

# Application of LS-DYNA<sup>®</sup> in Structural Fatigue Analysis and Post-Processing with LS-PrePost<sup>®</sup>

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## Abstract

*This paper provides a review of the development of LS-DYNA in structural fatigue analysis and the post-processing of the results with LS-PrePost.*

*Fatigue is the progressive and localized structural damage that occurs when the material is subjected to cyclic loadings. Fatigue damage and failure are very common in industries. Some studies have suggested that over 80% of all mechanical failure of metal are attributable to fatigue.*

*Starting from 971 R7 version of LS-DYNA, a series of features have been implemented in LS-DYNA to provide fatigue and durability analysis for metal structures, under various vibration loading conditions. The analysis provides accumulative damage ratio, expected fatigue life and cycles for the structures, based on the Palmgren-Miner rule and material's S-N curve. With the recent updates in LS-PrePost (4.2, 4.3), a new interface has been added to provide the fringe plot of the fatigue variables, which greatly simplifies the post-processing of the results and makes the result analysis easier.*

*Some examples are provided to demonstrate the effectiveness and convenience in running LS-DYNA and LS-PrePost for fatigue analysis and results post-processing.*