Paper ID: 16849
oral

MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Poster Session (P)

Author: Dr. peng weibin
Beijing Institute of Aerospace Systems Engineering, China Aerospace Science and Technology Corporation (CASC), China, peng_weibin@yahoo.com

WATER MEDIUM HYDRAULIC TEST METHODS FOR LARGE LIQUID HYDROGEN TANK

Abstract

The propellant tank, which was manufactured using high-strength aluminum alloy by weld, is an important part of the large rockets. To ensure weld quality, tanks need to be verified through the water medium hydraulic test. For a large liquid hydrogen tank, due to the significantly density differences between water and liquid hydrogen, the conventional hydraulic test will cause a significant tank structure weight increase. Four hydraulic test program were analysized in this paper, such as conventional hydraulic test, setting tank horizontally, gas medium test and putting liquid hydrogen tank in a segmented container. A novel water medium segment hydraulic test method were given,whose test load distribution is consistent with the flight load, and the propellant tank structure weight caused by conventional water medium hydraulic test was reduced significantly.