B.F.スペンサー教授へのインタビュー

B.F.スペンサー

（ノートルダム大学）

スペンサー教授（ノートルダム大学）とのインタビューを掲載します。同教授は、2001 年の第 1 回地震工学研究発表討論会のさいに招待講演を行うなど、日本の多くの研究者の方々との親交を持っています。この記事は、スペンサー教授の来日機会を利用した面談、およびメール通信によるインタビューをもとに構成したものです。日本語訳にすると微妙なニュアンスの違い等も生じますので、英語のままとします。

スペンサー教授には、非常に多忙の中、大変好意的にこの企画に協力して戴きました。多くの時間を費やして、学生時代のこと、研究分野のこと、中国語のことなどを話してもらうことができました。この場を借りて、スペンサー教授に御礼申し上げます。

インタビュア：

西谷章（早稲田大学）

NISHITANI (N): Thank you for joining us, Dr. Spencer. You are the very first person for JAEE Newsletter interview program. Perhaps you are one of the most well-known foreign researchers among Japanese earthquake engineering research community. Speaking of our personal relationship, I first met you in Hawaii in 1993, when the first international workshop on structural control was held. Since then, we have had many opportunities to get together. Nearly ten years since that time. Time passes so quickly.

Let's get started. To begin with, I would like to ask you about your academic background. According to my understanding, you obtained the Ph.D. degree in Theoretical and Applied Mechanics (TAM) at University of Illinois at Urbana-Champaign (UIUC). There are only few similar departments in Japanese universities, I suppose. Could you speak to us about the field of theoretical and applied mechanics, in particular focusing on the relationship with earthquake or civil engineering?

SPENCER:

Engineering mechanics is the basic study of fluids and solids and how they react to applied forces. With roots in physics and mathematics, engineering mechanics provides the basis for all

of the mechanical sciences: civil engineering, materials science and engineering, mechanical engineering, and aerospace engineering. As such, having my M.S. and Ph.D. degrees in Theoretical and Applied Mechanics provided me with a very versatile background.

N: I know you were a very good student while you were in graduate school at the University of Illinois. When I visited Prof. Bergman at the Urbana-Champaign campus, I found your name in certain plaque listing the names of certain students. Why was your name on this plaque?

SPENCER:

I was an instructor teaching courses such as statics, dynamics, and mechanics of solids to undergraduate students for five of my eight semesters as a graduate student at the University of Illinois. The enrollment in these classes ranged from 47 to over 100 students. In recognition of my classroom performance, the Department made me the 1985 recipient of the J.O. Smith Award as the Outstanding Young Teacher in Engineering Mechanics and placed my name on this plaque.

N: What kind of research did you do in your doctoral thesis at the University of Illinois?

SPENCER:

My research as a graduate student focused on computational stochastic mechanics, and in particular on determining the reliability of a randomly excited hysteretic oscillator. The solution of a large class of physically motivated problems arising in stochastic dynamics is facilitated by appropriate modeling of the system such that its response process is Markovian. The reliability of an oscillator with hysteretic restoring force can be viewed as a first passage problem in random vibration, which can be posed as the solution of the backward Kolmogorov equation, the formal adjoint of the Fokker-Planck equation. For this problem, the backward Kolmogorov equation is an elliptic-parabolic initial-boundary value for which general solution is unavailable. My doctoral research addressed the computational solution of this partial differential equation using an upwinded finite element method and was published by Springer-Verlag in a monograph entitled Reliability of Randomly Excited Hysteretic Structures.

N: Your thesis supervisor was Prof. Larry Bergman, who is one of my very good friends as well. What was he like as the supervisor? Do you think that you are the same kind of supervisor as he was? One thing that seems to Japanese very

unusual regarding the relationship between doctoral students and thesis supervisors is that most of former Ph.D. students call their former supervisors by their first names, after getting the degree. Did you feel some hesitation when you first call Prof. Bergman "Larry"?

SPENCER:

Although not the case at all universities in the US, in our department at UIUC, all of the graduate students called the faculty by their first names. However, hearing other students call Larry by his first name was very strange. It took a few months to become accustomed to this practice.

Regarding Larry's style as a supervisor, I believe that I speak for all of his former graduate students in saying that he is a truly excellent mentor. Although he never stated it, as opposed to the research itself being the "product" of his labors, I believe that Larry views the "product" as being his students. Of course, to effectively educate students, one must teach them how to conduct high quality research, but in my experience, the focus is on the student. I benefited tremendously from working with Larry at UIUC and have tried to emulate this style as a supervisor in my subsequent career as a faculty member at Notre Dame.

N: After receiving your doctoral degree, you joined the faculty of civil engineering at the University of Notre Dame. What made you go to the field of civil engineering? You could have chosen a field other than civil engineering.

SPENCER:

As you know, my undergraduate degree is in mechanical engineering. I also worked for the General Motors Corporation in Detroit for several summers learning about vehicle vibration problems. My graduate studies also focused on vibration problems, with an emphasis on randomly excited systems. Many disciplines conduct research on such topics. Indeed, upon graduation from the TAM department at UIUC, opportunities were available in aerospace, mechanical, and civil engineering. However, the most advanced research in the area of probabilistic mechanics was being conducted in civil engineering. At the same time, the research and educational opportunities offered at the Department of Civil Engineering at the University of Notre Dame seemed too attractive to pass up. I think that I made the right decision to join the ranks of the civil engineers!

N: Speaking of your research career, as you mentioned

minutes ago, your initial research was in computational stochastic mechanics. Subsequently you conducted research with regard to problems in fatigue and fracture reliability, active control of structures, and now magnetorheological (MR) damper-related semiactive control. What would you pick up as your best five or ten papers, if possible?

SPENCER:

I am not sure if the following papers are the "best", but they are the ones that I like the best.

Computational Stochastic Mechanics

B.F. Spencer, Jr., *Reliability of Randomly Excited Hysteretic Structures,* Lecture Notes in Engineering (series editors: C.A. Brebbia and S.A. Orszag), Vol. 21, Springer-Verlag, 1986.

B.F. Spencer, Jr. and L.A. Bergman, "On the Numerical Solution of the Fokker-Planck Equation for Nonlinear Stochastic Systems," *Nonlinear Dynamics,* Vol. 4, pp. 357-372, 1993.

Fatigue and Fracture Reliability

B.F. Spencer, Jr. and J. Tang, "A Markov Process Model for Fatigue Crack Growth," *Journal of Engineering Mechanics,* ASCE, Vol. 114, No. 12, pp.2134-2157, 1988.

Active Structural Control

B.F. Spencer, Jr., M.K. Sain, C.-H. Won, D.C. Kaspari Jr. and P.M. Sain, "Reliability-Based Measures Of Structural Control Robustness," *Structural Safety*, Vol. 15, pp. 111- 129, 1994.

S.J. Dyke, B.F. Spencer, Jr., P. Quast and M.K. Sain, "The Role of Control-Structure Interaction in Protective System Design," *Journal of Engineering Mechanics, ASCE,* Vol. 121, No. 2, pp. 322-338, 1995.

S.J. Dyke, B.F. Spencer, Jr., P. Quast, D.C. Kaspari, Jr., and M.K. Sain, "Implementation of an Active Mass Driver Using Acceleration Feedback Control," *Microcomputers in Civil Engineering: Special Issue on Active and Hybrid Structural Control*, Vol. 11, pp. 305-323, 1996.

Smart Damping (Semiactive Structural Control) using MR Fluid Technology

S.J. Dyke, B.F. Spencer, Jr., M.K. Sain and J.D. Carlson, "Modeling and Control of Magnetorheological Dampers for Seismic Response Reduction," *Smart Materials and Structures*, Vol. 5, pp. 565-575, 1996.

B.F. Spencer, Jr. S.J. Dyke, M.K. Sain and J.D. Carlson, "Phenomenological Model for Magnetorheological Dampers," *Journal of Engineering Mechanics, ASCE,* Vol. 123, No. 3, pp. 230-238, 1997.

B.F. Spencer, Jr., S.J. Dyke, and H.S. Deoskar, "Benchmark Problems in Structural Control - Part I: Active Mass Driver System; Part II: Active Tendon System," *Earthquake Engineering and Structural Dynamics*, Vol. 27, pp. 1127-1147, 1998.

G. Yang, B.F. Spencer, Jr., J.C. Carlson and M.K. Sain, "Large-Scale MR Fluid Dampers: Modeling and Dynamic Performance Considerations," *Engineering Structures*, Vol. 24, pp. 309-323, 2002.

N: And what is your recent research interest?

SPENCER:

My research interests continue in the use of MR dampers for protection of civil infrastructure systems. A tremendous amount of progress has been made since we started working with the Lord Corporation on this research topic in 1994. Last year saw the first full-scale implementation of MR dampers for civil engineering applications achieved. Nihon-Kagaku-Miraikan, the Tokyo National Museum of Emerging Science and Innovation, has two 30-ton, MR Fluid dampers installed between the 3rd and 5th floors. The dampers were built by Sanwa Tekki using the Lord Corporation MR fluid. Currently being retrofitted with stay-cable dampers, the Dongting Lake Bridge in Hunan, China will constitute the first full-scale implementation of MR dampers for bridge structures. Two Lord SD-1005 (www.rheonetic.com) MR dampers are being installed on each cable to mitigate cable vibration. Seeing this research come to fruition has been extremely gratifying.

Most recently, my students and I have expanded our research to include structural health monitoring. Although structural health monitoring and condition assessment for civil engineering structures is still a relatively young field, it holds great promise. Similarly, structural response control has revolutionized the way that buildings and bridges can respond to dynamics loads. Combining these two technologies together offers even more opportunities. We seek to develop an integrated system, including appropriate hardware, software, and networking components for acquisition and transmission of

the data, as well as development of new diagnostic methods.

N: I heard that you are going to move to the civil engineering department at the University of Illinois at Urbana-Champaign in the coming August. How many years have you spent at University of Notre Dame? Please tell us about what the University of Notre Dame is like. For instance, how many students are there? How many faculty members? How many departments in the College of Engineering? How much are the tuition and fees? The University of Notre Dame is in South Bend, Indiana. What is South Bend like?

SPENCER:

Effective fall of 2002, I will join the faculty at the University of Illinois. The decision to leave Notre Dame was difficult, as you might imagine. My entire career, almost 17 years, has been spent at Notre Dame, and I've enjoyed nearly every moment. Founded in 1842, Notre Dame is a Catholic University offering undergraduate, graduate and professional programs to 11,000 students. Notre Dame's research programs cover a broad spectrum of disciplines and build upon her long-established reputation for excellence in undergraduate education. The aerodynamics of glider flight and the transmission of wireless messages were pioneered at the University, and the formulae for synthetic rubber were discovered at Notre Dame. The campus is truly beautiful, with two lakes on campus and the famous "Golden Dome". In 2000-01 Notre Dame's regular faculty numbered 736 full-time and 355 part-time. Founded in 1873, the College of Engineering has 105 teaching and research faculty members in five departments: Aerospace and Mechanical Engineering, Chemical Engineering, Civil Engineering and Geological Sciences, Computer Science and Engineering, and Electrical Engineering. There are approximately 1000 undergraduate and graduate students in the College. The undergraduate tuition, room and board for one academic year is approximately $31,000.

South Bend, with a metropolitan area of nearly 250,000, combines the lifestyle of a smaller community with the cultural and economic attractions found in much larger cities. Housing costs and the overall cost of living are quite low. South Bend's economic base is a stable mix of large and small industries with a highly developed retail, health care, and service economy. There are two "Fortune 500" companies in the area.

N: You should have a lot of memories regarding your life in University of Notre Dame. Could you say something about your

most memorable experiences at the University of Notre Dame?

SPENCER:

My best memories of Notre Dame derive from working closely with so many excellent colleagues and students at the campus.

N: May I go to the next subject, which is in regard to University of Illinois at Urbana-Champaign? What is the official name of the civil engineering department? In these days, many of civil engineering departments in the US appear to change the names such as the Department of Civil and Geotechnical Engineering, the Department of Civil and Environmental Engineering, and so on. Are there a few departments in the U.S. that have still maintained the conventional name of "Department of Civil Engineering?" How many faculty members are there in the civil engineering department at University of Illinois? Are there many professors doing researches about structural dynamics or control over there?

SPENCER:

Some universities, such as Washington University in St. Louis, still keep the name "Department of Civil Engineering." At the University of Illinois at Urbana-Champaign, the offical name of the department is the Department of Civil and Environmental Engineering. The Department was founded in 1871 and has 53 full time faculty members in the areas of environmental, structural, construction, transportation, hydraulic, and geotechnical engineering. The faculty's activity in structural dynamics and control iscurrently limited, but I am pleased to say that Prof. Nicholas P. Jones has accepted the position as Department Head, effective this fall. His background and expertise in wind engineering will be a welcome addition to the Department.

N: You will become the Newmark Professor of Civil Engineering there. What is the official title of this position? Most of earthquake engineering related researchers know the name of "Newmark." How do you feel about being named to this position?

SPENCER:

The name of my position is the Nathan M. Newmark Professor of Civil Engineering. I am deeply honored to have been awarded this position, which carries the name of such an outstanding researcher and engineer.

N: We Japanese do not have such kind of professor system and are not familiar with it. So, we are wondering who and how to decide or choose, etc. Could you give us some information

about the system like this?

SPENCER:

Some of the endowed professorships/chairs can be awarded to anyone in the university; however, the Newmark Professorship is only for a faculty member in the Department of Civil and Environmental Engineering. Generally speaking, a donor will give a certain amount of money to the University to establish an endowed professorship/chair. A committee is formed to evaluate potential candidates for these position and make recommendations to the University administration. At UIUC, the Provost makes the final decision regarding who will be awarded the endowed professorships/chairs. In addition to the title, most of these positions also provide a small research fund.

N: Recently I happened to know that you speak Chinese quite fluently. I know you have had a very nice relationship with Chinese structural control community. So, it would be convenient for you to speak Chinese language. That is quite understandable. But when I heard you speaking Chinese, to be frank, I was very much surprised. Your Chinese sounds like too good, even though I do not speak or understand any Chinese language at all. One of my Chinese friends said to me that your pronunciation of Chinese was extremely good. How did you learn to speak Chinese so fluently in such a short time?

SPENCER:

While on an airplane returning from Japan in 1998, I struck up a conversation with a man sitting next to me about the importance of children learning a second language, and commented that the choice of which language was not obvious for a native English speaker. He suggested that Mandarine Chinese was the obvious language, since it is spoken by 20% of the world's population. He also noted that if one can read Chinese characters, then communication is also facilitated with Japanese and Korean people. While I did nothing at that time, the comments of this man stuck with me.

After a workshop I organized in Guangzhou, China in 1999, Larry Bergman and I took a short vacation to the ancient Chinese city of Xi'an. It happened that on the last day of the workshop, the USA had accidentally bombed the Chinese Embassy in Belgrade, Yugoslavia. During this time, the situation was rather tense, but because I had purchased a Chinese phrase book for this trip, we were able to get by without any big problems. This experience gave me the impetus to start studying Chinese. After deciding to learn the language, I was fortunate to be able to retain the wife of one

of the postdocs in our department as a tutor. This, of course, pressured me to keep up with my lessons. I have found the entire experience to be not only rewarding and useful, but also a good way to relax in the evening. I hope that in the future I will have the time and opportunity to learn Japanese as well.

N: If you did not study Engineering, what kind of field would you choose to study? Or if you were reborn, would you choose the same or similar field? Or what kind of occupation would you like to choose other than university professor?

SPENCER:

Actually, I feel that being a university professor is one of the best jobs that one can have. You have the opportunity to work with bright young students and help them mature into independent engineers. You have the freedom to conduct research on whatever topic you wish. Your job is basically your hobby. One has the chance to travel and meet wonderful people such as yourself. I really don't think that I would choose another path, even if given the opportunity.

N: Thank you for taking your time. I appreciate very much. I believe you will get much more successful at your new university.

第1回日本地震工学研究発表・討論会報告（その2）

土岐憲三
（京都大学）
川島一彦
（東京工業大学）
中埜良昭
（東京大学）

既に一部ご報告しましたが、2001年秋に第 1 回地震工学研究発表・討論会が開催されています。地震工学ニューズレター Vol.1 No.4 では、オーガナイズド・セッションを中心とした報告を行いましたが、そのとき掲載できなかった 2 つのオーガナイズド・セッションの模様を、オーガナイザーの方から報告します。

■地震災害から文化財を守る
[11 月 29 日、14：00～15：45]

報告：土岐憲三（京都大学工学研究科）

発表者：益田兼房（東京藝術大学美術研究科）
西沢英和（京都大学工学研究科）
山内泰之（独立行政法人　建築研究所）
林　良彦（文化庁文化財部建造物課）
都丸徳治（日本建設コンサルタント）
小林正美（京都大学工学研究科）

1995 年阪神淡路大震災に際しては、多数の地点から火災が発生し、多くの人命財産が失われた。大都市が強い地震動に襲われた際には、こうした火災の発生は必至であるが、たとえば京都の場合であれば、東西南北約 10km 四方の中に多数の国宝や重要文化財があることから、ひとたび強震動見舞われたならば、極めて多数の文化財が焼失するであろうと考えられる。

当該セッションは、地震の後に発生するであろう火災から、文化財を要する木造建築物への延焼を防止するための対策のあり方を議論、検討するために設けられた。そこで、国宝・重要文化財建造物の防火・防災対策の現状、文化財に関する危機管理システム、歴史的建造物の耐震性能、防火対策としての樹木の利用、京都におけるケーススタディ、火災のための水利システムなどについて研究発表を行った後、聴衆をも交えたパネルディスカッション形式の討論を行った。

こうした分野の研究発表はこれまでの地震工学の分野にはなかったことであり、地震工学、地震防災の分野の裾野を拡げる意味で、意義深いものであった。また、このセッションの成果として、これまでのこうした分野での活動は、京都の国宝などの文化財を守ることに限られていたが、これと平行して、江戸文化としての東京下町のまちなみの地震防災対策にも目を向けるという新しい視点が開けてきた。

■地震時保有耐力法による構造物の耐震設計(1)
〔11 月 30 日 14:00－15:45〕
地震時保有耐力法による構造物の耐震設計(2)
〔11 月 30 日 16:00－17:45〕

報告：川島一彦（東京工業大学）、中埜良昭（東京大学）

地震時保有耐力法に関連して，構造部材の耐力・変形性能，プッシュオーバーアナリシスの適用，耐震設計法，耐震性評価法等に関して，セッション(1)では6編，セッション(2)では 7 編，計 13 編の発表が行われた．構造物としては，建物，橋梁のほか，地下鉄・原子力発電所等の地下構造物に対する発表も行われた．

橋梁ではRC橋脚の塑性変形能に影響を与える塑性ヒンジ長や寸法効果，載荷履歴に関する発表と同時に，塑性ヒンジ領域における変形性能を高めるために，アンボンド高強度鋼材を配置したり，コアコンクリートに高密度にスパイル筋を配置した橋脚のほか，橋脚基部に免震ゴムをビルトインしたダメージフリー橋脚の開発等，新しい高靭性構造が開発されつつあることが報告された．建築物では，ひずみ速度や曲率速度がRC梁の強度や変形性能に及ぼす影響，破壊方式を考慮した耐震壁の耐震設計法，鉄骨梁に緊結されたコンクリートスラブが柱梁接合部の破壊特性に及ぼす影響が報告された．地下構造物に関しては，応答変位法に基づく地下構造物の損傷評価や長期間実際に使用されてきたRCカルバートの繰り返し載荷実験に基づく履歴特性等が報告された．

地震工学会という場でなければ一同に会する機会のなかったグループの発表であり，最初は質問にもとまどいが感じられたが，一つの質問がでるとそれに関連していろいろな異なる角度からの質疑が交わされた．構造部材にしても，建物，橋梁，地下構造物ではサイズや形状，配筋に大きな違いがあること，プッシュオーバーアナリシスの適用に際しても，上部構造に質量が集中している橋梁と質量分布が高さ方向にほぼ均質な建物，地盤の振動に引きずられて変形する地下構造物とでは異なることが認識されるようになった．このように，問題点の所在がわかるようになってくると，解析や実験の方向性も理解できるようになり，発表のバックグラウンドが明らかとなってくる．まだ各グループの理解には相当の隔たりがあるが，今回の第1回発表・討論会が相互理解に果たした役割は限りなく大きい．今後，さらに相互理解と相互批判が深まり，各方面でいい意味の技術の深みと新しい創意工夫がでてくることを期待したい．

第3回世界構造制御会議（3WCSC）速報

西谷　章

（早稲田大学）

2002 年 4 月 7 日～11 日の日程で、第 3 回世界構造制御会議（The Third World Conference on Structural Control）が開催されました。その概要を取り急ぎ報告します。

この会議は、IASC（International Association for Structural Control）を主催母体とする構造制御に関する世界会議で、4 年に 1 度開かれるものです。IASC の概要については既に地震工学ニューズレター Vol.1 No.3 おいて紹介しましたが、初代会長となる G.W. Housner・カリフォルニア工科大学名誉教授、2 代会長となる小堀鐸二・京都大学名誉教授のリードによって 1994 年に誕生した構造制御の国際学会です。

IASC 発足年の 1994 年に、第 1 回の世界会議を Housner 会長のもとで米国パサデナにおいて、1998 年に第 2 回の世界会議を小堀会長のもとで京都において開催しています。第 3 回となる今回は、3 代目の F.Casciati 会長（イタリア・パビア大学教授）のもとで、ヨーロッパ有数のリゾート地のひとつ、イタリア・コモ湖畔で開かれました。コモは、ミラノ市から自動車で 1 時間ほどのところにあり、すぐ隣はスイス国境となります。

正式な、最終的参加者数は発表になっていませんが、7 日午後に開かれた IASC 理事会の時点では、400 人を超える参加登録のあることが Casciati 会長から報告されています。

会議運営は完全にイタリア流でした。朝は通常の国際会議と同様に 8 時過ぎあるいは 9 時丁度のスタートですが、午前のセッションが 13 時まで行われたあとに、昼休みはしっかりと 2 時間確保されランチに充てられます。そして、15 時からの午後のセッションは 19 時まで続き、このあと夕食となります。会議主催の夕食会は 2 度開かれましたが、どちらの夕食もスタートは 20 時過ぎで、終了するのは 24 時近くという具合でした。

以下、開催日別に、会議の模様を報告します。

■4 月 7, 8 日

会議は 4 月 7 日からとなっていますが、他の世界会議と同様、7 日は参加登録の確認と Icebreak Party のみで、実質的な会議は 8 日の朝の開会式から始まりました。

コモ湖畔がリゾート地であるため大人数を収容できる会場は限られています。400 人収容可能な大会場である Social Theater が確保された 8 日に、開会式と 10 の基調講演がまと

めて行われました。
基調講演者とそのタイトルは以下の通りです。

T.Kobori:
Past, Present and Future in Seismic Response Control of Civil Structures
T.T.Soong:Structural Control: Theory versus Practice
L.Esteva:
Optimum Damage-Control Policies for Structural Systems under Seismic Risk Conditions
J.Rodellar:Complexity Issues of Structural Control
W.D.Iwan:
Structural Response Control Using Active Interaction Between Internal Elements
H-M.Koh:
Cost-Effectiveness Analysis for Seismic Isolation of Bridges
H.Iemura:From Ductility Demand to Damping Demand
C. Lexcellent:
Some Tools for Modelling Shape Memory Alloys, Thermomechanical Behavior and Some Efficient Use.
C-H. Loh:Structural Control Research in Taiwan
Y. Fujino:
Structural Health Monitoring in Civil Infrastructures and R & D of SHM of Bridges at the University of Tokyo

■4 月 9 日
9 日は、会場をコモ湖畔随一のリゾートホテル Villa d'Este に移して、2 つの部屋（Pino Meeting Room、Regina Meeting Room）を使ったパラレルセッションが、朝の 8 時 30 分から夜 19 時まで、途中 2 時間の昼食をはさんで、以下のようなスケジュールで開かれました。

－Pino Meeting Rm.
8:30- 9:45:Benchmark Activity
9:45-11:00:Monitoring, Identification
11:30-13:00:Code & Recommendation
15:00-19:00:Reporting from Industry

－Regina Meeting Rm.
8:30- 9:45:From the Research to the Application
9:45-11:00:Panel on Funded Research
15:00-16:30:Panel on Funding Innovative Research
17:00–19:00:Kobori Panel:Future Perspectives of

Structural Control

上記のセッション中の、17 時からの Regina Room での Kobori Panel は、小堀鐸二教授の Honour Symposium（2000 年 11 月開催）のさいの Structural Control に関するパネルディスカッションを引き継ぐものです。J.N. Yang 教授（UC, Irvine）の司会により、Structural Control の将来展望について、8 人のパネラー：F.Casciati 教授；家村浩和教授；J-M.Ko 教授（HongKong Polytechnic Univ.）；B.F.Spencer,Jr.教授（Univ. of Notre Dame）；西谷章；藤野陽三教授；S.Nagarajaiah 準教授（Rice Univ.）；池田芳樹博士（鹿島・小堀研究室）が順に意見を述べました。大地震への対応を意識した今後のアクティブ振動制御のあり方、具体的な制御機構の例から、将来地震センサがきめ細かく配置されたとして、数 10 秒先の、あるいは数分先の地震発生が予測可能になったとしたらそれを振動制御にどう生かすことができるだろうか、という問題まで、幅広い話題提供がなされました。会場からの質疑を受けて議論を行い、最後に小堀教授が、30 年間を想定した制震構造の設計・保守管理と、100 年間を想定した設計・保守管理は違うのが当然である、時間のファクタを考慮した構造制御の設計・管理の方法を考えるべきであろう、とまとめを行いました。

■4 月 10 日

10 日は Villa Oimo に会場を移しました。8 時 15 分から 9 時まで、次期会長となる現 IASC 副会長の R.Skelton 教授（UC, San Diego）による全体セッション講演：”After Structural Control–Then What?” が行われたのち、Monitoring、Passive Control、Active Control、Semiactive Control、Materials & Testing、Applications という大枠に分けられた 6 つの部屋で、パラレルに研究発表が行われました。各部屋での 10 日のセッション名を以下に挙げます（STS とあるのは、個人あるいはグループによって提案され、オーナイズされた Special Theme Session です）。

－Monitoring
- -Structural Health Monitoring (STS)
- -Structural Monitoring (STS)
- -Monitoring I
- -Environment Monitoring (STS)

－Passive Control
- -Semiactive Devices for Earthquake Prevention (STS)
- -New Application of Passive Vibration Control and Base
- -Isolation Technologies I (STS)

-New Application of Passive Vibration Control and Base Isolation Technologies II (STS)
-Seismic Dissipation Devices
ーActive Control
-Active Control Methods Based on Uncertain Models (STS)
-Active I
-Cable structures
-Active II
ーSemiactive Control
-Semi-active Seismic Isolation (STS)
-Semiactive Devices (STS)
ーMaterials & Testing
-SMA Applications I (STS)
-SMA Applications II (STS)
-Smart Materials for Structural Control (STS)
-Piezoelectrics
ーApplications
-Bridges I
-Integrating Structure and Control Design
-Control of Space Robots & Manipulators (STS)
-Bridges Monitoring

Semiactive Control の 2 つの STS（Semi-active Seismic Isolation および Semiactive Devices）は、ASCE の Structural Control Committee（Chairman: S. Nagarajaiah）の member である H.Gavin 助教授、Nagarajaiah 準教授、Spencer 教授、西谷によって提案されオーガナイズされたものです。2 つの STS において 10 数 編の論文が発表されました。この STS 以外にも、セミアクティブ制御関連の研究発表は少なくありませんでした。私自身は、今回の Kobori Panel のパネラーとしても、ここ数年はセミアクティブ制御が構造制御における重要なキーワードのひとつであろうと述べましたが、いま米国では、セミアクティブ構造制御研究がさかんに行われています。

■4 月 11 日

最終日にあたる 11 日も、会場に前日と同じ Villa Olmo が充てられました。朝 8 時 15 分から 1 時間の全体セッションでは、昨年 9 月のニューヨーク世界貿易センタービルの崩壊について、調査にあたった地元コロンビア大学の R.B.Testa 教授を中心とするグループから、”The World Trade Center Collapses: Structural Aspects”と題する発表がありました。崩壊原因と考えられるような新たな事実が伝えられたわけで

はありませんが、現地での長期にわたる実地調査結果をうけての熱気に溢れた講演でした。1 時間という時間はあまりにも短く、講演者からはもっと話すことができますという思いが、聴衆からはさらに話を聞きたいという思いが満ち満ちていました。

私の個人的なことになりますが、前日の朝、およそ 20 年ぶりに、イタリアで再会できた Testa 教授と朝食を一緒にとり、ニューヨークのこと、ニューヨーク訛りの英語のこと、私がいた当時のコロンビアの教授陣のことなど懐かしく話をすることができました。

この後、前日と同様の枠組みで 6 つの部屋に分かれて以下のような研究発表のセッションが開かれました。

ー Monitoring
- -Monitoring for Maintenance of infrastructure (STS)
- -Monitoring II
- -Damage Detection
- -Health Monitoring (STS)

ー Passive Control
- -Dissipation Devices I
- -Testing Passive Systems
- -TMD/TLC
- -Dissipation Devices II & Base Isolation

ー Active Control
- -Earthquake Mitigation via Control Algorithm (STS)
- -Helping the Structural Heritage
- -Retrofitting of Historical Building in the Mediterranean Area (STS)
- -Active III

ー Semiactive Control
- -Seismic Applications of Semiactive Control
- -Control algorithms toward Semiactive Control
- -MR Dampers
- -Magnetic-Rheological Fluid Dampers and 3D Isolation Devices (STS)

ー Materials & Testing
- -Buildings & Bridges Protections: Experimental & Testing Activities (STS)
- -A Network for structural assessment, Monitoring and Control (STS)
- -Experimental Facilities (STS)
- -Experimental Approaches

ー Applications
- -Benchmark Problem on Cable-Stayed bridges (STS)

-Fiber Optic Sensors in Structural Monitoring (STS)
-Elevators/Cranes
-Timber Structures

パラレルセッション終了後、18 時 30 分から閉会式が行われ、次回の世界会議が、2006 年に、次期会長となる Skelton 副会長の地元、米国 UC San Diego で開催されることが発表になりました。

（編集後記）

この号から、ニューズレターも Vol. 2 となります。2002年4月にイタリアで行われた第3回世界構造制御会議の速報も含めた関係上、Vol.2 No.1の月を、1月、2月、3月、4月とさせていただきました。No.2は、5月、6月として発行予定です。

この号には、ニューズレターの継続企画とする予定のインタビューの第1弾として、スペンサー教授とのインタビューを掲載しています。スペンサー教授には、大分時間を費やさせてしまう結果となりましたが、快くインタビューに応じ、さまざまなことを語ってくれました。

（会誌編集委員会・西谷）