STATISTICS OF STOCHASTIC SHELTER SHOCK MOTIONS INDUCED BY NUCLEAR EXPLOSIONS

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In order to perform a representative shock testing of shelter equipment submitted to the ground shock of a nuclear explosion, a new probabilistic shock testing concept has been developed under the auspices of the NC Laboratory, Spiez and already presented as Paper V.1 at MABS 8. The numerical generation of shock time functions as a fundamental part of this concept is based on stochastic model parameters, which are themselves described in term of probability distributions, and on mathematical models for the rigid body motion of the shelter, the elasto-plastic deformations
of the walls, ceiling and floor and the elastic vibrations. The seismic waves are simulated by a stochastic earthquake model.
A logical consequence of the development of such a simulation model was then to perform a statistical analysis of a great number of stochastically generated shelter motions. Several hundreds of time functions for 1 an d 3 bar norm shelters of the Swiss Civil Defense, and the statistics of their shock parameters (max acceleration, max velocity, max displacement) have been calculated.
A statistical analysis of the resulting response spectra has also been performed.