Injury Models

Conversion of Lower Leg Finite Element Model to DYNA3D/ParaDyn

Researchers at USARL translated the SIERRA 3D geometry-based FE model of the lower right leg derived from Zygote medical scans into multiple formats for analysis. The leg was simulated in ParaDyn and DYNA3D to identify potential bone fracture mechanisms in UBB loading, and in LS-DYNA to benchmark against external research. Initial results were identical between ParaDyn and DYNA3D, but both were different from LS-DYNA. An exhaustive study of many computational options identified the element formulation as the major cause of this discrepancy, and once addressed, all solvers predicted the same results. A USARL technological report describing these findings is in progress. This will improve USARL's modeling capabilities by allowing models to be run on a high performance computing platform, which will in turn assist the development of improved blast protection capabilities.