A MODEL STUDY TO THE EFFECTIVENESS OF BLAST WALLS

WEERHEIJM,J.;BAKKUM,E.A.

In this paper the effectiveness of blast walls in reducing the strength of incident plane shock waves is investigated by experiments on scale models.
The shock attenuation depends both on the reflection process at the front of the wall and the diffraction process at the back.

Obviously the wall shape affects both process to some extent. It is the aim of this work to clarify the influence of the wall shape by considering the two extreme cases of a screen and a symmetrical dike (rectangular topangle). Model tests were performed in a 40x40 cm2 blast simulator, which is equipped with a series of piezoresistive transducers and a pair of optical windows. The wall models were mounted at the optical section and loaded with plane shocks (peak pressures of 30 and 37 kPa). The flow at the optical section was studied with a shearing interferometer. Pressure signals on both sides of the model were obtained from transducers and the interferograms. It is shown that the diffraction process depends strongly
on the wave length of the incident shock. Numerical simulations with an FCT computer code were performed and compared with the experimental data.

A good agreement is found and thus the computer code can be used to predict the diffraction behavior in a broader range of peak pressures. It is concluded that the screen yields a better protection than the dike due to a more effective diffraction process.