

**Application of vortex technologies for NLW crowd control**

**E.I. Onipko, V.V. Selivanov**

***Bauman Moscow State Technical Uuniversity, 5 Baumanskaya str.,  
107005 Moscow, Russia***

The application of known police means for crowd control in criminal and conflict situations doesn't exclude lethal outcome, that contradicts the legislative system and ethnical norms defined by the world community. NLW crowd control based on wave technologies is limited in frequency and amplitude, that defines the possible application of such means only within the audible sound range.

At the same time, the influence on human receptors and senses by vortex of the high level can cause pain syndrome, irritation, spasms and shock. Thus, this influence is very effective for crowd control, as these effects is corresponded by panic, disorientation. In this case the response of any human is temporal and the damage is reversible (after the ending of vortex influence) and no lethal outcome happens.

Vortex technologies are based on physical principles of air flow vortex impact on barriers and semi-closed volumes to generate audible sounds. The geometry of setups to generate vortexes is simple, high-reliable, long-life, cheap. There are no special requirements to personnel. These devices can be developed as carried, stationary or moved by a transport. Main components of vortex generators including compressors and vortex diffusers are widely spread and there design is common.

These devices are also safe from the viewpoint of environment and influence on buildings and constructions. The constructions allow adjusting the main parameters to change the bio-physical level of impact.

Thus vortexes, generated by the proposed devices, are an ideal mean for crowd control at stadiums, transports, mass demonstrations and so on. There is no need for direct contact of police personnel with crowd. They are also useful to protect embassies and governmental buildings and even to withstand and localize criminal groups.

The application of vortex technologies are fully of humanitarian and peace-keeping character and highly effective during the conflicts and clashes, as even small possibilities of lethal outcome may escalate the conflict and cause the armed operations.

***Key words: crowd control, vortex technologies, bio-physical effect***