Threshold Level as An Index of Squeak and Rattle Performance

Document Number: 1999-01-1730

Date Published: May 1999

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Abstract:
A practical approach for evaluating and validating global system designs for squeak and rattle performance is proposed. Using simple slip and rattle models, actual sound and vibration data, and the fundamentals of audiological perception, analysis tools adapted from Chaos Theory are used to establish threshold levels of performance and identify system characteristics which are significant contributors to squeak and rattle. Focus on system design is maintained by using a simple rattle noise indicator and relating rattle events to levels of dynamic motion (acceleration, velocity, etc.). The threshold level is defined as the level of acceleration at which the system moves from a nonrattling state to a rattling state. The approach is demonstrated with a simple analytical model applied to an experimental structure under dynamic load.