic conversation in many languages. If elected, I will spend several months per year in a variety of parts of the world. Together with the excellent people of the Japanese Society, the world-wide collaboration is expected to achieve the big goals during the next 4 years. I do hope that you will make the final voting decision after reading this pledge of mine and comparing it carefully with those of other candidates. I am sure you will find that mine is the best to all of you.

Résumé

Laissez moi introduire brièvement dans ce document qui je suis et quels sont mes objectifs dans le cadre de la prochaine élection du président de la Société Internationale de Mécanique des Sols. Ma candidature peut se résumer dans les trois points suivants (A.V.E):

- Accomplissements en tant qu'ancien président de la société japonaise de mécanique des sols et que vice président de la société internationale de mécanique des sols (région Asie)
 - Une certaine Vision de l'avenir de la mécanique des sols et de la géotechnique
 - Une Energie et un enthousiasme sans relâche à améliorer l'avenir des 20 000 membres de la société internationale et à transmettre à nos collègues géotechniciens le message suivant : "vous êtes d'une grande valeur, vous méritez notre reconnaissance et vous pouvez le faire!".
- Ma candidature et les promesses qui en découlent tirent partie de mes nombreuses expériences



en tant que vice président de la société internationale de mécanique des sols (région Asie, qui comprend plus de **9000** membres), en tant qu'éditeur en chef du journal "Soils and Foundations" et ancien professeur de l'université de Tokyo ainsi que de mes diverses activités internationales menées au cours de ces 30 dernières années. J'ai l'intime conviction que la mécanique des sols doit faire plus pour le développement de la communauté internationale et de l'activité humaine.

Resumen

Espero que todos hayan pasado unas muy felices fiestas y, desde aquí, les deseo a todos un muy feliz año nuevo 2017.

En las siguientes páginas intentaré compartir con ustedes quién soy, cómo llegué aquí, y qué espero lograr de ser electo presidente de la Sociedad Internacional de Mecánica de Suelos e Ingeniería Geotécnica (ISSMGE, por sus siglas en inglés) para el período 2017–2021. Buscaré enfocarme, en particular, en los tres puntos que considero más importantes de mi candidatura y que defino con el acrónimo "LoVE":

- **L**ogros como antiguo presidente de la Sociedad Japonesa de Geotecnia (JGS, por sus siglas en inglés) así como actual vicepresidente para el Asia de la ISSMGE,
- **V**isión para el futuro de la ingeniería geotécnica, y
- **E**nergía para trabajar por un mejor futuro profesional para los 20,000 miembros de la ISSMGE que deberían estar convencidos, como lo estoy yo, que "cada uno es sumamente valioso, un extraordinario profesional, merece mucho más, y juntos podemos lograr más".

Baso mi compromiso en la experiencia que he adquirido siendo vicepresidente para el Asia de la ISSMGE, presidente de la Sociedad Japonesa de Geotecnia, editor en jefe de la revista científica Soils and Foundations, profesor de la Universidad de Tokio, así como de otras muchas innumerables actividades internacionales que he desarrollado en los últimos 30 años. Estoy convencido de que la ingeniería geotécnica tiene aún mucho por contribuir en aras del desarrollo de la humanidad.

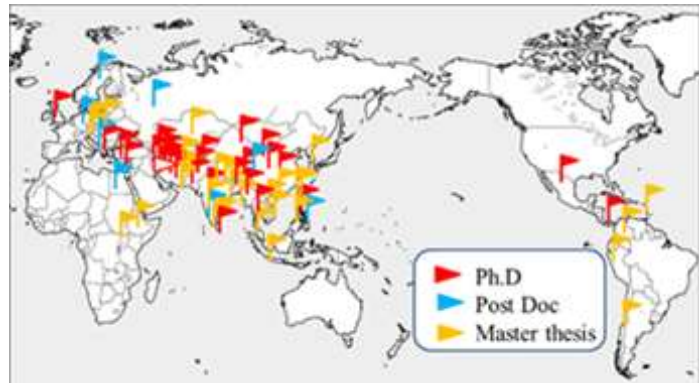


Figure 1 Distribution of former international students

Table 1 Societal memberships

| Name of Societies | Status |
|--|---|
| Japanese Geotechnical Society | Former President 2014-2016 |
| ISSMGE | Appointed Board Member 2009-2013, Vice President for Asia 2013-2017 |
| Japan Society of Civil Engineers | Fellow |
| Japan Association for Earthquake Engineering | Former Vice President 2009-2011 |
| Japan Landslide Society | Former Board Member |
| Architectural Institute of Japan | Member |
| Science Council of Japan | Associate Member 2014-2020 |
| Southeast Asian Geotechnical Society | Life Member 1980s- |
| Nepal Geotechnical Society | Honorary Member 2014- |
| Indian Geotechnical Society | Life Fellow 2016- |
| Japan Federation of Engineering Societies | Fellow 2017- |

As one of the presidential candidates of ISSMGE, it is my great pleasure to describe who I am, what I have done and what I will do for the international society during the period of 2017 - 2021. I have made many contributions to ISSMGE and have ample experiences as the President of the Japanese Geotechnical Society.

In 2016-2017, furthermore, I was a Distinguished Visiting Professor at Indian Institute of Technology Bombay and then a JICA expert at Indian Institute of Technology Hyderabad. For better international communication, I learned basic (very basic) conversation skills in such languages as Thai, Spanish, Indonesian, Persian, Turkish, Russian etc. (in decreasing order).

I will spend a few months every year in

different parts of the world.

I will energetically work for the benefit of the international geotechnical community and open a new era for our discipline.

(1) Who am I?

Education:

- 1977 Bachelor of Civil Engineering, University of Tokyo
- 1979 Master of Civil Engineering, University of Tokyo; for master thesis, I developed a computer code for dynamic analysis of soft ground and liquefaction
- 1982 Doctor of Engineering; I conducted laboratory works on deformation of sand undergoing stress axes rotation and developed a non-elastoplastic constitutive model which is nowadays a de facto standard in earthquake resistant design of ports and harbors in Japan.

Working:

- 1983-1984 Post-doc fellow at the University of British Columbia (Canada)
- 1985-1987 Assistant Professor at the Asian Institute of Technology (Bangkok, Thailand)
- 1987-1994 Lecturer and then Associate Professor of Civil Engineering, University of Tokyo
- 1989-1991 Associated research fellow at the Public Works Research Institute (Tsukuba, Japan), Ministry of Construction
- 1994-2015 Professor of Geotechnical Engineering, University of Tokyo
- 2015- Visiting Professor, Kanto Gakuin University and Director/Advisor in private sectors
- 2016-2017 Distinguished Visiting Professor and JICA Expert at Indian Institute of Technology Mumbai and then Hyderabad, respectively

Figure 1 shows the distribution of international students (in addition to many Japanese students) whom I supervised at several institutions. I became Professor Emeritus in 2015 and am currently working for Tohata Architects & Engineers as Director (<http://www.tohata.co.jp/>), Chuo Kaihatsu Corp. (geotechnical) as a Technical Advisor (<http://www.ckcnet.co.jp/>) and the Kanto Gakuin University as a Visiting Professor.

I am affiliating with many academic/engineering societies, both domestic and international, and have been playing important roles therein (Table 1).

As a researcher, I have been working on **geotechnical earthquake engineering** through

- **Damage reconnaissance** (in Japan, China, Taiwan Island, Philippines, Indonesia, India, Iran, Costa Rica and some more)
- **Shaking model tests** (1-g, centrifugal, and E-defense full-scale tests on damage mechanism and mitigation technology)
- Development of **numerical/analytical methods** for performance-based design
- Such **laboratory tests** on torsional and triaxial shear (including **zero-gravity shear** to create very low effective stress), consolidation under elevated temperature, swelling soil tests, etc.

Another expertise of mine is the **slope problems**;

- **Early warning** technology for mitigation of rainfall-induced slope failures
- **Flume test** on debris flow
- Experimental reproduction of **rock deterioration by weathering and hydration**

See Appendix for more information.

In 2008 I published a comprehensive book “*Geotechnical Earthquake Engineering*” with 700 pages from Springer Verlag (Figure 2) for which I spent 23 years to write.

Because of those efforts, I have received multiple awards from JGS (Japanese Geotechnical

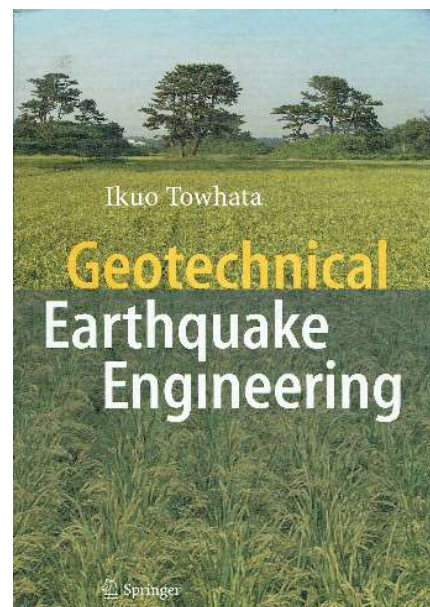


Figure 2 “Geotechnical Earthquake Engineering” published by Springer in 2008

Society) and JSCE (Japan Society of Civil Engineers) as well as the prestigious Shamsheer Prakash Research Award of USA. After the 2011 gigantic Tohoku earthquake in Japan, I have been devoting myself to recovery efforts as will be stated later. After completion of my service at the University of Tokyo, I have been engaged in international consulting in Asia, Europe and South America.

(2) What have I done for the geotechnical engineering community?

In a presidential campaign, contributions to ISSMGE in the past and in future are more important than a personal research history. In the societal work, it was always tough to take the ultimate responsibility as chief but I was able to learn lessons and get valuable experiences.

1) For ISSMGE

■ Participation in ICSMGE

In 1977, I attended the ICSMGE in Tokyo for the first time as a student assistant. Since the 1989 ICSMGE in Rio de Janeiro, I have participated in all the ICSMGEs and contributed as a session Co-Chairman, Chairman, speakers and Heritage Lecturer in the 2005 Osaka Conference.

■ Technical Committees

For activity of ISSMGE, I have been a member of TC203 (Earthquake Geotechnical Engineering and Associated Problems) as well as the Chair of ATC3 (Asian TC on Geotechnology for Natural Hazards). I belong to the **Joint Technical Committee 3** on Landslide (ISSMGE, ISRM & IAEG) where I am striving to push forward a flagship study on earthquake-induced landslides.

■ Conference organization

I was the secretary general for the 1st Earthquake Geotechnical Engineering Conference (IS Tokyo in 1995). I was the organizing chairman for the 3rd International Young Geotechnical Engineers' Conference in Osaka (Figure 3), 2005, together with working for the organizing committee of ICSMGE in Osaka at the same time. I managed this one-week conference for young people with registration fee of only US 300 \$ per person, inclusive of accommodation, meals, parties, technical trips etc. **ICSMGE Osaka was able to attract more than 1500 participants because (I believe) people loved the idea that every paper is orally presented.**

■ For ISSMGE Board

In the recent years I have spent much time on ISSMGE activities as one of the **Board Members (Appointed Board member 2009 - 2013 and Vice President for Asia 2013-2017)**. Figure 4 illustrates my international activities in Asia during this period. I took care of the publication of **Bulletin** as the chief editor from 2010 to 2014. I enthusiastically asked many people to contribute articles on disaster reconnaissance, challenge on frontiers, new technologies and important projects. Because of their kind supports, I successfully increased the number of issues per year from 4 to 6.

Moreover, I am one of the earliest **donors of the ISSMGE Foundation** that supports young engineers who wish to attend international conferences.

I delivered a lecture in an **ISSMGE Webinar** on geotechnical earthquake engineering in November, 2012.



Figure 3 Third International Young Geotechnical Engineers' Conference in Osaka in 2005 (I designed the logo, inspired by growing plants)

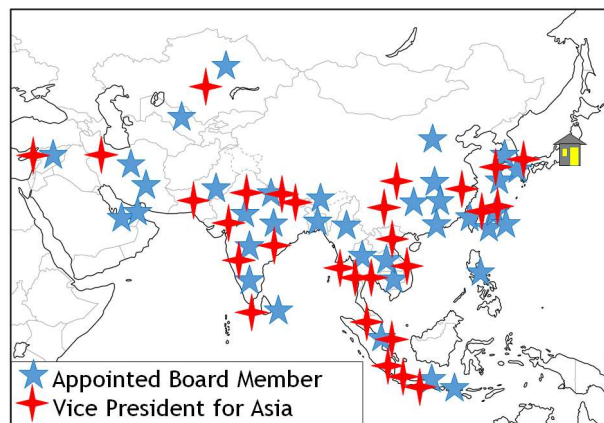


Figure 4 My activities in Asia from 2009 to 2017

Four years ago, in my campaign for VP Asia, I offered two pledges - they were, **“LCC: Low Cost Conference”** and **“Geotechnical Engineering of the people, by the people and for the people”**.

LCC with low registration fee was realized three times in Nepal 2014 on natural disaster and mitigation, Asian Regional Conf. SMGE in Fukuoka, 2015, and Mini Symposium “New Concepts and New Developments in Soil Mechanics and Geotechnical Engineering” in Nagoya, 2016. I also organized a sustainability/maintenance conference in Mumbai, India, in 2016 in collaboration with colleagues of the Indian Geotechnical Society.

Establishing **financial sustainability for small member societies** has been one of my concerns and helping host internationally valuable conferences combined with an exciting field excursion was my solution. The above-mentioned conference in Nepal (2014) was able to attract many international participants and the Society’s financial basis was remarkably strengthened.

The new motto **“Geotechnical engineering for the people and with people”** is touched upon in the next section.

2) For JGS (Japanese Geotechnical Society)

It is always tough to be a chief and take the **final responsibilities** but I was able to learn many lessons.

■ Chief Editor of the Soils and Foundations Journal

As the chief editor I was able to learn many practical points (both good and bad). Only the chief can learn real difficulties in managing an academic journal.

■ As the President of JGS from 2014 to 2016

▪ Management for many members

I steered activities and interest of more than 9000 members consisting of 7562 regular members as well as 920 student members and 843 company members.

▪ Financial problem

I solved the financial problem of the society by turning a 350 thousand US \$ deficit several years ago into a 110 thousand \$ profit in 2015.

▪ Dissemination of knowledge

I launched work to translate and internationally distribute all the technical standards of JGS so that experiences and good ideas might be shared by the international community. Consequently, JGS is recently more recognized by people as a valuable institution because of its many activities “for the people and with people.” In 2009, I was the chief organizer of the JGS National Conference. I organized this big event with 1500 participants.

▪ Recovery from a gigantic earthquake in 2011

My JGS activities further include recovery from the 2011 gigantic Tohoku earthquake. It was clearly demonstrated by this big natural disaster that geotechnical engineering has to make more contributions for people’s safety and welfare.

Therefore, I worked hard not only on damage reconnaissance but also on

- Technical advisory for reconstruction of residential areas affected by seismic slope instability and liquefaction
- Assessment and classification of residential lands from natural-disaster viewpoints
- Establishment of the “Authorized Evaluator of Residential Land” for people, etc.

Figure 5 shows an aerial view of Urayasu City that was severely affected by subsoil liquefaction. I have been working as the chairman of the technical advisory committee for developing a

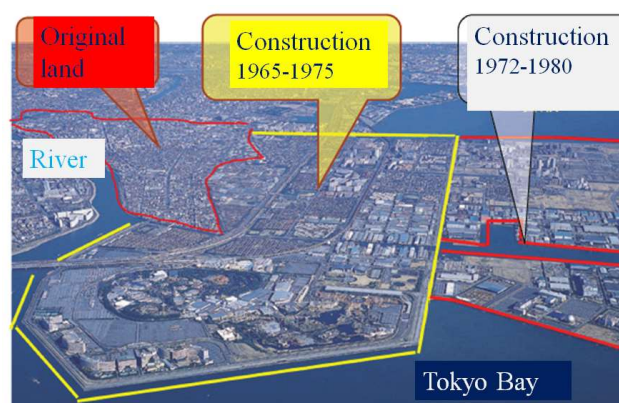


Figure 5 Aerial view of Urayasu City where young reclaimed islands were severely affected by subsoil liquefaction during the 2011 Tohoku gigantic earthquake (provided by Urayasu City)

difficult scheme for “soil improvement under existing houses”. Based on the people’s decision, loose sandy subsoil will be reinforced by underground walls of grid shape (Figure 6).

Another remarkable achievement was the full involvement of JGS in the 40-year process towards solving of **Fukushima No.1 Nuclear Power Station’s** incident in which geotechnical expertise will be essentially important (Figure 7).

Because of those efforts, the JGS membership started to expand after a continuous decrease for decades. My experiences will help me work for the international geotechnical community from now on.



Figure 6 Geotechnical support for people’s recovery from earthquake disaster (technical development of underground grid walls in liquefaction-prone soil)



Figure 7 Contribution of JGS for solving the nuclear incident of Fukushima No. 1 Power Station caused by tsunami

(3) What will I do for ISSMGE?

ISSMGE has been evolving very fast in the recent times but, at the same time, has several issues yet to be solved;

- Collaboration with industries and public sectors has to be promoted. The number of our Corporate Associates is merely 25.
- More efforts are needed to further improve our public image.
- Our Case History Journal should attract more interest from potential authors and readers. Don’t you think that peer review is too strict to practitioners who have good ideas to share with you but do not have much experience in paper writing?
- ISSMGE should use its capacity to be more actively involved in new topics such as global environmental issues, population increase, geo-informatics etc. by applying its geotechnical capacity to new fields. As the President of the Japanese Geotechnical Society until 2016, I have been tackling these issues.

As one of the Presidential Candidates, I promise that I will TRY BIG for you. I will fully use my past experiences for the good future of international geotechnical engineers.

- 1) **Better status of geotechnical engineering:** I will improve the status of geotechnical engineering by disseminating to the public that you are doing good things. ISSMGE will be expressing professional opinions on important geotechnical topics to show that **YOU ARE VALUABLE**. ISSMGE will recommend member societies and technical committees, if agreed, to national governments and public sectors as an authority to take initiative towards solving problems that are concerned by people.
- 2) **Knowledge dissemination among engineers and also with clients:** I will offer you an ISSMGE-authorized place where you can show that **YOU ARE VERY GOOD** so that you can get more business/research opportunities. Scientific research and engineering practice will be equally respected. Our Case History Journal will offer a place where practitioners can publish their good ideas and achievements without meeting unnecessarily strict scientific peer-review processes. This idea will enable the journal to have more contents as compared with, on average, current 4 articles in each of 4 issues per year currently.

In ISSMGE’s international conferences, there will be special sessions or days in which practitioners and public sectors or clients communicate with each other so that their technical seeds and needs may be understood clearly. The 2015 Asian Regional Conference in Fukuoka, Japan, did this (proceedings available from <http://doi.org/10.3208/jgssp.v02.esd>).

- 3) **Importance of advanced soil mechanics and geotechnical engineering:** this important point will be appealed to the public and customers so that they may understand your importance and provide more funding to your expertise: **YOU DESERVE IT.**

Recent experiences (Figure 8) have shown that the **total construction cost can be significantly saved by spending slightly more budget on field investigations and laboratory soil tests** in order to capture the subsoil conditions **more precisely**. Those efforts make it possible to propose a more rational design as well as construction planning. This point has to be appealed strongly.

Furthermore, a life-cycle-cost perspective will be made possible if precise subsurface information is available. These ideas are consistent with the recent world-wide awareness of ecology and sustainability, and can appeal to the public. The saved budget can be spent on other projects for the welfare of people. Herein collaboration among practitioners, academicians and policy makers will be very important.

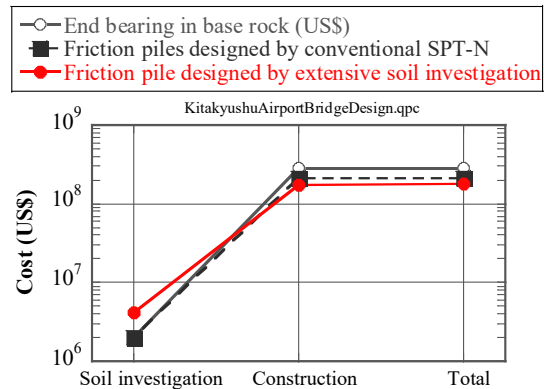


Figure 8 Importance of field investigation: Construction cost for pile foundation of a long bridge was reduced by US 100 million \$ by spending 2 million \$ on detailed soil investigation and making the pile design more rational (shorter friction piles) (after Geo-Risk Society of Japan)

- 4) **Monitoring and back-analysis:** From the viewpoint of soil mechanics, we should make more efforts on monitoring and back-analysis. In this field I have made a small contribution to the safety of landslide-prone people by developing a system of slope monitoring and early warning (Figure 9). This system uses a very modern MEMS technology and can detect minor slope displacement during heavy rain and advise people to evacuate well in advance if slope failure is likely. In this manner, monitoring and back analysis can reveal subsoil's material properties and what is going on underground so that necessary actions may be taken sufficiently before a catastrophic situation occurs. We have a good TC on numerical methods (Figure 10). **YOU CAN DO IT.**



Figure 9 Low-cost monitoring of slope that is prone to rainfall-induced landslide: geotechnical engineering for the people



Figure 10 Slope undergoing monitoring (Chuo Kaihatsu Corporation)

In addition to the above pledges that are based on my JGS experiences, I would like to make several **CHALLENGES**.

■ OPEN ACCESS DATABASE OF BORE HOLE DATA

As the President of JGS, I have been pushing OPEN ACCESS DATABASE of bore hole profiles. The idea was proposed together with several other institutes and states that bore hole data is a common property of people because people live on ground, people use ground water, people rely on lifelines and subways, and people plan to purchase land for future residence. Unfortunately, achievement is still limited. Similarly, in many countries, bore hole data is not well open to the public. One of the reasons for this is the strict copy-right regulation which does not allow information on private property to be freely released to the public. There will be intense discussions on priority between copy right and people's welfare. **One good idea is that the bore hole data is related not with its exact location but with the town block where it was obtained.** Availability of bore hole database will be combined with GIS technology, open new field of research and enable more rational construction planning. Please recall one of my new mottos "Geotechnical Engineering for the people and with people."

■ GLOBAL PROBLEMS

Concerns on global issues such as climate change (more heavy rains and more droughts?), population increase (more water supply) and energy supply are increasing and ISSMGE should pay attention to them. Fortunately, we already have Technical Committees on some of these topics. Heavy rains are likely to cause landslide disasters and breaching of levees. Rising of the sea water level will affect the safety of the coast line in conjunction with the risk of coastal erosion that is caused by insufficient sediment (soil) management. Shortage of water supply will require more systematic management of ground water. We geotechnical engineers should positively work on securing the water resources. On the basis of our past achievements, there are many future roles to be played for better future of our planet.

■ COMMUNICATION WITH OUTER WORLD

More communication is necessary between engineers working on superstructures and underground structures (above and below ground surface). Buildings of good quality become bad if foundation and subsoil are bad, and vice versa (Figure 11). Piled raft foundation is an important target of this communication/collaboration. *I am currently a director of an architect office!* Building engineers are keen to use BIM (Building Information Modelling). Subsoil and foundation data should be combined with BIM. Herein our young promising engineers will be involved more in information technology.



Figure 11 Earthquake damage to a well-designed building (sinking and tilting) caused by unsatisfactory subsoil condition



Figure 12 Myself (6 years old) proudly playing in river where I constructed channels and dams



Figure 13 Soil investigation! in tropical rain forest of Amazon

(4) I am ready to start

I played many chief roles in the past and have many experiences and know-hows that are necessary to take care of ISSMGE.

I like soil. When I was a child, I was fascinated by constructing channels and dams in a nearby river channel (Figure 12). Also, I constructed a marvelous canal network in garden and my father got very angry to find that his beloved garden was destroyed by a promising geotechnical engineer.

I like travel. I visited many interesting places in the world to see the dynamism of the earth and interesting geological/soil-mechanical processes (Figure 13). Visits to the rift valleys in Iceland and East Africa were unforgettable experiences. Another nice experience occurred in Borneo Island in Southeast Asia where I was attacked by two orangutans (Figure 14). I made a desperate fight but surrendered after 2 seconds. So I am a very unique professor who made a brave fight against such powerful colleagues.

For my international long-term stay, an apartment is already waiting for me in Budapest of Hungary.

Possibly I am challenging too many things for efforts of a single person. So, I need to make world-wide collaboration with many good people; but *no thanks to two guys in Figure 14*.

Last but not least, I have already completed heavy duties of Professor of University of Tokyo and President of JGS. My current positions are Director of an architectural office, Advisor for a geotechnical consulting firm and Visiting Professor at Kanto Gakuin University. They kindly allow me to spend time on international activities. Therefore, I believe I can contribute enthusiastically to make your future full of happiness.

If you want a better future for yourself and the next generation, you should vote me.

Best wishes

I. I. A.

Ikuo Towhata



June 20th, 2017

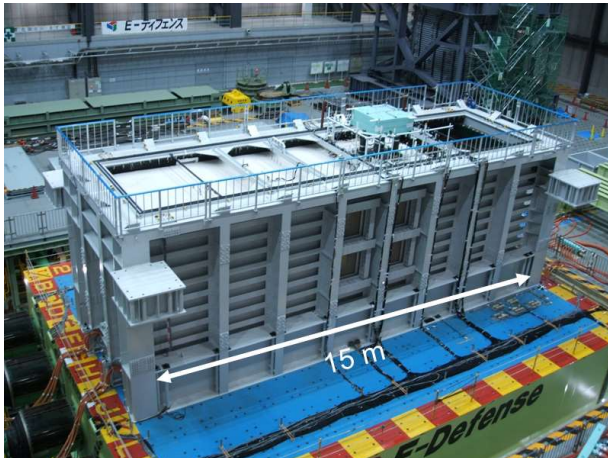


Figure 14 Two powerful animals that attacked me in jungle

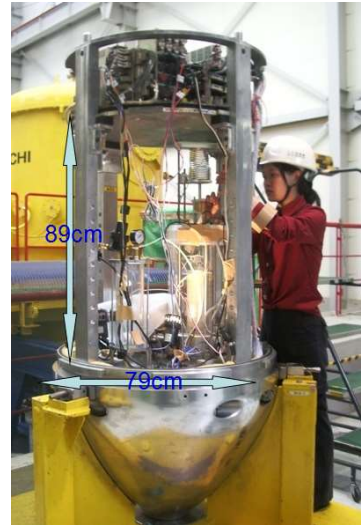


During technical tour for students on historical development of big city

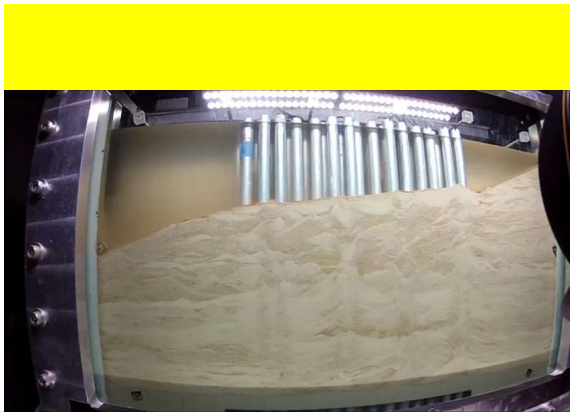
APPENDIX Some Photographs from My Past Research Activities



E-Defense full-scale shaking test on liquefaction-induced failure of quay wall



Installation of light triaxial device for micro-gravity test on sand



Centrifugal model test on mitigation of liquefaction-induced lateral flow by irregular installation of piles (at Port and Airport Research Institute)



Reconnaissance of seismic damage in mountainous area of Pakistan (2005)



Rock fracturing and creep distortion in mountain slope along a fault



Looking for a fault gouge (fine material in fault plane)