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# STUDY ON MULTIPLY-LEVEL MODEL FOR SOLID ROCKET MOTOR: CONSTRUCTION AND DATA STRUCTURE

**Abstract**

For physical-mechanism based simulation such as structure analysis, and operating-mechanism based simulation such as interior ballistics analysis, the key factors are theoretical mechanism, numerical algorithm, tools software and object model. Recently, emphasis of complex product has turned to collaborative design and life-cycle covered simulation. Resolutely, conventional modeling method, which focus on assembly or simplified-complete machine is unable to satisfy multiply users who are lively in the preceding collaborative environment. In this paper, the author used solid rocket motor as an example and two hotspot issues are present as follows: 1) Propellant designers focus on molecular-dynamics analysis as well as statistical analysis on oxidizer particles to get load conditions such as stress state of key locality, for reprehensive volume element , besides formula testing and experiential summary, and 2) except pipeline interference and kinetic behavior of thrower's drivers, influential transfiguration from motor is being more and more absorbing to structure engineer from launch rocket department. Conclusion indicated by case evaluation before-mentioned on solid rocket motor is that the complicacy of requirement-level from users seems to be distinct symbol for both physical-mechanism based simulation and operating-mechanism based simulation. Furthermore, this distinct symbol set out bran-new arrange in object-model's graininess. Forasmuch, it is necessary to describe the identical object-model on assorted dimensions and to take variety that depends on the stages of lifecycle into account. This paper put out the notion of Multiply-level Model (that is MLM) for solid rocket motor based on assumes and transfer from model tree and then try to get integration of structure information characterized by "materials-discrete assembles-integrated framework" as well as curriculum vitae information incised as "deign- manufacture- assemblage-test-usage". Ultimately, efforts to unify geometrical data, material property, technologic process and load are under the guidance of construction and data structure. Normative testing SRM with diameter of 400mm which delegates certain type of solid launch vehicle, is employed to demonstrate the production get by this paper as follows: 1) by catching hold of the items of material property and dispersing of object model, construction is put out under the guidance of Model-based Systems Engineering( MBSE ), 2) aimed at macro-micro analyzing on propellant as well as launch vehicle's dynamics, transformation mechanism and data channels for graininess-depending simulation is put out.