

P07 Mitigation of Blast Waves Using Water Barriers

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Abstract:

Water is the most common material in earth. It is cheap and available and therefore can be use rapidly. The effect of water on the progress of the shock wave was investigated extensively in the past both experimentally and numerically using commercial code such as AUTODYN, LS-DYNA etc. In This paper the mitigating effect of a water barrier on the generation and propagation of blast waves and the size of the fire-ball of a nearby explosive device has been investigated experimentally in a series of full scale test. The experiment aim was to study the influence of the design parameters, such as the water-to-explosive weight ratio, the water barrier thickness, the air-gap, the water barrier configuration and the cover area ratio of water on the effectiveness of the water mitigation concept. The peak overpressure in the test field was compared to ConWep [1] and the size of the fire-boll to the theoretical size [2]. From the results of the extensive filed experiments, it is deduced that firstly, the presence of an air-gap reduces the effectiveness of the water barrier in both reducing the overpressure and impulse. Secondly, the higher the water-to-explosive weight ratio or water barrier thickness the more significant is the reduction in peak pressure of the explosion.

References

[1] ConWep, Conventional Weapons Effects, U. S. Army Engineer Waterways Experiment Station, CEWES-SS-R. 30 Aug. 1992.

[2] W. E Baker, A. P Cox (1983), "Explosion Hazards and Evaluation – part", Elsevir scientific publishing company, New York.

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