

EFFECT OF FLEXIBILITY AND AIRCRAFT FLOW FIELD ON RAIL LAUNCH SIMULATION OF A MISSILE

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Abstract

One of the major causes for the dispersion of missile trajectory is its tip-off from the launcher. Generally low fidelity models are used to predict the tip-off of a missile. One or the other important parameters, like flexibility of missile, flexibility of launcher rail, clearances between launch shoes of missile and launcher rail are omitted in these low fidelity models. In the present study, effects of missile and launcher flexibility on missile tip-off are studied by comparing the results by a low fidelity rigid body simulation model and a 3D finite element model. Predicted tip-off by these two models is compared with ground flight measured data. Effect of omitting one of the launch shoes on missile tip-off is also studied using low fidelity model. For a ground launched missile gravitational pull decides the missile tip-off, but for aircraft launched missiles, aircraft flow field is equally important. Rail phase of an air to air missile is simulated considering varying aircraft flow field, using a full-fledged 3D Finite Element Model.

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