



# ME Seminar



## Experimental and Numerical Investigations on Mechanical Response of Aluminum AA2014-T6 Under Extreme Loading & Temperature Conditions

Dr. Anoop Kumar Pandouria, IIT Delhi, India

### ABSTRACT

Most of the structural components fail due to material defects, the uncertainty of loading, and environmental conditions. Therefore, the consideration of crack, loading rate, and environmental effects should be an essential part of the design for the safety assessments of structures like aircraft, ships, bridges, and spaceships, which are likely to withstand high strain rates loading. The main objective of this study is to understand the mechanical response of AA2014-T6 alloy under static, dynamic, and impact loading conditions at different temperatures. Research effort in this study can be summarized in the three steps. First, the material is characterized under tension and compression at different strain rates and temperatures. And established the constitutive and damage model for this material. Then, evaluation of the fracture initiation and propagation toughness under static and dynamic loadings at a wide range of temperatures. Finally, the experimental and numerical investigations on the monolithic and homo-stacked target plates under blunt and hemispherical projectile impacts.

### ABOUT THE SPEAKER

Dr. Anoop Kumar Pandouria is working as a Sr. Project Scientist in the department of Mechanical Engineering at IIT Delhi on the DRDO project entitled "Design of Antimine Boots Using Finite Element Simulations with a Human Body Model". He has received his Ph.D. in Solid Mechanics from the department of Applied Mechanics at Indian Institute of Technology, Delhi, in 2023. Prior to his PhD, he has received a Master of Technology (MTech) in Design Engineering from the same department at IIT Delhi in 2016. He has received his Bachelor of Engineering (B.E.) in Mechanical Engineering from Madhav Institute of Technology and Science, Gwalior, during 2008–2012. During his PhD, he has developed an experimental facility for high strain rate testing for compression, tension, and 3-point bend loading. He has also developed experimental and numerical skills to understand the mechanical and fracture behaviour of materials under static and dynamic loading and has published his work in several reputed journals and conferences. He is interested in both research and teaching. His research interests include experimental solid mechanics, dynamic fracture mechanics, constitutive and damage modelling, dynamic behaviour of materials, ballistic impact, and material response at high temperatures and strain rates.



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