SOUTH DAKOTA MINES
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Improving Interlaminar Toughness of Additively Manufactured Polymers Using Novel Dual-Material Filaments

Dr. Kevin Hart, Milwaukee School of Engineering

Tuesday, January 17
9 AM, CB 204W

Join us for refreshments and a social after the seminar in the ME Zoo

Polymeric materials made using material extrusion additive manufacturing techniques often have poor interlaminar toughness, resulting from the layer-by layer manufacturing method required. Consequently, additively manufactured polymers are rarely used in engineering applications requiring significant mechanical performance. Recently, however, a novel, dual-material filament has been developed which, if used in the additive manufacturing process, creates parts which have interlaminar toughness values which rival those of injection molded polymers. In this seminar, techniques for evaluating and improving the inter-laminar fracture toughness of additively manufactured polymers will be presented. First, methods for evaluating the fracture toughness using a single-edge-notch-bend fracture geometry are demonstrated. Then, fabrication and utilization of the novel, dual-material filaments are described. Interlaminar toughness values of samples made using these novel filaments show an over 2500% improvement when contrasted to materials made using more traditional filaments. In closing, efforts to commercialize the dual-material filament technology will be discussed.

Dr. Kevin Hart is an Assistant Professor of Mechanical Engineering at the Milwaukee School of Engineering in Milwaukee, WI. Dr. Hart received a BS in Engineering Mechanics from the University of Wisconsin-Madison in 2010, and a PhD in Aerospace Engineering from the University of Illinois at Urbana-Champaign in 2016. Dr. Hart is also the Principal Materials Engineer for Prepared for Flight, a technology company focused on the commercialization of novel additive manufacturing filaments.

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