

AN APPROXIMATION OF THE AXELSSON MODEL FOR QUICK INJURY PREDICTION

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In risk analysis tools it is desirable to have quick modules for estimating the injury and lethality due to blast. The current injury models however are too cumbersome. Both the Axelsson model and the Stuhmiller model require the input of four full pressure-time curves, which are to be measured with a so-called BTM. Next a full response calculation per load curve must be carried out before the necessary output is available for the injury prediction. TNO has started to look at simplifications of the Axelsson model. The TNO-study concerns two issues: the requirement of four pressure-time curves from a BTM and the need for full response calculations. With regard to the first issue there exists the Weathervane method to make the procedure more practical. But the second issue has not been addressed by other researchers, as far as we know. This second issue is the topic of this paper.

TNO succeeded to find a procedure which circumvents the need to solve the differential equation of the single degree of freedom model. The approach is applicable for both smooth Friedlander curves as well as blast waves with multiple peaks.

The procedure will be described in the paper, together with examples to show how the simplified approach compares with the original Axelsson model. The examples also give insight in some typical aspects of the Axelsson model, which one should be aware of when using the model. These typical aspects will be discussed.