

Frictional Dampers Dynamic Characterization- Theory and Experiments

Mohsen Salehi, Ph.D., Member ASME/AIAA/STLE
Hooshang Heshmat, Ph.D. ASME, STLE Fellow

Mohawk Innovative Technology®, Inc. (MiTi)
msalehi@miti.cc

ABSTRACT

This paper is concerned with one of the most neglected aspects in characterization of dynamic frictional behavior thin metallic compliant foil system. Additionally, the paper introduces the results of an experimental study as well as a semi empirical model for determination of dynamic friction coefficient of thin compliant foils. The results can be used as a tool for prediction of friction coefficient in reciprocating machineries. A rudimentary analysis is considered for the variation of dry and dynamic friction coefficient as a function of test parameters. Coefficient of friction is presented as a function of frequency, amplitude of motion and normal load. The amplitude of vibration ranged from 2.54 to 12.7 : m. The frequency of motion ranged from 50-1500 Hz and loads of 45 to 135 N were applied. The frictional damping were evaluated using a single degree of freedom model. This was developed based on the result of experimental work in which the damping force was replaced by an equivalent frictional term. The results of frictional losses, hysteresis loop, were utilized and compared with the single degree of freedom model. The dynamic friction coefficient was then assessed with a good agreement between the two techniques.