

MATERIALS AND STRUCTURES SYMPOSIUM (C2)

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Author: Dr. Hong Lin

Beijing Institute of Aerospace Systems Engineering, China Aerospace Science and Technology Corporation
(CASC), China, LinhongCalt@163.com

Dr. Xinyu Zhang

Beijing Institute of Aerospace Systems Engineering, China Aerospace Science and Technology Corporation
(CASC), China, univchang@hotmail.com

Dr. Huilian Peng

Beijing Institute of Aerospace Systems Engineering, China Aerospace Science and Technology Corporation
(CASC), China, huilian.peng@gmail.com

Dr. Qi Tang

Beijing Institute of Aerospace Systems Engineering, China Aerospace Science and Technology Corporation
(CASC), China, TangqCalt@163.com

Dr. Meng Wang

Beijing Institute of Aerospace Systems Engineering, China Aerospace Science and Technology Corporation
(CASC), China, csleon3@163.com

Mr. Yi Chen

Beijing Institute of Aerospace Systems Engineering, China Aerospace Science and Technology Corporation
(CASC), China, chenycalt@gmail.com

Dr. Xuesheng Chen

Beijing Institute of Aerospace Systems Engineering, China Aerospace Science and Technology Corporation
(CASC), China, bhliuchang@buaa.edu.cn

RESEARCH ON UNIT SINE VIBRATION TEST LEVEL OF SPACECRAFT

Abstract

The theoretical results from the spacecraft (SC)/launch vehicle (LV) coupled load theory analysis (CLA) or the experimental results from system vibration test, which is usually used for the unit sine vibration test level of spacecraft, has no satisfying precision when used separately. Firstly, the coupled load theory analysis is usually suitable for the spacecraft interface environment prediction. However, as it is difficult to simulate the local mechanical character of spacecraft to get correct unit responses, the low frequency vibration environment can not be given precisely. Secondly, due to the boundary impedance differences between system vibration test and flight condition, severe unit vibration test level is resulted. The combination method of the CLA result and the system vibration test result is given in this paper, which ensures the rationality and precision of the test level while enough safe margins are reserved. The CLA results of spacecraft interface are used for spacecraft/ launch vehicle interface force functions, and unit responses in system vibration test are used to get unit transfer character.