

## ENTRY AND ATTENUATION OF SHOCK WAVES IN TUNNELS

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Since the presentation of the paper no G9 at Southend-On-Sea, our theoretical basis of the shock wave attenuation problem has improved. Therefore, the empirical assumptions on the  $t/t_0$  - ratio could be replaced by a relation issuing from the shock wave profile equation. The resulting curve sheets have been published in the report FMB 74-15.

For the evaluation of shock wave attenuation in a tunnel the wave profile at the starting point has to be known. In the case of an explosion outside the tunnel the shock wave entering the tunnel undergoes certain distortions which take place within a distance of some tunnel diameters from the entrance. After that point the wave shows the normal decay behavior. The aim of the present investigation was to find the position of that point and the shock wave profile there. In the profile the duration is of special interest, as on this subject no reports were known to exist, contrary to the considerable amount of work published on peak overpressure.

In the experiments HE-spheres in the range of 0.5 to 1 kg TNT have been blasted in front of a tunnel entrance and at different distances from it.

Peak overpressure of the incident blast wave at the entrance varied from 1 to 40 bars with durations from 3 to 5 ms. Shock wave profiles have been measured at 8 stations along the tunnel. Two kinds of tunnel sections have been used, a square one and a round one. The tunnel length was 80 diameters. Experimental results will be given with the presentation of the paper.