

Abstract Submitted
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On the suitability of Synbone® as a tissue simulant GARETH APPLEBY-THOMAS, BRIANNA FITZMAURICE, AMER HAMEED, DAVID WOOD, MIKE GIBSON, JONATHAN PAINTER, Cranfield Defence and Security, Cranfield University, Shrivenham, Swindon, SN6 8LA, United Kingdom — The applicability of various materials as human tissue analogues has been a topic of increasing interest in recent years. It allows for more cost-effective experiments to be carried out, but also avoids ethical issues that would arise from using real human tissue. Synbone®, a porous polyurethane material, is commonly used in ballistic experiments as a bone simulant, but until now has not been characterised in terms of its dynamic behaviour. Here, the Hugoniot equation-of-state (EOS) for Synbone® has been derived via a series of plate-impact experiments; highlighting the importance of the underlying material structure in terms of material collapse under high strain-rates. A series of ballistic tests were also undertaken to provide further insight into the ballistic response of Synbone® and its potential role as a tissue simulant. This work – following on from previous in-house studies of other tissue analogues – has provided useful data for future simulation of this material. In addition, comparison to dynamic data for other tissue and simulant materials has highlighted the importance of considering tissue as non-monolithic; each layer of tissue should ideally be represented by its own simulant in ballistic experiments.

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