

Abstract Submitted  
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**Stress Waves in Elastic and Viscoelastic Bars**<sup>1</sup> MAJID ALEYAASIN, AHONSI BRIGHT, JOHN HARRIGAN, University of Aberdeen, JEREMY MILLETT, AWE — Strain-gauged circular rods are used for Split Hopkinson Pressure Bar (Kolsky Bar) testing and as load cells for Direct Impact testing. Strain measurements along the bar are used to determine the stress and displacement histories at the end of the bar. In recent studies an experimentally measured propagation coefficient has been used to account for wave dispersion and attenuation in polymer bars and to overcome the difficulties associated with modeling the stress waves in the bars. However, the accuracy of the technique relies on the accuracy of the propagation coefficient used to model the wave propagation in the bars. The propagation coefficient can be determined experimentally or, if the bar material properties are known accurately, it can be derived using a suitable wave model for the bars. Both elastic and viscoelastic bars are considered and experimental results, analytical wave models and finite element analysis are discussed and compared. Experimentally derived propagation coefficients are compared with those predicted by higher order rod theories.

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