

Biomechanics for (crash test) dummies – a lot happens in the blink of an eye

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Abstract

During vehicle crashes, the laws of physics and mechanics hold sway, but those of us accustomed to “real time” dynamics may have difficulty intuitively predicting the complex accelerations and forces that determine occupant motions and injury mechanisms for events that happen in the blink of an eye. Biomechanical accident reconstructionists and safety engineers use tools such as computer simulation and full-scale testing with instrumented anthropomorphic test dummies to open a window onto this fast and furious world. They also rely on careful evaluation of physical evidence left on structures, roadways, vehicle bodies/interiors and occupants themselves in real-world accidents to characterize the vehicle motions and occupant environment, and evaluate potential effectiveness of various safety systems in mitigating injury. We will review examples of research crash tests and accident investigations to see how biomechanical engineers analyze these loading scenarios to determine injury outcome.