

ALLAN M. ZAREMBSKI Ph.D., P.E., F.A.S.M.E., Hon. Mbr. AREMA
Professor of Practice and Director of Railroad Engineering and Safety Program

Summary of Qualifications:

Over forty years of professional engineering responsibility. Extensive experience in all areas of rail operations to include freight and passenger operations, transit, commuter and inter-urban. Internationally recognized expertise in the area of railway track and structures, vehicle-track dynamics, failure and failure analysis, safety, railway operations, and maintenance. Consulting services provided to virtually all major rail operations in North America together with numerous operations worldwide. Teaching of university level (undergraduate and graduate) courses and professional short courses.

PROFESSIONAL HISTORY:

- September 2015 **University of Delaware, Department of Civil and Environmental Engineering**
to present Professor of Practice and Director of Railroad Engineering and Safety Program
Develop and teach railroad engineering courses for seniors and graduate students. Develop railroad engineering and safety program to include courses and research activities in the areas of railroad track engineering, vehicle-track dynamics, failure and failure analysis, railway safety, railway economics, and railroad operations and maintenance. Develop and teach professional courses in railroad engineering and safety.
- August 2012 **University of Delaware, Department of Civil and Environmental Engineering**
to August 2015 Research Professor and Director of Railroad Engineering and Safety Program
Develop and teach railroad engineering courses for seniors and graduate students. Develop railroad engineering and safety program to include courses and research activities in the areas of railroad track engineering, vehicle-track dynamics, failure and failure analysis, railway safety, railway economics, and railroad operations and maintenance. Develop and teach professional courses in railroad engineering and safety.
- September 2007 **ZETA-TECH, an Independent Business Unit of Harsco Rail**
to July 2012 Vice President and General Manager
Directed activities in track maintenance planning and planning software, vehicle-track dynamics and interaction, rail and track analyses, economic analyses of railroad operations, and railway costing. Special areas of activity include rail maintenance, rail grinding, railroad track structure, vehicle-track dynamics, fatigue and failure analysis, safety, and risk management.

1984
to 2007

ZETA-TECH Associates, Inc., Cherry Hill, New Jersey

President

Directed activities in track maintenance planning and planning software, vehicle-track dynamics and interaction, rail and track analyses, economic analyses of railroad operations, and railway costing. Special areas of activity include railroad track structure, vehicle-track dynamics, fatigue and failure analysis, safety, and risk management.

1981 -
1984

Pandrol Inc./Speno Rail Services Co.

Director Research & Development

Dual responsibility for both companies in directing all research and development activities for new products, new systems, and future corporate activities. Reported directly to the President. Responsible for all railroad technology activities including product application, advertising, and technical support.

1976 -
1981

Association of American Railroads

Manager - Track Research Division

December 1978 to September 1981

Directed Division Responsible for conducting major research programs on railroad track. Directed AAR Track Laboratory. Conducted extensive field and laboratory tests as well as analytical research programs.

Assistant Manager - Track Research Division

August 1978 to December 1978

Initiated major research programs in Track Strength, Rail Fatigue, Ballast Failure Mechanisms, etc.

Senior Research Engineer

August 1976 to August 1978

Responsible for research programs on freight car fatigue design, rail overturning, and track gage widening. Developed industry standard methodology for fatigue design of freight cars. Developed test plans and procedures for AAR Track Laboratory.

1975 -
1976

Princeton University

Research Associate - Dept. of Civil Engineering

Conducted research activities in the area of lateral (railroad) track deformation and track buckling. Conducted laboratory tests at civil engineering laboratory.

1971 -
1973

Grumman Aerospace Corp.

Engineer

Responsibility for design and analysis of military aircraft structural components. Also conducted dynamic analyses of aircraft structures.

EDUCATION:

Sept. 1975	Ph.D. Civil Engineering; Princeton University
June 1974	M. A. Civil Engineering; Princeton University
Jan. 1973	M. S. Engineering Mechanics; New York University
Jan. 1971	B. S. (Magna Cum Laude) Aeronautics and Astronautics; New York University

PROFESSIONAL AFFILIATIONS:

Registered Professional Engineer: NJ, NY, PA, IL, MD

MEMBER:

American Railway Engineering and Maintenance of Way Association (Honorary Member)
American Society of Mechanical Engineers (Fellow)
American Society of Civil Engineers (Life Member)

HONORS AND AWARDS:

- Awarded The Fumio Tatsuoka Best Paper Award for 2017 by the Journal of Transportation Infrastructure Geotechnology
- Organizer: “Big Data in Railroad Maintenance Conference”, December 2017, December 2016, December 2015, December 2014
- Appointed Professor of Practice, , Department of Civil and Environmental Engineering, University of Delaware, September 1, 2015.
- Appointed Research Professor and Director of Railroad Engineering and Safety Program, Department of Civil and Environmental Engineering, University of Delaware, August 1, 2012.
- Elected Honorary Member of American Railway Engineering and Maintenance of Way Association (AREMA) in 2010.
- Received Federal Railroad Administration’s SPECIAL ACT AWARD, February 2001
- Elected Fellow of the American Society of Mechanical Engineers in 2000
- 1992 Rail Transportation Award, American Society of Mechanical Engineers
- Associate Editor, Railway Track and Structures Magazine, January 1985 to 1996. Author of monthly column; "Tracking R&D"
- Member: National Academy of Sciences, National Materials Advisory Board; Committee on Nondestructive Testing of Longitudinal Force in Rails
- Member: Office for Research and Experiments of the International Union of Railway; Committee D150
- Delegate: American Railway Engineering Association Railroad Delegation to the Peoples Republic of China, 1983
- Deputy Director - International Government Industry Research Program on Track Train Dynamics
- Patent 8,345,948 Automated Turnout Inspection granted January 1, 2013
- Author of 199 papers on railroad track analysis and behavior, rail fatigue, and freight car design and analysis
- Author of over 130 articles on railway operations and maintenance, published in all of the major U.S. and international (English speaking) industry publications

- Author of the book Tracking R&D; Research and Development, Simmons Boardman, Omaha, NE, 1993
- Author of the book The Art and Science of Rail Grinding, Simmons Boardman, Omaha, NE, 2005
- Taught courses and/or seminars at:
 - University of Illinois Champaign Urbana (May 2017)
 - University of Nevada Las Vegas (June 2017)
 - Columbia University
 - Technion, Haifa, Israel
 - China Academy of Railway Sciences, Beijing China
 - Astana, Kazakhstan
 - Brazil (Belo Horizonte, Sao Paulo, Sao Luis)
 - New Dehli, India

DR. ALLAN M. ZAREMBSKI

BOOKS

1. Zarembski, A.M., Tracking R&D, Research & Development, **Simmons-Boardman Books, Inc.**, Omaha, NE, March 1993
2. Zarembski, A.M., The Art and Science of Rail Grinding, **Simmons-Boardman Books, Inc.**, Omaha, NE, August 2005

BOOK CHAPTERS

1. The Railroad: What It Is, What It Does, Chapter 3: The Track: Alignment and Structure, **Simmons Boardman Books, Inc. 2008**
2. Guidelines to Best Practices for Heavy Haul Railway Operations, Chapter 6.7 Maintenance Management Analysis Tools, **International Heavy Haul Association, 2009**

PUBLICATIONS

1. Zarembski, A. M., “Rail Rollover - The State of the Art”, **Bulletin of the American Railway Engineering Association, Bulletin 664, Volume 79**, September - October 1977.
2. Zarembski, A. M., “Freight Car Environment Characterization for Fatigue Life Analysis”, **Track/Train Dynamics and Design, Advanced Techniques**, Pergamon Press, N.Y., 1978.

3. Garg, V. K., Prasad, B., & Zarembski, A. M., "Structural Dynamic Analysis & Fatigue Life Prediction of a Flat Car", **1977 Technical Proceedings 14th Annual Railroad Engineering Conference**, Pueblo, CO, March 1978.
4. Abbott, R. A., & Zarembski, A. M., "On the Prediction of the Fatigue Life of Rails", **Bulletin of the American Railway Engineering Association**, Bulletin 666, Volume 79, January - February 1978, p.p. 191-203.
5. Zarembski, A. M., & Abbott, R. A., "Fatigue Analysis of Rail Subject to Traffic and Temperature Loading", **Heavy Hauls Railways Conference**, Perth, Western Australia, September 1978.
6. Zarembski, A. M., "On the Nondestructive In Track Measuring the Longitudinal Force", **Conference on Nondestructive Techniques for Measuring the Longitudinal Force in Rails**, Washington, D.C., February 1979.
7. Zarembski, A. M., "Effect of Rail Section and Traffic on Rail Fatigue Life", **American Railway Engineering Association, 78th Annual Technical Conference**, Chicago, IL, March 1979.
8. McConnell, D. P., Zarembski, A. M., & Lovelace, W. S., "Track Strength Characterization Program an Overview", **American Railway Engineering Association, 78th Annual Technical Conference**, Chicago, IL, March 1979.
9. Darien, N. J., & Zarembski, A. M., "Railroad Freight Equipment Load Environment Testing", **25th International Instrumentation Symposium**, Anaheim, CA, May 1979.
10. Torkamani, M. A. M., Bhatti, M. H., & Zarembski, A. M., "Dynamic Rail Overturning: Modeling and Application", **Third ASCE/EMD Specialty Conference**, Austin, TX, September 1979.
11. Zarembski, A. M., & Rassasian, M., "Track Gage Widening A Model Study", **Transportation Engineering Journal**, American Society of Civil Engineers, November 1979.
12. Choros, J., & Zarembski, A. M., "Track Strength Vehicle Testing on High Curvature Mainline Track", **Rail International**, July 1982.
13. Abbott, R. A., & Zarembski, A. M., "Longer Rail Life is Goal", **Modern Railroads**, December 1978.
14. Torkamani, M. A. M., Bhatti, M. H., & Zarembski, A. M., "Dynamic Rail Overturning: Modeling", **Rail International**, September 1980.
15. Torkamani, M. A. M., Bhatti, M. H., & Zarembski, A. M., "Dynamic Rail Overturning: Application", **Rail International**, October 1980.

16. Zarembski, A. M., "On the Feasibility of Continuous Measurement of Track Gauge Restraint", **Rail International**, July - August 1980.
17. Zarembski, A. M., "Rail Research: Meeting the Challenge of Modern Traffic Loading", Annual Meeting of the **Transportation Research Board**, January 1980. (Transportation Research Record 744).
18. Halcomb, S., & Zarembski, A. M., "Freight Car Fatigue Analysis: Guidelines and Application", **Track Train Dynamics Conference**, Chicago, IL, November 1979.
19. Lovelace, W. S., & Zarembski, A. M., "Future Directions in Track Evaluation and Inspection", **Track Train Dynamics Conference**, Chicago, IL, November 1979.
20. Zarembski, A. M., & Choros, J., "On the Measurement and Calculation of Vertical Track Modulus", **Bulletin of the American Railway Engineering Association**, Bulletin 675, Volume 81, November - December 1979.
21. Zarembski, A. M., & Choros, J., "Laboratory Investigation of Track Gauge Widening", **Bulletin of the American Railway Engineering Association**, Bulletin 676, Volume 81, January-February 1980.
22. Zarembski, A. M., McConnell, D. P., & Lovelace, W. S., "New Car for Measurement and Evaluation of Gage-Widening Resistance of Track", **American Railway Engineering Association, 79th Annual Technical Conference**, Chicago, IL, March 1980. (Bulletin 678, Volume 81, June - July 1980).
23. Kerr, A. D., & Zarembski, A. M., "The Response Equations for a Cross-tie Track", **ACTA Mechanical**, 40, 253-276, 1981.
24. Zarembski, A. M., & Choros, J., "Field Evaluation of Mainline Quality Track Using a Track Strength Test Vehicle", **Bulletin of the American Railway Engineering Association**, Bulletin 680, Volume 82, November - December 1980.
25. Zarembski, A. M., "The Track Modulus", **Roadmasters' and Maintenance of Way Association of America, Ninety-Third Annual Conference**, Chicago, IL, September 1981.
26. Zarembski, A. M., "The Direct Inspection of Track", **Railway Track and Structures**, November 1980.
27. Bhateja, R., & Zarembski, A. M., "Determination of Track Gage Widening Parameters", **International Conference on Computing in Civil Engineering**, New York, N. Y., May 1981.
28. Zarembski, A. M., & Magee, G., "An Investigation of Railroad Maintenance Practices to Prevent Track Buckling", **American Railway Engineering Association 80th Annual Technical Conference**, Chicago, IL, March 1981 (published in Bulletin 684, September 1981).

29. Webb, H. G., Wells, T., & Zaremski, A. M., "Track Maintenance Research Program: An Overview", **American Railway Engineering Association 80th Annual Technical Conference**, Chicago, IL, March 1981.
30. Zaremski, A. M., "Effect of Increasing Axle Loads on Rail Fatigue Life", **Bulletin of the American Railway Engineering Association**, Bulletin 685, Volume 83, November - December 1981.
31. Zaremski, A. M., et al, "The Effect of Increasing Axle Loads on Rail Fatigue Life", **Rail Technology: Proceedings of the Joint BR/AAR Seminar**, Frederick and Round, Nottingham, England, 1983.
32. Armstrong, Wells, Stone, & Zaremski, "Impact of Car Loads on Rail Defect Occurrences", **Second International Heavy Haul Railway Conference**, Colorado Springs, CO, September 1982.
33. Zaremski, A. M., "Performance Characteristics for Concrete Tie Fasteners", **Concrete Tie Systems for the 1980's**, Skokie, IL, November 1983.
34. Manos, Scott, Choros, & Zaremski, "Development of an Improved Vehicular Loading Characterization Associated with the Gage Strength of Track", **Bulletin of the American Railway Engineering Association**, Bulletin 686, Volume 83, January - February 1982.
35. Zaremski, A. M., "Performance Characteristics for Wood Tie Fasteners", **Bulletin of the American Railway Engineering Association**, Bulletin 697, Volume 85, October 1984, p.p. 341-369.
36. Zaremski, A. M., "The Impact of Rail Surface Defects", **Railway Track and Structures**, November 1984.
37. Zaremski, A. M., "The Economics of Rail Grinding and Rail Surface Maintenance", **Third International Heavy Haul Railway Conference**, Vancouver, British Columbia, October 1986.
38. Lamson, S. T., Zaremski, A. M., & Taylor, E. H., "Profile Grinding on CP Rail", **Joint British Rail/Association of American Railroads Seminar on Vehicle Track Interaction**, Princeton, NJ, April 1984.
39. Kerr, A. D., & Zaremski, A. M., "On the New Equations for the Cross-Tie Track Response in the Lateral Plane", **Rail International**, Number 6, 1986.
40. Zaremski, A. M., "Performance Characteristics for Concrete Tie Fasteners", **Rail International**, March 1987.
41. Zaremski, A. M., "The Relationship Between Rail Grinding and Rail Lubrication", **Second International Symposium on Wheel/ Rail Lubrication**, Memphis, TN, June 1987.

42. Zarembski, A. M., Izbinsky, G., Handal, S. N., & Worthington, W. M., "Corrugation Behavior in the Freight Railroad Environment", **American Railway Engineering Association (presented at the March 1987 Annual Conference, Chicago)**, Bulletin 712, Vol. 88, October 1987.
43. Zarembski, A. M., "The Evolution and Application of Rail Profile Grinding", **Bulletin of the American Railway Engineering Association**, Bulletin 718, Volume 89, December 1988.
44. Zarembski, A. M., "Track Maintenance Planning Using Forecasting Software", **Railway Technology International**, 1988.
45. Zarembski, A. M., & Masih, J. T. A., "On the Development of Computer Model for the Economic Analysis of Alternate Tie/Fastener Configuration", **American Railway Engineering Association (presented at the March 1989 Annual Conference, Chicago)**.
46. Newman, R. R., Zarembski, A. M., Resor, R. R., "Burlington Northern's Assessment of the Economics of High Capacity/Heavy Axle Load Cars", **Bulletin of the American Railway Engineering Association**, Bulletin 726, Volume 91, May 1990.
47. Newman, R. R., Zarembski, A. M., & Resor, R. R., "The Effect of Increased Axle Loads on Maintenance of Way and Train Operations at Burlington Northern", **International Heavy Haul Association /Transportation Research Board Workshop**, Vancouver, B.C., June 1991.
48. Zarembski, A. M., "Forecasting of Track Component Lives and its Use in Track Maintenance Planning", **International Heavy Haul Association/Transportation Research Board Workshop, Vancouver, B.C.**, June 1991.
49. Zarembski, A. M., "Track Maintenance Planning For Short Lines, Regionals", **Modern Railroads Short Lines and Regionals**, October 1988.
50. Zarembski, A. M., Palese, J. W., & Martens, J. H., "The Effect of Improved Rail Manufacturing Process on Rail Fatigue Life", **American Railway Engineering Association**, Bulletin 733, Volume 92, December 1991.
51. Newman, R. R., Zarembski, A. M., & Resor, R. R., "Economic Implications of Heavy Axle Loads on Equipment Design Operations and Maintenance", **American Society of Mechanical Engineering**, WAM, RTD-Volume 4, Rail Transportation, December 1991.
52. Zarembski, A. M., "Wood Tie Fastener Performance Requirements: The User's Points of View", **Symposium on Elastic Track Fasteners, American Railway Engineering Association**, Omaha, NE, June 1992.
53. Resor, R. R., & Zarembski, A. M., "Development of Track Maintenance Planning Models for Rail Rapid Transit Systems", **Computers in Railways III, Proceedings of the Third International Conference (COMPRAIL 92)**, Vol. I: Management (Computational Mechanics Publications, Boston, 1992).

54. Zarembski, A. M., "Rail Life Analysis and its Use in Planning Track Maintenance", **Railway Technology International**, 1993.
55. Zarembski, A. M., "Determining the Cost of Track Maintenance", **Railway Track and Structures**, April 1993.
56. Zarembski, A. M., "Transit Rail Wear Standards", **American Public Transit Association**, Miami, June 1993.
57. Zarembski, A. M., & Palese, J. W., "Rail Maintenance Planning Using Computerized Rail Forecasting Models", **Conference on Track Maintenance Practices on Suburban and Mass Transit Railways**, Hong Kong, June 1993.
58. Zarembski, A. M., "Forecasting of Future Tie Requirements by Computer Modeling", **Crossties**, July/August 1993.
59. Zarembski, A. M., & Bohara, A. P., "Controlling Rail and Wheel Wear on Commuter Operations", **American Railway Engineering Association**, Bulletin 742, Volume 94, October 1993.
60. Zarembski, A. M., & McCarthy, W. T., "Development of Non-Conventional Tie and Track Structure Inspection Systems", **Workshop on Innovations in Maintenance of Way Work Equipment, Cosponsored by Transportation Research Board and Roadmasters and Maintenance of Way Association**, Denver, CO, September 1993. Also published in "Transportation Research Record No. 1489: Rail", Railroad Transportation Research, Transportation Research Board, National Research Council, Washington, DC, 1995.
61. Zarembski, A. M., & McCarthy, W. T., "Testing Track Strength and Wood-Tie Condition", **Railway Track and Structures**, September 1993.
62. Zarembski, A. M., "Track Maintenance Costing: Alternative Approaches", **Conference on Maintaining Railway Track; Determining Cost and Allocating Resources**, Arlington, VA, October 1993.
63. Zarembski, A. M., "Concrete vs. Wood Ties: Making the Economic Choice", **Conference on Maintaining Railway Track; Determining Cost and Allocating Resources**, Arlington, VA, October 1993.
64. Zarembski, A. M., "Incremental Costs Incurred for Track Maintenance", **Conference on High Speed Trains on Freight Railroads**, Washington, D.C., November 1994.
65. Zarembski, A. M., "Computerized Maintenance Planning and Reporting Systems", **Rail Transit '95: Design, Construction and Maintenance of Transit Track and Structures**, New York, NY, June 1995.
66. Zarembski, A. M., "Development of Rail Gage Face Angle Standards to Prevent Wheel Climb Derailments", **American Railway Engineering Association Annual Technical Conference**, Chicago, IL, March 1996.

67. Zarembski, A. M., "On the Use of Timber Sleepers in Main Tracks", **World Railway Equipment and Technology Update 1996/1997**, Kensington Publications Ltd., London, England, 1996.
68. Zarembski, A. M., "On the Benefits of Rail Maintenance Grinding", **American Railway Engineering Association Annual Technical Conference**, Bulletin 760, Volume 98, Chicago, IL, March 1997.
69. Zarembski, A. M., Holfeld, D. R., and Palese, J. W., "On the Derailment of Rail Vehicles Through Turnouts: A Review of Derailment Causes and Mechanisms", **American Railway Engineering Association Turnout Symposium**, Chicago, IL, August 1996.
70. Zarembski, A. M., "Track Inspection: Knowing What is Out There", **Railway Track and Structures 1997 Track Buyers Guide**, Chicago, IL, 1997.
71. Zarembski, A. M., "Modern Rail Grinding Techniques: Selecting the Proper Grinding Approach", **Railway Gazette International**, London, England, February 1997.
72. Zarembski, A. M., Holfeld, D. R., and Palese, J. W., "Derailment of Transit Vehicles in Turnouts", **Transportation Research Board Annual Meeting**, Washington, DC, January, 1997.
73. Zarembski, A. M., "Recent Developments in Maintenance Planning Systems", **Railway Track and Structures**, Chicago, IL, February 1997.
74. Zarembski, A. M. and Holfeld, D. R., "On the Prediction of the Life of Wood Crossties", **American Woodtie Preservers Association Conference**, Pittsburgh, PA, April 1997.
75. Zarembski, A. M. and Holfeld, D. R., "On the Prediction of the Life of Wood Crossties", **Crossties Magazine**, May/June and July/August, 1997.
76. Holfeld, D. R., and Zarembski, A. M., "Knowledge Transfer: Utilizing New Technologies" **Sixth International Heavy Haul Railway Conference**, Capetown, South Africa, April 1997.
77. Zarembski, A. M., "Development and Implementation of Integrated Maintenance Planning Systems", **Transportation Research Board Annual Meeting**, Washington, DC, January, 1998.
78. Zarembski, A.M., and Gauntt, J.C., "Evaluation of Life Cycle Costs of Alternate Tie (Sleeper)/Fastener Systems and Their Use in Defining Maintenance Policy and Practice", **WCRR Conference**, Florence, Italy, November 1997.
79. Zarembski, A.M., "The Economics of Increasing Axle Loads", **European Railway Review**, London, England, June 1998.
80. Zarembski, A.M., "Enhanced Tie Condition Inspection Using Hand Held Recording Systems", **Crossties Magazine**, August 1998.

81. Zarembski, A.M., Thornton, D., Palese, J.W., Forte, N., “Development and Implementation of RailGraph; A Field Deployable Rail Maintenance Management Tool”, **American Railway Engineering Maintenance Association Annual Technical Conference**, 1998.
82. Zarembski, A.M., and Paulsson, Bjorn, “Introduction of Heavy Axle Loads in Europe: Economics of 30 Tonne Axle Load Operations on the Malmbanan”, **European Railway Review**, 1998
83. Zarembski, A.M, Palese, J.W., and Katz, Leonid “Implementation of a Dynamic Rail-Highway Grade Crossing Transition”, **Transportation Research Board Annual Meeting**, Washington, DC, January, 1999.
84. Zarembski, A.M, “Determination of Future Crosstie Requirements from Gage Strength Measurements”, **Crossties Magazine**, March/April 1999.
85. Zarembski, A.M. Chiddick, A.S. “Application of New Lubricant Formulations For The Reduction of Wheel Squeal Noise Under Freight and Passenger Service”, **American Society of Mechanical Engineers Joint Technical Conference with AREMA**, September 1999
86. Zarembski, A.M., “Use of Track Strength Data in the Determination of Future Crosstie Requirements”, **American Railway Engineering Maintenance Association Annual Technical Conference**, September 1999
87. Zarembski, A.M, & Palese, J.W., “Application of Maintenance of Way Information Systems to Enhance Operations and Safety”. **Passenger Transport, American Public Transit Association**, October 1999.
88. Bonaventura, Clifford S., Palese, Joseph W. & Zarembski, A.M., “Intelligent System for Real-Time Prediction of Railway Response to the Interaction with Track Geometry”. **American Society of Mechanical Engineers, 2000 Spring ASME/IEEE Joint Rail Conference**, April 2000.
89. Gauntt, J.C., & Zarembski, A.M., “Analysis of Wood Cross-Tie Price Sensitivities”. **American Railway Engineering Maintenance Association Annual Technical Conference**, September 2000.
90. Zarembski, A.M., “The Implications of Heavy Axle Load Operations for Track Maintenance on Short Lines”. **American Railway Engineering Maintenance Association Annual Technical Conference**, September 2000.
91. Zarembski, A.M., & Blaze, J., “Small Roads and Heavy Loads”. **Railway Age Magazine**, April 2000.
92. Zarembski, A.M., & Kondapalli, Sunil K., “Ballast Shoulder Cleaning: Issues and Economics”, submitted for publication **Railway Age Magazine**, June 2000.

93. Resor, R.R., Zarembski, A.M., & Patel, P.K., "An Estimation of the Investment in Track and Structures Needed to Handle 286,000 lb. Rail Cars on Short Line Railroads", **Transportation Research Board**, 2000.
93. Palese, J.W., & Zarembski, A.M., "BNSF Tests Risk-Based Ultrasonic Detection", published **Railway Track & Structures Magazine**, February 2001.
94. Zarembski, A.M., Palese, J.W., & Bell, J.G., "Limiting High Speed Dynamic Forces on the Track Structure; The Amtrak Acela Case", **American Railway Engineering Maintenance Association Annual Technical Conference**, Sept 2001.
96. Redden, J.W.P., Selig, E.T. & Zarembski, A.M., "Design Considerations in Stiff Track Modulus Environments", **Railway Track & Structures Magazine**. February 2002
97. Zarembski, A.M, Palese, Joseph W., and Katz, Leonid "Reduction of Dynamic Wheel/Rail Impact Forces at Grade Crossings Using Stiffness Transitions", **American Society of Mechanical Engineers, 2001 ImechE Congress**, New York, NY, November 2001
98. Zarembski, A.M., Palese, J.W., Bell, J.G., "Controlling Track Forces during Introduction of New High Speed Trains", **International Railway Journal**, October 2001
99. Zarembski, A.M., Turner, F., "Funding Infrastructure Upgrade Needs on Short Lines", **Railway Age Magazine**, December 2001.
100. Turner, R., Zarembski, A.M., "Helping Shortlines Meet the Challenges of HAL", published **Railway Track & Structures Magazine**, November 2001.
101. Lee, T., Zarembski, A.M., Weisgerber, J., "Use of New Generation Maintenance of Way Information System on Toronto Transit", **Railway Track & Structures Magazine**, May 2002.
102. Zarembski, A.M., Parker, L.A., Palese, J.W., Bonaventura, C., "Computerized Tie Condition Inspection and Use of Tie Condition Data in Cross-Tie Maintenance Planning", **International Heavy Haul Conference**, May 2003.
103. Zarembski, A.M., Parker, L.A., Palese, J.W., "Use of Comprehensive Tie Condition Data in Cross-Tie Maintenance Planning and Management on the BNSF", **American Railway Engineering Maintenance Association Annual Technical Conference**, September 2002.
104. Zarembski, A.M., Gauntt, J.C., "Development of a Tie Usage Index for Matching Wood Performance and Operating Conditions", **American Railway Engineering Maintenance Association Annual Technical Conference**, September 2002.
105. Zarembski, A.M., Bell, J.G., "Limiting the Effects of High-Speed Dynamic Forces on Track Structure", published **TR News**, September-October 2002

106. Bonaventura, C.S., Palese, J.W., Zarembski, A.M., “Real-Time Prediction of Railway Vehicle Response to the Interaction with Track Geometry”, **International Heavy Haul Conference**, May 2003.
107. Zarembski, A.M., Blaze, J., “The Economics of Heavy Axle Loads: Costs and Benefits”, published at the **Heavy Haul: The Solution for Europe’s Future**, Paris, March 2003.
108. Zarembski, A.M., Blaze, J., “The Economics of Heavy Axle Loads: Costs and Benefits”, **International Railway Journal**, April 2003.
109. Zarembski, A.M., Palese, J.W., “Risk Based Ultrasonic Rail Test Scheduling: Practical Applications in Europe and North America, **Conference Contact Mechanics and Wear of Rail/Wheel Systems (CM2003)**, Gothenberg, Sweden, June 2003.
110. Zarembski, A.M., Resor, R. R., Patel, P, “Economics of Wayside Inspection Systems”, **2003 ASME International Mechanical Engineering Congress and Exposition (IMECE’03)**, Washington, DC, November 16-21, 2003.
111. Zarembski, A.M., Weisgerber, J., “Implementation of a New Generation of Maintenance of Way Information Systems for Transits”, **AREMA 2003 Annual Conference & Exposition**, Chicago, IL, October 5-8, 2003.
112. Bonaventura, C.S., Palese, J.W., Zarembski, A. M., “Field Evaluation and Deployment of a Track Geometry Car Based Real-Time Dynamics Simulator”, **AREMA 2003 Annual Conference & Exposition**, Chicago, IL, October 5-8, 2003.
113. Bonaventura, C.S., Zarembski, A.M., Palese, J.W., Holfeld, D.R., “Increasing Speeds through the Diverging Route of a Turnout without Increasing Lead Length”, **83rd TRB Annual Meeting**, Washington, DC, January 11-15, 2004.
114. Resor, R.R., Zarembski, A.M., Patel, P., “Factors Determining the Economics of Wayside Defect Detectors”, **83rd TRB Annual Meeting**, Washington, DC, January 11-15, 2004.
115. Bonaventura, C.S., Palese, J.W., Zarembski, A.M., “Performance of a Track Geometry Car-Based Real-Time Dynamics Simulator using Multiple Vehicle Types, **2003 ASME International Mechanical Engineering Congress and Exposition (IMECE’03)**, Washington, DC, November 16-21, 2003.
116. Blaze, J., Zarembski, A.M., “Lessons from the North American Rail/Intermodal Experience: Integrating Technical Engineering with Strategic Business Planning”, **IRCA Rail International – Schienen der Welt**, May 2004.
117. Zarembski, A.M., “Engineering of Railway Tracks”, **Kerr Symposium on Engineering Mechanics**, University of Delaware College of Engineering, Newark, DE, April 29-30, 2004.

118. Zaremski, A.M., Grissom, G.T., Henry M. Lees, "Development of Track Buckling Risk Analysis Methodology", **AREMA 2004 Annual Conference & Exposition**, Nashville, TN, September 19-22, 2004.
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