

Marc H. Richman, Inc.

*Consulting Engineers – Forensic Engineers – Metallurgists/Materials Engineers
Specializing in Products Liability – Legal Evidence*

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Prof. MARC H. RICHMAN, Sc.D., P.E.

Professional Biographical Sketch

Date and Place of Birth: 14 October 1936

Boston, Massachusetts
U.S.A.

Citizenship: United States

Education:

----- Boston Latin School, Sept. 1947 - June 1953
S.B. (Metallurgy), Massachusetts Institute of Technology,
June 1957
Sc.D. (Metallurgy), Massachusetts Institute of Technology,
February 1963

Experience:

1957 - 1981	Consulting Engineer in Private Practice
1981 - pres	President, Marc H. Richman, Inc., Consulting Engineers, One Richmond Square, Providence, R.I. 02906
6/57 - 9/57	Engineer, Research & Development Laboratory, Shipbuilding Div., Bethlehem Steel Corp., Quincy, Mass.
9/57 - 6/60	Instructor in Metallurgy, Dept. of Metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.
6/59 - 9/59	Guest Scientist, Laboratories for Research & Development, Franklin Institute, Philadelphia, Penn.
6/60 - 2/63	Research Assistant, Dept. of Metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.

Experience: (cont'd)

1/58 - 5/62 Instructor in Metallurgy, Div. of University Extension, University of Massachusetts.

2/63 - 9/63 Active Duty, U.S. Army, Faculty, U.S. Army Ordnance Center & School, Aberdeen Proving Ground, Md.

9/63 - 6/67 Assistant Professor of Engineering, Brown University, Providence, R.I.

7/67 - 6/70 Associate Professor of Engineering, Brown University, Providence, R.I. (with tenure)

6/68 - 6/71 President, Educational Aids of Newton, Inc., Providence, R.I.

7/68 - 1/70 Consultant, U.S. Naval Applied Science Laboratories, Brooklyn, N.Y.

1968 - 1989 Executive Committee, Division of Engineering, Brown University, Providence, R.I. (alternating two year terms)

1970 - 1994 Editor, Soviet Physics - Crystallography, Plenum Publishing, N.Y. (American Institute of Physics)

1970 - 1998 Editorial Advisory Board, Materials Characterization, (formerly Metallography), American Elsevier Publishing Co.

7/70 - 6/98 Professor of Engineering(Tenure),Brown University, Providence, R.I.

9/70 - 2/71 Visiting Professor of Industrial Engineering, University of Rhode Island, Kingston, R.I.

7/71 - 6/86 Director, Central Electron Microscopy Facility, Materials Research Program, Brown University, Providence, R.I.

9/71 - 9/81 Consultant, U.S. Army Materials & Mechanics Research Center, Watertown, Mass.

1974 - 1986 Biophysicist, Adjunct Staff, Dept. of Medicine, Miriam Hospital, Providence, R.I.

1974 - 1986 National Advisory Board, Educational Modules of Materials Science and Engineering, National Science Foundation, Washington, D.C.

1978 - 1993 Bioengineer, Affiliate Staff, Dept. of Orthopaedics, Rhode Island Hospital, Providence, R.I.

1985 - 1989 Representative for Undergraduate Curriculum and Affairs, Division of Engineering, Brown University, Providence, R.I.

1986 - 1992 Editorial Advisory Board, Journal of Forensic Engineering, Pergamon Press, N.Y.

1989 - 1998 ABET Representative, Division of Engineering, Brown University, Providence, R.I.

1989 - 1993 Executive Comm., Div. of Engineering, Brown University, Providence, R.I.

1990 - 1998 Radiation Safety Committee, Brown Univ.

Experience: (cont'd)

1991 - 1998 Director, Undergraduate Programs, Division of Engineering, Brown University, Providence, R.I.
1991 - 1992 Chairman, Undergraduate Concentration Comm., Division of Engineering, Brown University, Providence, R.I.
1991 - 1992 Medical Council, Brown Univ., Providence, RI
1991 - 1994 Deputy Director, Center for Thin Films and Interface Research, Brown Univ./Univ. of R.I.
1992 – 1996 Committee on Academic Standing, Brown University, Providence, R.I.
7/98 - pres Professor Emeritus of Engineering, Brown University, Providence, R.I.
7/09 – pres Part Time Lecturer, Dept. of Civil Engineering/Dept of Mechanical Engineering, Dept. of Electrical and Computer Engineering, University of Massachusetts, Dartmouth.

Professional Activities:

American College of Forensic Examiners
Diplomate, ACFE
Fellow, ACFE
American Institute of Mining, Metallurgical and Petroleum Engineers
TMS (The Minerals, Metals, Materials Society)
American Institute of Chemists
Founding Member
Fellow
ASM International (formerly American Society for Metals)
Boston Chapter
Student Affairs Chairman (1958-60)
Executive Committee (1960-63)
Rhode Island Chapter
Secretary-Treasurer (1965-68)
Chairman (1968-69)
National
Education Committee (1960-62, 1966-68)
Development Committee (1968-69)
Constitution and By-Laws Committee (1969-72)
New England Regional Conference Committee
Program Chairman (1965-66, 1966-68)
Secretary (1968-70)
International Code Council
Institute of Materials (United Kingdom)
Fellow
International Association of Arson Investigators
National Society of Professional Engineers

Providence Engineering Society
First Vice President (1990-91)
President (1991-92)
Trustee (1992-pres)
Rhode Island Society of Professional Engineers

Awards and Fellowships:

Albert Sauveur Memorial Award, 1968-69, American Society for Metals
Fellow, American Institute of Chemists
Fellow, American Board of Forensic Examiners
Fellow, Institute of Materials (U.K.)
Outstanding Young Faculty Award, 1969, American Society for Engineering Education
Tau Beta Pi
Sigma Xi
Freeman Award for Outstanding Achievement in Engineering, Providence Engineering Society, 1989
Fellow, National Academy of Forensic Engineers
Technical Analysis Corp., Award for Excellence in Teaching of Engineering, 1992.
Engineer of The Year, R.I. Society of Professional Engineers, 1992 - 1993.

Professional Registration and Certification:

Licensed Professional Engineer - State of Connecticut
Registered Professional Engineer - Commonwealth of Massachusetts
Registered Professional Engineer - State of Rhode Island
CESB (Council of Engineering Specialty Boards) Board Certified Diplomate in Forensic Engineering by NAFE (National Academy of Forensic Engineers)
Board Certified Forensic Examiner (American Board of Forensic Examiners)

Military Commissions:

Major, Ordnance Corps., U.S. Army Reserve, Retired.

Theses:

B.S., M.I.T. June 1957, The Effect of Austenitizing Temperature on the Nucleation rate of Pearlite,
Thesis Advisor: Prof. Morris Cohen

Sc.D., M.I.T. Jan. 1963, Electron Microscopy of the Fine Structure of Iron-Nickel-Carbon Martensites,
Thesis Advisor: Prof. Morris Cohen

Publications

1. "The Role of Austenitizing Temperature in the Nucleation of Pearlite" (with D.A. Thomas & M. Cohen); Acta Met. 7 (1959) 814.
2. "Experimental Evidence for Martensitic Embryos" (with H.G.F. Wilsdorf & M. Cohen); Acta Met. 7 (1959) 819.
3. Discussion to "The Effect of Hydrostatic Pressure on the FCC - BCC Reactions in Iron-Base Alloys", "Progress in Very High Pressure Research" (with L. Kaufman); Bundy, Hibbard and Strong, Eds., Wiley, 1961, New York, 107.
4. "An Analytical Method for Calculation of Electron Diffraction Patterns Containing Twin Reflections" (with E.S. Meieran); Trans. AIME 227 (1963) 1044.
5. "Discoveries in the Science of Metals" (with W.F. Collins); Science Materials Center, Inc., New York, 1963.
6. "A General Analytical Method for Calculating Electron Diffraction Patterns Containing Twin Reflections" (with E.S. Meieran); Brown University Technical Report ARPA/E7, May 1964.
7. "A Critical Review of the Effects of Grain Boundaries on Mechanical Properties of Materials" (with M.A. Jaswon); Appl. Mech. Rev. 17, No. 11, (1964) 857.
8. Discussion "Growth of Martensite in an Iron-28.8% Nickel Alloy" (with M. Cohen); R.B. Yeo, Trans. ASM 57 (1964) 1063.
9. "The Role of Carbon and Fine Structure in the Hardening of Iron-Nickel-Carbon Martensites" (with M. Cohen); Technical Report No. 10, 27 April 1965, Contract Nonr 1841 (35), M.I.T.
10. "TiC Alloyed Cutting Tools" (with J. Stanislaw & C.F. James, Jr.); The Tool and Manufacturing Engineer, June 1966, 26.
11. "Determination of the Isothermal Transformation Diagram for Hi-Carbon M-2 Tool Steel" (with L.M. Markowitz); Brown Technical Report ARPA/E32, July 1966.
12. "Field Ion Microscopy and a Study of the Tungsten-Carbon Alloy System" (with R.D. French); Brown Technical Report ARPA/E33, August 1966.
13. "Calculation of the Cleavage Characteristics of Hexagonal Close-Packed Metal Crystals" ASM 59 (1966) 374.

14. "A Critical Review of the Effects of Grain Boundaries on Mechanical Properties of Materials", "Applied Mechanics Surveys" (with M.A. Jaswon); Abramson et al, eds., Spartan Books, Washington, DC, 1966, 211.
15. "An Approximate Calculation of the Surface Energies of Individual Crystallographic Planes in B.C.C. and H.C.P. Crystals", Brown Technical Report, AT(30-1)2394, No. 25, January 1967.
16. "On Promoting Creativity", Brown University Engineer, No. 10, March 1967.
17. "The Computation of Continuous Transformation Diagrams from Isothermal Data" (with L.M. Markowitz); Trans. ASME 239 (1967) 131.
18. "A Temperature Control System for a Machining Operation" (with J. Stanislaw & H.O. Baudisch); Instruments and Control Systems, 40 (1967) 101.
19. "The Effect of Titanium Carbide Content of Cemented WC-TiC Cutting Tools in the Machining of Steels and Cast Irons" (with J. Stanislaw & C.F. James, Jr.); J. of Materials, 2 (1967) 625.
20. "Introduction to the Science of Metals", Blaisdell Publishing Company Waltham, MA, 1967.
21. "Diffusion of Carbon in Tungsten and the Formation of Tungsten Carbide" (with R.D. French); XIV Field Emission Symposium, Washington, DC, 1967.
22. "The Work Function and Surface Energy of B.C.C. Metals" Trans. ASM 60 (1967) 719.
23. "Observations of Dislocations and Their Interactions with Second Phase Particles in Aluminum-Silicon Alloys by Transmission Electron Microscopy" (with K.D. Prince); Brown Technical Report, AT(30)-2394 Report No. 24, November 1966, presented at AIME Meeting, Cleveland, October 1967.
24. "An Electron Diffraction Study of the Oxide Formed on Cemented Carbide-Titanium Carbide Cutting Tools" (with J. Stanislaw & C.F. James, Jr.); Trans. ASME 90B Feb. 1968, 92.
25. "Carburizing Tungsten in the Field Ion Microscope" (with R.D. French); Philosophical Magazine 18 (1968) 471.
26. "Electron Microscopy of the Fine Structure of Fe-Ni-C Martensites" (with M. Cohen); Mat. Sci. and Engin. 3 (1968) 240.
27. "Electron Microscope Technique for the Measurement of Oxide Films" (with J. Stanislaw); Proc. 26th Annual EMSA, C.J. Arsenaux, Claitor's

28. "Transverse Sectioning of Field-Ion Microscopy Specimens for Transmission Electron Microscopy" (with R.D. French); Trans. ASM 61 (1968) 190.
9. "Computer Aid in Indexing HCP Field Ion Micrographs"(with W.D. Sproul), Trans. AIME 242 (1968) 1186.
30. "Dislocations and Growth Occlusions in Tungsten Selenide" (with K.D. Prince & A. Wold); Proc. 26th Annual EMSA, C.J. Arsenaux, ed., Claitor's Publishing Co., New Orleans, 1968, 264.
31. "Microstructure of Electro-Eroded Cemented Carbide Surfaces" (with V.N. Filimonenko & J. Gurland); Proc. 26th Annual EMSA, C.J. Arsenaux, editor, Claitor's Publishing Co., New Orleans, 1968, 284.
32. "Electron Microscope Observations of Tungsten Selenide" METALLOGRAPHY 1 (1968) 227.
33. "Manufacturing Processes and Materials" (with J. Sanislao); Ch. 19, The Production Handbook, Third Edition, Ronald Press, New York.
34. "Adsorption and the Recombination of Surface Bonds" (with R.D. French); XV Field Emission Symposium, Bonn, Germany, September 1968, 77.
35. "A Comparative Field Ion Microscope Study of Tungsten Carbide" (with W.D. Sproul); XV Field Emission Symposium, Bonn, Germany, September 1968, 46.
36. "An Investigation of the role of the Interface in Composite Materials", Brown University Technical Report, AMMRC-1, October 1968.
37. "An Investigation of the Internal Structural Factors Determining the Flow and Fracture Strengths of Beryllium" (with R.W. Armstrong, S.J. Burns and J. Gurland); U.S. Air Force Technical Report AFML-TR-69-10, Wright-Patterson AFB, January 1969.
38. "A Method for Temperature Measurement in a Single Point Cutting Tool" (with J. Stanislaw & C.F. James, Jr.); Trans. AIME 1 No. 4 (1969).
39. "Direct Observations of the Effect of Particle Size on Dispersion Hardening" (with K.D. Prince); J. of Materials 4 (1969) 145.
40. "Microstructure of Electric Discharge Machined WC-Co" (with V.N. Filimonenko & J. Gurland); METALLOGRAPHY 2 (1969) 125.
41. "Field Ion Microscopy of Carbides of Tungsten Formed Externally and In Situ" (with W.D. Sproul); METALLOGRAPHY 2 (1969) 149.

42. "The Effects of Continuous Annealing on Aluminum Conductor Quality" (with M.R. Waldman); Wire Journal 2, No. 12 (1969) 63.
43. "Design and Synthesis of Materials with Specific Properties", Metals and Materials 3 (1969) 217.
44. "Field Ion Microscopy of Martensite" (with M.E. Schreiner); XVI Field Emission Symposium, Pittsburgh, September 1969, 41.
45. "Imaging Characteristics of Transition Metal Compounds" (with P.C. Sekhar & F.Y. Ko); XVI Field Emission Symposium, Pitts., Sept. 1969, 67
46. "Quantitative Field Ion Microscopy", Proc. of the International Conf. on Quantitative Relations Between Properties and Microstructure, D.C. Brandon and A. Rosen, eds., Israel University Press, Jerusalem, 1969, 503.
47. "A Study of the Formation of Tungsten Carbide in the Field Ion Microscopy", "Applications of Field Ion Microscopy in Physical Metallurgy", Hochman, Muller and Ralph, eds., Georgia Institute of Technology Press, Atlanta, 1970, 453.
48. "The Role of Interfacially Active Metals in Composites" (with R.D. French & A. Levitt); BULLETIN, Amer. Cer. Soc. 49 (1970) 580.
49. "Production and Economic Consequences of the Oxide Film Barrier in Titanium Carbide-Tungsten Carbide Cutting Tools" (with J. Stanislaw); Metals Engineering Quarterly 10 No. 1 (1970) 58.
50. "The Cohesive Energy of Surface Atoms of Tungsten on Various Crystal Planes" Japan J. Appl. Phys. 8 (9) (1970).
51. "The First Materials Science Course for Undergraduates", J. Engineering Education 60 (1970) 478.
52. "Solid Solution Strengthening I: Binding of Dislocations to Atomic Sized Defects: (with E.S.P. Das); Scripta Mct. 4 (1970) 69.
53. "Effect of Interaction-Induced Partial Order on the Random Solute Atom Dispersion in a Matrix" (with E.S.P. Das); Scripta Mct. 4 (1970) 189.
54. "An Electron-Microscopical Study of the Tempering of Tungsten-High Speed Steels" (with E. Tekin); METALLOGRAPHY 3 (1970) 1.
55. "Field Ion Microscopy of Martensite" (with P.C. Sekhar and M.E. Schreiner); XVII Field Emission Symposium, Yale University, New Haven, CT, 1970, 45.
56. "Precipitation and Dislocations in an Aluminum-Silicon Alloy" (with K.D. Prince); Brown Technical Report AT(30-1)-2394/40, August 1970.

57. "Application of Segmented Slip Theory of Hardening to BCC Metals" (with E.S.P. Das); 2nd Int'l Conference on the Strength of Metals and Alloys 1 (1970) 158.
58. "Proceedings of the Second Brown University Meeting on Materials Education", editor, Division of Engineering, Brown University, Providence, RI, January 1971.
59. "Electric Discharge Machining - Theory and Applications" (with J. Stanislaw); Precision Metals 29 (1971) 47.
60. "Tempering of Martensite: A Field Ion Microscope Study" (with P.C. Sekhar and M.E. Schreiner); METALLOGRAPHY 4 (1971) 147.
61. "A Field Ion Microscope Study of Ferrous Martensite" (with P.C. Sekhar and M.E. Schreiner); METALLOGRAPHY 4 (1971) 133.
62. "The Effect of a Coated Thin Surface Layer on the Wear of Cemented Carbide Tools" (with M. Lee and J. Stanislaw); Proc. 1st Int'l Cemented Carbide Conference, Chicago, 1971, 979.
63. "Dynamic Simulation of Dislocation Movement Among Random Obstacles" (with E.S.P. Das, A. Kleinman and P.M. Gurara); Proc. Summer Computer Simulation Conference, Boston, 1971, 233.
64. "Reply to Comments on Effect of Interaction Induced Partial Order on the Random Solute Dispersion in a Matrix" (with E.S.P. Das); Scripta Met. 5 (1971) 5.
65. "Engineers - A Valuable National Resource", Engineerings, Providence Engineering Society 46 No. 16 (1971) 1.
66. "Application of Fractographic Techniques to Beryllium" (with S.J. Burns and J. Gurland); METALLOGRAPHY 4 (1971) 533.
67. "An Approximate Method for the Motion of Dislocations Among Random Obstacles in the Presence of Viscous Drag" (with E.S.P. Das and P.M. Gurara); J. Appl. Phys. 43 (1972) 2210.
68. "Report on the Second Brown University Meeting on Materials Education", Mat. Sci. and Engin. 1 (1972) 37.
69. "What Engineers Should Know About Materials: An Introductory Course", (in two parts) Engineerings, Providence Engineering Soc. 47 (1972) No. 13, 1 and No. 14, 2.
70. "Dislocation Configurations and the Forbidden Energy Gap of WSe₂", (with J. Monzack); METALLOGRAPHY 5 (1972) 179.
71. "Some Atomistic Observations on the Role of Titanium in Magnesium-

- Professional Biographical Sketch – **Marc H. Richman, Sc.D., P.E.** – Page 10 -
Graphite Fiber Composites" (with A.O. Levitt and E. DiCesare); AMMRC
Technical Report, TR 72-32, October 1972. Submitted to Mct. Trans.
72. "Computation of Standard Projections for a Triclinic System of
Arbitrary Orientation" (with F.Y. Ko); METALLOGRAPHY 5 (1972) 501.
 73. "Computer Searching for Obstacles Ahead of a Moving Dislocation" (with
E.S.P. Das and A. Kleinman); Mct. Trans. 4 (1973) 373.
 74. "Chemical Vapor Deposition of a TiC Coating on a Cemented Carbide
Cutting Tool" (with M. Lee); J. Electrochem. Soc. 120 (1973) 993.
 75. "Some Observations on the Wear of TiC-Coated Cemented Carbide Cutting
Tools" (with M. Lee); SME Technical Paper MR 73-217, (1973).
 76. "Reversible Microstructure of Control of Electrical Properties of
WSe₂" (with W.D. Sproul) Appl. Phys. Let., Oct. 15, 1973, 23 (1973) 460.
 77. "Exfoliation of Magnesium-Graphite Composites: A Combined
Metallographic and Analytical Approach" (with A.P. Levitt and E.S.
DiCesare); METALLOGRAPHY 6 (1973) 497.
 78. "Microstructural Study of Occlusions in WSe₂" (with W.D. Sproul);
METALLOGRAPHY 7 (1974) 37.
 79. "Some Properties of TiC-Coated Cemented Carbides" (with M. Lee); Mct.
Technology 1 (1974) 538.
 80. "Materials in a Modern Society", Materials Div. Newsletter, American
Society of Engineering Education, May 1974, p.8.
 81. "The Influence of Annealing Temperature on the Strain Rate Sensitivity
of Copper in Torsion" (with P. Senseny and J. Duffy); J. Appl. Mech.
(March 1975) 245.
 82. "Effect of the Eta Layer on TiC-Coated Cemented Carbide Tool Life"
(with W.D. Sproul); J. Vac. Sci. and Tech., 12 (1975) 42.
 83. "Reactive Sputtering of TiC with Oxygen" (with W.D. Sproul); Thin Solid
Films, 28 (1975).
 84. "The Use of Microscopy for Determining the Formation Mechanism of Beta
Silicon Nitride" (with H.M. Jennings); Proc. E.M. Soc. of South Africa,
5 (1975) 117.
 85. "Machining of a Glass Ceramic (K₂O-MgF₂-MgO-SiO₂) in a Dry and Wet
Environment" (with J. Stanislaw and E.G. Turker); ASTM Journal of
Testing and Evaluation, 4 (1976) 109.
 86. "Production and Economic Consequences When Machining Glass Ceramic
(K₂O-MgF₂-MgO-SiO₂)" (with E.G. Turker and J. Stanislaw); ASTM Journal

87. "The Effect of the Interfacial Eta Carbide Layer on TiC-Coated Cemented Carbides" (with W.D. Sproul); *Metals Technology*, 3 (1976) 489.
88. "The Ladder Microconstituent of Silicon Nitride" (with S.D. Danforth and H.M. Jennings); *METALLOGRAPHY* 9 (1976) 361.
89. "A Hexagonal (Wurzite) form of Silicon" (with H.M. Jennings); *SCIENCE*, 193 (1976) 1242.
90. "Transmission Electron Microscopy of Reaction Bonded Silicon Nitride" (with S.C. Danforth); *METALLOGRAPHY* 9 (1976) 321.
91. "Molecular Structure, Microstructure, Macrostructure, and Properties of Silicon Nitride": (with H.M. Jennings and J.O. Edwards); *Inorg. Chem. Acta.*, Vol. 20 (1976) 167-181.
92. "Microstructural Analysis of Reaction Bonded Silicon Nitride" (with H.M. Jennings and S.C. Danforth); *METALLOGRAPHY* 9 (1976) 427.
93. "Structure, Formation, Mechanisms and Kinetics of Reaction Bonded Silicon Nitride: (with H.M. Jennings); *J. Mat. Sci.*, 11 (1976) 2087.
94. "A Metallurgical Examination of Fractured Stainless Steel ASIF Tibial Prosthesis" (with J. Thunhold, J.K. Weltman and A. Cole); *Injury, British J. Trauma Surgery*, 8 (1976) 13.
95. "Strength vs. Nitrided Density and Microstructural Design of Reaction Bonded Silicon Nitride" (with S.C. Danforth and H.M. Jennings); *J. Mat. Sci.*, 13 (1978) 1590.
96. "Failure of Dacron Prostheses Caused by Structural Defect" (with J. Yashar) *Surgery* 84 (1978) 659.
97. "The Influence of Microstructure on the Strength of Reaction Bonded Silicon Nitride" (with S.C. Danforth and H.M. Jennings); *Acta Met.*, 27 (1979) 123.
98. "Variations in Pore Structure of Reaction-Bonded Silicon Nitride (RBSN)" (with S.C. Danforth); *J. Mat. Sci.*, 14 (1979) 240.
99. "On a Growth Mechanism for B-Phase Silicon Nitride" (with H.M. Jennings and S.C. Danforth); *J. Mat. Sci.*, 14 (1979) 1013.
100. "Reaction Bonded Silicon Nitride I: Control of Microstructure" (with S.C. Danforth and H.M. Jennings); submitted to *J. Amer. Ceram. Soc.*
101. "Reaction Bonded Silicon Nitride II: Improved Mechanical Properties"

102. "Development of an Improved Bond Cement (with H.M. Litchman) to appear in Orthop. Res.
103. "Effect of Processing Parameters on Reaction Bonding of Silicon Nitride" to appear as NASA Tech. Rept.
104. "Nitridation of High-Purity Single-Crystal Silicon" (with O.J. Gregory); METALLOGRAPHY 15 (1982) 89.
105. "Reactive Sputter Coated Reaction Bonded Silicon Nitride" (with O.J. Gregory); Thin Solid Films, 91 (1982) 163.
106. "Ten Years Experience with the Use of Long Stem Endoprostheses in Hip Fractures" (with W.F. Garrahan, M.D.); submitted to Journal of Bone and Joint Surgery, Boston.
107. "An Investigation of Interfacial Reactions in Metal Matrix Composites" (with S.C. Chin); AMMRC Tech. Rept. TR 82-14 (1982).
108. "Strength and Fracture Toughness of Reaction Bonded Si₃N₄" (with S.C. Danforth); Bulletin Amer. Ceram. Soc., 62 (1983) 501.
109. "Microstructure of RBSN Prepared with Si₃N₄ Additions" (with O.J. Gregory); METALLOGRAPHY 17 (1984) 77.
110. "The Role of Si₃N₄ Additions on the Reaction Bonding of Silicon Compacts" (with O.J. Gregory); J. Mat. Sci., 3 (1984) 112; Materials Science Letters, 67 (1984) 335.
111. "Thermal Oxidation of Sputter-Coated RBSN" (with O.J. Gregory); J. Amer. Ceram. Soc., 67 (1984) 335.
112. "Sputter-Coating of Ti-6Al-4V with Inconel 617 for Erosion Resistance" (with M. Emiliani, R. Brown and O.J. Gregory) Surface and Coating Tech., 33 (1987) 267.
113. "The Microstructure and Phase Stability of Inconel 617" (with M. Emiliani and R. Brown) submitted to Journal of the Amer. Ceram Soc.
114. "Sputter-Coating of Ti-6Al-4V by Inconel 617 for Erosion Resistance" (with M. Emiliani, R. Brown and O. Gregory) Surface and Coatings Technology, 33 (1987) 267.
115. "A TEM Study of Sputtered Inconel 617, Part I: Coatings in Plan Section" (with M. Emiliani, R. Brown and O. Gregory) J. Mat. Sci., 25 (1990) 137.
116. "A TEM Study of Sputtered Inconel 617, Part II: Coatings in Cross Section" (with M. Emiliani, R. Brown, and O. Gregory) J. Mat. Sci.

117. "Diffusion of Sputtered Inconel 617 Coatings in Titanium" (with M. Emiliani and R. Brown) Metall. Trans., 21A (1990) 1613.
118. "Sputtered TiN Thin Films for Improved Corrosion Resistance" (with P. Bhardawaj, O.J. Gregory, and K.P. Braga) Applied Surface Sci., 48/49 (1991) 555.
119. "Premises Liability: Preparation and Trial of a Difficult Case in Rhode Island" (with F.G. Cass, J.A. Kelly, and T.W. Pearlman), NBI, Eau Claire, WI (1992).
120. Current Developments in Products Liability in Rhode Island (with J.S.Foley, W.H.Jestings, and B.R.Magratten), NBI, Eau Claire, WI (1997).
121. Current Developments in Products Liability in Rhode Island (with G.C. DeMaria, Sr. and B.R.Magratten), NBI, Eau Claire, WI (1999).
122. Current Developments in Products Liability in Rhode Island (with Susan Marcotte Carlin and Robert J. Quigley, Jr.), NBI, Eau Claire, WI (2001).
123. "An Introduction to the Science of Metals", Marc H. Richman, translated by Sung Chul Yang, Pyungminsa Publishing, Seoul, Korea, 2001.

01/16/07

Marc H. Richman, Inc.

*Consulting Engineers – Forensic Engineers – Metallurgists/Materials Engineers
Specializing in Products Liability – Legal Evidence*

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FEE SCHEDULE

1. Normal hourly rate for investigation, research, conference, analysis, reconstruction, etc.

Marc H. Richman, Sc.D., P.E.	\$200.00
Other Engineers	\$150.00 - \$200.00
IT experts	\$150.00
Technical Assistants	\$ 50.00 - \$ 75.00

2. Deposition testimony, trial testimony (*Minimum of two hours)

Marc H. Richman, Sc.D., P.E.	\$375.00*
Other Engineers	\$225.00* - \$300*

Unless notified on previous day or prior to travel, minimum testimony time will be billed if case is settled or continued.

3. Travel time billed at normal hourly rates listed above.

Travel by automobile charged at rate of \$1.00 per mile, plus parking, etc.

Travel by commercial transportation at cost of tickets.

Where travel over long distances is by automobile and air travel plus associated travel time would be less expensive than mileage plus auto travel time, the lesser of the two shall be billed for both travel and travel time.

4. Costs for laboratory testing, etc. shall be billed and itemized.

5. Costs for long distance telephone, FAX, Federal Express, etc. shall be billed and itemized.

6. **Retainer of \$1,500.00 is required in advance** except for governmental agencies, courts, law enforcement agencies, and pro bono work unless special provisions are arranged.

7. **Advance payment of \$1,500.00** is required **prior** to deposition for testimony at depositions noticed by opposing party in civil action and where opposing counsel is to pay for professional services time of witness. This is a minimum charge of \$1,500.00. Total charged is to be in amount equal to sum of preparation time (where allowed by local jurisdiction), travel time, deposition time*, IT time to obtain information stored on computers (if so requested in subpoena), and reading and signing time. A bill for charges in excess of the advance payment will be sent to noticing counsel after the deposition.

8. **Terms** - Statements will be rendered at intervals during the investigation and payment within thirty (30) days of date of invoice.

9. Payments should be made to **Marc H. Richman, Inc.** and sent to the above address.

Federal Tax Identification No. 05-0394056