

SAN FRANCISCO BAY CONSERVATION AND DEVELOPMENT COMMISSION

455 Golden Gate Avenue, Suite 10600 • San Francisco, California 94102 (415) 352-3600 • Fax: (415) 352-3606 • www.bcdc.ca.gov

May 30, 2014

TO: Commissioners and Alternates

FROM: Lawrence J. Goldzband, Executive Director (415/352-3653 lgoldzband@bcdc.ca.gov)
Rafael Montes, Senior Engineer (415/352-3670 rafaelm@bcdc.ca.gov)

SUBJECT: Recommendation for Engineering Criteria Review Board Appointment
(For Commission consideration on June 5, 2014)

Summary and Recommendations

The staff recommends that the Chair, with the Commission's concurrence, appoint William T. Holmes, S. E. (Structural Engineering) and Professor Martin Fischer (Environmental Engineering, Stanford University) to serve on the Commission's Engineering Criteria Review Board.

Staff Report

The McAteer-Petris Act Government Code Section 66605 (e) states that, "public health, safety, and welfare require that fill be constructed in accordance with sound safety standards which will afford reasonable protection to persons and property against the hazards of unstable geologic or soil conditions or of flood or storm waters;..."

The Engineering Criteria Review Board (ECRB) advises the Commission on issues related to the safety of fills and structures on fills as prescribed in Section 10271 of the Commission's regulations. These regulations require, in part, that the ECRB include no more than 11 members, including geologists, architects and civil engineers specializing in geotechnical and coastal engineering.

Pursuant to Policy No. 1 of the *San Francisco Bay Plan* policies on the Safety of Fills, the ECRB is empowered to review the engineering criteria used for major Bay fill projects to determine the adequacy of their specific safety provisions, and make recommendations concerning these provisions.

Currently, the ECRB's membership includes nine members: one geophysicist, one architect, one geologist, two geotechnical engineers, two coastal engineers and two structural engineers. On May 1, 2014, you appointed the newest member to the Board, Ronald Mayes, Ph.D. (Structural Engineering). Mr. Holmes will be the third structural engineer to be appointed to the Board. Professor Fischer will be the third coastal and first environmental engineer to be appointed to the Board. No additional position remains vacant after this appointment. The following is a summary of Mr. Holmes' and Professor Fischer's professional credentials.



Making San Francisco Bay Better

Mr. Holmes has forty-five years of practical experience in all aspects of designing structures, particularly designing for protection from earthquake effects. He is highly respected by his peers, including members of the ECRB, in the area of Structural Engineering. Mr. Holmes is an expert in seismic vulnerability of buildings and loss estimation. He was the Senior Technical Advisory for the development of FEMA 273, which is the current standard for seismic analysis of buildings and is the basis for state-of-the-art vulnerability calculations. In 1990, he developed probable seismic losses from unreinforced masonry buildings in San Francisco that led to a retrofit ordinance. He has taken part in, or peer reviewed, projects to retrofit schools and other critical buildings in India and Turkey and performed seismic assessment of hospitals in India, Bhutan, and Nepal.

For a more comprehensive review of Mr. Holmes' professional qualifications, please see the Curriculum Vitae attached.

Professor Martin Fischer is a Professor of Civil and Environmental Engineering at Stanford University. He is the Director of the Center for Integrated Facility Engineering and the Coordinator of the Building Energy Efficiency Research at the Precourt Energy Efficiency Center (CIFE). CIFE's mission is to be the world's premier academic research center for Virtual Design and Construction of Architecture-Engineering-Construction (AEC) industry projects...to support exceptionally reliable engineering and management practices to plan, design, construct and operate sustainable facilities. Professor Fischer is among a group of Stanford engineers developing computer models to help port authorities and other government agencies make more informed decisions about adapting to climate change as they plan for the next generation of infrastructure.

For a more comprehensive review of Professor Fischer's professional qualifications, please see the Curriculum Vitae attached and a link to some of his profiled work.

<http://news.stanford.edu/news/2011/may/seaports-climate-change-051611.html>



WILLIAM T. HOLMES,
Structural Engineer
Senior Consultant
Rutherford & Chekene

Mr. Holmes has 45 years of practical experience in all aspects of designing structures, particularly designing for protection from earthquake effects. In addition to traditional structural engineering design of buildings, Mr. Holmes' interests and experience includes a remarkably wide variety of topics, including post earthquake reconnaissance and analysis, post earthquake response of hospitals, seismic protection of nonstructural systems, fragility and retrofit standards for URM and concrete buildings, regional loss estimation, development of seismic standards for both new and existing buildings, research and development of seismic technology, seismic isolation, public policy, and performance based seismic engineering.

Mr. Holmes has traveled to Armenia, Azerbaijan, Bhutan, Canada, China, Chile, Ecuador, Greece, India, Italy, Japan, Mexico, New Zealand, Pakistan, Thailand, and Turkey to speak at conferences and workshops or to consult with local officials relating to seismic design and retrofit.

He has taken part in, or peer reviewed, projects to retrofit schools and other critical buildings in India and Turkey and performed seismic assessment of hospitals in India, Bhutan, and Nepal.

Education

B.S., Civil Engineering, Stanford University, Stanford, CA
M.S., Structural Engineering, Stanford University, Stanford, CA

Registration

Registered Civil and Structural Engineer, California
Registered Professional Engineer, Tennessee,

**Professional Affiliations
and Honors**

Applied Technology Council (ATC), President, 1985-86; Board of Directors, 1983-1987
American Society of Civil Engineers, Life Member
California State Hospital Building Safety Board, Member 1983-95; Chair, 1988-93
Consortium of Universities for Research in Earthquake Engineering (CUREE), Board of Directors, 1994-present;
Earthquake Engineering Research Institute, Honorary Member; Board of Directors, 1990-93; Chair of Monograph Committee, 1994-2008; Chair of Learning From Earthquakes (LFE) Reconnaissance Program, 2005-present
Building Seismic Safety Council (BSSC), Provisions Update Committee for NEHRP Provisions, Chair, 1994-1997, 1997-2000
BSSC Exceptional Service Award, 2002
BSSC Board Chair, 2010-present
NEES Governance Board: Member 2010-present
Structural Engineers Association of Northern California (SEAONC), Fellow and Honorary Member; President, 1987-88; Board of Directors, 1979-81, 1987-89



Structural Engineers Association of California, Fellow, Board of Directors, 1981-83, 1988-91
Member, New Zealand Department of Building and Housing Structural Advisory Committee, 2006-present.
Robert Cornforth Award, National Council of Structural Engineers Associations, 2010
H.J. Brunner Award for outstanding achievement in structural engineering (SEAONC), 2005
Alfred E. Alquist Medal for Achievement in Earthquake Safety (Public Service) from the California Earthquake Safety Foundation, 1999
ATC Award of Excellence, Extraordinary Achievement in Seismic Rehabilitation of Buildings, 1998

Selected building design experience

Project Principal or Project Structural Engineer on the following engineering projects:
Marin County Community Mental Health Center, San Rafael, CA
Saddleback Community Hospital, Laguna Hills, CA
Jerry L. Pettis Memorial Veterans Hospital, Loma Linda, CA
Dept. of Justice Headquarters Office Building, Sacramento, CA
Main Library Expansion, UC Berkeley, CA
Allen Pavilion, Oregon Shakespeare Festival Ashland, OR
Restoration and Seismic Strengthening of 6 Historic Quad Buildings, Stanford University, CA
Seismic Protection of Computer Room and Related Equipment: Hewlett-Packard Headquarters, Palo Alto, CA
Survey of Nonstructural Seismic Risks at Six VA Hospitals
Evaluation of Compliance Requirements for CA SB1953: 20 various hospitals
Mills Peninsula Hospital Replacement Hospital (new 243 bed seismically isolated hospital), 2011
Lathrop Post Acute Rehab Center, Base Isolated Rehab Center, 2013

Selected peer reviews

International Peer Reviewer and Consultant for the New Zealand Royal Commission of Inquiry into the Canterbury Earthquakes 2011-2012
Retrofit of Five Government Lifeline Buildings, Delhi, India, 2005-2006.
Seismic Design of State Building, Anchorage, Alaska (Built on Site with Graben)
Santa Clara County Office Building (Damping Devices)
Oakland City Hall, CA (Base Isolation)
Member of Stanford University Design Criteria Panel (numerous panel criteria reviews and individual peer reviews)

Selected Studies and Research

Project Director (for Applied Technology Council), *Identification and Mitigation of High Risk Older Concrete Buildings*, Ongoing
Project Director (for NIST), Update of Strategies for NEHRP Post-Earthquake Investigations, 2013

Project Director (for BSSC), *Development of Concrete Model Buildings Types* for estimating seismic risk of older concrete buildings, 2010

Project Director (for BSSC), *Research Required to Take Full Advantage of Performance-Based Seismic Design*, prepared for NIST, 2008-9.

Co-Principal Author, FEMA 547/ICSSC RP-7, *Techniques for the Seismic Rehabilitation of Existing Buildings*, NIST, 2008

Chair, Project Steering Committee, ATC 58: *Development of Next-Generation Performance-Based Seismic Design Guidelines*

Senior Technical Advisor, ATC 33 (FEMA 273-ASCE 41): *NEHRP Guidelines for Seismic Rehabilitation of Buildings*, Member of Senior Technical Committee, 1993-97

Principal Investigator, *Seismic Performance Objectives for Tall Buildings*, A report for the PEER Tall Buildings Initiative.

Chair, Joint Venture Management Committee, SAC joint venture for research into steel frame failures on Northridge Earthquake, 1996-1999

Consultant for Structures to California Seismic Safety Commission, for Report to Governor on Northridge Earthquake, 1995

Co-Principal-in-Charge, "Development of Seismic Standards for Existing Federal Buildings," National Institute of Standards and Technology (NIST), 1992-93 Project Director of update to these standards, 2011.

Member of Project Working Group (7 person control panel), Development of a Standardized Earthquake Loss Methodology (HAZUS), National Institute of Building Sciences, funded by FEMA, 1991-present; Chair, 2000-present.

Project Principal, San Francisco Unreinforced Masonry Buildings Study, City of San Francisco, 1989

Structural Consultant, VA Study to Establish Seismic Protection for Furniture, Equipment and Supplies, Veteran Administration, 1978

Selected Publications and Lectures

Primary Author, "Application of the Recommendations of the Canterbury Earthquakes Royal Commission to the Design, Construction, and Evaluation of Buildings and Seismic Risk Policies in the United States," *Earthquake Spectra*, Volume 30, February, 2014.

Co-editor, Special Edition of EERI *Spectra* commemorating the Centennial of the 1906 Earthquake, 2006

"State of the Art Structural Rehabilitation and Practice," VIII Mexican Symposium on Earthquake Engineering, 2005

"Performance Based Seismic Engineering and the Retrofit Methods of FEMA 273/356," Turkish-Greek Joint Workshop, Athens and Istanbul, 2001

"The State of Practice of Seismic Retrofit in the United States," US-Japan Symposium and Workshop on Seismic Rehabilitation of Concrete Structures, Tokyo, 2000



State of the Art Speaker, "Risk Assessment and Retrofit of Existing Buildings," 12th World Conference on Earthquake Engineering, Auckland, New Zealand, 2000

The Background and History of the Seismic Hospital Program in California," Workshop on Seismic Design and Retrofitting of Hospitals in Seismic Areas, Florence, Italy, 1999

Keynote Speaker, ASCE Structures Congress, Portland, OR, 1997

"Evaluation of Existing Buildings," State of the Art speaker at the 11th World Conference on Earthquake Engineering, Acapulco, Mexico, 1996

Visiting Lecturer, The New Zealand National Society for Earthquake Engineering, New Zealand, 1996

Co-Editor, EERI Reconnaissance Report on Northridge Earthquake, Volume II, Buildings, 1996

Guest Lecturer, The First Workshop on Seismic Design of Structures, Bangkok, Thailand, 1995

"Policies and Standards for Re-occupancy Repair of Earthquake-Damaged Buildings," Earthquake Spectra, 10:1, Earthquake Engineering Research Institute, February 1994

"The Hazards of Unreinforced Masonry Buildings," SEAONC Fall Seminar, San Francisco, 1990

"Structural Protection of Nonstructural Elements in Existing Buildings," US/Italy Technical Exchange, Varenna, Italy, 1989



Martin Fischer

Professor of Civil and Environmental Engineering and (by Courtesy) Computer Science
The Jerry Yang & Akiko Yamazaki Environment & Energy Building
473 Via Ortega, Room 297, Stanford, CA 94305-4020
<http://www.stanford.edu/~fischer>, fischer@stanford.edu

Martin Fischer is a Professor of Civil and Environmental Engineering and (by Courtesy) Computer Science at Stanford University. He is also the Director of the Center for Integrated Facility Engineering and the Coordinator of the Building Energy Efficiency Research at the Precourt Energy Efficiency Center. His research focuses on modeling, predicting, measuring, and improving the life-cycle performance of the built environment. He is known globally for his work and leadership in developing virtual 4D modeling (time plus 3D) methods to improve project planning, enhance facility life-cycle performance, increase the productivity of project teams, and further the sustainability of the built environment. His award winning research results have been used by many small and large industrial and government organizations around the world. He has lived, worked, consulted, and taught in Europe, South America, North America, and Asia. He is a graduate of the Swiss Federal Institute of Technology in Lausanne and Stanford University and a Foreign Member of the Royal Swedish Academy of Engineering Sciences.

Martin A. Fischer

Professional Preparation

Diploma, Civil Engineering, Swiss Federal Institute of Technology, Lausanne, January 1984

M.S., Industrial Engineering, Stanford University, June 1987

Ph.D., Civil Engineering, Stanford University, June 1991

Main Current Appointment

2006-present Professor, Civil and Environmental Engineering, Stanford University

Other Current Appointments

2009-present Affiliated Faculty, Woods Institute for the Environment

2009-present Affiliated Faculty, Emmett Interdisciplinary Program in Environment and Resources (E-IPER)

2009-present Senior Fellow, Precourt Institute for Energy, Stanford

2009-present Courtesy Faculty Appointment in Computer Science, Stanford University

2008-present Coordinator, Energy Efficiency for Buildings, Precourt Inst. for Energy Efficiency, Stanford

2001-present Director, Center for Integrated Facility Engineering (CIFE), Stanford

Prior Appointments

2008-2012 Advisory Professor, School of Economics and Management, Tongji University, Shanghai, China

2006 Visiting Professor, Dept. of Civil Eng., Helsinki University of Technology, Helsinki, Finland

2002-2013 Visiting Professor, School of Construction & Property Mgt., University of Salford, UK

1999-2006 Associate Professor, Civil and Environmental Engineering, Stanford University

1992-99 Assistant Professor, Civil and Environmental Engineering, Stanford University

1996 Visiting Professor, Queensland University of Technology, Australia

1991-92 Acting Assistant Professor, Civil and Environmental Engineering, Stanford University

1984-91 Various positions in industry and academia in Switzerland, Germany, USA, and Japan

Selected Awards

2012 Elected Foreign Member, Royal Swedish Academy of Engineering Sciences

2002 Best Paper, ASCE Journal on Computing in Civil Engineering

2000 Best Paper, Artificial Intelligence in Design (AID) Conference

1996 Engineering News Record Top 25 Newsmaker\

1996 CAREER Award, NSF

Selected Publications

- Austin Becker, Satoshi Inoue, Martin Fischer, Ben Schwegler (2012). "Climate change impacts on international seaports: knowledge, perceptions, and planning efforts among port administrator." *Climatic Change*, January 2012, Volume 110, Issue 1-2, pp 5-29.
- Roshan Mehdizadeh and Martin Fischer (2012). "Sustainability Rating Systems." *Journal of Green Building*, Spring 2012, Vol. 7, No. 2, pp. 177-203.
- Fischer, Martin (2008). "Reshaping the life cycle process with virtual design and construction methods." *Virtual Futures For Design, Construction And Procurement*, Brandon, Peter and Kocaturk, Tuba (eds.), Blackwell Publishing, 104-112.
- Tobias Maile, Vladimir Bazjanac, and Martin Fischer (2012). "A method to compare simulated and measured data to assess building energy performance." *Building and Environment*, Volume 56, October 2012, 241-251.
- Haymaker, John; Fischer, Martin; Burke, Kevin; and McDonough, William (2004). "Tools to Signal C2C Design Intention." Invited Paper to the CIB W78 Workshop on Integrated Systems to Support Sustainability, Toronto, May 7-8, Electronic Proceedings.

Other Publications

- Flager, Forest; Adya, Akshay; Haymaker, John; and Fischer, Martin (2014). "A bi-level hierarchical method for shape and member sizing optimization of steel truss structures." *Computers & Structures*, vol. 131, pp. 1-11.
- Ernestine Fu, David Newell, Austin Becker, Ben Schwegler, Martin Fischer (2013). "Is Adaptation Sustainable? A Method to Estimate Climate-Critical Construction Resource Capacity." *Construction Innovation*:

Information, Process, Management, special issue on Addressing Global Challenges for a Sustainable Built Environment, 13(2), pp. 202-216.

- Roshan Mehdizadeh, Martin Fischer, and Judee Burr (2013). "The Green Housing Privilege? An Analysis of the Connections between Socio-Economic Status of California Communities." *Journal of Sustainable Development*, 6(5), pp. 37-49.
- Flager, F., J. Basbagill, M Lepech and M Fischer. (2012). Multi-objective building envelope optimization for life-cycle cost and global warming potential. 9th European Conference on Product and Process Modeling. Reykjavik, Iceland. G. Gudnason and R. Scherer (eds). London: Taylor & Francis Group, 193-200.
- Rebolj, D, Fischer, M, Endy, D, Moore, T, Šorgo, A. (2011), Can we grow buildings? Concepts and requirements for automated nano- to meter-scale building. *Advanced engineering informatics* vol. 25, 390-398.

Synergistic Activities

- Co-Chair, Faculty Committee on Sustainable Urban Systems Program, Stanford University
- Director, Center for Integrated Facility Engineering (CIFE); since 1988, CIFE has carried out applied research to integrate design, construction, and operations for buildings and infrastructure through the development and application of advanced information technology and collaboration
- Co-Founder of Virtual Design and Construction (VDC) Certificate Program for professionals; since 2008, the program has taught VDC methods to almost 1,000 construction industry professionals from around the world
- Chief Advisor, Green Products Innovation Institute (invited to launch the Institute on May 20, 2010, together with Governor Schwarzenegger and Bill McDonough)
- Co-founder of 4D modeling software firm (sold to Bentley)

Collaborators over the past 48 months

L. Alarcon (Univ. Catolica, Santiago, Chile), R. Arbulu (SPS), V. Bazajanc (LBNL), M. Esteban (Waseda), G. Dewulf (Univ. Twente, Netherlands), R. Drogemuller (QUT, Australia), Z. Haddad (CCC, Athens, Greece), R. Hänninen (Granlund, Finland), D. Hudgens (Accu-Crete), V. Kamat (Univ. Michigan), K. Ku (VT), R. Jongeling (Plan B, Sweden), T. Moore (Michigan State), S. Polalis (Harvard), D. Reed (DPR), D. Rebolj (Univ. Maribor, Slovenia), A. Ripberger (Sfirion, Munich), L. Rischmoller (PB), M. Schreyer (Max Boegl, Germany), B. Schwegler (WDI), R. See (Digital Alchemy), O. Seppanen (Vico), K. Seto (Yale), D. Shelden (Gehry Technologies), A. Šorgo (Univ. Maribor, Slovenia), T. Tutti (Tocoman), T. Zabelle (Strategic Project Solutions)

Graduate Advisors

Principal Ph.D. Advisor: Bob Tatum, Civil & Env. Engineering, Stanford University

Other Ph.D. Advisors: Ray Levitt, Stanford, Helmut Krawinkler, Stanford, Paul Adler, USC

Post-Doctoral Students in Past 5 Years

Reid Senescu, Benjamin Welle

Ph.D. Graduates

Florian Aalami (ADAPT Structural Concrete Software), Ragip Akbas (Consultant), Burcu Akinci (CMU), Austin Becker (Univ. of Rhode Island), Mark Clayton (Texas A&M University), Ning Dong (DPR), Forest Flager (Stanford), Ju Gao (Univ. of Hong Kong), Timo Hartmann (Univ. of Twente, Netherlands), John Haymaker (GeorgiaTech), Calvin Kam (bimSCORE), Atul Khazode (DPR), Jonghoon Kim (DPR Construction), Taewan Kim (City Univ. of Hong Kong), Arto Kiviniemi (Univ. of Liverpool, UK), Bonsang Koo (Seoul National Univ. of Technology, Korea), Kathleen Liston (Moderna Homes), Tobias Maile (LBL), Claudio Mourgues (Pontificia Universidad Catolica, Santiago, Chile), William O'Brien (UT Austin), Reid Senescu (CDR, Stanford), Sheryl Staub-French (Univ. of British Columbia), Victor Gane (Startup), Benjamin Welle (Perkins+Will), Peggy Yee (GSA)

Total number of graduate students advised: 10 post-doctoral students, 24 Ph.D. students as principal advisor, 18 Ph.D. students as committee member, 21 Engineer degree students

Total number of graduate students currently advising: 12 Ph.D. students as principal advisor, 1 Ph.D. student as co-advisor, 7 as committee member, 2 Engineer degree students