



## On the shakedown response of an auxetic structure

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### Abstract

Cyclic elastoplastic shakedown is an understudied mechanical behavior whereby limited plastic deformation in the early stages of cycling gives rise to internal residual stresses that arrest the plastic response. As a result, purely elastic behavior is recovered upon further load cycling. This presentation is a study to map out the benefits of alternative resilient plastic design approaches that employ shakedown and that go beyond the traditional yield-limited approaches for metallic structures in a variety of industries. The focus is on auxetic structures that exhibit effective negative Poisson's ratio. This unconventional behavior can improve energy absorption, anchoring capabilities, and failure resistance, including under cyclic loadings. The presentation highlights a case study of the full-field characterization and measurement of shakedown for an auxetic structure.

