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Engineering & Scientific Consulting

Anup Pydah, Ph.D., P.E., CRE

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Professional Profile

Dr. Pydah specializes in the design, vibrations, and failure analysis of high-performance structures in extreme environments. He has extensive experience developing high-fidelity finite element models (FEA) of complex structural assemblages, designing bespoke laboratory testing, and leveraging data analytics and machine learning techniques to help clients solve multi-physics problems. These analyses span multiple scales and industries, ranging from implantable medical devices and consumer electronics to composite transmission line conductors and wind turbine blades. As a Licensed Professional Mechanical Engineer, Dr. Pydah applies his expertise to assist clients with understanding mechanical loads on their products and how these loads relate to design performance and failure.

As a Certified Reliability Engineer, Dr. Pydah helps clients characterize and replicate field vibrations, fatigue, and damage sustained to their products and packages within a lab setting. These analyses help evaluate the performance and damage tolerance of products in the field.

Dr. Pydah's work includes both litigation and non-litigation matters. He leverages his experience with the analysis of metallic, composite, and polymeric materials to assist aerospace, wind energy, railway, and automobile manufacturers with issues pertaining to high-speed impact, vibrations, and fatigue as well as root cause analyses of wind turbine blade failures and moisture ingression. He regularly assists oil, gas, and electric utilities with evaluating pipeline stresses and transmission line aeolian vibrations and failure. Dr. Pydah also helps consumer electronics and medical device companies with computational simulations, lab testing, and failure analysis of their products.

Dr. Pydah's doctoral and post-doctoral research focused on analyzing complex structural assemblages subjected to blast loads, ballistic impact, or crashes. This involved the consideration of non-linear dynamics, large deformations, complex material constitutive models, plasticity, damage mechanisms, and failure. He also developed novel foldable, deployable, and adaptable origami structures. His research has found applications as blast mitigating metamaterials in civil/defense vehicles and infrastructure, as armor and impact protectors for infantry and athletes, as tunable energy harvesters, and as multi-functional outer space habitats for inter-planetary missions.

At Virginia Tech, Dr. Pydah was the technical advisor to the Virginia Tech Wind Turbine Team which developed renewable energy solutions for local and international farms. He regularly volunteers as a scientific judge for regional and state science fairs.

Academic Credentials & Professional Honors

Ph.D., Aerospace Engineering, Indian Institute of Technology, Madras, India, 2016

B.Sc. Eng., Mechanical Engineering, Dayalbagh Educational Institute, India, 2009

Licenses and Certifications

ASQ Certified Reliability Engineer (CRE)

Prior Experience

Postdoctoral Research Associate, Virginia Tech, 2016-2019

Publications

Anup Pydah and R.C. Batra, Impact analysis of PEEK/ceramic/gelatin composite for finding behind the armor trauma, Composite Structures, 237 (2020), 111863.

Anup Pydah and R.C. Batra, Beam-based vibration energy harvesters tunable through folding, ASME Journal of Vibration and Acoustics, 141(1) 011003 (2019).

Guojun Nie, Anup Pydah, and R.C. Batra, Torsion of functionally graded truncated conical cylinders, Composite Structures (in press 2019).

Anup Pydah and R.C. Batra, Blast loading of bumper shielded hybrid two-layered Miura-ori/ honeycomb core sandwich plates, Thin-Walled Structures, 129 (2018), 45-57.

Anup Pydah and Aditya Sabale, Closed-form exact solutions for thick bi-directional functionally graded circular beams, Multidiscipline Modeling in Materials and Structures (to appear, 2018), 10.1108/MMMS-12-2017-0.156.

Anup Pydah and R.C. Batra, Analytical solution for cylindrical bending of multilayered foldcore sandwich panels, Thin-Walled Structures, 123 (2018), 509-519.

Anup Pydah and R.C. Batra, Shear deformation theory using logarithmic function for thick circular beams and analytical solution for bi-directional functionally graded circular beams, Composite Structures, 172 (2017) 45-60.

Anup Pydah and R.C. Batra, Crush dynamics and transient deformations of elastic-plastic Miura-ori core sandwich plates, Thin-Walled Structures, 115 (2017), 311-322.

Anup Pydah and Aditya Sabale, Static analysis of bi-directional functionally graded curved beams, Composite Structures, 160 (2017) 867-876.

Anup Pydah and K. Bhaskar, Accurate analytical solutions for shear-deformable web-core sandwich plates, Journal of Sandwich Structures and Materials 19(5) (2017), 616-643.

Anup Pydah and K. Bhaskar, An accurate discrete model for web-core sandwich plates, Journal of Sandwich Structures and Materials, 18(4) (2016), 474-500.

Anup Pydah and K. Bhaskar, Accurate discrete modelling of sti□ened isotropic and orthotropic rectangular plates, Thin-Walled Structures, 97 (2015), 266-278.

K. Bhaskar and Anup Pydah, An elasticity approach for simply-supported isotropic and orthotropic stiffened plates, International Journal of Mechanical Sciences, 89 (2014), 21-30.

Presentations

Anup Pydah and R.C. Batra, Lightweight origami-core sandwich structures for improved blast resistance,

MII Technical conference and review, Blacksburg, VA, April 2018 (BEST POSTER AWARD).

Anup Pydah, An accurate discrete model for the dynamics of web-core sandwich plates, ASME 2015 International Mechanical Engineering Congress & Exposition, Houston, TX, November 2015.

Anup Pydah and K. Bhaskar, Elasticity solutions for isotropic and orthotropic stiffened plates, 17th U.S. National Congress on Theoretical and Applied Mechanics, East Lansing, MI, June 2014.

Editorships & Editorial Review Boards

International Journal of Engineering and Technologies (IJET), Member of Editorial Board, 2018

Peer Reviews

AIAA Journal, International Journal of Mechanical Sciences, Applied Mathematical Modelling, Multidiscipline Modeling in Materials and Structures