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Engineering & Scientific Consulting

Solver Thorsson, Ph.D., P.E.

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Professional Profile

Dr. Thorsson specializes in analysis of mechanical systems, materials, and structures, with particular focus on failure analysis and composite materials. He utilizes his combined background in experimental, theoretical, and computational analysis to solve complex multidisciplinary engineering problems for clients. Dr. Thorsson consults clients across a wide range of industries, including aerospace, automotive, naval, consumer products, and wind, solar, and gas energy. The products Dr. Thorsson has analyzed include automotive vehicles and components, wind turbines, solar panels and racking/tracking systems, aircraft, space launch vehicles (i.e., rockets), satellites, steel and composite pipes, pressure vessels (composite and composite overwrapped pressure vessels (COPVs)), composite boat hulls, hydraulic hoses, hydraulic dampers, large industrial equipment, sporting equipment, medical devices, and consumer products, including consumer electronics and lithium-ion batteries.

In the aerospace, wind, and solar industries, Dr. Thorsson assists clients with engineering challenges over the entire life cycle of the project, often in support of litigation or arbitration. His analyses commonly involve review of the design, manufacturing, and certification requirements, conducting root cause analysis, evaluating existing or alleged damage and/or defect, fitness for service evaluation, evaluation, and consulting regarding repair and/or remediation, review of fleet-wide performance data, structural and material testing, and computational analysis. Dr. Thorsson has training in composite material structural repairs, including wind turbine blade repairs, and he has obtained a Blade Repair certification from the Global Wind Organization (GWO).

Dr. Thorsson has extensive experience assisting clients in the automotive industry with technical analyses in support of products litigation, class action lawsuits, motor vehicle regulatory requirements, noncompliance determinations, and petitions for inconsequential noncompliance. He has assisted clients with defect investigations, root cause analysis, and testing to requirements for Federal Motor Vehicle Safety Standards (FMVSS) and analogous international automotive safety standards (e.g., Europe, India, and China). His analyses have addressed hydraulic brake hoses, semi-vehicle trailers, and various systems and subsystems (including brakes, timing chain, seats, seat belts, and others). Dr. Thorsson has directed technical analyses on large projects that involved multiple dozens of technical staff and on small projects that involved just a few technical staff, authored technical reports, and briefed the National Highway Traffic Safety Administration (NHTSA) regarding technical investigations in petitions for inconsequential noncompliance.

Prior to joining Exponent, Dr. Thorsson conducted research at the University of Michigan Aerospace Department. His research was conducted in collaboration with one of the world's leading aircraft manufacturers and focused on the impact response and damage of aerospace grade carbon fiber reinforced polymer (CFRP) composites, with a particular focus on barely visible impact damage (BVID). During his research at University of Michigan, he also investigated the crashworthiness of woven composite tubes for the automotive industry and the structural performance of sandwich structures.

Academic Credentials & Professional Honors

Ph.D., Aerospace Engineering, University of Michigan, Ann Arbor, 2017

M.S., Aerospace Engineering, University of Michigan, Ann Arbor, 2013

B.S., Mechanical Engineering, University of Iceland, 2012

Licenses and Certifications

Professional Engineer Mechanical, California, #39937

Academic Appointments

Stanford University, Department of Aeronautics and Astronautics, Invited Lecturer

Prior Experience

Visiting Scientist at the William E. Boeing Department of Aeronautics & Astronautics, University of Washington, 2017

Lab Manager, Composite Structures Laboratory, Department of Aeronautics and Astronautics at the University of Washington, 2015-2017

Professional Affiliations

American Institute of Aeronautics and Astronautics (AIAA) member

AIAA, Aerospace Design and Structures Group, Materials Technical Committee Member

American Society for Composites

Languages

Icelandic

Publications

Lin, Shiyao, Solver I. Thorsson, and Anthony M. Waas. "Predicting the low velocity impact damage of a quasi-isotropic laminate using EST." Composite structures 251 (2020): 112530.

Thorsson, Solver I., et al. "Low-velocity impact predictions of composite laminates using a continuum shell based modeling approach part A: Impact study." International Journal of Solids and Structures 155 (2018): 185-200.

Thorsson, Solver I., et al. "Low-velocity impact predictions of composite laminates using a continuum shell based modeling approach Part B: BVID impact and compression after impact." International Journal of Solids and Structures 155 (2018): 201-212.

Thorsson, Solver I., et al. "Experimental investigation of composite laminates subject to low-velocity edge-on impact and compression after impact." Composite Structures 186 (2018): 335-346.

Thorsson, Solver I., et al. "Numerical investigation of composite laminates subject to low-velocity edge-on impact and compression after impact." Composite Structures 203 (2018): 648-658.

Thorsson, Solver I., et al. "Effects of elevated loading rates on mode I fracture of composite laminates using a modified wedge-insert fracture method." Composites Science and Technology 156 (2018): 39-47.

Thorsson, Solver I., and Anthony M. Waas. "8.11 Foreign Object Impact on Composite Materials and the Modeling Challenges." (2018): 206-218.

Thorsson, Solver I., et al. "Matrix crack interacting with a delamination in an impacted sandwich composite beam." Engineering Fracture Mechanics 163 (2016): 476-486.

Xu, Wu, Solver I. Thorsson, and Anthony M. Waas. "Experimental and numerical study on cross-ply woven textile composite with notches and cracks." Composite Structures 132 (2015): 816-824.

Ph.D. Thesis

Thorsson, Solver I. Experimental and numerical investigation of fiber reinforced laminated composites subject to low-velocity impact. Ph.D. Thesis, Department of Aerospace Engineering, University of Michigan, Ann Arbor, April 2017.

Conference Proceedings and Presentations

Kornuta, J. A., Thorsson, S. I., Gibbs, J., Veloo, P., & Rovella, T. "Automated error identification during nondestructive testing of pipelines for strength." International Pipeline Conference. Vol. 84447. American Society of Mechanical Engineers, 2020.

Nathan, S., Thorsson, S. I., Kornuta, J., Veloo, P., Martin, P., Rovella, T., Rosenfeld, M. " Influence of line pipe steel microstructure on NDE yield strength predictive capabilities." Pipeline Pigging and Integrity Management Conference, 2020.

Thorsson, Solver I., et al. "Prediction of Low-Velocity Face-on Impact Response and Compression after Impact (CAI) of Composite Laminates using EST and Cohesive Modeling (DCZM)." 2018 AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference. 2018.

Thorsson, Solver I., et al. "Prediction of low-velocity face-on impact response of composite laminates using high-fidelity finite element modeling techniques." 57th AIAA/ASCE/AHS/ASC structures, structural dynamics, and materials conference. 2016.

Thorsson, Solver I., et al. "Prediction of low-velocity impact damage in sandwich composite beams." 56th AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference. 2015.

Ji, W., Sringeri, S. P., Thorsson, S. I., Kosztowny, C. J., Waas, A. M., Rassaian, M., & Liguore, S. L. "Face-on and edge-on impact response of composite laminates." 56th AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference. 2015.

Invited Presentations

Thorsson, Solver I. “Failure Analysis of Composites” Guest Lecturer at AA252 - Techniques of Failure Analysis, Department of Aeronautics and Astronautics, Graduate School of Engineering, Stanford University. Spring 2022.

Thorsson, Solver I. “Failure Analysis of Composites” Guest Lecturer at AA252 - Techniques of Failure Analysis, Department of Aeronautics and Astronautics, Graduate School of Engineering, Stanford University. Spring 2020.

Thorsson Solver I. “Progressive damage and failure analysis modeling of composite laminates subject to impact and compression after Impact.” Boeing-University of Washington Workshop on Progressive

Damage Analysis, Seattle, WA, January 2015.

Thorsson, Solver I., Xie, Jiawen. ”Modeling and Experiments on Matrix Crack/Delamination Interaction in Sandwich Panels.” Boeing-University of Washington Workshop on Progressive Damage Analysis, Seattle, WA, January 2015.

Thorsson, SI. “Barely Visible Impact Damage in Composite Laminates” SAE International Composites Academy, Ann Arbor, MI, 2014.

Project Experience

Visiting Scientist at the William E. Boeing Department of Aeronautics & Astronautics, University of Washington, 2017

Composite Material Test Lab Manager, Composite Structures Laboratory, Department of Aeronautics and Astronautics at the University of Washington, 2015-2017

Formula Student Suspension Group Member, Team Spark of University of Iceland, Formula Student (FS) Europe, Institution of Mechanical Engineers, 2012.