

RELATED CORRESPONDENCE

October 2, 2001

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

DOCKETED
USNRC

Before the Atomic Safety and Licensing Board

October 9, 2001 (12:40PM)

OFFICE OF SECRETARY
RULEMAKINGS AND
ADJUDICATIONS STAFF

In the Matter of)	
)	
PRIVATE FUEL STORAGE L.L.C.)	Docket No. 72-22
)	
(Private Fuel Storage Facility))	ASLBP No. 97-732-02-ISFSI

**APPLICANT'S EIGHTH SUPPLEMENTAL RESPONSE TO
STATE'S FIRST REQUESTS FOR DISCOVERY**

Applicant Private Fuel Storage L.L.C. ("Applicant" or "PFS") files this Eighth Supplemental Response to "State of Utah's First Set of Discovery Requests Directed to the Applicant," dated April 9, 1999 ("State's First Discovery Requests"). The Applicant files this Supplemental Response pursuant to 10 C.F.R. § 2.740(e), to name additional witnesses it may call at hearing. The Applicant's original response to the State's First Discovery Requests noted that it would file such supplemental responses as it identified additional witnesses.¹

I. GENERAL DISCOVERY REQUESTS

A. GENERAL INTERROGATORIES

GENERAL INTERROGATORY NO. 3. For each admitted Utah contention, give the name, address, profession, employer, area of professional expertise, and educational and scientific experience of each person whom PFS expects to call as a witness at the hearing. For purposes of answering this interrogatory, the educational and scientific experience of expected witnesses may be provided by a resume of the person attached to the response.

¹ Applicant's Objections and Non-Proprietary Responses to State's First Requests for Discovery, dated April 21, 1999, at 17.

APPLICANT'S RESPONSE: The Applicant supplements its response to the State's First Discovery Requests by identifying the following additional persons whom the Applicant expects to call as witnesses at the hearing with respect to the State's admitted contention Part B of Utah Contention L ("Part B of Utah L"). The Applicant is still in the process of identifying witnesses that it expects to call at the hearings and will supplement this response in accordance with 10 C.F.R. § 2.740(e).

Part B of Utah L (Geotechnical)

<u>Name and Address:</u>	Dr. C. Allin Cornell 110 Coquito Way Portola Valley, CA 94028
<u>Profession:</u>	Professor (Research)
<u>Employer:</u>	Stanford University
<u>Professional Expertise:</u>	Probabilistic Methods, Structural Engineering, Earthquake Engineering
<u>Educational, Scientific Experience, and Professional Qualifications:</u>	See attached resume
<u>Publications in the last ten years:</u>	See attached resume
<u>Testifying experience as expert in last four years:</u>	Testimony before California Earthquake Authority, July 1997
<u>Subject Matter of Testimony:</u>	Appropriate standards for the performance of Probabilistic Seismic Hazards Analysis for the PFSF. Dr. Cornell will testify concerning the conservatism of seismic design for constructed facilities and the adequacy of the 2,000 year return period earthquake as the standard for the PFSF seismic design

Documents reviewed and/or relied upon:

The documents reviewed and relied upon by Dr. Cornell will include the PFS Safety Analysis, seismic RAI responses, studies performed by PFS's consultants including himself, including the probabilistic seismic hazards analysis, and technical papers and documents related to seismic safety. In addition, Dr. Cornell may review and rely upon documents produced by the State as well as any new information that may come into PFS's possession.

Name and Address:

Mr. Bruce E. Ebbeson
Stone & Webster
3 Executive Campus
Route 70 & Cuthbert Boulevard
Cherry Hill, NJ 08034

Profession:

Structural Engineer

Employer:

Stone & Webster, Inc.

Professional Expertise:

Structural design and analysis, including seismic analysis of nuclear facilities

Educational, Scientific Experience, and Professional Qualifications:

See attached resume

Publications in the last ten years:

See attached resume

Testifying experience as expert in last four years:

None

Subject Matter of Testimony:

Structural design of the important-to-safety structures, systems and components ("SSCs") in the Canister Transfer Building at the PFSF and the ability of those SSCs to withstand seismic loadings

Documents reviewed and/or relied upon:

Mr. Ebbeson will rely on the design documents generated by Stone & Webster, equipment vendors and other parties for the PFSF, the PFS SAR, and other information supplied by PFS or developed by Stone & Webster. Mr. Ebbeson may rely as well on document produced by the State or other documents that may come into PFS's possession.

Name and Address: Dr. Krishna P. Singh
Holtec International
555 Lincoln Drive West
Marlton, NJ 08053

Profession: Executive and Mechanical Engineer

Employer: Holtec International

Professional Expertise: See attached resume

Educational, Scientific Experience,
and Professional Qualifications: See attached resume

Publications in the last ten years: See attached resume

Testifying experience as expert in last
four years: Expert witness in fall 1995 trial between owners of
the South Texas Project and Westinghouse
concerning the South Texas steam generators. Was
subsequently deposed in 1996 in litigation involving
Pacific Northwest laboratories

Subject matter of testimony: Dr. Singh will testify to the robustness of the design
of the HI-STORM 100 cask storage system and its
ability to withstand seismic events without releasing
radioactive materials to the environment

Documents reviewed and/or relied
upon: Dr. Singh will rely on the Topical Safety Analysis
Report for the HI-STORM 100 and materials and
analyses therein, and other information supplied by
PFS or developed by Holtec. In addition, Dr. Singh
may rely on the PSF SAR as well as documents
produced by the State and other documents that may
come into PFS's possession.

Name and Address: Dr. Alan Soler
Holtec International
555 Lincoln Drive West
Marlton, NJ 08053

Profession: Mechanical Engineer

Employer: Holtec International

Professional Expertise: Mechanical design and dynamics of spent fuel casks
and fuel racks

Educational, Scientific Experience, and Professional Qualifications: See attached resume

Publications in the last ten years: See attached resume

Testifying experience as expert in last four years: None

Subject Matter of Testimony: Dr. Soler will testify to the robustness of the design of HI-STORM 100 cask storage system and its ability to withstand seismic events, including those in excess of the 2,000 year return period earthquake

Documents reviewed and/or relied upon: The documents reviewed and relied upon by Dr. Soler will include the Topical Safety Analysis Report, the cash stability analysis of the HI-STORM casks, and other information supplied by PFS or developed by Holtec. In addition, Dr. Soler may review and rely upon documents produced by the State as well as any new information that may come into PFS's possession.

GENERAL INTERROGATORY NO. 4. For each admitted Utah contention, identify the qualifications of each expert witness whom PFS expects to call at the hearing, including but not limited to a list of all publications authored by the witness within the preceding ten years and a listing of any other cases in which the witness has testified as an expert at a trial, hearing or by deposition within the preceding four years.

APPLICANT'S RESPONSE: See Response to General Interrogatory 3 above.

The Applicant is still in the process of identifying expert witnesses that it expects to call at the hearings and will supplement this response in accordance with 10 C.F.R.

§ 2.740(e).

GENERAL INTERROGATORY NO. 5. For each admitted Utah contention, describe the subject matter on which each of the witnesses is expected to testify at the hearing, describe the facts and opinions to which each witness is expected to testify, including a summary of the grounds for each opinion, and identify the documents (including all pertinent pages or parts thereof), data or other information which each witness has reviewed and considered, or is expected to consider or to rely on for his or her testimony.

APPLICANT'S RESPONSE. See Applicant's Response to General

Interrogatory No. 3 above. Pursuant to previous discussion and agreement with counsel for the State of Utah, Applicant will identify and/or provide copies of documents relied upon, or expected to be relied upon, by Applicant's experts.

Respectfully submitted,



Jay E. Silberg
Ernest L. Blake, Jr.
Paul A. Gaukler
Matias F. Travieso-Diaz
SHAW PITTMAN
2300 N Street, N.W.
Washington, DC 20037
(202) 663-8000

Dated: October 2, 2001

Counsel for Private Fuel Storage L.L.C.

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

Before the Atomic Safety and Licensing Board

In the Matter of)	
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PRIVATE FUEL STORAGE L.L.C.)	Docket No. 72-22
)	
(Private Fuel Storage Facility))	ASLBP No. 97-732-02-ISFSI

CERTIFICATE OF SERVICE

I hereby certify that copies of Applicant's Eighth Supplemental Response to State's First Requests for Discovery, the attached resumes and declaration of Paul Gaukler were served on the persons listed below (unless otherwise noted) by e-mail with conforming copies by U.S. mail, first class, postage prepaid, this 2nd day of October, 2001.

G. Paul Bollwerk III, Esq., Chairman
Administrative Judge
Atomic Safety and Licensing Board Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
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Dr. Jerry R. Kline
Administrative Judge
Atomic Safety and Licensing Board Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
e-mail: JRK2@nrc.gov; kjerry@erols.com

Dr. Peter S. Lam
Administrative Judge
Atomic Safety and Licensing Board Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
e-mail: PSL@nrc.gov

* Office of Commission Appellate
Adjudication
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Office of the Secretary
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001
Attention: Rulemakings and Adjudications
Staff
e-mail: hearingdocket@nrc.gov
(Original and two copies)

* Adjudicatory File
Atomic Safety and Licensing Board Panel
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

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U.S. Nuclear Regulatory Commission
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David W. Tufts, Esq.
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Salt Lake City, Utah 84105
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*Richard E. Condit, Esq.
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2260 Baseline Road, Suite 200
Boulder, CO 80302

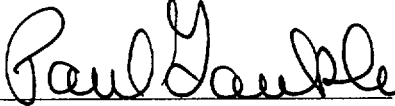
* By U.S. mail only

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Paul A. Gaukler

**UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION**

Before the Atomic Safety and Licensing Board

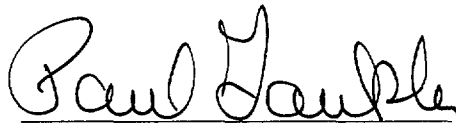
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PRIVATE FUEL STORAGE L.L.C.)	Docket No. 72-22
)	
(Private Fuel Storage Facility))	ASLBP No. 97-732-02-ISFSI

DECLARATION OF PAUL A. GAUKLER

Paul A. Gaukler states as follows under penalties of perjury:

1. I am with Shaw Pittman in Washington, D.C.
2. I am duly authorized to verify Applicant's Eighth Supplemental Response to State's First Requests for Discovery; specifically, the supplemental response to General Interrogatory Nos. 3-5.
3. I certify that the statements in such responses are true and correct to the best of my personal knowledge and belief.
4. I declare under penalty and perjure that the foregoing is true and correct.

Executed on October 2, 2001.


Paul A. Gaukler

RESUME OF
ALAN I. SOLER Ph.D.

ALAN I. SOLER, Ph.D.

EXECUTIVE VICE PRESIDENT
HOLTEC INTERNATIONAL

EDUCATION

University of Pennsylvania
Ph.D. in Mechanical Engineering (1962)

California Institute of Technology
M.S. in Mechanical Engineering (1959)

University of Pennsylvania
B.S. in Mechanical Engineering (1958)

AREAS OF PROFESSIONAL CONCENTRATION

Dynamics of casks and fuel racks, impact, mechanical design of cask and MPCs, failure analysis of reinforced concrete structures, cask transporter design, NUREG-0612 compliance, crane design and stress analysis.

PROFESSIONAL EXPERIENCE

HOLTEC INTERNATIONAL

Marlton, New Jersey
1986 – Present Executive Engineer

UNIVERSITY OF PENNSYLVANIA

Philadelphia, Pennsylvania
1966 - 1991 Professor of Mechanical Engineering and Applied Mechanics

INGERSOLL-RAND RESEARCH CENTER

Princeton, New Jersey
May 1964–Sept. 1965 Member of Technical Staff

DYNASTRUCTURES, INC., CONSULTANTS IN APPLIED MECHANICS

Philadelphia, Pennsylvania
May 1962–May 1964 Research Specialist

ACADEMIC HONORS

Tau Beta Pi
Sigma Tau
Society of Sigma Xi

PROFESSIONAL SOCIETY MEMBERSHIPS/ACTIVITIES

Member, ASME, Fellow ASME, 1986
Treasurer, University of Pennsylvania Chapter, Sigma Xi, 1968-70.
General Arrangements Committee Member, 1969, ASME Vibrations Conference.
ASEE Local Activity Coordinator, 1968-1974.

Member, Rotordynamics Subcommittee, ASME Design Division, 1973-1974.
Local Arrangements Committee, 1971 Summer ASME Applied Mechanics Meeting.
Recording Secretary, ASME Applied Mechanics Division, Publication Committee, 1971-1972.
-Applied Mechanics Representative to ASME Power Division Subcommittee on Environmental Policy, 1974-1976.
Member, Turbine and Auxiliaries Committee, ASME Power Division, 1974-76, Papers Review
Member, Task Group on Heat Transfer Equipment, ASME, working group #1 (tubesheets), 1975-1998.
Member - Subcommittee on Pressure Vessels and Piping, Nuclear Engineering Division, ASME, 1976-1987, Chairman, 1984-1987.

TECHNICAL CONSULTING

Consultant to Solid Mechanics Group, Ingersoll-Rand Research Center, Princeton, New Jersey, September 1965 - December 1966.
Consultant to Condenser Engineering Department, Ingersoll-Rand Corporation, Phillipsburg, New Jersey, September 1965 - 1982. Consultant to Structural Mechanics Associates, November 1958 - January 1969.
Visiting Scientist, Mechanical Engineering Research Division, Livermore Laboratories, Livermore, CA, Summer 1973, 1974 (AEC "Q" Clearance).
Member of Consulting Group, Thermac Associates, 1975 - 1986.
Consultant to Joseph Oat Corp. - Manufacturers of Nuclear Heat Exchangers. Camden, New Jersey, 1975 - 1986.
Consultant to Heat Exchange Institute - Nuclear HEX, 1978-1979.
Consultant, Inc., Wilson Div., Reading, PA, 1979-1980.
Consultant, NADC, Willow Grove, PA, 1984-1986.

PATENTS

Patent #3,382,918, May 1968, Reinforcing Structure for Direct Flow Steam Dome for Condensers (with Mr. R. J. Stoker and Dr. B. Paul of Ingersoll-Rand Corporation).

DRY SPENT FUEL STORAGE TECHNOLOGY

1992-Present: Lead Analyst in Mechanical/Seismic/Structural analysis in support of Holtec=s Dry Storage submittals for dual-purpose casks (HI-STAR 100 for Storage and Transport) and for METCON casks (HI-STORM 100 for Storage).

1994: Performed cask tip-over and drop analysis to support \$50.59 effort for defueling Shoreham Station using IF-300 casks.

1995: Principal Analyst for evaluating cask drop events for Connecticut Yankee.

1997: Co-developer of the dynamic formalism to predict peak cask deceleration from cask tip-over and drop event on ISFSI pads.

1996: Principal designer of HI-STAR 100 Impact Limiter.

1998: Developer of the "penetration area principle" to predict impact limiter response under cask drop events; method was verified using quarter-scale tests.

1999: Designer and principal analyst for Holtec International's autonomous "Cask Transfer Facility" (CTF).

HIGH DENSITY FUEL RACK STRESS ANALYSIS

- Principal developer of Holtec's rack dynamic analysis code DYNARACK. This code is widely recognized as the most sophisticated program for high density rack seismic analysis.
- Performed seismic analysis of high density racks for 36 Nuclear Power Plants in the period 1980 to present.
- Pioneered dynamic analysis techniques of elevated pool slabs. Qualified the elevated pool slabs of Quad City Units 1 and 2, Grand Gulf and Oyster Creek using dynamic reinforced concrete analysis (all approved by the USNRC).

LICENSING SUPPORT

- Provided licensing support on over forty high-density rack applications to the USNRC (in the past twenty years).
- Appeared as expert witness (support) for Pacific Gas & Electric in Diablo Canyon reracking license review (1987).

PUBLICATIONS/PRESENTATIONS

1. "On the Lobar and Longitudinal Vibrations of Solid Propellant Rocket Motors", (with H. B. Kingsbury and J. R. Vinson) Proceedings of the 6th Solid Propellant Rocket Conference, AIAA, Washington, D.C. (February 1965).
2. "On the Solution to Transient Coupled Thermoelastic Problems by Perturbation Techniques", (with M. A. Brull) presented at the Summer Applied Mechanics Meeting of ASME (June 1965) and published in the Journal of Applied Mechanics (June 1965).
3. "A New Perturbation Technique for Differential Equations with Small Parameters", (with M. A. Brull), Quarterly of Applied Mathematics XXIV, No. 2 (July 1966) and presented at the 5th National Congress on Applied Mechanics, Minneapolis, Minnesota (June 1966).
4. "On Rolling Contact and the Theorem of Angular Momentum", (with S. C. Batterman), Journal of Engineering Education 67, 9 (May 1967).
5. "Higher Order Effects in Thick Rectangular Beams", International Journal of Solids and Structures 4, (July 1968) pp. 723-739.
6. "On the Vibrations and Stability of Moving Bands", Journal of the Franklin Institute (October 1968).
7. "Higher Order Theories for Structural Analysis Using Legendre Polynomial Expansions", presented at ASME Winter Annual Meeting, Los Angeles, CA (November 1969), and published in Journal of Applied Mechanics (December 1969).

8. "One Dimensional Viscous Magnetofluidynamic Flow in an Annulus", (with S. Schwietzer), presented at the AIAA Fluid and Plasma Dynamics Conference, San Francisco, California (June 1969), and published in Journal of the Franklin Institute 289, No. 6 (June 1970).
9. "On the Solution of Finite Deformation Problems of Beams Using Rate Equations", (with J. Lehner), Journal of Applied Mechanics, (March 1970) pp. 207-210.
10. "Approximate Theory for Locally Loaded Plant Orthotropic Beams", (with H. Tsai), International Journal of Solids and Structures 6, (1970) pp. 1055-1068.
11. "Approximate Solution of the Finite Cylinder Problem Using Legendre Polynomials" (with J. Fellers), AIAA Journal 8, No. 11 (November 1970) and presented at the 6th U.S. Congress on Applied Mechanics (June 1970).
12. "On Analysis of Cable Network Systems Using Galerkin's Method", (with H. Afshari), Journal of Applied Mechanics, (September 1970) pp. 606-612.
13. "On the Buckling of Rings", (with S. C. Batterman), ASCE Engineering Mechanics Journal (December 1970).
14. "Dynamic Response of Single Cables with Initial Sag", Journal of the Franklin Institute (October 1970).
15. "Analysis of Cable Dynamics and Optimum Towing Strategies for Tethered Submersibles", (with B. Paul), presented at the Ocean Engineering Symposium, University of Pennsylvania (November 19-20, 1970), and published in Journal of Marine Technology 6, 2 (April 1972) pp. 34-41.
16. "Circumferential Forces and Moments in Edge Loaded Conical Shell Elements", Journal of Applied Mechanics (March 1972) pp. 290-291.
17. "Pre-twisted Curved Beams of Thin-Walled Open Section", Journal of Applied Mechanics (September 1972) pp. 779-786.
18. "Thermal Stresses and Initial Deformation of Heated Condenser Tubes", Journal of Engineering for Power (April 1973) pp. 84-91.
19. "New Results on Applications of Multi-Segment Stepwise Integration to First Order Equations", (with G. J. Hutchins), Journal of Computer Methods in Applied Mechanics and Engineering (1972) pp. 307-316.
20. "Dynamics of Cables and Cable Systems", Shock and Vibration Digest 5, 3 (March 1973) pp. 1-9.
21. "Cable Network Vibrations Using Galerkin's Method of Polynomial Approximating Functions", (with H. Afshari), Journal of Applied Mechanics (June 1973) pp. 622-624.
22. "Analysis of Moderately Thick Shells of Revolution", (with G. J. Hutchins), Journal of Applied Mechanics (December 1973) pp. 955-961.

23. "Project Cyclops - A Design Study of a System for Detecting Extraterrestrial Life", contributing author, NASA Report CR114445 (October 1972).
24. "Vibration of Cable Gridworks with Small Initial Deformation", (with H. Afshari), *Journal of Applied Mechanics* (December 1973), and presented at Winter ASME Meeting, Detroit, Michigan (November 1973).
25. "Transverse Elastic Buckling of Plane Pipe Gridworks", (with H. Afshari, *Journal of Structures, ASCE* (April 1974).
26. "On Seal Forces in Removable End Closure in Very High Pressure Test Chambers", *ASME Journal of Pressure Vessel Technology* (February 1975).
27. "Limit Design of Condenser Hotwell Floors", *ASME Journal of Engineering for Power* (October 1975) pp. 628-633.
28. "Stability of Rotor-Bearing Systems with Generalized Support Flexibility and Damping and Aerodynamic Cross-Coupling", (with R. E. Warner), presented at ASME Lubrication Conference, Toronto (October 1974), and published in the *ASME Journal of Lubrication Technology* (July 1975) pp. 461-472.
29. "Tubesheet Design in U-Tube Heat Exchangers Including the Effect of Tube Rotational Restraint", published in *Journal of Engineering for Industry* 98, 4 (November 1976) pp. 1157-1160 and presented at Design Engineering Conference, Chicago, IL (April 1976).
30. "Effective Bending Properties for Stress Analysis of Rectangular Tubesheets", (with W. Hill), published in *ASME Journal for Power* 99, 3 (July 1977) pp. 365-370, presented at 1976 ASME Annual Meeting.
31. "Stress Analysis of a U-Tube Heat Exchanger Tubesheet with an Integral Channel and an Unperforated Rim", presented by Pressure Vessel and Piping Division, ASME Mexico City Conference (September 1976) (76-PV-58).
32. "Analysis of Beam Columns on Elastic Plastic Foundations with Application to Power Plant Condenser Support Plate Design", (with C. Shahravan), published in *ASME Journal of Engineering for Power*, 100 (January 1978) pp. 182-188.
33. "Analysis of Closely Spaced Double Tubesheets under Mechanical and Thermal Loading", presented at 1977 Joint Power Generation Conference, ASME, Los Angeles, California (77-JPGC-NE-21).
34. "The Tubesheet Analysis Method in the New HEI Condenser Standards", (with M.D. Bernstein), presented at the 1977 Joint Power Generation Conference, ASME, Los Angeles, California, published in *ASME Journal for Power* 100 (April 1978) pp. 363-368.
35. "Design Curves for Stress Analysis of U-Tube Heat Exchanger Tubesheet with Integral Channel and Head", (with J. E. Soehrens) *Journal of Pressure Vessel Technology* 100 (May 1978) pp. 221-233.

36. "Design of Condenser Hotwell Floor for Pressure Loading", presented at ASME 1978 Annual Meeting, ASME Advances in Reliability and Stress Analysis H00119 (1979) pp. 203-215.
37. "A Preliminary Assessment of the HEI Tubesheet Design Method - Comparison with a Finite Element Solution", presented at ASME 1978 Winter Annual Meeting, ASME Advances in Reliability and Stress Analysis H00119 (1979) pp. 127-146.
38. "Analysis of Bolted Joints with Nonlinear Gasket Behavior", ASME Journal of Pressure Vessels 102 (August 1980) pp. 249-256.
39. "Stress Analysis of Rectangular Tubesheets for Condensers", Paper 80-C2/NE-14 presented at ASME Nuclear Engineering Conference, San Francisco, California (August 1980).
40. "A Finite Element Model for Thick Beams", (with D. Barrett) Computer Methods in Applied Mechanics and Engineering 25 (1981) pp. 299-313.
41. "A Design Concept for Minimizing Tubesheet Stress and Tubejoint Load in Fixed Heat Exchangers", (with K. P. Singh) 1982 ASME Pressure Vessel and Piping Conference, Orlando, Florida; Int. Journal for Pressure Vessel Technology, Trans. ASME (c. 1982).
42. "Dynamic Coupling in a Closely Spaced Two Body System Vibrating in a Liquid Medium: The Case of Fuel Racks", (with K. P. Singh) 1982 SMIRT Conference, Keswick, England (May 1982).
43. "A Finite Element Model for Thickwalled Axisymmetric Shell", (with D. J. Barrett), ASME Journal of Pressure Vessel Technology 104, (August 1982) pp. 215-222.
44. "Design Parameters Affecting Bolt Load in Ring Type Gasketed Joints", (with K. P. Singh), Journal of Pressure Vessel Technology, Trans. ASME (1984).
45. "Effect of Non-Uniform Inlet Air Flow on Air-Cooled Heat Exchanger Performance", (with K. P. Singh and T. L. Ng) presented at Joint ASME-JSME Transfer Conference, Hawaii (March 1983) and published in Conference Proceedings.
46. "A Method for Computing Maximum Water Temperature in a Fuel Pool Containing Spent Nuclear Fuel", (with K. P. Singh) presented at Fourth International Conference on Pressure Vessels and Piping, Portland, Oregon (June 1983), Nuclear Technology, ANS (c. 1984).
47. "Seismic Response of Free Standing Fuel Rack Constructions to 3-D Floor Motions", (with K. P. Singh) presented at the Fourth International Conference on Pressure Vessels and Piping, Portland, Oregon (June 1983) and published in Nuclear Engineering and Design 80, (1984) pp. 315-329.
48. "Analysis of Tube-Tubesheet Joint loading Including Thermal Loading", (with Xu Hong) published in Journal of Applied Mechanics (June 1984), and presented at 1984 Pressure Vessels and Piping Conference.
49. "Analysis and Design of Pressure Vessel Bolted Flanges with Non Linear Gasket Materials", 11th Conference on Production Research and Technology - Computer Based Factory Automation, Conference Proceedings, Carnegie Mellon University, Pittsburgh, PA (May 1984).

50. "Foundation Stresses under Support of Freestanding Equipment Subjected to External Loads", (with K. P. Singh and I. Gottesman), International Journal of Pressure Vessels and Piping, Vol. 20, No. 2 (1985) pp. 127-138.
51. "Finite Elements for Thick 3-D Shells", (with A. Khaskia), International Journal of Pressure Vessel Technology, 1985.
52. "Tube-to-Tubesheet Rolled Joints: Part I - Analysis Including Strain Hardening and Temperature Dependent Properties", (with S. Weinstock), Proceedings of ASME 1985 Pressure Vessel and Piping Conference H00329, New Orleans, LA.
53. "Tube-to-Tubesheets Rolled Joints: Part II - Experimental Analysis", (with K. Reinis), Proceedings of ASME 1985 Pressure Vessel and Piping Conference H00329, New Orleans, LA.
54. "An Elastic Plastic Analysis of the Integral Tubesheet in U-Tube Heat Exchangers - Towards an ASME Code Oriented Approach", (with K. P. Singh), Proceedings of ASME 1985 Pressure Vessel and Piping Conference H00329, New Orleans, LA.
55. "A Design Procedure for Evaluating the Tube Axial Load due to Thermal Effects in Multi-Pass Fixed Tubesheet Exchangers", (with K. P. Singh), ASME Journal of Pressure Vessel Technology (c. 1986).
56. "Tubesheet Analysis - A Proposed ASME Design Procedure" (with S. Caldwell and K. P. Singh), ASME Karl Gardner Memorial Symposium Proceedings (c. 1986). Channel and an Unperforated Rim, presented by Pressure Vessel and Piping Division, ASME.
57. "Some Results From Simultaneous Seismic Simulations of all Racks in a Fuel Pool", with K.P. Singh, INMM Spent Fuel Management Seminar X, Washington, D.C., January, 1993.
58. Application of Transient Analysis Methodology to Quantify Thermal Performance of Heat Exchangers, I. Rampall, K.P. Singh, A. Soler, and B. Scott, Heat Transfer Engineering, 1997.
59. "Seismic Response Characteristics of HI-STAR 100 Cask System on Storage Pads", with K.P. Singh and Mark G. Smith, INMM Conference, Washington, DC, January, 1998.

RESUME OF
KRISHNA P. SINGH, Ph.D.

RESUME

**KRISHNA P. SINGH, Ph.D.
PRESIDENT & CEO**

EDUCATION

**University of Pennsylvania
Ph.D. in Mechanical Engineering (1972)**

**University of Pennsylvania
M.S. in Mechanical Engineering (1969)**

**B.I.T. Sindri, Ranchi University
B.S. In Mechanical Engineering (1967)**

PROFESSIONAL EXPERIENCE

**HOLTEC INTERNATIONAL
Marlton, New Jersey**

1986 - Present President and CEO

**JOSEPH OAT CORPORATION
Camden, New Jersey**

1979 - 1986 Vice President of Engineering

1974 - 1979 Chief Engineer

1971 - 1974 Principal Engineer

**R.I.T. ALLAHABAD
India**

1967 - 1968 Assistant Professor of Applied Mechanics

LICENSES

Registered Professional Engineer - Pennsylvania (1974 - present)

Registered Professional Engineer - Michigan (1980 - present)

PROFESSIONAL MEMBERSHIPS/ACTIVITIES

Fellow of the ASME; Member ANS; Chairman, TEMA Vibration Committee (1979 - 1986); Chairman, PVP Committee Of the ASME, Nuclear Engineering Division (1988-92); Member, ASME O&M Committee (1991 to present); Member ASCE (1977-83), Member, Heat Exchange Institute (1976-86).

PATENTS

"Heat Exchanger for Withstanding Cycle Changes in Temperature" (with M. Holtz and A. Soler), Patent No. 4,207,944 (1980).

"Radioactive Fuel Cell Storage Rack" (with M. Holtz), U.S. Patent No. 4,382,060 (May, 1983).

BOOKS AND ARCHIVAL VOLUMES (authored or edited):

1. "Mechanical Design of Heat Exchangers and Pressure Vessel Components", (with A. I. Soler), Arcturus Publishers, Cherry Hill, New Jersey, 1100 pages, hardbound (1984).
2. "Theory and Practice of Heat Exchanger Design", Arcturus Publishers (c. 1995).
3. "Feedwater Heater Workshop Proceedings", with Tom Libs, EPRI 78-123 (1979).
4. "Feedwater Heater Technology: State-of-the-Art", EPRI - cs - 4155 (1985).
5. "Analytical Correlations of Fluid Drag of Fuel Drag of Fuel Assemblies in Fuel Rack Storage Locations", EPRI Project RP-2124.
6. "Thermal/Mechanical Heat Exchanger Design", ASME, PVP - Vol. 118 (1986).
7. "Time Dependent and Steady State Characterization of the CAES Recuperator", EPRI TR-104224 (July 1994).
8. "Pressure Vessels, Heat Exchangers and Piping", Proc. ASME, IEEE Joint Power Generation Conference, NE-14 (1994).

ACADEMIC ACTIVITIES

Chair, Advisory Committee On Mechanical Engineering and Mechanics, University of Pennsylvania (1993-)

Professor (Adjunct) in Mechanical Engineering and Mechanics, University of Pennsylvania (1986-92), Graduate and Undergraduate Courses in Heat Transfer Equipment

CONTINUING EDUCATION COURSES OFFERED ON HEAT EXCHANGE AND STEAM GENERATION

1. I.I.T. Bombay, One Week Course on Heat Exchanger Design (1979).
2. Duke Power Company, Charlotte, NC (1982, 1983, 1986, 1990) - In-house Course on Heat Exchanger Design and Testing.

3. National Italian Reactor Authority, Genoa, Italy - On Condensers, Steam Generators, and Moisture Separator Reheaters (1985).
4. Mississippi Power & Light Company, In-House Course on Moisture Separator Reheaters and Surface Condensers (1987).
5. Center for Professional Advancement (1988, New Brunswick, NJ; 1990, Caracas, Venezuela; 1991, Houston, Texas; 1992, Amsterdam, Holland).

CONSULTING

Consultant to Electric Power Research Institute (EPRI); Pressure Vessel Research Council (PVRC); Tubular Exchanger Manufacturers Association (TEMA); Department of Energy (DOE) (Idaho Operations); Department of Energy (DOE) (Chicago Operations); American Electric Power Corporation; Baltimore Gas and Electric; Carolina Power & Light; Commonwealth Edison Company; Detroit Edison Company; Duke Power Company; Entergy Operations; GPU Nuclear; Iowa Electric Light and Power; New York Power Authority; Niagara Mohawk Power Corporation; North Atlantic Energy Services; Northeast Utilities; Northeast Nuclear Energy; Pacific Gas and Electric Company; PECO Energy; Southern Nuclear Operating Company; Tennessee Valley Authority.

PUBLICATIONS

1. "A Method for Solving Ill-Posed Integral Equations of the First Kind", (with B. Paul), Computer Methods in Applied Mechanics and Engineering 2 (1973) 339-348.
2. "Numerical Solutions of Non-Hertzian Elastic Contact Problems", (with B. Paul), Journal of Applied Mechanics, Vol. 41, No. 2, 484-490, June, 1974.
3. "On the Inadequacy of Hertzian Solution of Two Dimensional Line Contact Problems", Journal of the Franklin Institute, Vol, 298, No. 2, 139-141 (1974).
4. "How to Locate Impingement Plates in Tubular Heat Exchangers", Hydrocarbon Processing, Vol. 10, 147-149 (1974).
5. "Stress Concentration in Crowned Rollers", (with B. Paul), Journal of Engineering for Industry, Trans. ASME, Vol. 97, Series B, No. 3, 990-994 (1975).
6. "Application of Spiral Wound Gaskets for Leak Tight Joints", Journal of Pressure Vessel Technology, Trans. ASME, Vol. 97, Series J, No. 1, 91-93 (1975).
7. "Contact Stresses for Multiply-Connected Regions - The Case of Pitted Spheres:, with B. Paul and W. S. Woodward, Proceedings of the IUTAM Symposium on Contact Stresses, August 1974, Holland, Delft University Press, 264-281, (1976).
8. "Design of Skirt-Mounted Supports:, Hydrocarbon Processing, Vol. 4, 199-203, April 1976.
9. "Predicting Flow Induced Vibration in U-Bend Regions of Heat Exchangers - An Engineering Solution". Journal of the Franklin Institute, Vol. 302, No. 2, 195-205, August 1976.

10. "A Method to Design Shell-side Pressure Drop Constrained Tubular Heat Exchangers", with Mr. Holtz, *Journal of Engineering for Power, Trans. of the ASME*, Vol. 99, No. 3 July 1977, pp 441-448.
11. "An Efficient Design Method for Obround Pressure Vessels and Their End Closures", *International Journal of Pressure Vessel and Piping*, Vol. 5, 1977, pp 309-320.
12. "Analysis of Vertically mounted Through-Tube Heat Exchangers", *Journal of Engineering for Power, Trans. ASME*, Vol. 100, No. 2, April, 1978, pp 380-390.
13. "Study of Bolted Joint Integrity and Inter-Tube-Pass Leakage in U-Tube Heat Exchangers: Part I - Analysis", *Journal of Engineering for Power, Trans. ASME*, Vol. 101, No. 1, pp 9-15 (1979).
14. "Study of bolted Joint Integrity and Inter-Tube-Pass Leakage in U-Tube Heat Exchangers, Part II - Applications", *Journal of Engineering for Power, Trans. ASME*, Vol. 101, No. 1, pp 16-22 (1979).
15. "On Thermal Expansion Induced Stresses in U-Bends of Shell-and-Tube Heat Exchangers", (with Maurice Holtz); *Trans. ASME, Journal of Engineering for Power*, Vol. 101, No. 4, October, 1979, pp. 634-639.
16. "Heat Transfer Characteristics of a Generalized Divided Flow Heat Exchanger", *Proceedings of the Conference on Industrial Energy Conservation Technology*, Houston, Texas, pp 88-97 (1979).
17. "An Approximate Analysis of Foundation Stresses in Horizontal Pressure Vessels", (with Vincent Luk), Paper No. 79-NE-1, *Trans. ASME, Journal of Engineering for Power*, Vol. 102, No. 3, pp 555-557, July, 1980.
18. "Generalization of the Split Flow Heat Exchanger Geometry for Enhanced Heat Transfer", (with Michael Holtz), *AIChE. Symposium Series 189*, Vol. 75, pp 219-226 (1979).
19. "Analysis of Temperature Induced Stresses in the Body Bolts of Single Pass Heat Exchangers", *ASME Winter Annual Meeting*, Paper No. 79 QA/NE-7, New York, NY, 1979.
20. "Optimization of Two-Stage Evaporators for Minimizing Rad-Waste Entrainment", (with Maurice Holtz), *Journal of Mechanical Design, Trans. of the ASME*, Vol. 102, No. 4, pp 804-806 (1980).
21. "A Comparison of Thermal Performance of Two and Four Tube Pass Designs for Split Flow Shells", (with M. J. Holtz), *Journal of Heat Transfer, Trans. of the ASME*, Vol. 103, No. 1, pp 169-172, February, 1981.
22. "A Method for Maximizing Support Leg Stress in a Pressure Vessel Mounted on Four Legs Subject to Moment and Lateral Loadings". *International Journal of Pressure Vessels and Piping*, Vol. 9, No. 1, pp 11-25 (1981).
23. "Design, Stress Analysis and Operating Experience in Feedwater Heaters", (with Tom Libs), *Proceedings of the Conference on Industrial Energy Conservation Technology*, Houston, pp 113-118 (1980).
24. "On the Necessary Criteria for Stream Symmetric Tubular Heat Exchanger Geometries", *Heat Transfer Engineering*, Vol. 3, No. 1 (1981).

25. "Some Fundamental Relationships for Tubular Heat Exchanger Thermal Performance", *Trans. ASME, Journal of Heat Transfer*, Vol. 103, pp 573-578 (1981).
26. "Transient Swelling of Liquid Level During Pool Boiling in an Emergency Condenser", (with J. P. Gupta). *Letters in Heat and Mass Transfer*, Vol. 8, No. 1, pp 25-33, Jan/Feb., 1981.
27. "An Approximate Method for Evaluating the Temperature Field in Tubesheet Ligaments Under Steady State Conditions", (with M. Holtz), *Journal of Engineering for Power*, *Trans. ASME*, Vol. 104, pp 895-900 (1982).
28. "Feasibility Study of A Multi-Purpose Computer Program to Optimize Power Cycles for Operative Plants", (with Y. Menuchin and N. Hirota), *Proceedings of the Conference on Industrial Energy Conservation Technology*, Houston, (1981).
29. "Design Parameters Affecting Bolt Load in Ring Type Gasketed Joints", (with A. I. Soler), *Trans. ASME, Journal of Pressure Vessel Technology*, Vol 105, pp 11-13 (1983).
30. "A Design Concept for Minimizing Tubesheet Stress and Tubejoint Load in Fixed Tubesheet Heat Exchangers", (with A. I. Soler), *Trans. ASME (C)* 1982).
31. "Dynamic Coupling in a Closely Spaced Two-Body System Vibrating in Liquid Medium: The Case of Fuel Racks", (with A. I. Soler), *Proceedings of the Third International Conference on "Vibration in Nuclear Plant"*, Keswick, England, May, 1982, pp. 815-834.
32. "Effect of Nonuniform Inlet Air Flow on Air Cooled Heat Exchanger Performance", (with A. I. Soler and Lee Ng), *Proceedings of the Joint ASME-JSME Heat Transfer Conference*, 1983, pp. 537-542.
33. "Seismic Response of Free Standing Fuel Rack Constructions to 3-D Motions", (with A. I. Soler), *Nuclear Engineering and Design*, Vol. 80, (1984), pp. 315-329.
34. "A Method for Computing Maximum Water Temperature in a Fuel Pool Containing Spent Nuclear Fuel", *Heat Transfer Engineering*, Hemisphere, Dec. (1986).
35. "On Minimization of Radwaste Carry-Over in a N-stage Evaporator", (with Maurice Holtz and Vincent Luk), *Heat Transfer Engineering*, pp. 68-73, Vol. 5, No. 1-1 (1984).
36. "Feedwater Heater Procurement Guidelines - Some New Performance Criteria", *Symposium on State-of-the-art Feedwater Heater Technology*, EPRI (c. 1984).
37. "Method for Quantifying Heat Duty Derating due to Inter-Pass Leakage in Bolted Flat Cover Heat Exchangers", *Heat Transfer Engineering*, pp. 19-23, Vol. 4, No. 3-4 (1983).
38. "On Some Performance Parameters for Closed Feedwater Heaters", *Journal of Pressure Vessel Technology*, *Trans. ASME* (1987).
39. "A Design Procedure for Evaluating the Tube Axial Load Due to Thermal Effects in Multi-Pass Fixed Tubesheet Heat Exchangers", (with A. I. Soler), *Journal of Pressure Vessel Technology*, *Trans. ASME* (1987).

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40. "An Elastic-Plastic Analysis of the Integral Tubesheet in U-Tube Heat Exchangers - Towards an ASME Code Oriented Approach", Int. Journal of Vessel and Piping (c. 1987).
 41. "Feedwater Heaters", Heat Transfer Equipment Design, R. Shal et. al (editor), Hemisphere (c. 1988).
 42. "Surface Condensers", Heat Transfer Equipment Design, R. Shal et. al (editor), Hemisphere (c. 1988).
 43. "Flow Induced Vibration", Heat Transfer Equipment Design, R. Shal et. al (editor), Hemisphere (c. 1988).
 44. "Mechanical Design of Heat Exchangers", Heat Transfer Equipment Design, R. Shal et. al (editor), Hemisphere (c. 1988).
 45. "A Rational Method for Analyzing Expansion Joints": (with A. Soler), ASME, Journal of Pressure Vessel Technology (c. 1988).

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46. "An Analysis of the Improvement in the Thermal Performance of Surface Condenser Equipped with Tweener Supports", ASME Joint Power Generation Conference, Miami (Oct. 1987).
 47. "Pressure Vessels - Design & Operation", Chemical Engineering, pp 62-70, Chemical Engineering, July 1990, McGraw Hill, N.Y.
 48. "Spent Fuel Storage Options: A Critical Appraisal", Power Generation Technology, pp 137-140, Sterling Publications, U.K. (1990-91).
 49. "Design Strength of Primary Structural Welds in Free-Standing Structures", with A.I. Soler and S. Bhattacharya, Journal of Pressure Vessel Technology, Trans. ASME (c' 1991).
 50. "Seismic Qualification of Free-Standing Nuclear Fuel Storage Modules - The Chin Shan Experience", Nuclear Engineering International, U.K. (March, 1991).
 51. "Transient Response of Large Inertia Cross Flow Heat Exchangers", with Y. Wang, A.I. Soler and K. Iulianetti, ASME 91-JPGC-NE-27 (1991).
 52. "Some Results from Simultaneous Seismic Simulations of All Racks in a Fuel Pool", with A.I. I. Soler, INN M Spent Fuel Management Seminar X, Washington, D.C., January, 1993.
 53. "A Case for Wet Storage", INN M Spent Fuel Management Seminar X, Washington, D.C., January, 1993.
 54. "Application of Transient Analysis Methodology to Heat Exchanger Performance Testing" with I. Rampall and Benjamin H. Scott, ASME Joint Power Generation Conference, October, 1994.
 55. "Predicting Thermal Performance of Heat Exchangers Using In-Situ Testing and Statistical Correlation", with K. Iulianetti and Benjamin H. Scott, ASME Joint Power Generation Conference (1994).
 56. "Shellside Boiling in Narrow Crevices", with I. Rampall (to be submitted for publication, Heat Transfer Engineering (ca. 1996)).

**RESUME OF
BRUCE E. EBBESON**

Experience Summary

Mr. Ebbeson has 30 years of experience in the engineering industry. Currently, he is the supervisor of the structural division for Stone & Webster's Cherry Hill office. He is presently involved in a number of projects, including the decommissioning of the Maine Yankee nuclear plant and the design of a facility in Utah to store spent nuclear fuel. He serves as a structural engineering consultant on various projects performed in Stone and Webster's Cherry Hill, Boston, Denver and Taiwan offices. Previously, his experience has included assignments on many nuclear power plant projects as a Principal Structural Engineer in a supervisory capacity. He has designed plant modifications and performed safety evaluations to meet licensing requirements. He also has coordinated the implementation of modifications with construction groups and has performed independent design reviews of nuclear power plants at various stages of licensing/operation.

Upon joining Stone & Webster Engineering Corporation in 1973, he was first assigned as a Career Development Engineer in the Structural Division where he was assigned to the Structural Mechanics Section. He was later assigned to the Engineering Mechanics Division as a support engineer in the Structural Mechanics Staff Group. He was reassigned to the Cherry Hill Office in July 1979, to assume the responsibilities as Principal Structural Mechanics Engineer on the River Bend Project. He has worked on various projects where his duties have included conceptual arrangement, analysis, and design of structural components of nuclear power plants.

Prior to joining Stone & Webster Engineering Corporation, Mr. Ebbeson was a Structural Design Engineer with the Philadelphia Water Department, Philadelphia, Pennsylvania.

Education

M.S., Civil Engineering - 1973

B.S., Civil Engineering - Tufts University - 1970

Training

Various courses in Engineering Management - Drexel University

Various Stone & Webster Management Training Classes

Licenses, Registrations, and Certifications

Professional Engineer - Massachusetts - 1977

Professional Engineer - Louisiana - 1981

Professional Engineer - New Jersey - 1983

Professional Affiliations

American Society of Civil Engineers - Member

Experience Summary

Mr. Ebbeson has 28 years of experience in the engineering industry. Currently, he is the supervisor of the structural division for Stone & Webster's Cherry Hill office. He is presently involved in a number of projects, including the decommissioning of the Maine Yankee nuclear plant and the design of a facility in Utah to store spent nuclear fuel. He serves as a structural engineering consultant on various projects performed in Stone and Webster's Cherry Hill, Boston, Denver and Taiwan offices. Previously, his experience has included assignments on many nuclear power plant projects as a Principal Structural Engineer in a supervisory capacity. He has designed plant modifications and performed safety evaluations to meet licensing requirements. He also has coordinated the implementation of modifications with construction groups and has performed independent design reviews of nuclear power plants at various stages of licensing/operation.

Upon joining Stone & Webster Engineering Corporation in 1973, he was first assigned as a Career Development Engineer in the Structural Division where he was assigned to the Structural Mechanics Section. He was later assigned to the Engineering Mechanics Division as a support engineer in the Structural Mechanics Staff Group. He was reassigned to the Cherry Hill Office in July 1979, to assume the responsibilities as Principal Structural Mechanics Engineer on the River Bend Project. He has worked on various projects where his duties have included conceptual arrangement, analysis, and design of structural components of nuclear power plants.

Prior to joining Stone & Webster Engineering Corporation, Mr. Ebbeson was a Structural Design Engineer with the Philadelphia Water Department, Philadelphia, Pennsylvania.

Education

M.S., Civil Engineering - 1973

B.S., Civil Engineering - Tufts University - 1970

Training

Various courses in Engineering Management - Drexel University

Various Stone & Webster Management Training Classes

Licenses, Registrations, and Certifications

Professional Engineer - Massachusetts - 1977

Professional Engineer - Louisiana - 1981

Professional Engineer - New Jersey - 1983

Professional Affiliations

American Society of Civil Engineers - Member

Experience History

STONE & WEBSTER ENGINEERING CORPORATION, CHERRY HILL, NEW JERSEY - 1979 TO PRESENT

Structural Division Supervisor (Apr 1999 to Present)

Presently, Mr. Ebbeson is responsible for all Civil/Structural activities in the Cherry Hill Office, including hiring, personnel evaluations and technical direction. Additionally, he is actively involved as a consultant on a number of projects, including the Maine Yankee Nuclear Plant decommissioning and the AT&T 700 A Street office building project.

AT&T Point of Presence (POP) Building, 700A Street, Wilmington, DE (Sept 1999 to Jan 2000)

Mr. Ebbeson provided civil/structural consulting support for the development of conceptual designs for the 24,000 sq. ft. network building. He was involved in the review of the Geotechnical report and in the preparation of a report performed to evaluate the risk to the facility from floods.

AT&T (Oct 1998 to Nov 1999)

Mr. Ebbeson was assigned to a team responsible for performing reliability assessments of AT&T facilities including those in Durham NC, Dublin O, Chicago, Boston, Staten Island, Miami, Florham Park and Jersey City. He was responsible for performing the civil/structural portion of the assessments, including preparation of reports.

Private Fuel Storage Facility (Oct 1998 to Present)

Mr. Ebbeson is responsible for the seismic analysis and structural design of the Canister Transfer Building for a proposed facility that will store spent nuclear fuel. His duties included planning and supervising the preparation of calculations and drawings for the facility, and responding to questions posed by the Nuclear Regulatory Commission.

Public Service Electric & Gas Company (Feb 1990 to Oct 1998)

As Lead Civil/Structural Task Manager, Mr. Ebbeson was responsible for coordinating the civil/structural activities on all tasks for the Hope Creek and Salem Nuclear Generating Stations. He has developed design criteria and technical standards for the design of structures and structural components. He has performed and directed structural activities for a number of major design changes, including feedwater heater replacement, control room architectural renovation, auxiliary building ventilation upgrades, containment fan coil unit upgrades, addition of tornado missile barriers and Salem Unit 3 leakage/spill containment. These activities include design of HVAC, electrical raceway and piping systems, seismic qualification of safety-related equipment, design of equipment supports, design of new structures, evaluation of existing structures for increased loadings, and design of rigging systems. When necessary, finite element and structural dynamic analyses were performed. He also served as Task Manager, responsible for developing schedules and budgets, managing the task execution, and interfacing with the client's Project Manager, for a number of projects.

Browns Ferry Nuclear Plant (Sept 1989 to Dec 1989)
Tennessee Valley Authority

Assigned to the site as lead Structural Engineer, Mr. Ebbeson was responsible for the update and verification of the Final Safety Analysis Report (FSAR).

Industrial Projects Group (May 1989 to Sept 1989)

As Principal Structural Engineer, Mr. Ebbeson was responsible for a variety of structural tasks, including design of steel and concrete structures for a solid waste resource recovery facility (Pasco County), design of improvements to office buildings (New Jersey Bell), and rewriting of structural specifications (Niagara Mohawk Power Corporation's Nine Mile Point Nuclear Station). Also responsible for investigation of structural adequacy at IBM's East Fishkill, New York, facility.

Limerick Generating Station - Unit 2 (June 1988 to Apr 1989)
Philadelphia Electric Company

As Lead Structural Engineer, Mr. Ebbeson was responsible for the preparation of review plans, performing technical reviews and writing a final report for submittal to the NRC as part of the integrated design and construction assessment.

Brown's Ferry Nuclear Plant (Feb 1988 to Apr 1989)
Tennessee Valley Authority

As Lead Structural Engineer, Mr. Ebbeson was responsible for directing the structural portion of the calculation review program. This program consisted of a technical review of the structural design to verify the adequacy of the existing facility. Also responsible for directing the structural design and analysis tasks required to improve the design of the existing plant.

Comanche Peak Steam Electric Station (Sept 1986 to Jan 1988)
TU Electric Company

As Assistant Lead Engineer, Mr. Ebbeson was responsible for design verification of the containment building base mat and shell, the auxiliary/electric building and the safeguards building. Responsible also for the verification of structural seismic analysis results. Duties also included preparation of estimates, development of design criteria, and writing of reports.

Beaver Valley Power Station Unit 2 - (May 1986 to June 1986)
Duquesne Light Company

As Technical Reviewer, Mr. Ebbeson was responsible for the overall review of structural work. Activities included review of licensing criteria, design basis, technical review of calculations, review of drawings and specifications, and preparation of a final report.

BWR Continuing Services Project (Mar 1986 to Aug 1987)

As Lead Structural Engineer, Mr. Ebbeson was responsible for all structural work performed by SWEC on three existing BWR nuclear projects.

**Oyster Creek Nuclear Generating Station (Nov 1983 to Feb 1986)
General Public Utilities Nuclear Corporation**

As Lead Structural Engineer, Mr. Ebbeson was responsible for all structural work, concerned with field modifications to the existing nuclear facility.

Structural Division Staff (June 1982 to Feb 1985)

As Principal Staff Engineer, Mr. Ebbeson was responsible for planning and supervising all structural seismic and hydrodynamic analyses for nuclear projects.

Field Assignment (March 1983 to June 1983)

Temporary assignment to Washington Public Power Supply System (WPPSS) offices in Richland, Washington. Mr. Ebbeson served as a consultant to WPPSS in the civil/structural area during final design reverification of a nuclear project.

**River Bend Station - Unit 1 (July 1979 to May 1982)
Gulf States Utilities Company**

As Principal Engineer, Mr. Ebbeson was responsible for the planning and supervision of the analysis and design of the reactor building concrete structures and steel containment as well as the dynamic analyses of all Category I buildings. Also responsible for preparing licensing documents, writing reports, and resolving construction problems.

STONE & WEBSTER ENGINEERING CORPORATION, BOSTON, MASSACHUSETTS - 1973 TO 1979

As Structural Engineer (Dec 1978 to July 1979), Mr. Ebbeson was responsible for analysis and design of nuclear power plant containment structures and internal structural components. Projects included Montague (miscellaneous studies), NYSE&G, and the EPRI breeder conceptual study (structural design of reactor building). Also worked on a special task force to re-analyze five nuclear plant shut down in March 1979.

As Support Engineer (Aug 1973 to Dec 1978), Mr. Ebbeson was responsible for working in the area of barrier designs for protection from tornados and accident generated missiles. Also responsible for development of computer programs, planning of a physical testing program, inspection of a tornado disaster area, and analysis and design of steel and concrete missile barriers. Also worked on analysis and design of structures on various projects. Projects included Shoreham, Philadelphia Electric (equipment drop impact problems), SWEC's Reference Nuclear Power Plant (RNPP) (conceptual design of containment internal structures and seismic analysis), and Beaver Valley - Unit 2 (seismic analysis and checking of containment internal structures design).

**Oswego Steam Station - Units 5 and 6
Niagara Mohawk Power Corporation (June 1973 to Aug 1973)**

As Career Development Engineer, Mr. Ebbeson was responsible for assisting Structural Engineers on a fossil fuel power plant project. Duties included helping with the preparation of specifications, comparison of bids, and coordination of design and construction activities.

PHILADELPHIA WATER DEPARTMENT, PHILADELPHIA, PENNSYLVANIA - 1970 TO 1971

As Structural Design Engineer (June 1970 to Aug 1971), Mr. Ebbeson was responsible for design of steel and concrete structural elements, preparation of drawings, and checking of designs and drawings.

RESUME OF
C. ALLIN CORNELL

C. ALLIN CORNELL

EDUCATION:

Stanford University, Architecture	AB	1960
Stanford University, Civil Engineering (Structures)	MS	1961
Stanford University, Civil Engineering (Structures)	PhD	1964
Doctoral Thesis: "Stochastic Process Models in Structural Engineering"		

PROFESSIONAL EMPLOYMENT:

Stanford University :	Acting Assistant Professor	1963-1964
Universidad Nacional Autonoma de Mexico :	Visiting Professor	Summer 1966
University of California, Berkeley :	Visiting Associate Professor	1970-1971
Basler and Hofmann, Zurich:	Research Engineer	Summer 1972
Laboratorio Nacional de Engenharia Civil, Lisbon:	Visiting Research Investigator	1974-1975
Massachusetts Institute of Technology:	Assistant Professor and Ford Post-Doctoral Fellow	1964-1966
	Assistant Professor	1966-1968
	Associate Professor	1968-1974
	Holder of Gilbert Winslow Career Development Chair	1971-1974
	Professor	1974-1983
Stanford University :	Visiting Professor	1981-1983
	Professor (Research) - Half-Time	1983-present
	Co-Director, Reliability of Marine Structures Program	1988-present
	Fellow, SU-USGS Institute on Earthquake Engineering and Seismology	1986-1996
Consulting Practice:	Part-Time	1965-1981
	Half-Time	1981-present
Cygn, Inc., San Francisco	Senior Vice President	1984-1985
C. Allin Cornell, Co.	President	1981-present

PROFESSIONAL ORGANIZATIONS AND COMMITTEES (Current and Former):

American Iron and Steel Institute:
Advisory Committee on Load-Factor Building Design

American National Standards Institute:
Building Loads Code Committee A58

American Society of Civil Engineers:
Committee on Structural Safety
Committee on Nuclear Power Plant Safety
Committee on Bridge Safety

Committee on Offshore Structure Safety

Earthquake Engineering Research Institute:

Editorial Board: Earthquake Spectra, 1991-1993

Seismic Risk Committee

Planning Committee, 50th Anniversary Annual Meeting, 1998-99

Joint European Committee on Structural Safety

National Academy of Engineering (Elected 1981)

Phi Beta Kappa

Seismological Society of America: Board of Directors,	1984-1987
Vice-president	1985-1986
President	1986-1987

Sigma Xi

Society of Risk Analysis:

Senior Advisory Board, 1991 P.S.A.M. Conference

JOURNAL EDITORIAL BOARDS:

Structural Safety; Risk Abstracts; Probabilistic Engineering Mechanics; Engineering Structures; Earthquake Spectra, Uncertainties in Structural Mechanics

GOVERNMENT COMMITTEES AND SERVICE:

NBS, Consultant	1967-1975
USGS, Advisory Committee to Seismicity and Risk Analysis Branch	1974
UNESCO, Working Group on Definition of Seismicity and Ground Motion	1974
USGS, Workshop on Earthquake Prediction and Engineering Hazards	1977
NAE/NRC-Marine Board	
Committee on Offshore Technology	1979-1981
Committee on Marine Structures,	
Loads Advisory Group	1986-1987
Parent Committee	1987-1989
NAS Committee on Seismology	1981-1984
Panel on Science of Earthquakes	1996-2001
NAS-Water Board	
Committee on Techniques for Estimating Probabilities of Extreme Floods	1986-1988
NAE/NRC-Geotechnical Board - Comm. for Workshop on Reliability Methods for Risk Mitigation in Geotechnical Engineering	1992-1994

NRC	Seismic PRA Seminar Technical Coordinator	1982
OECD-CSNI Specialist Meetings:	Probabilistic Methods in SRA for NPP's	
	Chairman	1980
	Technical Organizing Committee	1983
NATO, Advanced Study Institute,	Reliability of Structures and Soils, Lecturer, (Seismic Safety of NPP's)	1982

AWARDS RECEIVED:

Huber Research Prize, American Society of Civil Engineers	1971
Guggenheim Fellowship	1974-1975
Fulbright-Hayes Advanced Research Grant	1974-1975
Moisseiff Award, American Society of Civil Engineers	1977
Norman Medal, American Society of Civil Engineers	1983
(First) ICASP Award, Committee of Inter. Conference on Applications of Statistics and Probability in Soils and Structures	1987
Fruedenthal Medal, American Society of Civil Engineers	1988
Offshore Technology Research Center Honors Lecture, OTC	1995
EERI Distinguished Lecturer	1999
EERI Outstanding Paper of 1998 (Earthquake Spectra) (Co-authors: Shome, Bazzurro, and Carballo)	2000

SOME REPRESENTATIVE RECENT SPONSORED UNIVERSITY RESEARCH CONTRACTS:

SPONSOR:

NSF Stochastic Models of Structural Loads.
 Spatial and Temporal Memory in Earthquake Recurrence and Hazard.
 Nonlinear Seismic Assessment Procedures for Buildings
 Probabilistic Prediction of Near-Source Strong Ground Motion and Nonlinear Structural Response

PEER (NSF Earthquake Engineering Center): Technical Foundation for Performance-Based Design

SAC Nonlinear Seismic Demands in Fracturing Steel Moment-Resisting Frames

ONR Reliability Analysis of Moored Marine Structures.

EPRI Multi-site Wind Record Analysis for Transmission Lines Structural Loads.

Effectiveness of Strong Ground Motions.

MMS Probability-Based Design Procedures for Offshore Structures

NRC Hazard-Consistent Nonlinear Analysis of Structures and Soils

JOINT INDUSTRY PROJECT

(36 company consortium, managed by Amoco Production Company)
Structural Systems Reliability Analysis for Offshore Structures.

INDUSTRIAL AFFILIATES PROGRAM

Reliability of Marine Structures.

1986-present

[resumes\largeparts\log.vitae\04\00]

PUBLICATIONS

Book:

Benjamin, J. R. and Cornell, C. A., *Probability, Statistics, and Decision for Civil Engineers*, McGraw-Hill Book Company, 1970.

Papers in Referred Journals:

Torres, G. G. B., Brotchie, J. R., and Cornell, C. A., "A Program for the Optimum Design of Prestressed Concrete Highway Bridges", *Journal of the Prestressed Concrete Institute*, Vol. 11, No. 3, June, 1966.

Reinschmidt, K. F., Cornell, C. A., and Brotchie, J. R., "Iterative Design and Structural Optimization", *Journal of the Structural Division*, ASCE, Vol. 92, No. ST6, December, 1966, pp. 281-318.

Sturman, G. M., Albertson, L. C., Cornell, C. A., and Roesset, J. M., "A Computer-Aided Bridge Design System", *Journal of the Structural Division*, ASCE, Vol. 92, No. ST6, December, 1966, pp. 141-165.

Cornell, C. A., "Bounds on the Reliability of Structural Systems", *Journal of the Structural Division*, ASCE, Vol. 93, No. ST1, February, 1967, pp. 171-200.

Ayer, F. and Cornell, C. A., "Grid Moment Maximization by Mathematical Programming", *Journal of the Structural Division*, ASCE, Vol. 94, No. ST2, February, 1968, pp. 529-549.

Cornell, C. A. and Vanmarcke, E. H., "Some Practical Implications of Elementary Safety Analysis", *Journal of the Boston Society of Civil Engineers*, Vol. 55, No. 3, July, 1968.

Cornell, C. A., "Engineering Seismic Risk Analysis", *Bulletin of the Seismological Society of America*, Vol. 58, No. 5, October, 1968, pp. 1583-1606.

Cornell, C. A., "A Probability-Based Structural Code", *Journal of the American Concrete Institute*, No. 12, Proc. Vol 66 December, 1969, pp. 974-985.

Corotis, R. B., Vanmarcke, E. H., and Cornell, C. A., "First Passage of Non-Stationary Random Processes", *Journal of the Engineering Mechanics Division*, ASCE, No. EM2, April, 1972, pp. 401-414.

Peir, J. C. and Cornell, C. A., "Spatial and Temporal Variability of Live Loads", *Journal of the Structural Division*, ASCE, Vol. 99, No. ST5, May, 1973, pp. 923-943.

McGuire, R. K. and Cornell, C. A., "Creep of Concrete Under Stochastic Live Load", *Journal of the Structural Division*, ASCE, Vol. 99, No. ST5, May, 1973, pp. 923-943.

Merz, H. A. and Cornell, C. A., "Seismic Risk Analysis Based on a Quadratic Magnitude-Frequency Law", *Bulletin of Seismological Society of America*, Vol. 63, No. 6, December, 1973, pp. 1999-2006.

McGuire, R. K. and Cornell, C. A., "Live Load Effects in Office Buildings", *Journal of the Structural Division*, ASCE, Vol. 100, No. ST7, July, 1974, pp. 1351-1366.

Ang, A. H. S. and Cornell, C. A., "Reliability Bases of Structural Safety Design", *Journal of the Structural Division*, ASCE, Vol. 100, No. ST9, September, 1974, pp. 1755-1770.

- Whitman, R. V., et al., "Seismic Design Decision Analysis", *Journal of the Structural Division*, ASCE, Vol. 101, No. ST5, May, 1975, pp. 1067-1084.
- Garson, R. C., Morla-Catalan, J., and Cornell, C. A., "Tornado Design Winds Based on Risk", *Journal of the Structural Division*, ASCE, Vol. 101, No. ST9, September, 1975, pp. 1883-1897.
- Cornell, C. A. and Merz, H. A., "Seismic Risk Analysis of Boston", *Journal of the Structural Division*, ASCE, Vol. 101, No. ST10, October, 1975, pp. 2027-2034.
- Morla-Catalan, J. and Cornell, C. A., "Earth Slope Reliability by a Level-Crossing Method", *Journal of the Geotechnical Division*, ASCE, Vol. 102, No. GT3, June, 1976.
- Veneziano, D., Grigoriu, M., and Cornell, C. A., "Vector-Process Models for System Reliability", *Journal of the Engineering Mechanics Division*, ASCE, Vol. 103, No. EM3, Proc. paper 12981, June, 1977, pp. 441-460.
- Ravindra, M. K., Cornell, C. A., and Galambos, T. V., "Wind and Snow Load Factors for Use in LRF", *Journal of the Structural Division*, ASCE, Vol. 104, No. ST9, Proc. Paper 14006, September, 1978, pp. 1443-1457.
- Fardis, M. N. and Cornell, C. A., "Containment Liner Seismic Reliability Under Statistical Uncertainty", *Nuclear Engineering and Design*, Vol. 49, No. 3, September, 1978, pp. 279-294.
- Fardis, M. N. and Cornell, C. A., "Seismic Soil-Containment Interaction: Pipe Safety", *Journal of the Engineering Mechanics Division*, ASCE, Vol. 104, No. EM6, Proc. Paper 14218, December, 1978, pp. 1353-1370.
- Fardis, M. N., Cornell, C. A., and Meyer, J. E., "Accident and Seismic Containment Reliability", *Journal of the Structural Division*, ASCE, Vol. 105, No. ST1, Proc. Paper 14305, January, 1979, pp. 67-83.
- Larrabee, R.D. and Cornell, C.A., "Upcrossing Rate Solution for Load Combinations", *Journal of the Structural Division*, ASCE, Vol. 105, No. ST1, Proc. Paper 14329, January, 1979, pp. 125-132.
- Cornell, C. A., Shakal, A., and Banon, H., "Seismic Motion and Response Prediction Alternatives", *Earthquake Engineering and Structural Dynamics*, Vol. 7, 1979, pp. 295-315.
- Millman, R., Kilcup, R., and Cornell, C. A., "Design Temperature for Structural Elements", *Journal of the Structural Division*, ASCE, Vol. 106, No. ST4, Proc. Paper 15364, April, 1980, pp. 877-895.
- Kennedy, R. P., Cornell, C.A., Campbell, R.D., Kaplan, S. and Perla H.F., "Probabilistic Seismic Safety Study of an Existing Nuclear Power Plant", *Nuclear Engineering and Design*, Vol. 59, No. 2, August, 1980, pp. 315-338.
- Cornell, C. A., "Some Thoughts on Systems and Structural Reliability", *Nuclear Engineering and Design*, Vol. 60, No. 1, September, 1980, pp. 115-116.
- Cornell, C. A., "Utilization of Present Knowledge of Probabilistic Structural Reliability in Analyses of Nuclear Power Plants", *Nuclear Engineering and Design*, Vol. 60, No. 1, September, 1980, pp. 33-36.
- Larrabee, R. D. and Cornell, C. A., "Combination of Various Load Processes", *Journal of the Structural Division*, Vol. 107, No. ST1, January, 1981, pp. 223-239.
- Fardis, M. N. and Cornell, C. A., "Analysis of Coherent Multistate Systems", *IEEE Transactions on Reliability*, Vol. R-30, No. 2, June, 1981, pp. 117-122.

- Galambos, T.V., Ellingwood, B., MacGregor, J.G. and Cornell, C.A., "Probability-Based Load Criteria: Assessment of Current Design Practice", *Journal of the Structural Division*, ASCE, Vol. 108, No. ST5, May, 1982, pp. 959-977.
- Galambos, T.V., Ellingwood, B., McGregor, J.G. and Cornell, C.A., "Probability-Based Load Criteria: Load Factors and Load Combinations", *Journal of the Structural Division*, ASCE, V. 108, No. ST5, May, 1982, pp. 978-997.
- Winterstein, S. R. and Cornell, C. A. "Load Combinations and Clustering Effects", *Journal of the Structural Division*, ASCE, Vol. 110, No. 11, November, 1984, pp. 2690-2708.
- Winterstein, S. R. and Cornell, C. A., "The Energy Fluctuation Scale and Diffusion Models", *Journal of Engineering Mechanics*, ASCE, No. 2, February, 1985, pp. 125-142.
- Toro, G. R., and Cornell, C. A., "Extremes of Gaussian Processes with Bimodal Spectra", *Journal of Engineering Mechanics*, ASCE Vol. 112, No. 5, pp. 465-484, May, 1986.
- Cornell, C. A., "On the Seismology - Engineering Interface", Presidential Address, *Bulletin of the Seismological Society of America*, April, 1988, Vol. 78, No. 2.
- Bjæger, P., Loseth, R., Winterstein, S. R. and Cornell, C. A., "Reliability Method for Marine Structures Under Multiple Environmental Load Processes," *Proceedings of the 5th International Conference on Behavior of Offshore Structures*, BOSS, N.I.T., Trondheim, Norway, June, 1988.
- Cornell, C. A., and Winterstein, S. R., "Temporal and Magnitude Dependence in Earthquake Recurrence Models", *Bulletin of the Seismological Society of America*, August, 1988, Vol. 78, No. 4.
- Karamchandani, A., and Cornell, C. A., "Sensitivity of Simulation Estimates to Changes in Distribution Parameters", *Submitted to ASCE*, 1990.
- De, R. S., Karamchandani, A., and Cornell, C. A., "Offshore Structural System Reliability Under Changing Load Pattern", *Applied Ocean Research*, V. 13, No. 3, June, 1991.
- Karamchandani, A., and Cornell, C. A., "An Event-to-Event Strategy for Non-Linear Analysis of Truss Structures", *ASCE Structural Division*, Vol. 118 No. 4, April, 1992, pp. 895-925.
- Karamchandani, A., and Cornell, C. A., "Reliability Analysis of Truss Structures with Multi-State Elements", *Jo. of Str. Engrg.*, Vol. 118, No. 4, April, 1992.
- Karamchandani, A., and Cornell, C. A., "Adaptive Hybrid Conditional Expectation Approaches for Reliability Estimation", *Structural Safety*, Vol. 11, No. 1, November, 1992, pp. 59-74.
- Karamchandani, A., and Cornell, C. A., "Sensitivity Estimation Within First and Second Order Reliability Methods", *Structural Safety*, Vol. 11, No. 2, 1992, pp. 95-108.
- Cornell, C.A., Wu, S.C., Winterstein, S.R., Dieterich, J.H., and Simpson, R.W., "Seismic Hazard Induced by Mechanically Interactive Fault Segments", *BSSA*, Vol. 83, No. 2, pp. 436-449, April, 1993.
- Bea, R.G., Cornell, C.A., Vinnem, J.E., Geyer, J.F., Shoup, G.J., and Stahl, B., "Comparative Risk Assessment of Alternative TLP Systems: Structure and Foundation Aspects", *Jour. of OMAE*, ASME, Vol. 116, pp. 86-96, May, 1994.

- Bazzurro, P. and Cornell, C.A., "Seismic Hazard Analysis for Non-Linear Structures. I: Methodology", *Jo. of Str. Engrg.*, ASCE, Vol. 120, No. 11, November, 1994.
- Bazzurro, P. and Cornell, C.A., "Seismic Hazard Analysis for Non-Linear Structures. II: Applications", *Jo. of Engrg.*, ASCE, Vol. 120, No. 11, November, 1994.
- Banon, H., Bea, R.G., Bruen, F.J., Cornell, C.A., and Krieger, W.F., "Assessing Fitness for Purpose of Offshore Platforms. I: Analytical Methods and Inspections", *Jour. of Struct. Engrg.*, ASCE, Vol. 120, No. 12, Dec, 1994.
- Wu, S.-C., Cornell, C.A., and Winterstein, S.R., "A Hybrid Recurrence Model and Its Implication on Seismic Hazard Results", *BSSA*, Vol. 85, No. 1, pp. 1-16, February, 1995.
- Jackson, D.D., Aki, K., Cornell, C.A., Dieterich, J.H., Henyey, T.L., Mahdyiar, M., Schwartz, D., and Ward, S.N. (Working Group on California Earthquake Probabilities), "Seismic Hazard in Southern California: Probable Earthquakes, 1994 to 2024 ", *BSSA*, Vol. 85, No. 2, pp. 379-439, April, 1995.
- Bazzurro, P., Cornell, C.A., Diamantidis, D., and Manfredini, G.M., "Seismic Damage Hazard Analysis for Requalification of Nuclear Power Plant Structures: Methodology and Application", *Nuclear Engineering and Design*, Vol. 160, pp. 321-332, 1996.
- Manuel, L., and Cornell, C.A., "The Influence of Alternative Wave Loading and Support Modeling Assumptions on Jack-up Rig Response Extremes", *Transactions of ASME, Journal of Offshore Mechanics and Arctic Engineering*, PP. 109-114, Vol. 118, No. 2, May, 1996.
- Shome, N., Cornell, C.A., Bazzurro, P., and Carballo, J.E., "Earthquakes, Records and Nonlinear Responses", *Earthquake Spectra*, Vol. 14, No. 3, pp. 469-500, August, 1998.
- Bazzurro, P., Cornell, C.A., Shome, N., and Carballo, J.E., "Three Proposals for Characterizing MDOF Nonlinear Seismic Response", *Journal of Structural Engineering, ASCE*, Vol. 124, No. 11, pp. 1281-1289, November, 1998.
- Budnitz, R.J., Apostolakis, G., Boore, D.M., Cluff, L.S., Coppersmith, K.J., Cornell, C.A., and Morris, P.A., "Use of Technical Expert Panels: Applications to Probabilistic Seismic Hazard Analysis", *Risk Analysis*, Vol. 18, No. 4, pp. 463-469, 1998.
- Manuel, L., Schmucker, D.G., Cornell, C.A. and Carballo, J.E., "A Reliability-Based Design Format For Jacket Platforms Under Wave Loads", *Marine Structures*, Vol.11, No. 10, pp. 413-428, 1998.
- Bazzurro, P., and Cornell, C.A., "On Disaggregation of Seismic Hazard", *Bulletin of Seismological Society of America, B.S.S.A.*, Vol. 89, No.2, pp. 501-520, April, 1999.
- Luco, Nicolas and Cornell, C.Allin, "Effects of Connection Fractures on SMRF Seismic Drift Demands", *ASCE Journal of Structural Engineering*, Vol. 126, No. 1, pp.127-136, January, 2000.
- Stahl, Bernhard, Gebara, Joseph M., Aune, Stig and Cornell, C.Allin, "Acceptance Criteria for Offshore Platforms", *Journal of Offshore Mechanics & Arctic Engineering*, Vol. 122, No. 3, pp. 153-156, August, 2000.
- Hanks, Thomas C. and Cornell, C. A., "Probabilistic Seismic Hazard Analysis: A Beginner's Guide", to appear in *Earthquake Spectra*, 2001.

Cornell, C.A., Jalayer, F, Hamburger, R.O. and Foutch, D.A., "The Probabilistic Basis for the 2000 SAC/FEMA Steel Moment Frame Guidelines", submitted to *ASCE Structural Journal* for publication in 2001.

Yun, S-Y., Hamburger, R. O., Cornell, C. A., and Foutch, D. A., "Seismic Performance for Steel Moment Frames", submitted to *ASCE Structural Journal* for publication in 2001

Vamvatsikos, D. and Cornell, C. A., "Incremental Dynamic Analysis", accepted for publication, March, 2002, *Structural Dynamics and Earthquake Engineering*, 2001.

Luco, N. and Cornell, C. A., "Structure-Specific Scalar Intensity Measures for Near-Source and Ordinary Earthquake Ground Motions", *Earthquake Spectra*, Submitted, 2001.

Banon, H., C. A. Cornell, C. B. Crouse, P. W. Marshall, and A. H. Younan, "ISO Seismic Guidelines for Offshore Platforms", accepted for publication, *Journal of OMAE*, ASME, 2001.

Hamburger, R. O., Foutch, D. A., and Cornell, C. A., "Translating Research to Practice: FEMA/SAC Performance-based Design Procedures", submitted to *EERI*, for special publication on SAC/FEMA Guidelines, September, 2001.

Conference Proceedings and Book Chapters:

Cornell, C. A., Benjamin, J. R., and Gabrielsen, B. L., "A Stochastic Model of the Creep Deflection of Reinforced Concrete Beams", *Proceedings of International Symposium in the Flexural Mechanics of Reinforced Concrete*, Miami, Florida, November, 1964.

Cornell, C. A., Reinschmidt, K. F., and Brotchie, J. R., "A Method of Structural Optimization", *Proceedings of International Symposium on the Use of Computers in Structural Engineering*, University Newcastle, England, February, 1966.

Cornell, C. A. and Vanmarcke, E. H., "The Major Influences on Seismic Risk", *Proceedings of the Fourth World Conference on Earthquake Engineering*, Santiago, Chile, January, 1969.

Rascon, O. A. and Cornell, C. A., "A Physically Based Model to Simulate Strong Motion Earthquake Records on Firm Ground", *Proceedings of the Fourth World Conference on Earthquake Engineering*, Santiago, Chile, January, 1969.

Cornell, C. A., "Bayesian Statistical Decision Theory and Reliability-Based Design", *Proceedings of International Conference on Structural Safety and Reliability of Engineering Structures*, Washington, D. C., April, 1969. Published in *Structural Safety and Reliability*, ed. by A. Freudenthal, Pergamon Press, New York, 1972.

Cornell, C. A., "Structural Safety Specifications Based on Second-Moment Reliability Analysis", *Final Report*, IABSE Symposium on Concepts of Safety of Structures and Methods of Design, London, England, September, 1969.

Cornell, C. A., "A First-Order Reliability Theory for Structural Design", *Structural Reliability and Codified Design*, ed. by N. C. Lind, S. M. Study No. 3, University of Waterloo, Canada, 1970.

Cornell, C. A., "Design Seismic Inputs", *Seismic Design for Nuclear Power Plants*, ed. by R. J. Hansen, MIT Press, Cambridge, Massachusetts, 1970.

- Cornell, C. A., "Implementing Probability-Based Structural Codes", American Concrete Institute, *Special Publication SP31-4*, March, 1971.
- Cornell, C. A., "Probabilistic Analysis of Damage to Structures Under Seismic Loads", Chapter 27 of *Dynamic Waves in Civil Engineering*, ed. by D. A. Howells, et al., John Wiley & Sons, Ltd., London, England, 1971.
- Cornell, C. A. "First-Order Uncertainty Analysis of Soil Deformation and Stability", *Statistics and Probability in Civil Engineering*, ed. by Peter Lumb, Hong Kong University Press, Hong Kong, 1971.
- Vanmarcke, E. H. and Cornell, C. A., "Seismic Risk and Design Response Spectra", *Proceedings of the ASCE Conference on the Safety and Reliability of Metal Structures*, Pittsburgh, Pennsylvania, November, 1972.
- Cornell, C. A. and Rokach, A. J., "Statistical Strength Analysis and Steel Columns", *Proceedings of the ASCE Conference on the Safety and Reliability of Metal Structures*, Pittsburgh, Pennsylvania, November, 1972.
- Cornell, C. A., "First-Order Analysis of Model and Parameter Uncertainty", *Proceedings of the International Symposium on Uncertainties in Hydrologic and Water Resource Systems*, University of Arizona, Tucson, Arizona, December, 1972 (invited lecture).
- Cornell, C. A., "Second-Moment Structural Code Formats", Invited Paper, *Proceedings of 50th Anniversary Symposium*, Deutscher Betonverein, Berlin, Germany, May, 1973.
- Vanmarcke, E. H., Cornell, C. A., Whitman, R. V., and Reed, J. W., "Methodology for Optimum Seismic Design", *Proceedings of the Fifth World Conference on Earthquake Engineering*, Rome, Italy, June, 1973.
- Merz, H. A. and Cornell, C. A., "Aftershocks in Engineering Seismic Risk Analysis", *Proceedings of the Fifth World Conference on Earthquake Engineering*, Rome, Italy, June, 1973.
- Cornell, C. A., "Decision Analysis for Seismic Design", *Proceedings of Joint United States-Japan Seminar on Earthquake Engineering*, Berkeley, California, September, 1973.
- Cornell, C. A., "Statistics of Tall Building Damage During the 1971 San Fernando Earthquake", *Proceedings of Joint United States-Japan Seminar on Earthquake Engineering*, Berkeley, California, September, 1973.
- Cornell, C. A., "Characterization of Hazards", *Proceedings of Designing to Survive Disaster Conference*, Illinois Institute of Technology, Chicago, Illinois, November, 1973.
- Whitman, R. V., Cornell, C. A., and Taleb-Agha, G., "Analysis of Earthquake Risk for Lifeline Systems", *Proceedings of U.S. National Conference on Earthquake Engineering*, Ann Arbor, Michigan, 1975.
- Cornell, C. A. and Vanmarcke, E. H., "Seismic Risk Analysis for Offshore Structures", *Proceedings of Offshore Technology Conference*, Dallas, Texas, May, 1975, Paper # OT2350.
- Cornell, C. A., et al., "A Project on Structural Loadings", *Proceedings of Second U.S. National Conference on Wind Engineering Research*, Wind Engineering Research Council, Colorado State University, Fort Collins, Colorado, June, 1975.
- Cornell, C. A., "Summary Report on Structural Design Parameters", *Proceedings of Second International Conference on Applications of Statistics and Probability to Soil and Structural Engineering*, ICOSSAR, Aachen, West Germany, September, 1975.

- Whitman, R. V. and Cornell, C. A., "Design", Chapter 9, *Seismic Risk and Engineering Analysis*, Rosenblueth, E. and Lomnitz, C., eds.; Elsevier Press, Amsterdam, The Netherlands, 1976.
- Cornell, C. A., "Theme 2 Summary Report: Ground Motion, Seismicity, Seismic Risk and Zoning", *Proceedings of the Sixth World Conference on Earthquake Engineering*, New Delhi, India, January, 1977.
- Cornell, C. A., "Optimization: The Only Rational Way or Only a Rationalistic Way?", *Proceedings of the Sixth World Conference on Earthquake Engineering*, Contribution to a Panel on Design and Engineering Decisions, New Delhi, India, January, 1977.
- Fardis, M. N., Cornell, C. A., and Meyer, J. E., "A Probabilistic Seismic Analysis of Containment Liner Integrity", *Proceedings of the Fourth International Conference on Structural Mechanics in Reactor Technology*, Vol. K(a), paper 4/16, San Francisco, California, August, 1977.
- Cornell, C. A. and Larrabee, R. D., "Representation of Loads for Code Purposes", *Proceedings of the Second International Conference on Structural Safety and Reliability (ICOSSAR '77)*, Munich, Federal Republic of Germany, September, 1977.
- Cornell, C. A., and Newmark, N. M., "On the Seismic Reliability of Nuclear Power Plants", Invited Paper, *Proceedings of ANS Topical Meeting on Probabilistic Reactor Safety*, Newport Beach, California, May 8-10, 1978.
- Larrabee, R. D. and Cornell, C. A., "A Combination Procedure for a Wide Class of Loading Processes", *Proceedings of the ASCE Specialty Conference on Probabilistic Mechanics and Structural Reliability*, Tucson, Arizona, January, 1979.
- Madsen, H., Kilcup, R., and Cornell, C. A., "Mean Upcrossing Rate for Sums of Pulse-Type Stochastic Load Processes", *Proceedings of the ASCE Specialty Conference on Probabilistic Mechanics and Structural Reliability*, Tucson, Arizona, January, 1979.
- Askins, R. C. and Cornell, C. A., "SHA-Based Attenuation Model Parameter Estimation", *Proceedings of the U.S. National Conference on Earthquake Engineering*, Stanford, California, August, 1979.
- Cornell, C. A., "Probabilistic Seismic Hazard Analysis: A 1980 Assessment", *Proceedings of U.S. - Yugoslavia Earthquake Engineering Research Seminar*, Skopje, Yugoslavia, June 30 - July 3, 1980.
- Savy, J. B. and Cornell, C. A., "A Theoretical Earthquake Model to Complement Empirical Studies of Strong Ground Motion Attenuation", *Proceedings of the 7th World Conference on Earthquake Engineering*, Istanbul, Turkey September 8-13, 1980.
- Cornell, C. A., "Structural Safety: Some Historical Evidence that it is a Healthy Adolescent". Invited keynote lecture, *Proceedings of the 3rd International Conference on Structural Safety and Reliability*, Trondheim, Norway, June 23-25, 1981, pp. 19-30.
- Cornell, C. A., "Seismic Criteria for Older Plants: An Illustration of Decision Analysis", *Proceedings of the Post-SMIRT Seminar on Reliability of Nuclear Power Plants*, Paris, August, 1981.
- Veneziano, D., and Cornell, C.A., "Historic Seismic Hazard Analysis", *Proceedings of the Conference on Seismic Risk Analysis for Heavy Industrial Facilities*, San Francisco, June, 1983.
- Cornell, C. A., Winterstein, S. R., and Toro, G. R., "Clumping Effects in Extremes of Dynamic Response Processes", *Proceedings of the ICASP-4*, Florence, Italy, June, 13-17, 1983, Vol. 3, pp. 1675-1699.

- Toro, G.R., and Cornell, C.A., "Extremes of Bimodal Dynamic Responses", *Proceedings of the ASCE Specialty Conference on Probabilistic Methods and Structural Reliability*, Berkeley, CA, January, 1984, pp. 393-396.
- Cornell, C.A., Rackwitz, R., Guenard, Y., and Bea, R., "Reliability Evaluation of Tension Leg Platforms", *Proceedings of the ASCE Specialty Conference on Probabilistic Mechanics and Structural Reliability*, Berkeley, CA, January, 1984, pp. 159-162.
- Cornell, C.A., "Seismic Hazard Analysis: Some Current Directions and Some Comments on its Role in Seismic PRA", *Proceedings of the ASME Pressure Vessel and Piping Conference*, San Antonio, June, 1984.
- Kilcup, R. G. and Cornell, C. A., "Extreme Wind Speed Analysis by Temporal-Spatial Event Models", *Proceedings of the 4th International Conference on Structural Safety and Reliability*, Kobe, Japan, May 27-29, 1985, Vol. II. pp. 569-573.
- Toro, G. R. and Cornell, C. A., "Extremes of Transient Dynamic Responses", *Proceedings of the 4th International Conference on Structural Safety and Reliability*, Kobe, Japan, May 27-29, 1985, Vol. I, pp. 602-606.
- Winterstein, S. R. and Cornell, C. A., "Fatigue and Fracture under Stochastic Loading", *Proceedings of the 4th International Conference on Structural Safety and Reliability*, Kobe, Japan, May 27-29, 1985, Vol. III, pp. 745-749.
- Veers, P., Winterstein, S., Nelson, D. and Cornell, C.A., "Variable Amplitude Load Models for Fatigue and Crack Growth", *Proceedings ASTM Symposium on Developmental Fatigue Loading Spectra*, Cincinnati, Ohio, April, 1987.
- Bjerager, P., Karamchandani, A., and Cornell, C.A., "Failure Tree Analysis in Structural Systems Reliability", *Proceedings ICASP*, Vancouver, B.C., May, 1987.
- Cornell, C. A., and Winterstein, S., "Temporal and Magnitude Dependence in Earthquake Recurrence Models", *Proceedings of U.S.-Japan Workshop on Stochastic Methods in Earthquake Engineering*, Florida-Atlantic U., Boca Raton, Fla, May, 1987.
- Sewell, R. T., Cornell, C. A., Toro, G. R., McGuire, R. K., Kassawara, R., and Singh, A., "Factors Influencing Floor Response Spectra in Nonlinear Structures", *Proceedings of SMIRT*, Lausanne, August, 1987.
- Ibrahim, Y., and Cornell, C. A., "Application of a Hybrid Strategy for Structural System Reliability Analysis", *Proceedings of ASCE Structures Congress*, Orlando, Fla, August, 1987.
- Nordal, H., Cornell, C.A. and Karamchandani, A., "A Structural Systems Reliability Case Study of an Eight-leg Steel Jacket Offshore Production Platform", *Proceedings of Marine Structural Reliability Symposium*, SNAME, Arlington, Va, October, 1987.
- Cornell, C. A. and Sewell, R. T., "Non-linear Behavior Intensity Measures in Seismic Hazard Analysis", *Proceeding of the International Workshop on Seismic Zonation*, Guangzhou, China, December, 1987.
- Sewell, R.T. and Cornell, C.A., "Seismic Hazard Analysis Based on Limit-State Structural Damage", *Proc. ICASP-5*, Vancouver, BC, Canada, 1987.
- Bjerager, P., Winterstein, S. R., and Cornell, C. A., "Outcrossing Rates by Point Crossing Method", ASCE, *Proceedings of the Specialty Conference on Probabilistic Methods*, V.P.I., Blacksburg, Virginia, May, 1988.

- Karamchandani, A., Bjerager, P., Winterstein, S. R. and Cornell, C. A., "Methods to Estimate Parametric Sensitivity in Structural Reliability Analysis", *Proceedings of the Specialty Conference on Probabilistic Methods*, V.P.I., Blacksburg, Virginia, May, 1988.
- Ibrahim, Y., and Cornell, C. A., "Experiences with Applications of Importance Sampling in Structural Reliability Computations", ASCE, *Proceedings of the Specialty Conference on Probabilistic Methods*, V.P.I., Blacksburg, Virginia, May, 1988.
- Liu, W.D., Cornell, C. A. and Imbsen, R. A., "Analysis of Bridge Truck Loads", ASCE, *Proceedings, Specialty Conference on Probabilistic Methods*, V.P.I., Blacksburg, Virginia, May, 1988.
- Sewell, R. T., McGuire, R. K., Toro, G. R., Cornell, C. A., and Stepp, J. C., "Approaches That Use Seismic Hazard Results To Address Topics of Nuclear Power Plant Seismic Safety, With Application To The Charleston Earthquake Issue", *Proceedings of the Second Symposium on Current Issues Related to Nuclear Power Plant Structures, Equipment, and Piping With Emphasis on Resolution of Seismic Issues in Low-Seismicity Regions*, Orlando, FL, 1988.
- De, R. S., Karamchandani, A., Bjerager, P., and Cornell, C. A., "On Spatial Correlation of Nodal Wave Forces in System Reliability Analysis of Offshore Structures", *Proceedings of Second Working Group Conference on Reliability and Optimization of Structural Systems*, IFIP, London, September, 1988. (Proceedings to be published by Springer-Verlag, Lecture Notes in Engineering Series.)
- Cornell, C. A., "Some Comments on Structural System Reliability", invited Keynote address, *Proceedings of Workshop on Research Needs for Applications of System Reliability Concepts and Techniques*, Univ. of Colorado, Boulder, October, 1988.
- Bjerager, P., Loseth, R., Winterstein, S. R., and Cornell, C. A., "Nonlinear Stochastic Response of a Moored Structure under Combined Loads", *Proceedings, Ocean Structural Dynamics Symposium '88*, Oregon State University, September, 1988, pp. 480-495; also appeared *Proc. of 4th Behavior of Offshore Structures Symposium*, Trondheim, Norway, 1988.
- Cornell, C.A., and Sewell, R.T., "Equipment Response in Linear and Non-Linear Nuclear Power Plant Structures: Small Magnitude Versus Design-Type Motions", *Proceedings of 1987 Workshop: Characterization of Small-Magnitude Earthquakes*, EPRI, Palo Alto, CA., June, 1989.
- Cornell, C. A., and Toro, G., "Seismic Hazard Assessment", Chapter in *Techniques for Determining Probabilities of Events and Processes Affecting the Performance of Geological Repositories*", Edited by R.L. Hunter, and C. J. Mann, Sandia National Laboratory, NUREG/CR-3964, SAND86-0196, Vol.1 prepared for U.S. Nuclear Regulatory Commission, June, 1989.
- Karamchandani, A., Bjerager, P., and Cornell, C. A., "Adaptive Importance Sampling", *Proceedings of the 5th ICOSSAR*, San Francisco, California, August, 1989.
- Ibrahim, Y., and Cornell, C. A., "A Strategy For The Reliability of Complex Structural Systems", *Proceedings of the 5th International Conference on Structural Safety and Reliability*, San Francisco, California, August, 1989.
- De, R. S., Karamchandani, A., and Cornell, C. A., "Study of Redundancy In Near-Ideal Parallel Structural System", *Proceedings of the 5th International Conference on Structural on Structural Safety and Reliability*, San Francisco, California, August, 1989.

- Cornell, C. A., Sewell, R. T., Toro, G. and McGuire, R., "Linear and Nonlinear Response of Structures and Equipment to California and Eastern United States Earthquakes", *Electric Power Research Institute Technical Report No. NP-5566*, Palo Alto, California, August, 1989.
- Abrahamson, N. A., Somerville, P. G., and Cornell, C. A., "Uncertainty in Numerical Strong Motion Prediction for Engineering Applications", *Proc., Fourth U.S. Natl. Conf. on Earthquake Eng'g.*, May, 1990, Palm Springs, CA, Vol. 1.
- Sewell, R. T., O'Hara, T. F., Cornell, C. A., and Stepp, J. C. "Selection of Review Method and Ground-Motion Input for Assessing Nuclear Power Plant Resistance to Potential Severe Seismic Accidents", *Third Symposium on Current Issues Related to Nuclear Power Plant Structures*, Orlando, Florida, December, 1990.
- Banon, H., Cornell, C.A., and Harding, S.J., "Probabilistic Combination of Forces in Tension Leg Platform Tethers", *Journal of Structural Engineering*, Vol. 117, No. 5, May, 1991, pp. 1532-1548.
- Karamchandani, A., and Cornell, C. A., "Load Paths in Structural System Reliability", *Proceedings, ICASP '91*, Mexico City, June, 1991.
- Inoue, T., and Cornell, C.A., "Seismic Hazard Analysis of MDOF Structures", *Proc., ICASP '91*, Mexico City, June, 1991.
- Inoue, T., and Cornell, C.A., "Seismic Hazard Analysis of Multi-Degree-of-Freedom Structures", *Proceedings JICOSSAR*, Tokyo, October, 1991.
- Wu, S.C., Cornell, C.A., and Winterstein, S.R., "Estimation of Correlations Among Characteristic Earthquakes", *Proceedings 4th ICSZ*, Stanford University, Palo Alto, CA, 1991.
- Stahl, B., Shoup, G.J., Geyer, J.F., Vinnem, J.E., Cornell, C.A., and Bea, R.G., "Methodology for Comparison of Alternative Production Systems (MCAPS)", OTC , *Proc. 22nd Annual Offshore Tech. Conf.*, Houston, May, 1992.
- Lebas, G., Lacasse, S., and Cornell, C.A., "Response Surfaces for Reliability Analysis of Jacket Structures", *Proceedings 11th Internatl. Conf. on OMAE*, Calgary, Canada, June, 1992.
- Bea, R.G., Cornell, C.A., Vinnem, J.E., Geyer, J.F., Shoup, G.J., and Stahl, B., "Comparative Risk Assessment of Alternative TLP Systems: Structure & Foundation Aspects", *Proceedings, 11th Internatl. Conf. on OMAE*, Calgary, Alberta, Canada, June 7-11, 1992.
- McGuire, R.K., Toro, G.R., Veneziano, D., Cornell, C.A., Hu, Y.X., Jin, Y., Shi, Z., and Gao, M., "Non-Stationarity of Historical Seismicity in China", *Proc. of 10WCEE*, Madrid, Spain, July, 1992.
- Birades, M., Cornell, C.A., and Ledoigt, B., "Load Factor Calibration for the Gulf of Guinea". Adaption of API RP2A-LRFD, *Proceedings, Internatl. Conf. on BOSS*, London, July, 1992.
- Bazzurro, P., and Cornell, C.A., "Seismic Risk: Non-Linear MDOF Structures", *Proc., Tenth World Conference on Earthquake Engineering*, ISBN 90-5410-60-5, Madrid, Spain, July 19-24, 1992.
- De, R.S., and Cornell, C.A., "Factors in Structural System Reliability", *Proceedings, Third Working Group Conference on Reliability and Optimization of Structural Systems*, IFIP, Munich, Sept., 1992. (Proceedings to be published by Springer-Verlag, Lecture Notes in Engineering Series.)

- Winterstein, S.R., Ude, T.C., Cornell, C.A., Bjerager, P., and Haver, S., "Environmental Parameters for Extreme Response: Inverse FORM with Omission Factors", *Proceedings, ICOSSAR-93*, Innsbruck, Austria, 1993.
- Cornell, C.A., "Summary - Assessment Working Group", Part of "Aging of Energy Production and Distribution Systems", DOE Workshop, Rice University, Houston, TX, October, 1992, *Appl. Mech. Rev.*, Vol. 46, No. 5, May, 1993.
- Manuel, L., and Cornell, C.A., "Sensitivity of the Dynamic Response of a Jack-Up Rig to Support Modeling and Morison Force Modeling Assumptions", *Proceedings, 12th ICOMAE*, No. OMAE-93-1283, Glasgow, Scotland, June, 1993.
- Iwan, W.D., Thiel, C.C., Housner, G.W. and Cornell, C.A., "A Reliability-Based Approach to Seismic Reassessment of Offshore Platforms", *ICOSSAR '93*, Innsbruck, Austria, Aug. 9-13, 1993.
- Bazzurro, P., Cornell, C.A., Diamantidis, D., and Manfredini, G.M., "Requalification of Nuclear Power Plant Structures Seismic Damage Hazard Analysis: Methodology and Application", *Presented at 12th Internatl. Conf. on SMIRT*, Stuttgart, Germany, Aug., 15-20, 1993.
- Cornell, C.A., "Which 84th Percentile Do You Mean?", *Proc. 4th DOE Nat. Phenom. Haz. Mit. Conf.*, Atlanta, GA, October, 1993.
- Puskar, F.J., Aggarwal, R.K., Cornell, C.A., Moses, F., and Petrauskas, C., "A Comparison of Analytically Predicted Platform Damage to Actual Platform Damage During Hurricane Andrew", *Proc. Offshore Tech. Conference*, Houston, TX, May, 1994.
- Bazzurro, P., Cornell, C.A., Pelli, F., and Manfredini, G.M., "Stability of Sloping Seabed - Seismic Damage Analysis: Methodology and Application", *Proc., Third Symposium on Strait Crossings*, Alesund, Norway, June 12-15, 1994.
- Bazzurro, P., Cornell, C.A., Diamantidis, D., and Vaidya, N.R., "Probabilistic Seismic Requalification of Nuclear Power Plant Structures", *Proc., ASME PVP-1994 Conf.*, Minneapolis, MN, June 19-23, 1994.
- Schmucker, D.G., and Cornell, C.A., "Dynamic Behavior of Semi-Ductile Jackets Under Extreme Wave and Wave-in-Deck Forces", *Pres., BOSS-94*, MIT, Cambridge, MA, July 12-15, 1994.
- Cornell, C.A., "Risk-Based Structural Design", *Proc. 1994 Symp. on Risk Analysis*, Univ. of Michigan, July, 1994.
- Manuel, L., and Cornell, C.A., "An Efficient FORM-Based Strategy for the Reliability Analysis of Marine Structures", *Proc. 6th IFIP WG 7.5 Working Conf. Reliability and Optimization of Structural Systems*", Assisi, Italy, September, 1994.
- Hanks, T.C., and Cornell, C.A., "Probabilistic Seismic Hazard Analysis: A Beginner's Guide", *Proc. 5th Symp. Current Issues Related to Nuclear Power Plant Structures, Equip. and Piping*, Orlando, FL, December, 1994.
- NEPEC Working Group: "Earthquake Research at Parkfield, California, for 1993 and Beyond —", *Rep. of the NEPEC Wrkg. Grp. to Eval. the Parkfield Earthquake Prediction Experiment*, U.S.G.S. Circ. 1116, U.S. GPO, Washington DC, 1994.
- Cornell, C.A., "Structural Reliability - Some Contributions to Offshore Technology", OTRC Honors Lecture, OTC 7753, *Proceedings. 27th Annual Offshore Technology Conference*, Houston, TX, May, 1995
- Mahdyiar, M., Cornell, C.A., Jackson, D., and Aki, K., "Probabilistic Seismic Hazard Analysis of Southern California Analysis of Southern California", *Proceedings, 5th Inter. Conf. on Seismic Zonation*, Nice, France, October, 1995.

- Cornell, C. A., "Environment/Force/Response Interface and Integration: Reliability Analysis and Reliability-Based Design", *Proc., E&P Forum Workshop on Uncertainties in the Design Process*, London, England, November, 1995
- Coppersmith, K.J., Perman, R.C., Youngs, R.R., Crampton, T.A., DiSilvestro, L.A., Morris, P.A., Nelson, S.T., Smith, R.P., Stepp, J.C., Cornell, C.A., and Sullivan, T., "The Probabilistic Volcanic Hazard Analysis Project", *International High-level Radioactive Waste Management Conference*, Las Vegas, NV. ANS-ASCE, April, 1996.
- Aggarwal, R.K., Dolan, D.K., and Cornell, C.A. "Development of Bias in Analytical Predictions Based on Behavior of Platforms During Hurricanes", *Proc. 28th Annual Offshore Technology Conference*, Houston, Texas, May, 1996.
- Aggarwal, R.K., Litton, R.W., , Cornell, C.A., Tang, W.H., , Chen, J.H., and Murff, J.D., "Development of Pile Foundation Bias Factors Using Observed Behavior of Platforms During Hurricane Andrew", *OTC 8078, 28th Annual Offshore Technology Conference*, Houston, Texas, May, 1996.
- Cornell, C. A., "Calculating Building Seismic Performance Reliability: A Basis for Multi-level Design Norms", *Proc. Eleventh World Conf. On Earthquake Engineering*, Acapulco, Mexico, June, 1996.
- Cornell, C. A., "Reliability-Based Earthquake-Resistant Design; The Future", *Proc. Eleventh World Conf. on Earthquake Design*, Acapulco, Mexico, June, 1996.
- Cornell, C.A., and Bandyopadhyay, K. K., "Should We Relax Seismic Criteria for Shorter System Exposure Times?", *ASME Proc. Press. Vessels and Piping Conf.*, Montreal, July, 1996.
- Winterstein, S. R., Ude, T.C., Bazzurro, P., and Cornell, C. A. , "Ocean Environment Contours For Structural Response Analysis and Experiment Design", *ASCE Probabilistic Methods Speciality Conference*, Worcester, MA., August, 1996.
- Bazzurro, P., Winterstein, S.R., Ude, T.C., and Cornell C.A., "Magnitude-Distance Contours for Probabilistic Seismic Hazard Analysis", *ASCE Probabilistic Methods Speciality Conference*, Worcester, MA., August, 1996.
- Schmucker, D. G., and Cornell, C. A., "Reliability of Jackets: Beyond-Static-Capacity", *7th ASCE EMD/STD Joint Speciality Conference on Probabilistic Mechanics and Structural Reliability*, Worcester, MA., August, 1996.
- Budnitz, R.J. (Chairman), Apostolakis, G., Boore, D.M., Cluff, L.S., Coppersmith, K.J., Cornell, C.A., and Morris, P.A. "Recommendations for Probabilistic Seismic Hazard Analysis: Guidance on Uncertainty and Use of Experts", Author: SSHAC (Senior Seismic Hazard Analysis Committee), Report No. NUREG/CR-6372 prepared for *US Nuclear Regulatory Commission, U.S. Department of Energy and the Electrical Power Research Institute*, April, 1997.
- Bazzurro, P. and Cornell, C.A., "Spatial Disaggregation of Seismic Hazard", *Proc. 6th U.S. National Conference on Earthquake Engineering*, Seattle, Washington, June, 1998.
- Luco, N. and Cornell, C.A., "Effects of Random Connection Fractures on the Demands and Reliability for a 3-Story Pre-Northridge SMRF Structure", *Proc. 6th U.S. National Conference on Earthquake Engineering*, Seattle, Washington, June, 1998.
- Shome, N. and Cornell, C.A., "Normalization and Scaling Accelerograms for Nonlinear Structural Analysis", *Proc. 6th U.S. National Conference on Earthquake Engineering*, Seattle, Washington, June, 1998.
- Carballo, J.E. and Cornell, C.A., "Input to Nonlinear Analysis: Modification of Available Accelerograms for Different Source and Site Characteristics", *Proc. 6th U.S. National Conference on Earthquake Engineering*, Seattle, Washington, June, 1998.

Stahl, Bernard, Gebara, Joseph M., Aune, Stig and Cornell, C. Allin, "Acceptance Criteria for Offshore Platforms", *Proc. 17th International Conference on Offshore Mechanics and Arctic Engineering – OMAE98-1463*; July 5-9, 1998, Lisbon, Portugal.

Luco, N., and Cornell, C.A., "Seismic Drift Demands for Two SMRF Structures with Brittle Connections", *Proc. Structural Engineers World Congress*, San Francisco, July, 1998.

Bazzurro, Paolo, Winterstein, Steven R. and Cornell, C. Allin, "Seismic Contours: A New Characterization of Seismic Hazard", *Proc. 11th European Conference on Earthquake Engineering*, Paris, France, September 6-11, 1998.

Amin, M., Budnitz, R., Cornell, C.A., Kennedy, R. P., Olson, D. E., and Tang, H.T., "Reduced Seismic Loads for Temporary Conditions", *Proceedings, 7th Inter. Symp. On Current Issues Related to Nuclear Power Plant Structures, Equipment and Piping*, N.C. State Univ., Raleigh, N.C., December, 1998.

Bazzurro, P., Cornell, C.A. and Pelli, F., "Site-and Soil-specific PSHA for Nonlinear Soil Sites", *Proceedings, 4th Earthquake Resistant Design Structures 99 (ERES99)*, Catania, Italy, June 15-17, 1999.

Hamburger, R., Foutch, D. and Cornell, C. A. "Performance Basis of Guidelines for Evaluation, Upgrade, and Design of Moment-Resisting Steel Frames", Paper No. 2543, *Proceedings of the 12th World Conference on Earthquake Engineering*, New Zealand, January, 2000.

Shome, N. and Cornell, C.A., "Structural Seismic Demand Analysis: Consideration of 'Collapse'", *Proceedings ASCE Specialty Conference on Probabilistic Mechanics and Structural Reliability*, PMC2000-119, Notre Dame, IN, July, 2000

Cornell, C. A., Vamvatsikios, D., Jalayer, F., and Luco, N., "Seismic Reliability of Steel Frames", *Proceedings of IFIP WG7.5 Structural Systems Reliability and Optimization Workshop*, Ann Arbor, MI, September, 2000.

Younan, A, Banon, H., Marshall, P., Crouse, C.B. and Cornell, C.A., "An Overview of the ISO Seismic Guidelines", *Proceedings, OMAE*, , May, 2001

Luco, N., Cornell, C. A., and Yeo, G. L., "Annual Limit State Frequencies for Partially-Inspected Earthquake-Damaged Buildings", *Proceedings, ICOSSAR*, 2001 - REVISE /FINISH-

Technical Reports

Cornell, C.A. & Luco, Nicolas, "The Effects of Connection Fractures on Steel Moment Resisting Frame Seismic Demands and Safety", A report to the SAC Steel Project, SAC/BD-99/03 (available at eerelib@nisee.ce.berkeley.edu), Department of Civil Engineering, Stanford University, Stanford, California.

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