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GARY J. NOVAK, Ph.D., P.E.
SENIOR CONSULTANT
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Dr. Novak is a Senior Consultant at ESI in the Mechanics and Materials practice. He has more than 20 years of industry experience in all facets of research and development and technology management. His consulting experience includes analysis and investigation of mechanical systems, failure analysis, technology evaluations, and intellectual property analysis.

Areas of Specialization

Design and Analysis of Bolted Joint and Sealing Systems
Analysis of Biomechanical Systems
Design and Analysis of Composite, Polymer, and Rubber Components
Design and Analysis of Powertrain Components and Systems
Automotive Engines and Transmissions
Vibration Analysis and Design
Structural and Computational Mechanics
Mechanical Design Analysis
Technology Management
Project Portfolio Development and Management
Product Development Processes
Intellectual Property Management and Systems

Education

Ph.D., Solid and Fluid Mechanics, University of Illinois-Chicago, 1981
M.S., Engineering, University of Illinois-Chicago, 1977
B.S., Engineering, University of Illinois-Chicago, 1975

Licensed Professional Engineer (P.E.)

State of Illinois…….License No. 062-041410

January 2020

Professional Affiliations

American Society of Mechanical Engineers
Member

Society of Automotive Engineers
Member

American Society of Mechanics
Member

Positions Held

Engineering Systems Inc., Aurora, Illinois

Senior Consultant, 2003 – Present

Federal Mogul Sealing Systems, Skokie, Illinois

1990 – 2002

Fel-Pro Inc., Skokie, Illinois (Acquired by Federal Mogul in 1998)

Chief Technology Officer, 1999-2002
Director of Advanced Technology, 1990-2002

University of Illinois, Chicago, Illinois

Lecturer, Department of Mechanical Engineering, 1989-1992

Rush Medical Center, Chicago, Illinois

Assistant Professor, Department of Orthopedic Surgery, 1989-1990

Novak Engineering, Indian Head Park, Illinois

Principal Engineer, 1989-2003

Borg Warner Automotive, Inc., Des Plaines, Illinois

Senior Research Engineer, 1985-1988
Senior Engineer, 1981-1985

Chicago Bridge and Iron Company, Oakbrook, Illinois

Engineer, 1980-1981

University of Illinois, Chicago, Illinois

Research Assistant, 1976-1980

Awards

Five U.S. patents

National Institute of Health Post-Doctoral Fellowship in Orthopedic Biomechanics - February 1989 to Jan 1990

Continued Education

SAE Course: Turbo Charging Internal Combustion Engines, 2017

ATR Global LLC: OSHA Scaffold Safety Course, 2015

ASM Course: How to Organize and Run a Failure Investigation Online, 2011

ASME Course: Turbine Principles and Applications, 2011

SAE Course: Vehicle Accident Reconstruction Methods Seminar, 2009

Forklift Training and Certification, 2008 & 2015 & 2019

SAE Course: Patent Law for Engineers Seminar, 2007

SAE Course: Injuries, Anatomy, Biomechanics & Federal Regulation Seminar, 2005

SAE Course: Section Officers Leadership Training, 1993

ASME Course: Shock and Vibration Analysis, 1993

Raymond Engineering: The Bolted Joint, 1991

Northwestern University: Technology Based Innovation, 1991

Strategic Decisions Group: Managing Innovation, 1990

University of Wisconsin: Developing Management Skills Unit I, 1988

SAE Course: Fiber Reinforced Composite Materials, 1986

DePaul University: Business Law, Organizational Behavior, Aggregate Economics, 1982 – 1983

Publications and Presentations

"Divining the Origin of Metallurgical Witness Marks Using Reverse Engineering Techniques," **D.E. Alexander**, R. Franzese, M. Kenner, A. Maratea, G. Novak, M. Stevenson, J. Wagner, presented at the ASM International Indianapolis Chapter Spring Conference, Columbus, IN, February 12, 2019

"Investigative Use of Reverse Engineering Techniques: Application to Metallurgical Laboratory Analysis of an Aircraft Accident," **D.E. Alexander**, R. Franzese, M. Kenner, A. Maratea, G. Novak, M. Stevenson, J. Wagner, presented at the Materials Science & Technology Conference, Columbus, OH, October 15, 2018

Investigation of a Compressor Turbine Blade Failure Involving the Fir Tree Attachment Condition," **E. Wright**, G. Novak, R. Baron, D. Ahearn, D. Alexander, presented at 2018 MS&T Technical Meeting, Columbus, OH, October 15, 2018

"Shelving Cart Design and Manufacturing Safety Analysis" D.B.Brickman, **G.J.Novak,** C.A.Fox, S.A.Karlins, The XXVIIIth Annual Occupational Ergonomics and Safety Conference Chicago, IL. June 9-10, 2016

"Failure Analysis of a Corroded Threaded Fitting in an Ammonia Refrigeration System", S.A. Sanders, M.E.Stevenson, **G.J.Novak**, R.J.Pape, Fail. Analysis. and Prev., (2014) 14:420-435.

"Crib Mattress Support Collapse Accident Reconstruction", D.B.Brickman, **G.J.Novak**, A.C. Mathias, The XXV Annual Occupational Ergonomics and Safety Conference, Atlanta, Georgia, June6-7, 2013.

ASM-WEST Symposium on Material and Design Challenges in Aerospace: Fasteners: The Role of Fastener and Gasket Selection on Sealing System Performance November 5, 2012

"Measurement of Thermal Residual Stress Using the Strain Gauge Method", C. R. Morin, E. H. Knox, M. T. Kenner, **G. J. Novak**, J. T. Eganhouse, presented at the Session on "Tools and Techniques," Failure Analysis Symposium, Materials Science & Technology (MS&T) 2007 Conference and Exhibition, ASM International, Detroit, Michigan, September 17, 2007

"New Stopper Technologies for MLS Gaskets", K.Cierocki, **G. J.Novak**, SAE paper 2002-01-0665, 2002.

"3 D Engine Analysis and MLS Cylinder Head Gasket Design", T.Chen, J.Zwick, B.Tripathy, **G. J.Novak** SAE paper 2002-01-0663, 2002.

"Surface Finish Measurement Considerations in Industrial Static Sealing", E.Widder and **G. J. Novak**, presented at 1998 ASME PVP Conference, San Diego, July 1998.

"The Role of the Stopper in the Mechanics of Combustion Seals", **G. J. Novak,** M.Sadowski, R.Capretta, E.Widder, SAE paper 980575, 1998.

"Flange Bending Model and Its Application to Bolt Span Specifications", Z.Hu, **G.J. Novak**, T.Chen, SAE paper 980579, 1998.

"Thread Lubricants", **G. J. Novak** and T.Patel, chptr 3 in "Handbook of Bolts and Bolted Joints", edited by J.Bickford and S.Nassar, Marcel Dekker, 1998.

"The Effect of Flange Flexibility on the Response of Gasketed Bolted Joints Subjected to External Forces", **G. J. Novak,** Z.Hu, M.Sadowski, E.Widder, SAE paper 970524, 1997.

"Parametric Model of Elastomeric Bolt Isolators Under Large Deformation", Z.Hu, T.Chen, **G. J. Novak,** SAE paper 970522, 1997.

"A Method for Determining the Load Deflection Curve of an Elastomeric Gasket", Z.Hu, T.Chen, **G. J. Novak**, SAE paper 960217, 1996.

"Development of a Computer Aided Gas Sealability Tester", E.Widder, **G. J. Novak**, SAE paper 960213, 1996.

"A Design/Analysis Method of Gasketed Bolted Joints for Noise/Vibration Control", J.Zwick, Z.Hu, **G. J. Novak**, SAE paper 952087, 1995.

"A Probabilistic Gasket Design Method", **G. J. Novak**, M.Sadowski, Z.Hu, SAE paper 950765, 1995.

"Sealing Performance of an Embossed Rubber Coated Metal Gasket", **G. J. Novak**, G.Schwerdtfeger, E.Widder, SAE paper 950328, 1995.

"Trunk Muscle Geometry and Centroid Location When Twisting", Y.H.Tsuang, **G.J.Novak**, O.D.Schipplein, A.Hafezi, J.H.Trafimow, G.B.J.Andersson, J.Biomechanics, Vol 26, pp 537-546, 1993.

"Influence of Erector Spinae Muscle Fatigue on the Lumbo-Sacral Moment During Lifting", **G.J.Novak,** O.D.Schipplein, J.H.Trafimow, G.B.J.Andersson, Eur. J. Exp. Musculoskel. Res., Vol 2, pp 39-44, 1993.

"Gasketed Joint Analysis Including Flange Bending Effects", E.Widder, M.Sadowski, **G. J. Novak**, SAE paper 930120, 1993.

"Gasketed Joint Analysis Using Computer Aided Engineering Techniques", E.Widder, **G. J. Novak**, SAE paper 920131, 1992.

"Influence of Fatigue on the Lumbo-Sacral Moment During Lifting", **G.J.Novak**, O.D.Schipplein, J.H.Trafimow, G.B.J.Andersson, presented at Intl. Soc. of the Lumbar Spine Meeting, Boston, 1990.

"Modification in Lifting Technique after Lumbar Muscle Fatigue", **G.J.Novak**, O.D.Schipplein, J.H.Trafimow, G.B.J.Andersson, submitted to the Transactions of the 37th Annual Meeting of the Orthopaedic Research Society, 1991

"The Effects of Quadriceps Fatigue on the Technique of Lifting", J.H.Trafimow, O.D.Schipplein, **G.J.Novak**, G.B.J.Andersson, submitted to Spine, 1990.

"An Evaluation of Trunk Models for Studies of Lifting Dynamics", **G.J.Novak**, A.B.Schultz, G.B.J.Andersson, T.P.Andriacchi, poster presentation at American Society of Biomechanics Meeting, Burlington, Vermont, 1989.

"A Design Procedure for Thermoplastic Bumpers", P.Sabol, F.J.Ferfecki, **G.J.Novak**, SAE paper 870109, 1987.

"An Analysis of Body Dynamics in Sagitally Symmetric Lifting", **G.J.Novak**, doctoral thesis, University of Illinois, Chicago, Illinois, 1981.

"Maximum Voluntary Strengths of Male Adults in Some Lifting, Pushing, and Pulling Activities", D.Warwick, **G. J.Novak**, A.Schultz, M.Berkson, Ergonomics, Vol 23, No. 1, pp 49-54, 1980.

"The Effect of Body Configuration and External Loads on Forces Internal to the Human Trunk", master's thesis, University of Illinois, Chicago, Illinois, 1977.

"A Scheme for Analysis of the Mechanics of the Lower Trunk During Manual Materials Handling", A.B.Schultz, W.K.Liu, **G.J.Novak,** Report on International Symposium: Safety in Manual Materials Handling, State Univ. of N.Y. at Buffalo, 1976.

Major Industrial Reports

"Reflector Plate Support Column Stress Analysis", section 5.4 of the Clinch River Breeder Reactor Project Closure Head Final Report by Chicago Bridge and Iron Co., July 1981.

"A Design Procedure for the Initial Belt Sheave Layout for a Metal Belt CVT", Borg Warner Corp. Research Center Project 4525 report, September 1983.

"Review of Freewheel Analysis", Borg Warner Corp. Research Center Report, November 1984.

"Stress Analysis of a Cast Aluminum Torque Converter Impellor", Borg Warner Corp. Research Center project 3147-80-81014, November 1984.

"Stress Analysis of a Glass Reinforced Nylon TD25E Turbine", Borg Warner Automotive Inc. Research Center project 4839 report, October 1987.
"Preliminary Report, Analysis of Rubber Suspension Bushing", March 1990.

"Preliminary Report, Optimal Boat Shoe Outsole Construction", September 1994.