

Non-lethal weapons bases on electro-hydrodynamical effect.

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This study has been devoted to theoretical and experimental investigation of water jets generated by a water electrical discharge. The objective of the investigation is to study possibilities of using such water jets as a non-lethal weapon-damaging factor.

The jet damaging capability is determined by its kinetic energy and depends on its mass and flow velocity. Maximum flow velocities (so-called concurrent flow velocity ratio) can be obtained behind a propagating shock wave front. In acoustic approximation a concurrent flow velocity ratio can be found from

$$V = \frac{P_B - P_0}{\rho_0 \cdot c},$$

where P_B и P_0 – shock wave front pressure and unperturbed medium pressure, ρ_0 - medium density before the shock wave front, c –sound speed in the medium .

A water electrical discharge is an effective source of high and super high pressure waves. The pressure wave characteristics such as amplitude, propagation velocity, compression zone extension are determined by a set of the electrical charge and discharge circuit characteristics: stored energy, maximum speed of energy input in the discharge, discharge gap voltage, discharge gap length, electrode shape. Thus, a lot of factors influence a shock wave effect and its characteristics.

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