

# LOAD HISTORY ON TARGETS, CAUSED BY DETONATING FRAGMENTING CHARGES

Prof. Dr. Manfred Held

*TDW Schrobenhausen.  
Hagenauer Forst 27, 86529 Schrobenhausen, Germany*

## ABSTRACT

Cylindrical encased high explosive charges firstly accelerate the casing by the introduced shock wave and then by the extremely high compressed products of the detonated high explosive charge. This radially expanding case starts cracking. In a short time difference these cracks are building gaps, where the highly compressed gaseous products start to pass these. They expand faster in this stage. Therefore the fragments are behind the blast and shock wave. Travelling through the surrounding ambient air the products of explosives are more retarded than the fragments. In the scaled distances of around 1 to 2  $\text{m/kg}^{1/3}$  the fragments arrive the front of the expanding products and are flying in front of the expanding cloud.

These launching procedures will be discussed in detail with the expected time differences in the arrival conditions of blast waves and fragment showers on targets, what is happening at the near distances.

The synergistic effects are then measured with ballistic pendulums, where the load of blast wave and from fragment impacts can be partially separated.