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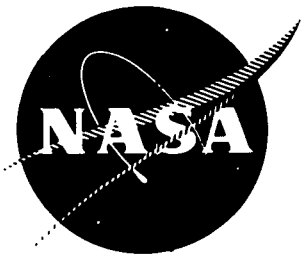

REGISTER OF EXPERTS FOR INFORMATION ON MECHANICS OF STRUCTURAL FAILURE

By James L. Carpenter, Jr., and Nestor Moya

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prepared for

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16. Abstract

This Register is comprised of a list of approximately 150 experts from approximately 60 organizations who have published results of theoretical and/or experimental research related to six problem areas in the mechanics of structural failure. Each author included is listed by organizational affiliation, address and principal field of expertise.

The initial criteria for the selection of names for the register are recent contributions to the literature, participation in or support of relevant research programs, and referral by peers.

The purpose of the register is to present, in easy reference form, sources for dependable information regarding failure modes and mechanisms of aerospace structures. The Register includes two indexes: an alphabetical listing of the experts and an alphabetical listing of the organizations with whom they are affiliated.

17. Key Words (Suggested by Author(s))	18. Distribution Statement
Life Prediction Fracture Strength Fracture Mechanics Hydrogen Embrittlement Protective Coatings Composite Materials Indexes (Documentation) Directories	Unclassified - Unlimited

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FOREWORD

This Register comprises those experts who have published results of theoretical and/or experimental research related primarily to the problem areas listed in the Table of Contents. There are also included areas of expertise which may be of use in the near future. In most cases the area of expertise was described by the expert accounting for variations in wording.

The purpose of this publication is to present, in easy reference form, sources for dependable information regarding failure modes and mechanisms of aerospace structures. The experts, who are points of contact, could be queried by researchers in similar fields of research and development work for unpublished information and more of the details which have not appeared in published reports, journal articles, or society presentations. In addition, further inquiries could be made regarding active ongoing projects where the published results may not appear for several months. No attempt was made to ascertain that persons listed are actually available for extensive consultation. This is left to negotiation between the parties involved.

The organizational affiliation reflects the latest reference document which was reviewed and is not necessarily current.

Selection for inclusion was based on the independent judgments of an author's peers as well as the number of his appropriate documents uncovered by a staff of technical reviewers. This is recognized as being an incomplete listing and represents only an initial installment. Nevertheless, we hope that it will contribute as a guide to those who seek related information. Candidates for a revised register are encouraged.

The authors wish to acknowledge the interest and assistance of the following individuals in the compilation of this Register: James E. Campbell, Battelle Memorial Institute; James C. Freche, NASA Lewis Research Center; and George C. Sih, Lehigh University.

TABLE OF CONTENTS

PROBLEM AREA 1

Life prediction of materials at high temperatures and exposed to monotonic and cyclic loading - Includes information on low cycle and thermal fatigue particularly as it applies to turbine buckets in the gas turbine engine and high cycle fatigue data for materials used in components such as engine bearings.

Expert Organization	Expertise
ACHTER, M. R. Naval Research Laboratory Washington, D. C.	Flow and fracture characteristics of metals at elevated temperatures. Environmental effects on creep and fatigue. Refractory metals. Effects of laser radiation on materials.
ANDERSON, William J. NASA Lewis Research Center Cleveland, Ohio	Life prediction of materials exposed to cyclic loading in rolling and sliding concentrated contacts. Rolling fatigue. Contact stresses. Elastohydrodynamics. Ball and roller bearings. Gears.
BIENIEK, Maciej P. Columbia University New York, New York	Creep and fatigue failure predictions. Inelastic solids. Large deflections of structures. Structural dynamics.
BISSON, Edmond E. NASA Lewis Research Center Cleveland, Ohio	Advanced bearing technology. Rolling element fatigue life. Lubrication.
CARDEN, Arnold E. University of Alabama University, Alabama	Life prediction of materials at elevated temperature. Fatigue. Fatigue crack growth. Creep crack growth. Fracture toughness - experimental methods. Design of experiments.
CARTER, Thomas L. NASA Lewis Research Center Cleveland, Ohio	Effects of hardness on fatigue life of steel bearing materials.
CHRISTENSEN, Roy H. McDonnell Douglas Company Huntington Beach, California	Life prediction of aerospace structures. Structural analysis. Structural tests. Aircraft structural design.

Expert Organization	Expertise
COFFIN, Louis F., Jr. General Electric Company Schenectady, New York	Low cycle fatigue. Thermal fatigue. Fatigue crack nucleation and propagation. High-temperature materials. Fracture analysis. Plasticity. Plastic working processes. Friction and wear.
CROOKER, Thomas W. Naval Research Laboratory Washington, D. C.	Low cycle fatigue in high strength alloys. Crack propagation in high strength steels. Toughness of welded structures.
DIETRICH, Marshall W. NASA Lewis Research Center Cleveland, Ohio	Rolling element fatigue. Elasto-hydrodynamic lubrication at both cryogenic and high temperatures. Bearing and gearing materials evaluation. Mechanical power transmission system research and development.
DORN, John E. University of California Berkeley, California	Life prediction and mechanical behavior of materials at elevated temperatures. Creep. Fatigue. Plastic flow.
DUBLIN, Michael General Dynamics/Convair San Diego, California	Design criteria for strength, and static and dynamic aeroelasticity. Analytical and experimental investigations involving structural and dynamics investigations of aircraft, launch vehicles, and missiles.
FORSBERG, D. Kevin Lockheed Aircraft Corporation Burbank, California	Fatigue. Aircraft structural design. Life testing for aerospace structures.
FRECHE, John C. NASA Lewis Research Center Cleveland, Ohio	Fatigue data and life prediction of various structural materials. Nickel and cobalt base alloys. Materials for airbreathing and space propulsion systems.
FREUDENTHAL, Alfred M. George Washington University Washington, D. C.	Life prediction of structures. Fatigue of metals and nonmetals. Inelastic behavior of engineering materials. Plasticity. Structural design. Fracture toughness.

Expert Organization	Expertise
GELL, Maurice United Aircraft Corporation East Hartford, Connecticut	Life prediction of materials at elevated temperatures. Loads. Deformation and fracture mechanisms. Fractography. Fatigue. Creep. Superalloys.
HALFORD, Gary R. NASA Lewis Research Center Cleveland, Ohio	Life estimation of materials exposed to cyclic loading at high temperature. Creep. Low cycle fatigue. High temperature alloys. Fracture toughness.
HARDRATH, Herbert F. NASA Langley Research Center Hampton, Virginia	Fatigue life prediction of aerospace structures and materials. Complex loadings. Complex configurations. Plasticity effects. Elevated temperature effects. Environmental effects. Fracture mechanics analysis.
HIRSCHBERG, Marvin H. NASA Lewis Research Center Cleveland, Ohio	Low cycle fatigue. Life prediction of structural materials.
HOFF, Nicholas J. Stanford University Stanford, California	Life prediction structural materials. Fatigue. Creep. Crack propagation.
ILLG, Walter NASA Langley Research Center Hampton, Virginia	Fatigue life. Structural steels and titanium alloys at elevated temperatures.
KOENIG, Herbert A. University of Connecticut Storrs, Connecticut	Life prediction of materials. Fatigue. Elastic-plastic analysis of structures. Creep. Deformation.
LIPSITT, Harry A. Aerospace Research Laboratories Wright-Patterson AFB, Ohio	Mechanical metallurgy. Fatigue, creep, tension, and hardness properties of ceramics. Diffusion and strain aging. Elasticity. Precipitation hardening.
MANSON, Samuel S. NASA Lewis Research Center Cleveland, Ohio	Life prediction of materials. Monotonic and cyclic loading. Elasticity. Thermal stress in design. Creep. Fatigue. Vibration. High temperature materials. Fracture mechanics analysis.

Expert Organization	Expertise
MORRISON, Thomas W. SKF Industries, Inc. King of Prussia, Pennsylvania	Rolling element materials at high temperatures. Fatigue. Ball bearings.
NELSON, Lloyd Lockheed Aircraft Corporation Burbank, California	Fatigue. Aircraft structural design. Structural analysis. Structural test.
PARKER, Richard J. NASA Lewis Research Center Cleveland, Ohio	Rolling element bearing life. Prediction of fatigue life and other modes of failure. Materials. High speeds. Lubrication. High temperatures. Residual stresses.
SCIBBE, Herbert W. NASA Lewis Research Center Cleveland, Ohio	Rolling element fatigue life. Steel bearing materials. Advanced bearing technology.
SCOTT, Douglas Naval Electronics Laboratory San Diego, California	Bearing materials at elevated temperatures. Fatigue. Hardness. Metallurgy of rolling element materials.
SINES, George UCLA Los Angeles, California	Fatigue failure of metals. Thermal effects. Effect of residual stresses. Fracture of ceramics. Flaws in ceramics. Hydrides in titanium. Fracture mechanics analysis.
SMITH, Clarence R. General Dynamics/Convair San Diego, California	Life testing. Fatigue. Strain theory. Aluminum alloys. Fracture toughness testing.
SPERA, David A. NASA Lewis Research Center Cleveland, Ohio	Low cycle fatigue. Creep. Thermal effects. High temperature alloys. Linear creep damage theory.
SULLIVAN, C. Patrick United Aircraft Corporation East Hartford, Connecticut	Low cycle fatigue. High cycle fatigue. Creep. Fatigue-creep interaction.

Expert Organization	Expertise
WELLS, Clifford H. United Aircraft Corporation East Hartford, Connecticut	Life prediction of high temperature alloys. Fatigue. Creep. Fracture mechanics.
ZARETSKY, Erwin V. NASA Lewis Research Center Cleveland, Ohio	Rolling element bearings. Machine elements. Elastohydrodynamics. Mechanical power transmission systems. Rolling element fatigue. Lubrication. Gearing.

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PROBLEM AREA 2

Fracture toughness data on various structural materials - Available data are categorized with respect to test methods, K_{Ic} vs K_c and other peculiar parameters considered by the investigators. In particular, data derived from ASTM standard tests are identified.

Expert Organization	Expertise
ADAIR, Atwell Mason Aerospace Research Laboratories Wright-Patterson AFB, Ohio	Plastic deformation and brittle fracture of metals. Mechanism of fatigue limits on metals. Fracture mechanics analysis.
BROWN, William Findlay, Jr. NASA Lewis Research Center Cleveland, Ohio	Plane strain fracture toughness. High strength materials. Fracture toughness testing methods. Fracture mechanics analysis.
CAMPBELL, James E. Battelle Memorial Institute Columbus, Ohio	Fracture toughness data. Hardenability of steels. Deformation of fracture of materials at low and elevated temperatures. Fatigue crack propagation in metals. Fracture analysis. Heat treatment of steels. Hydrogen embrittlement.
CROOKER, Thomas W. Naval Research Laboratory Washington, D. C.	Fracture toughness testing. Crack propagation. Low cycle fatigue in high temperature alloys.
DAMIANO, Victor V. Franklin Institute Philadelphia, Pennsylvania	Fatigue. Fracture characteristics. Flow. Beryllium alloys.
DOLAN, Thomas J. University of Illinois Urbana, Illinois	Fatigue of structural components. Deformation and fracture of metals. Experimental stress analyses. Analysis of causes of failure. Environmental effects. Accident reconstruction. Design philosophy.

Expert Organization	Expertise
FREUDENTHAL, Alfred M. George Washington University Washington, D. C.	Fracture toughness. Fatigue of metals and nonmetals. Inelastic behavior of engineering materials. Plasticity. Structural design. Life prediction of materials.
GRUFF, James J. Rockwell International, Inc. Los Angeles, California	Fatigue testing. Stress corrosion effects. Loads. Structural aluminum alloys.
HAHN, George T. Battelle Memorial Institute Columbus, Ohio	Fracture toughness of alloys, ceramics, and polymers. The micro-mechanisms of fracture. Ductile-to-brittle transition in metals. Plastic zones of cracks. Fracture mechanics of crack extension, dynamic propagation, fracture arrest, and cyclic crack growth, crack extension and dynamic propagation in pipes and pressure vessels. Surface coatings.
HALFORD, Gary R. NASA Lewis Research Center Cleveland, Ohio	Fracture toughness testing. Fatigue. Creep. Cyclic loads. High temperature materials. Life prediction.
HAYDEN, H. Wayne Martin Marietta Laboratories Baltimore, Maryland	Mechanical properties of metals. Deformation. Fracture. Fatigue. Superelasticity. Environmental embrittlement of metals and composites. Powder metallurgy. Fracture mechanics.
HEYER, Robert H. Armco Steel Corporation Middletown, Pennsylvania	Indentation hardness testing. Metallurgy of flat rolled steel. Metallurgy.

Expert Organization	Expertise
HUDSON, C. Michael NASA Langley Research Center Hampton, Virginia	Fatigue-crack propagation and fracture toughness on various materials. Fatigue life in various gas environments. Fatigue-crack propagation under various amplitude loadings.
IRWIN, George R. Lehigh University Bethlehem, Pennsylvania	Fracture toughness testing. Crack propagation. Stress. Strain. Fatigue testing. Structures. Fracture mechanics.
KAUFMAN, John G. Alcoa Research Laboratories New Kensington, Pennsylvania	Mechanical properties of aluminum and its alloys. Fracture. Strain. Stress concentration. Cryogenic applications.
KENDALL, David P. Watervliet Arsenal Watervliet, New York	Fracture toughness of high strength steels. Yield strength. Strain rate. Loading. Temperature effects.
KENDALL, Ernest G. Aerospace Corporation El Segundo, California	Fracture toughness of nonmetallic structural materials. Failure modes. High temperature materials.
KLIMA, Stanley J. NASA Lewis Research Center Cleveland, Ohio	Fatigue testing. Crack propagation. Stress rupture. Mechanical properties of nickel and cobalt alloys.
KOBAYASHI, Albert S. University of Washington Seattle, Washington	Two and three-dimensional stress intensity factors for isotropic and orthotropic materials. Plasticity correction factors and J-Integral determination. Dynamic stress intensity factors and crack arrest in built-in stringer structures subjected to dynamic loading. Fracture mechanics analysis.

Expert Organization	Expertise
KRAFFT, Joseph M. Naval Research Laboratory Washington, D. C.	Fracture toughness. Plastic flow. Dynamic effects on toughness. Environmental effects on stress corrosion. Fatigue propagation. Penetration ballistics.
KUSENBERGER, Felix N. Southwest Research Institute San Antonio, Texas	Metal fatigue. Nondestructive evaluation methods.
LANGE, Eugene A. Naval Research Laboratory Washington, D. C.	Low cycle fatigue data in terms of crack propagation rates as a function of total strain range and ΔK. Fracture mechanics structural analysis and material characterization in the plane strain, elastic-plastic, and the plastic fracture states.
LATANISION, Ronald M. Martin Marietta Laboratories Baltimore, Maryland	Mechanical properties of nickel-based alloys. Hydrogen embrittlement.
LOW, John R., Jr. General Electric Research Lab Schenectady, New York	Fracture toughness testing. Effect of microstructure on fracture toughness. High strength alloys.
LOWNDES, Holland B., Jr. Flight Dynamics Laboratory Wright-Patterson AFB, Ohio	Fatigue testing. Fracture in structures. Aerospace applications.
MASTERS, J. N. The Boeing Company Seattle, Washington	Fracture toughness properties of aircraft structural materials. Steel alloys. Fatigue testing.
McEVILY, Arthur J., Jr. University of Connecticut Storrs, Connecticut	Fracture. Crack propagation. Crack detection.
McMILLAN, J. Corey The Boeing Company Seattle, Washington	Fatigue testing. Fracture propagation. Stress corrosion resistance. Electron fractography.

Expert Organization	Expertise
McNITT, RICHARD P. Virginia Polytechnic Institute and State University	Fracture toughness data on various structural materials in various modes. Use of notched hollow rounds for getting toughness data. Hydrogen embrittlement.
MUKHERJEE, Amiya K. The Boeing Company Seattle, Washington	Fracture toughness testing. Fatigue limits. Aircraft structures.
NAUMANN, Eugene C. NASA Langley Research Center Hampton, Virginia	Fatigue tests. Failure mode. Loads. Cycling.
PARIS, Paul C. Del Research Corporation Hellerton, Pennsylvania	Fracture toughness and applied mechanics. Structural stability. Plastic analysis of structures. Fracture mechanics analysis.
PELLINI, William S. Naval Research Laboratory Washington, D. C.	Metals processing. Brittle fracture. Transformation and properties of steel. Solidification of metals. Gases in metals. Weldability. High temperature materials.
POPP, Herbert G. General Electric Company Cincinnati, Ohio	Fracture toughness testing. High strength alloys. High temperature. Fatigue limits.
PRAGER, William Brown University Providence, Rhode Island	Fracture toughness testing. Creep. Fatigue. Crack propagation.
ROSENFIELD, Alan R. Battelle Memorial Institute Columbus, Ohio	Fracture of metals, polymers, rocks, and ceramics. Rapid crack propagation and crack arrest. Microstructural origins of fracture toughness and of strength. Mixed mode crack growth. Crack tip plasticity.

Expert Organization	Expertise
SIH, George C. Lehigh University Bethlehem, Pennsylvania	Fracture toughness data analysis on plane strain, plane stress and three-dimensional crack specimens for metals and composites. Mixed mode fracture in the plane and through the thickness. Nonlinear behavior of materials with cracks. Design of test specimens.
SMITH, Clarence R. General Dynamics/Convair San Diego, California	Fracture toughness. Strain theory. Fatigue. Aluminum alloys. Life testing.
SMITH, S. H. The Boeing Company Seattle, Washington	Fatigue testing. Crack propagation in aluminum alloys. Aircraft structures. Fracture mechanics.
SRAWLEY, John E. NASA Lewis Research Center Cleveland, Ohio	Fracture toughness testing of various structural materials. Fatigue. Plane strain. Fracture mechanics analysis.
STEIGERWALD, Edward A. TRW, Inc. Cleveland, Ohio	Fracture toughness of high strength materials. Alloys. Plane strain. Hydrogen embrittlement.
SULLIVAN, Timothy L. NASA Lewis Research Center Cleveland, Ohio	Fracture toughness of titanium. Crack propagation. Measurement of crack growth.
TAGGART, Raymond University of Washington Seattle, Washington	Fatigue of metals with respect to crack propagation. Microstructures. Mechanical properties of binary alloys.
TIFFANY, C. F. The Boeing Company Seattle, Washington	Fracture toughness testing. Crack propagation. Pressure vessels. Fracture mechanics analysis.
TRUELL, Rohm Brown University Providence, Rhode Island	Fracture toughness testing. Fatigue. Crack propagation.

Expert Organization	Expertise
TURNER, N. G. Forge Space Technology Center King of Prussia, Pennsylvania	Fracture toughness testing. Mechanical behavior of titanium.
WEISS, Volker Syracuse University Syracuse, New York	Fracture toughness testing. Theory of fracture. Fatigue. Residual stress. Fracture mechanics analysis.
WELLS, Clifford H. United Aircraft Corporation East Hartford, Connecticut	Fracture toughness data on various structural materials. Fatigue. Life prediction of high temperature alloys.

PROBLEM AREA 3

Fracture mechanics analysis - capabilities and limitations - A significant amount of publications deal with linear elastic fracture mechanics and assumes plane strain. Attempts are made to identify any work that was done, taking into account elastic-plastic theories.

Expert Organization	Expertise
ABELKIS, Paul R. McDonnell Douglas Company Long Beach, California	Fatigue of materials and structures. Fatigue design, analysis and testing. Loads spectra. Statistical analysis. Structural design. Crack propagation and fracture analysis.
ADAIR, Atwell Mason Aerospace Research Laboratories Wright-Patterson AFB, Ohio	Fracture mechanics analysis. Plastic deformation and brittle fracture of materials. Mechanism of fatigue limit on metals. Fracture toughness testing.
AMATEAU, Maurice F. Aerospace Corporation El Segundo, California	Fracture mechanics analysis. Plastic strain anisotropy. Titanium.
AUST, Karl T. University of Toronto Toronto, Canada	Structure and properties of grain boundaries in metals. Plastic deformation and annealing phenomena in metals. Structure and properties of metals.
BACKOFEN, Walter A. Massachusetts Institute of Technology Cambridge, Massachusetts	Metal plasticity. Deformation textures. Mechanical anisotropy. High temperature deformation. Plastic working processes. Fracture. Fatigue.
BEACHEM, Cedric D. Naval Research Laboratory Washington, D. C.	Fracture mechanics analyses. Electron fractography. Specimen design. Crack tip mechanisms. Fatigue. Stress corrosion cracking. Hydrogen assisted cracking. Elastic-plastic fracture. Hydrogen embrittlement.
BOCKRATH, George E. McDonnell Douglas Company Huntington Beach, California	Ductile fracture theory in metals. Fatigue analysis. Maraging and stainless steels. Aluminum titanium, and beryllium alloys.

Expert Organization	Expertise
BROWN, William Findlay, Jr. NASA Lewis Research Center Cleveland, Ohio	Fracture mechanics analysis. Plane strain fracture toughness. Fracture toughness testing.
BROWN, William Fuller, Jr. University of Minnesota Minneapolis, Minnesota	Fracture mechanics analysis. Ferromagnetic domains and magneto-mechanical effects. Electromagnetics. Elasticity and plasticity.
CHEN, Yu Rutgers University New Brunswick, New Jersey	Fracture mechanics analysis. Vibration. Dynamic stress concentration. Structural analysis.
DAVIS, Sidney O. Aerospace Materials Laboratory Wright-Patterson AFB, Ohio	Fracture mechanics analysis. Linear elastic concepts. Crack propagation. Aluminum, titanium, and columbium alloys.
FIGGE, I. E. NASA Lewis Research Center Cleveland, Ohio	Fracture mechanics. Fatigue limits. Stress. Fatigue tests. Titanium. Steel alloys.
FUCHS, Henry O. Stanford University Stanford, California	Failure criteria for crack initiation and propagation. Residual stress effects. Analysis of irregular load sequences.
GRANT, Nicholas J. Massachusetts Institute of Technology Cambridge, Massachusetts	Fracture mechanics analysis. Deformation. Strain rate. Thermal effects.
GROSS, Bernard NASA Lewis Research Center Cleveland, Ohio	Fracture mechanics analysis. Stress intensity factors. Splitting forces. Boundary collocation.
GROSSKREUTZ, Joseph C. National Bureau of Standards Washington, D. C.	Fracture mechanics analysis. Plastic deformation. Metal fatigue. Metal physics. Structure of light nuclei.

Expert Organization	Expertise
HARDRATH, Herbert F. NASA Langley Research Center Hampton, Virginia	Non K_{Ic} toughness, plasticity effects. Complex structural configurations. Elevated temperature effects. Fatigue crack propagation. Stress corrosion cracking. Life prediction.
HAYDEN, H. Wayne Martin Marietta Laboratories Baltimore, Maryland	Mechanical properties of metals. Deformation. Fracture. Fatigue. Superelasticity. Environmental embrittlement of metals and composites. Powder metallurgy. Fracture toughness.
HERTZBERG, Richard W. Lehigh University Bethlehem, Pennsylvania	Fracture mechanics analyses. Deformation and fracture of materials. Fatigue crack propagation of metals and polymers. Failure analysis. Mechanical response of unidirectional, solidified, eutectic composites.
HILTON, Peter D. Lehigh University Bethlehem, Pennsylvania	Fracture mechanics analysis. Elastic-plastic analyses.
HULBERT, Lewis E. Battelle Memorial Institute Columbus, Ohio	Mathematical analysis of fracture in two and three-dimensional. Micromechanics of composites. Thermal stresses and thermal fatigue.
HUTCHINSON, John W. Harvard University Cambridge, Massachusetts	Fracture mechanics analysis. Elastic-plastic analyses.
IRWIN, George R. Lehigh University Bethlehem, Pennsylvania	Fracture mechanics analysis. Stress. Strain. Crack propagation. Fatigue testing. Fracture toughness.
JACOBSON, Marcus J. Northrop Corporation Hawthorne, California	Fracture mechanics analysis. Vibration effects. Thermal effects. Composite materials.

Expert Organization	Expertise
KOBAYASHI, Albert S. University of Washington Seattle, Washington	Fracture mechanics analysis. Two and three-dimensional stress intensity factors for isotropic and orthotropic materials. Plasticity correction factors and J-Integral determination. Dynamic stress intensity factors and crack arrest in built-in stringer structures subjected to dynamic loading. Fracture toughness.
KRAMER, Irwin R. Martin Marietta Aerospace Denver, Colorado	Plastic deformation. Surface effects related to flow and fracture of metals. Effect of alloying elements on mechanical and physical properties of metals. Hardenability of steels.
LANGE, Eugene A. Naval Research Laboratory Washington, D. C.	Fracture mechanics structural analysis and material characterization in the plane strain, elastic-plastic, and the plastic fracture states. Low cycle fatigue data in terms of crack propagation rates as a function of total strain range and ΔK.
LIEBOWITZ, Harold George Washington University Washington, D. C.	Fracture mechanics analysis. Deformation. Plasticity. Crack propagation.
MACMILLAN, Norman H. Martin Marietta Laboratories Baltimore, Maryland	Lattice and defect structure of solids. Relationship of structure and environment to mechanical properties. X-ray crystallography. Mathematical analysis of lattice structure and defects.
MANSON, Samuel S. NASA Lewis Research Center Cleveland, Ohio	Fracture mechanics analysis. Elasticity. Thermal stress in design. Creep. Fatigue. Vibration. High temperature materials. Life prediction.
McCLINTOCK, Frank A. Massachusetts Institute of Technology Cambridge, Massachusetts	Fracture mechanics analyses, capabilities and limitations. Plastic flow. Fracture.

Expert Organization	Expertise
MENDELSON, Alexander NASA Lewis Research Center Cleveland, Ohio	Fracture mechanics analysis. Plasticity theory. Deformation. Stress. Strain. Applications theory.
PARIS, Paul C. Del Research Corporation Hellerton, Pennsylvania	Fracture mechanics analyses. Structural stability. Plastic analysis of structures. Fracture toughness.
PELLOUX, Regis M. Massachusetts Institute of Technology Cambridge, Massachusetts	Ductile fatigue striations. Crack propagation theory. Shear. Aircraft structures.
SIH, George C. Lehigh University Bethlehem, Pennsylvania	Analytical and numerical analyses of two and three-dimensional crack problems. Torsion and flexure of bars. Plane extension and bending of plates. Pressurized cylindrical and spherical shells. Surface flaws. Application to structural design.
SINES, George UCLA Los Angeles, California	Fracture of ceramics. Fatigue failure of metals. Effect of residual stress.
SMITH, C. William Virginia Polytechnic Institute and State University Blacksburg, Virginia	Fracture mechanics of cracked plates in bending including three-dimensional efforts. Elastic-plastic effects.
SMITH, S. H. The Boeing Company Seattle, Washington	Fracture mechanics analysis. Fatigue testing. Crack propagation in aluminum alloys. Fracture toughness.
SRAWLEY, John E. NASA Lewis Research Center Cleveland, Ohio	Fracture mechanics analyses. Fatigue. Plane strain. Fracture toughness testing.

Expert Organization	Expertise
SWEDLOW, Jerold L. Carnegie-Mellon University Pittsburgh, Pennsylvania	Analyses of crack and notch geometries including the effects of elasticity, anisotrophy, elasto-plasticity, and nonplanar loadings and geometries. Applications to metals and advanced fiber composites.
TIFFANY, C. F. The Boeing Company Seattle, Washington	Fracture mechanics analysis. Pressure vessel structures. Crack propagation. Strain. Fracture toughness.
WEI, R. P. U.S. Steel Corporation Pittsburgh, Pennsylvania	Fracture mechanics analysis. Plane strain. Fracture toughness. Test methods.
WEISS, Volker Syracuse University Syracuse, New York	Theory of fracture. Fatigue. Residual stresses. Solid state phase transformation. X-ray diffraction. Fracture toughness testing.

PROBLEM AREA 4

Hydrogen embrittlement of superalloys - This subject is of interest regarding turbine buckets, which are exposed to high temperatures. It will be of increasing importance if additional interest develops in using hydrogen as the fuel in gas turbine engines.

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Expert Organization	Expertise
BEACHEM, Cedric D. Naval Research Laboratory Washington, D. C.	Hydrogen embrittlement. Test methods. Microscopic mechanisms. Stress corrosion cracking mechanisms. Fracture mechanics analysis.
CAMPBELL, James E. Battelle Memorial Institute Columbus, Ohio	Hydrogen embrittlement. Hardenability of steels. Fatigue of steel and aluminum. High strength steels. Fracture toughness.
CHANDLER, Willis T. Rockwell International, Inc. Canoga Park, California	Hydrogen embrittlement. Metallurgy of high temperature and refractory alloys. Transformations in metals. Liquid metal corrosion.
GRAY, Hugh R. NASA Lewis Research Center Cleveland, Ohio	Hydrogen embrittlement. Hot salt stress corrosion. Titanium alloys.
HULBERT, Lewis E. Battelle Memorial Institute Columbus, Ohio	Hydrogen embrittlement. Fracture mechanics analysis. Deformation. Heat transfer.
LATANISION, Ronald M. Martin Marietta Laboratories Baltimore, Maryland	Hydrogen embrittlement. Mechanical properties of nickel alloys.
McNITT, Richard P. Virginia Polytechnic Institute and State University Blacksburg, Virginia	Hydrogen embrittlement. Fracture toughness data on structural materials.
STEIGERWALD, Edward A. TRW, Inc. Cleveland, Ohio	Hydrogen embrittlement. Plane strain. Alloys. Fracture toughness testing.

Expert Organization	Expertise
TETELMAN, Alan S. UCLA Los Angeles, California	Hydrogen embrittlement. Titanium alloys.
WILLIAMS, Dean N. Battelle Memorial Institue Columbus, Ohio	Hydrogen embrittlement. Titanium alloys.

PROBLEM AREA 5

Protective coatings - Airbreathing engines operating in contaminated environments are in need of protection against attack by the contaminants. Information on the various candidate coatings and the effects of combustion products of contaminants in jet fuels on engine components is of prime interest. For example, the sulfur ordinarily contained in JP fuels reacts with salt present in shipboard and offshore environments and the resulting compounds attack turbine buckets severely.

Expert Organization	Expertise
GREENE, John A. S. Martin Marietta Laboratories Baltimore, Maryland	Protective coatings. Stress corrosion cracking of aluminum and titanium alloys. Aqueous corrosion of aluminum and titanium alloys. Formulation and characterization of aluminum and titanium alloys.
GRISAFFE, Salvatore J. NASA Lewis Research Center Cleveland, Ohio	Nickel aluminide coatings. Protective coatings for superalloys.
HAHN, George T. Battelle Memorial Institute Columbus, Ohio	Protective coatings. Heavy element chemistry. Diffusion. Isotope separation. Plasma chemistry. Space materials. Fracture toughness.
LEGGETT, Hyman Martin Marietta Aerospace Orlando, Florida	Fused oxide coatings. Zirconium systems. Testing superalloys at elevated temperatures. Ceramics.
NEJEDLIK, James F. TRW, Inc. Cleveland, Ohio	Aluminate coatings. Stress corrosion. Coatings for nickel- and cobalt-base alloys. Test methods.
PERKINS, Roger A. Lockheed Missiles and Space Co. Palo Alto, California	Protective coatings for superalloys; Oxidation protection for hypersonic structures.
QUIGG, Harold T. Phillips Petroleum Company Bartlesville, Ohio	Hot corrosion effects. Sulfidation. Superalloys.
STETSON, Alvin R. Solar San Diego, California	Protective coatings for tantalum-based and columbium-based alloys. Turbine engine materials.
TENNEY, Darrell R. Virginia Polytechnic Institute and State University Blacksburg, Virginia	Protective coatings. Oxidation behavior of structural materials under re-entry environments.

Expert Organization	Expertise
WURST, John C. University of Dayton Dayton, Ohio	Protective coatings for high temperature materials. Aerospace applications. Refractory materials. Thermal fatigue. Test methods.

PROBLEM AREA 6

Composite materials on low cycle and thermal fatigue - Our aim here is to search for data related to composite structural materials.

Expert Organization	Expertise
BOLLER, Kenneth H. U.S. Department of Agriculture Washington, D. C.	Fatigue properties of plastic laminates reinforced with fibers. Axial loading. Shear loading. Stress. Notching.
BROUTMAN, Lawrence J. Illinois Institute of Technology Chicago, Illinois	Fracture toughness, strength, and fatigue of fiber and particulate composites. Effect of material parameters on fracture and fatigue. Crack propagation and fracture in polymers and glasses. Impact strength and damage in polymers and composites. Fracture at interfaces.
CHAMIS, Christos C. NASA Lewis Research Center Cleveland, Ohio	Fiber reinforced composites. Impact resistance. Fracture mechanics. Failure criteria.
CHIAO, T. T. Lawrence Livermore Laboratories Livermore, California	S-Glass/Epoxy composites. Stress rupture. Yield strength.
DALLY, James W. University of Maryland College Park, Maryland	Fatigue failure mechanisms in composite materials. Stress analysis of composites. Predicting fatigue failure with damage indicators. Static and dynamic photoelasticity.
DECKER, Raymond F. International Nickel Company Sterling Forest, New York	Composites. Mechanisms of nickel-based superalloys. High temperature effects.
DOW, Norris F. General Electric Company Valley Forge, Pennsylvania	Composite materials data on low cycle and thermal fatigue.

Expert Organization	Expertise
HALPIN, John C. Aerospace Materials Laboratory Wright-Patterson AFB, Ohio	Fibrous composites. Structural applications. Static strength. Environmental effects.
HELLER, Robert A. Virginia Polytechnic Institute and State University Blacksburg, Virginia	Composite material data. Fatigue under varying embrittlement conditions. Creep effects.
HERTZBERG, Richard W. Lehigh University Bethlehem, Pennsylvania	Microstructural aspects of fatigue crack propagation in metal alloys and polymers. Mechanical response of unidirectional, solidified eutectic composites. Electron fractography. Failure analysis. Deformation and fracture of materials. Fracture mechanics analysis.
HOWELL, William E. NASA Langley Research Center Hampton, Virginia	Composite materials. Data on low cycle and thermal fatigue.
JACOBSON, Marcus J. Northrop Corporation Hawthorne, California	Fiber reinforced composites. Honeycomb structures. Vibration effects. Thermal effects. Acoustic fatigue. Fracture mechanics analysis.
JOHNS, Robert H. NASA Lewis Research Center Cleveland, Ohio	Structural characteristics, metal- and resin-matrix composites.
KROCK, Richard H. P.R. Mallory & Company, Inc. Burlington, Massachusetts	Composite materials data on low cycle and thermal fatigue. Refractory metals. Beryllium-and copper-base alloys.
LYTTON, Jack L. Virginia Polytechnic Institute and State University Blacksburg, Virginia	Fracture characteristics of fiber-reinforced composites. Hydrogen embrittlement of superalloys. Mechanisms of failure of steel.

Expert Organization	Expertise
PETRASEK, Donald W. NASA Lewis Research Center Cleveland, Ohio	Wire reinforced composites. Metal matrix composites. Mechanical characteristics of refractory metal wires.
RAO, P. Nagaraja ITT Research Institute Chicago, Illinois	Fatigue mechanisms of reinforced composites. Aircraft structures.
REIFSNIDER, Kenneth L. Virginia Polytechnic Institute and State University Blacksburg, Virginia	Composite material data on low cycle fatigue. Thermal effects near stress concentrations. Elastic-plastic fatigue crack propagation.
SALKIND, Michael J. United Aircraft Corporation East Hartford, Connecticut	Fiber reinforced materials. Controlled solidification. Powder metallurgy. Sintering.
SIGNORELLI, Robert A. NASA Lewis Research Center Cleveland, Ohio	Wire reinforced composites. Metal matrix composites. Mechanical characteristics of refractory metal wires.
STEELE, James H., Jr. Virginia Polytechnic Institute and State University Blacksburg, Virginia	Fracture characteristics of fiber-reinforced composites.
TENNEY, Darrell R. Virginia Polytechnic Institute and State University Blacksburg, Virginia	Analysis of metallic diffusion in fiber-reinforced composite materials.
TOTH, Istvan J. TRW, Inc. Cleveland, Ohio	Aluminum matrix composites. Fatigue and fracture of metal matrix composites.
WRIGHT, Maurice A. University of Tennessee Space Institute Tullahoma, Tennessee	Effects of thermal cycling and loading on boron-aluminum composites. Linear elastic fracture mechanics analysis of composite materials Fatigue properties of fiber-reinforced plastic-matrix structural materials.

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