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（カリフォルニア大学バークレー校　太平洋地震工学研究センター）

専門分野：Disaster and Climate Change Risk Management/Finance Specialist, engineering, natural hazards, fire/blast, research, model development, and teaching.
（災害・気候変動リスク管理、地震工学）

CHARLES SCAWTHORN
Curriculum Vitae

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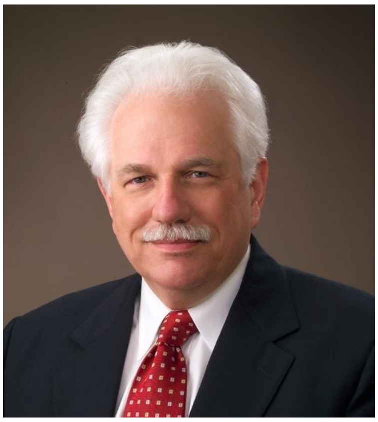

SUMMARY: Professor, Disaster and Climate Change Risk Management/Finance Specialist, more than 40 years' experience in engineering, natural hazards, fire/blast, disaster and climate change risk management, research, model development, and teaching.

PROFESSIONAL EXPERIENCE

- **Disaster finance / risk management:** developed numerous disaster response and emergency management models, plans, scenarios/training; analysis for cat bonds and participated in development of sovereign disaster risk financing programs.
- **Climate Change**: analysis of CC impacts on flood, wildfire risk; development of CC adaptation strategies. More than 1,000 citations for "Scawthorn climate" on Google Scholar.
- **Structures:** analysis, design and testing of buildings, bridges, offshore platforms, aqueducts, buried pipe, underground tanks, electric transmission towers and foundations, variety industrial and energy structures.
- **Infrastructure**: network and systems analysis wide variety of infrastructure: water supply, electric, communications network vulnerability and reliability.
- **Hazard analysis:** probabilistic analyses for seismic, flood, drought, tsunami, wind, fire, explosion, terrorism.
- **Disaster response and field investigations** of major earthquakes, tropical cyclones, floods, fires, explosions and hazmat releases on five continents
- **Model and software development:** MH-Hazus Flood model; EQEHazard, MnhPRA etc. software
- **Academic**: Professor, Kyoto University, Japan; Visiting Professor: Stanford University, Waseda University (Tokyo), Beijing Normal University; Visiting Scholar, Univ. California at Berkeley
- **Publications**: Six major books and over 200 journal and conference papers
- **Communications:** invited speaker numerous conferences and symposia; many appearances on TV, in documentaries

EDUCATION

- Kyoto University, Japan: Ph.D. Earthquake Engineering, 1981
- Osaka University of Foreign Studies, Japan: Japanese language Cert.
- Lehigh University, Penn: M.S.C.E. Structural Engineering, 1968
- Cooper Union, N.Y.: Bachelor of Engineering, Civil Engineering, 1966
- Graduate courses in urban / regional planning, Univ. of California
- Certificates in *Protective Construction* (DOD) and *Security Vulnerability Assessment* (EPA/Sandia National Laboratory)

LANGUAGES: English (native); Japanese (good spoken, fair literacy)

REGISTRATIONS:

- California: Civil/Structural
- New York: Professional Engineer

SELECTED CLIENTS: World Bank, Asian Development Bank, GFDRR, FEMA, NCS, NSF, NIST, California OES, California Seismic Safety Commission, SFPUC, LADWP, CCWD, EBMUD, Metro Vancouver, Portland Water Bureau, Southern California Edison, Con Edison, BC Hydro, Japan Gas Association, Lloyd's of London, most global, US and Japanese insurers and reinsurers, Goldman Sachs, Norges Bank Investment Management…

INTERNATIONAL EXPERIENCE: **North America**: United States, Canada, Mexico, Haiti; **Asia**: China, India, Japan, Pakistan, Bangladesh, Sri Lanka, Bhutan, Philippines, Indonesia, Cambodia, Laos, Vietnam, Kazakhstan, Kyrgyzstan, Abu Dhabi, Saudi Arabia; **Australia**; **Oceania**: New Zealand, Fiji, Samoa; **Europe**: United Kingdom, Germany, Denmark, Norway, Netherlands, France, Italy, Poland, Russia, Turkey, Armenia; **Africa:** Morocco, Ghana, Egypt, Ethiopia.

Fifty years of 地震研究

or

How Japan helped me to make a small contribution to earthquake engineering

Charles Scawthorn. S.E., D.Eng.
SPA Risk LLC, Berkeley CA 94708

I am deeply honored to receive the DPRI Award. I have been affiliated with Kyoto University for 50 years, so that this Award has a very special meaning for me. To explain this, I'd like to begin by how I came to Kyoto University and more generally Japan and how this began my journey as an earthquake engineer. After that, I shall discuss some of the places that journey took me to, both geographical and intellectual.

In 1976, I was already a practicing structural engineer in San Francisco designing towers, buildings, offshore platforms and large industrial facilities, including for earthquakes, when I became interested in cities and why they are shaped the way they are. I realized that downtown San Francisco, with all its high-rise buildings, was on the softest soil, was "mal-optimized" when one considered earthquake damage. The thought occurred to me "how far would I have to move the central business district (CBD) to achieve an optimum city form?" And then I thought, *that would make an interesting doctoral research topic!* I would learn about earthquakes and could work to reduce earthquake damage around the world.

I considered the best place to pursue that research – it would have to be a place with large densely populated cities, high seismicity, a top university, and a rich culture since, if I was returning to university for several years I also wished to learn another culture and language. Well, only one place satisfied all these constraints – Japan. My choice was Tokyo or Kyoto, and that was an easy choice.

I arrived in Kyoto in October 1976 and joined the laboratory of Prof. Yamada Yoshikazu, where I worked on seismic hazards, structural response, agents of damage such as shaking, liquefaction and fire following earthquake, and the economics of these factors, until March of 1981 when I received my doctorate. In those years I benefited from the teaching and assistance of Profs. Yamada, Iemura Hirokazu, Kameda Hiroyuki and Toki Kenzo, and many others. I also met my wife, Nini Jensen, from Denmark, a scholar of early Showa history. I had a wonderful time, drinking in Japanese society, sometimes in Gion with Prof. Yamada.

In 1981 I returned to San Francisco with Nini and joined the firm of Dames & Moore where for the next 6 years I performed seismic hazard and risk studies, developed a probabilistic fire following earthquake model that is now used by the insurance industry worldwide, and researched methods of reinforcing low-strength masonry buildings, which are the source of most earthquake deaths in lesser developed economies. During that time I maintained close ties with Kyoto University and the Japanese earthquake engineering community, participating in US-Japan workshops and meetings and founding the US-Japan Committee on the Anticipated Tokai Earthquake of the US Earthquake Engineering Research Institute (EERI). The Tokai earthquake had been predicted to occur with very high probability and great damage in the area around the Izu Peninsula near Tokyo, so that Japan was heavily investing in reinforcing schools and other buildings and building tsunami defenses and other safety measures. There was much the US could learn from this, hence the committee, which I led and organized several large successful workshops in Japan and the US, introducing many US earthquake engineers to their Japanese counterparts.

In 1987 I joined the firm of EQE International where we focused on earthquake engineering (the "EQ" and "E") because Silicon Valley, sited between the San Andreas and Hayward faults, had factories, people and enormous values in assets in large fragile older buildings that would collapse in an earthquake. We reinforced literally thousands of buildings and grew the firm from a modest consulting firm focused on Silicon Valley to a firm of 600 people in 30 offices in 10 countries, along the way creating the practice and market of earthquake risk management. Some of the projects I had at that time included analyzing and developing structural retrofits for all of San Francisco's fire stations and all of Seattle's municipal buildings. I founded EQE's practice helping insurance companies understand their earthquake risk and then all natural hazards risk, with Lloyds of London and virtually all the major insurance companies worldwide becoming our clients. In doing this we pioneered many of the probabilistic practices that have now grown into a billion dollar a year "risk modeling" industry.

In 1995 I was in Osaka attending a US-Japan meeting of EERI when the Hanshin Awaji earthquake occurred. I flew over Kobe that afternoon, observing the thousands of collapsed buildings, large fires and firefighters desperately trying to draft water from flood channels because the water pipes had broken. The next day I survey damage on the ground from Nishinomiya to Rokko Island to Ashiya until late that night I walked to Osaka, passing thousands of people sleeping outdoors or huddled around fires in the cold winter night. This only confirmed the choice I'd made two decades earlier to try to reduce earthquake damage.

Shortly thereafter, EQE was approached by a consortium of the three largest trading companies in Japan – Mitsubishi Shoji, Mitsui Bussan and Sumitomo Shoji to work with them to introduce earthquake risk management in Japan. These companies were usually fierce competitors but realized the methods EQE had developed in the US were needed in Japan. I opened and led EQE's Tokyo office for the next two years, by which time we'd built a staff, performed many seismic retrofits including the first of a high-rise building in Japan, and introduced probabilistic practices to Japan's largest insurers.

In 2003 Prof. Toki retired and Kyoto University performed a global search to fill his chair. I applied and was accepted, having the honor to be a Kyoto University Professor, heading the Earthquake Disaster Prevention Laboratory assisted by Associate Professor Kiyono Junji and Assistant Professor Ono Yusuke. For five years, until I reached the mandatory retirement age, I taught supervised and engaged in research and helped advance earthquake disaster prevention, particularly regarding lifelines and infrastructure. One project we worked on was for the World Bank, in which two students developed a global database that allowed World Bank employees to assess earthquake, flood, volcanic and typhoon risk for any Bank project worldwide. I was particularly pleased when the two students demonstrated the software at the World Bank Headquarters in Washington DC, and showed how the billions the Bank was investing could be designed so as to greatly reduce future losses.

As I approached retirement from Kyoto University, I thought *what can I leave that will reduce natural hazards losses and benefit Kyoto University*? I realized that KyoDai's Disaster Prevention Research Institute (DPRI) is probably the largest and oldest disaster research institute (DRI) in the world and that, while each professor at DPRI has international contacts, many DRIs around the world had little official contact with DPRI. The concept of a Global Alliance of Disaster Research Institutes (GADRI) occurred to me, in which many DRIs could speak with one voice, share data and come together on research topics and policies. This was a mere seed of an idea which I discussed with people at DPRI particularly Prof. Tatano Hirokazu, who with many others has grown this concept into an alliance of over 200 DRIs worldwide.

Since 2008 I've served as a Visiting Professor at Waseda University, Beijing Normal University and Stanford University, and been affiliated with the University of California at Berkeley, working to improve our understanding of how to reduce earthquake, fire and other natural hazards losses. I've also served as an Advisor to the Global Facility for Disaster Reduction and Recovery of the World Bank, working on projects in many countries, such as a ten year project to develop a national strategy for natural hazards risk reduction in Morocco, and the development of a national fire building code in Bhutan.

In all this, I have applied, and in a small way advanced, the methods of probabilistic risk quantification and reduction that I learned at Kyoto University. In doing this, I've had the joy of living in Japan for almost twenty years of my life, which has been most gratifying. All cultures are unique, but Japan's culture stands out for the way it blends centuries-old tradition with cutting-edge modern life—where quiet shrines sit beside neon skylines, where craftsmanship is treated as a lifelong discipline, and where everyday gestures, from bowing in greeting to carefully wrapping a gift, reflect a deep respect for harmony, beauty, and other people. This I also learned in Kyoto.