Lucius Pitkin, Inc. *Consulting Engineers*

Fitness-For-Service
Failure & Materials Evaluation
Nondestructive Engineering

DR. THOMAS C. ESSELMAN – PRINCIPAL

Education:

B. S. Mechanical Engineering, Case Institute of Technology, Cleveland, Ohio, June, 1968.
M.S. Engineering Mechanics, CaseWestern ReserveUniversity, Cleveland, Ohio, June, 1971.
Ph.D. Engineering Mechanics, CaseWestern ReserveUniversity, Cleveland, Ohio, June, 1973. Education and research concentration included interaction of mechanics and materials, buckling including shell buckling, experimental stress analysis, fracture mechanics, and classical elasticity and plasticity.
MBA, University of Pittsburgh, Pittsburgh, Pennsylvania, June, 1980

Experience:

Dr. Esselman is a Principal at Lucius Pitkin, Inc.

Dr. Esselman has over thirty-five years experience in engineering including the areas of component and structure performance, aging, stress analysis, dynamics, seismic design and analysis, mechanical design, thermo-hydraulics, materials, materials degradation, and failure analysis. His responsibilities have included performance and management of a large variety of engineering, engineering development, and engineering evaluation issues. Dr. Esselman consults frequently on power generation and delivery, generating plant design and operation, material degradation, plant and system aging issues, and materials evaluations. He has had responsibility for numerous interdisciplinary task forces, cross-functional problem solving projects, and technology planning activities.

Dr. Esselman was previously the President of Altran Corporation. Altran Corporation was an engineering consulting firm that Dr. Esselman founded in 1986. The focus of Altran Corporation was to provide engineering and materials consulting services, including failure analysis, engineering design, life cycle management, stress analysis, thermal hydraulics, seismic evaluation, structural analysis, root cause analysis, and design review services. Altran had a laboratory that performed materials testing and product development activities for diverse clients.

In 1996, Dr. Esselman co-founded Echo Technologies, Inc. This company used proprietary technology to develop a sensor that detected the presence of bacteria. This company was sold to Smiths Group in 2005.

Altran Corporation was acquired by Altran Technologies, SA in September, 2000. Altran Technologies, SA is a consulting firm with headquarters in Paris, France that provides consulting services around the world. Dr. Esselman was employed by Altran

Technologies, SA in various positions including Chief Technology Officer and President of Altran USA, Inc.

Dr. Esselman was previously with Westinghouse Electric Corporation.He was initially a Senior Engineer and progressed to the position of Manager, Engineering Mechanics. He was responsible for Structural Design, Engineering Analysis, Component Design, and piping design for electrical power plants. Specific responsibilities varied from managing large scale power plant design and analysis activities of over 300 people to developing the design of the next generation of components for power plants. He supervised piping and component stress and fatigue analyses for Westinghouse components. He prepared and presented Licensing Board testimony relative to seismic qualification and component qualification several times in final plant licensing stages.

Dr. Esselman is also a Lecturer in the School of Engineering and Applied Science at HarvardUniversity. He co-developed and teaches a course entitled “Innovation in Engineering and Science” at HarvardUniversity. This course has been offered annually at Harvard since 2002.

Dr. Esselman has authored or co-authored more than fifty publications and lectures. He has lectured on Innovation in the United States, Ireland, Belgium, Netherlands, France, the United Kingdom, and Japan.

Membership, Positions, and Boards

Member, American Society of Mechanical Engineers (ASME)
Member, American Nuclear Society
Member, American Association for Advancement of Science
Member, Beta Gamma Sigma – Business Honor Society
1998-2001 – Vice Chairman, Codes and Standards, Pressure Vessel and Piping Division of the American Society of Mechanical Engineers (ASME)
1996-1999 – Technical Program Representative, Codes and Standards, Pressure Vessel and Piping Division of the American Society of Mechanical Engineers (ASME)
1986-1991 – Member, Pressure Vessel Research Council, Technical Committee on Piping Systems
1980-1985 – Member, Board of Overseers, CaseWestern ReserveUniversity
1983-1985 – Chairman, Visiting Committee for Student Affairs, CaseWestern ReserveUniversity
1996-2000 – Director, Echo Technologies, Inc., Company developed a sensor to detect the presence of bacteria.
2002-2005 – Director, Medicine in Need (MEND), Non-profit Company founded by faculty and students at HarvardUniversity.
2005-2009 – Member, Scientific Advisory Board, Medicine in Need (MEND)
2005-2009 – Corporate Advisory Board, Hult International School of Business

2007-Present – Accreditation Board for Engineering and Technology (ABET), Mechanical Engineering Program Reviewer
2008-Present – Board Member, Great Lakes Energy Institute, Case Western Reserve University

Publications and Lectures:

1. Kicher, T., Esselman, T., and Gratzinger, R., "Thermal Buckling of Stud Supported Liner Shells", 2nd International Conference on Structural Mechanics in Reactor Technology, Berlin, Germany, September 10 – 14, 1973.
2. Reed, J., Cooper, K., Esselman, T., "Applications of Computer - Aided Engineering to Ship Systems and Structures", The 1983 SPC/IREAPS Technical Symposium, August, 1983.
3. Lin, C. W., and Esselman, T. C., "Equivalent Static Coefficients for Simplified Seismic Analysis of Piping Systems", Transactions of the 7th Structural Mechanics in Reactor Technology Conference, Vol. K(b), pp. 335-341, Chicago, IL, 1983.
4. Akselrod A., and Esselman, T., "Hydrodynamic Event Resulting from a Sudden Pipe Rupture and Subsequent Check Valve Closure, Practical Methods and Conservative Evaluations", ASME Winter Annual Meeting, 1991.
5. Esselman, T. C., Akselrod, A., and Marina, M., "Distribution Piping Operation to Prevent Waterhammer", Proceedings of the International District Heating and Cooling Association (IDHCA), 1991 Annual Meeting.
6. Durkin, C., Sinha, S., Esselman, T., Madia, J., "Characteristics of Steam Generator Girth Weld Cracking", PVP-Vol. 221, American Society of Mechanical Engineers, 1991.
7. Akselrod, A., Esselman, T. Griffith, P., and Min, E., "Condensation Induced Waterhammers in Steam Distribution Systems", American Society of Mechanical Engineers Winter Annual Meeting, 1991, PVP-Vol. 224, FED-Vol. 126.
8. Esselman, T., "Prevention of Waterhammer", International District Heating and Cooling Association (IDHCA) College/University Conference, February 27, 1992, Auburn University.
9. Chandra, S., Esselman, T., "Erosion-Corrosion Phenomena in Power Plants", Electric Power Research Institute, Fluid Systems Testing and Analysis Forum, September, 1992.
10. Esselman, T., "Development of a Balanced Approach to Piping System Qualification for Operating Plants", PVP-Vol. 238, American Society of Mechanical Engineers, 1992.
11. Esselman, T., Marina, M., Sinha, S., "Steam Generator Shell Design and Plant Operation to Prevent Cracking", PVP-Vol. 233, American Society of Mechanical Engineers, 1992.
12. Esselman, T., Thailer, H, "Rational Design of Piping Systems", PVP-Vol. 264, American Society of Mechanical Engineers, 1993.
13. Esselman, T., Ballinger, R., "Boric Acid Corrosion of Nuclear Plant Components", PVP-Vol. 261, American Society of Mechanical Engineers, 1993.
14. Akselrod, A., and Esselman, T., "Transient Thermal-Hydraulic Analysis of the Reactor Vessel Head Vent System", SMiRT-12, Elsevier Science Publishers, 1993.
15. Esselman, T., "Prevention of Waterhammer", International District Heating and Cooling Association (IDHCA) Safety, Environment, and Operations Workshop, Baltimore, MD, September 29, 1993.
16. Groeger, J. H., and Esselman, T. C., "Aging of Outdoor Polymeric Insulators for Outdoor Medium Voltage Distribution Applications", Proceedings of the IEEE First International Conference on Electrical Distribution, Sao Paulo, Brazil, 1993.

17. Esselman, T. and McDevitt, R., "An Aging Management Program Focused on the Full Utilization of Existing Licenses", Proceeding of the 4th Topical Meeting on Nuclear Thermal Hydraulics, Operations, and Safety, Taipei, Taiwan, 1994, pp. 6-D-1 to 6-D-6.
18. Esselman, T. and McBrine, W., "Effective Flow-Accelerated Programs in Nuclear Facilities", Proceeding of the 4th Topical Meeting on Nuclear Thermal Hydraulics, Operations, and Safety, Taipei, Taiwan, 1994, pp. 6-D-1 to 6-D-6.
19. Esselman, T., Editor, International Pressure Vessel and Piping Codes and Standards: Current Perspectives, PVP-Vol. 313-2, American Society of Mechanical Engineers, 1995.
20. Esselman, T., Contributing Editor, "Flow Accelerated Corrosion", *Codes and Standard for Quality Engineering,* Proceedings of 1994 ASME Pressure Vessel and Piping Division Conference, PVP-Vol. 285, American Society of Mechanical Engineers, 1994, pp 1-24.
21. Esselman, T., Contributing Editor, "Corrosion in Piping and Vessels", *Codes and Standard for Quality Engineering,* Proceedings of 1994 ASME Pressure Vessel and Piping Division Conference, PVP-Vol. 285, American Society of Mechanical Engineers, 1994, pp 25-52.
22. Chandra, S., Habicht, P., Chexal, B., Mahini, R., McBrine, W., Esselman, T., Horowitz, J., "Pipe Degradation Investigations for Optimization of Flow-Accelerated Corrosion Inspection Location Selection", PVP-Vol. 313-2, American Society of Mechanical Engineers, 1995.
23. Esselman, T. Sinha, S., "Condensation Induced Waterhammer Occurrence and Prevention", PVP-Vol. 313-1, American Society of Mechanical Engineers, 1995.
24. Esselman, T., McBrine, W., and Elaidi, B., "Aging Assessment as a Part of a Comprehensive Life Cycle Management Program", American Society of Mechanical Engineers, PVP-Vol. 332, 1996, pp. 67-76.
25. Esselman, T., Principal Editor, Pressure Vessel and Piping Codes and Standards: Volume 1, American Society of Mechanical Engineers, PVP-Vol. 338, 1996.
26. Esselman, T., Principal Editor, Pressure Vessel and Piping Codes and Standards: Volume 2, American Society of Mechanical Engineers, PVP-Vol. 339, 1996.
27. Esselman, T., Kupinski, M., "Waterhammer Event – Root Cause Analysis and Prevention", American Society of Mechanical Engineers, PVP-Vol. 338, 1996, pp. 125-128.
28. Esselman, T., Skulte, P., and Vecchio, R., "Service Water Pump Shaft Failure – Material Selection for Repair", 2nd International EPRI Conference, Welding and Repair Technology for Power Plants, Daytona Beach, Florida, May, 1996.
29. Esselman, T., McBrine, W., and Martin, R., "A Degradation-Based Failure Prevention Program for Buried Structures and Components", American Society of Mechanical Engineers, PVP-Vol. 353, pp. 61-67, 1997.
30. Esselman, T., Principal Editor, Pressure Vessel and Piping Codes and Standards, American Society of Mechanical Engineers, PVP-Vol. 353, 1997.
31. Esselman, T., Lubin, B., Principal Editors, Risk-Informed Decision Making, American Society ofMechanical Engineers, PVP-Vol. 358, 1997.
32. Esselman, T. C., Eissa, M. A., McBrine, W. J., "Structural Condition Monitoring in a Life Cycle Management Program", Nuclear Engineering And Design, Elsevier Science, May 1998, Vol. 181, pp. 163–173.
33. Gu, J. D., Roman, M., Esselman, T., Mitchell, R., "The Role of Microbial Biofilms in Deterioration of Space Station Candidate Materials", International Biodeterioration and Biodegradation Journal, Elsevier Science Ltd., Vol. 41, pp. 25-33, 1998.
34. Esselman, T. and Beckham, P., "Safety Valve Operation, Setpoint Pressures, and Testing", Proceedings of the Fifth NRC/ASME Symposium on Valve and Pump Testing, NUREG/CP-0152, Volume 2, July, 1998.

35. Womack, L. F., Esselman, T. C., Hefler, J., “One Utility's Solution to Outsourcing - Create Your Own Partner”, Nuclear Engineering International, January, 1999, Vol. 44.
36. Leisk, G., McBrine, W., Esselman, T., van der Schijff, O., Wender, P.and Latanision, R., "Application of Practical Aging Management Concepts to Corrosion Engineering," 14th International Corrosion Congress, Cape Town, South Africa, September, 1999.
37. Esselman, T., McBrine, W., Van Der Schijff, O., Mittelman, M., Latanision, R., “Corrosion Monitoring and Mitigation to Improve Plant Performance”, Plant Life Extension and Plant Life Management (PLIM-PLEX) International Conference, Madrid, Spain, November, 1999.
38. Latanision, R., Leisk, G., McBrine, W., Esselman, T., van der Schijff, O., and Wender, P., "Application of Practical Aging Management Concepts to Corrosion Engineering," Environmental Effects in Flow-Assisted Corrosion of Naval Systems, Tri-Service Corrosion Conference, South Carolina, AMPTIAC Document AM026053, November, 1999.
39. Esselman, W. H. and Esselman, T. C., “Nuclear Power – Viable in a Competitive Market?”, Nuclear News, January, 2000, pg. 48.
40. Green, D., Adcock, F., Esselman, T., and Cafarella, P., “A Plant Optimization and Asset Management Program”, Proceedings of the Eighth International Conference on Nuclear Engineering, ICONE-8781, April, 2000.
41. McBrine, W., Esselman, T., Hosler, J., and Hart, S., “Investigation of High Lift Phenomenon in Dresser 3700 Series Main Steam Relief Valves”, Proceedings of the Sixth NRC/ASME Symposium on Valve and Pump Testing, NUREG/CP-0152, Vol. 3, July, 2000.
42. Esselman, T., “The Future Role of Engineering Organizations”, American Nuclear Society, Engineering Excellence Conference, May 9, 2000.
43. Esselman, T., “The New Nuclear Business with Old Nuclear Plants”, Nuclear Non-Operating Owner’s Group Conference, Orlando, Florida, September, 2000.
44. McBrine, W., Esselman, T., Hosler, J., and Hart, S., “High Lift Phenomenon in Main Steam Safety Valves - Investigation And Resolution”, Nuclear Non-Operating Owner’s Group Conference, Orlando, Florida, September, 2000.
45. Esselman, T. C., Semprucci, L. B., Van Duyne, D., “Test Data and Comparison to Analysis for Condensation Induced Waterhammer,” 11th International Topical Meeting on Nuclear Reactor Thermal-Hydraulics (NURETH-11), Avignon, France, October, 2005.
46. Esselman, T. C., Semprucci, L. B., Van Duyne, D., “Test Data and Comparison to Analysis for Column Closure Waterhammer,” 11th International Topical Meeting on Nuclear Reactor Thermal-Hydraulics (NURETH-11), Avignon, France, October, 2005.
47. Esselman, T. C., “Innovation in Science and Engineering: How to Make it Have an Impact?”, The Oxford Forum on Entrepreneurship and Innovation, Oxford University, 2006.
48. Esselman, T. C., “A Regional View of Innovation”, 2007 Deioma Lecture, Case Western Reserve University, April 12, 2007.
49. Nichols, E., Esselman, T., “Creating and Sustaining a Competitive Advantage by Applying an INPO AP-913 Equipment Reliability Process”, Power-Gen Europe 2007, Madrid, Spain, June, 2007.
50. Esselman, T. C. and Barry, K., “Modular Design in New Nuclear Plants – A Challenge and an Opportunity”, Configuration Management Benchmarking Group Conference, Boston, July, 2009.
51. Bruck, P. M. and Esselman, T. C., “Failure Analysis and Fitness-for-Service - Impact on Configuration Management”, Configuration Management Benchmarking Group Conference, Boston, July, 2009.

52. Esselman, T. C., “Innovation in a Science and Engineering Education”, Presented to the Southeast Asia Technical University Consortium (SEATUC), Tokyo, Japan, February, 2010.
53. Esselman, T. C., “Augmented Containment Inspection”, Workshop on Nuclear Plant Life Extension Research and Development, Sponsored by NRC, DOE, and NEI, February 22, 2011.
54. Esselman, T. C. and Gaertner, J. P., “Life Limiting Issues for Long Term Operation of Nuclear Power Plants”, American Nuclear Society Utility Working Conference, Hollywood FL, August 15, 2011.