

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Space Structures I - Development and Verification (Space Vehicles and Components) (1)

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THE FAILURE MODE ANALYSIS OF THE 1/20 END FRAME OF THE INTERSTAGE SECTION

Abstract

Interstage section is the connecting part between the different stage of a multistage rocket. It plays the role of the load transfer function. When it is under the compressive load, the shell part bears considerable loads, and the structural stability has a great impact on the interstage section. When it is under the tensile load and the bending load, the structural strength of the end frame has an important influence on the carrying capacity of the interstage section. Therefore, in order to improve the test efficiency, reduce the cost of product development and summarize the failure law of the structure, this paper selects a section of the 1 / 20 end frame as the research object. Meanwhile, the test data and the results of the finite element calculation under the tensile load are compared to get the failure load, analyze the failure law and determine the failure mode. From the comparison results, it can be seen that the consistency of the stress and the strain data of the test and the calculation results of the finite element simulation is good. And the finite element analysis simulates the whole damage process, gets a failure mode of the structure, and draws the conclusion that the failure of the structure which leads to the overall structure fracture, starts from the two lower corner of the connecting hole of the test object, and extends to both sides rapidly. The result can also provide the basis for the design and the improvement of the end frame of the interstage section in the future.