Air blast mitigation using water foam coverage

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The use and effectiveness of water foam for the mitigation of blast from explosive charges was experimentally investigated in the open field. Two types of explosives were studied. The charges used were 20 kg of RDX-powder while for ANFO both 30 and 50 kg charges were used. The 1.8x1.2 m large flat charges (their height varied for the different charges) were placed on the ground. For each explosive type both a bare charge and a foam confined charge was used. The water foam was confined by a large plastic bag (4x4 m) and placed directly on top of the explosive charge. The foam had an expansion ratio of 200 and consisted of a foaming agent and water which was expanded with air using a nozzle. The blast profile in the air was measured using side-on pressure gauges at several locations (3-200 meter from the detonation site). Also a high speed video recording (at 30 meter distance) was used to visualize the effect of water foam mitigation. The water foam cover reduced both the peak pressure and impulse of the blast wave in the far field (200 m) with about 20 percent for ANFO and 40% for RDX. In the near field (5 m) the mitigating effect was even larger for ANFO with about 50 percent. Although only preliminary results are obtained, some suggestions on the working principles of water foam for blast mitigation will be discussed.