NEWEST PROTECTION OF ARMORED VEHICLES

United Nations Educational, Scientific and Cultural Organization

Junior Academy of Sciences of Ukraine

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Existing problem

Lack of reliable protection against high-precision weapons with ***I < 0,01 P,***
where ***I*** – the level of radiation of guidance systems,
P – the power of conventional rangefinders.

Purpose

Search for new protection opportunities armored vehicles from modern high-precision weapons.

Idea

Use of vulnerable (weaknesses) in high-precision weapon guidance systems:
- separation of signals from the target out of signals from other objects (obstacles),
- human factor.

The course of the study: materials and methods

<u>Stage 1.</u> Analysis of the peculiarities of the use of high-precision weapons guidance systems (Fig. 1) and means of counteracting them. The distortion of laser beam reflection is achieved through:
- surface roughness;
- refraction of light on the glass surface;
- different values of light absorption coefficient by metals (10^4 cm^{-1}) and glass (10^{-2} cm^{-1}).

Stage 2. Material modeling of armor using metal and glass (Fig. 2). Creating an uneven coating of materials from different optical properties.

Stage 3. Experiment (model, portable laser, receiver - mobile phone, lantern in strobe mode between fragments of coating): observation and comparison of results.

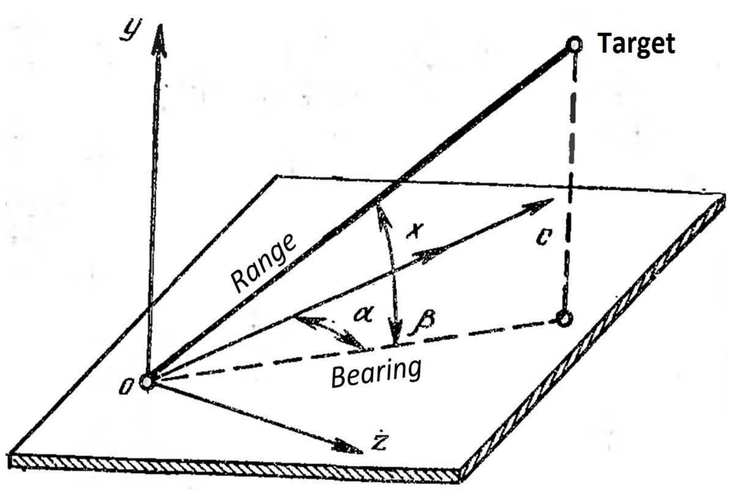

Fig. 1. Search for an object by the guidance system: α - bearing or azimuth, β - corner of the place (Fedorov, 1988).

Fig. 2. Armor model: metal sheet with broken glass (author's development).

Results

1. The greatest effect on models with small fragments of glass (Fig.3).

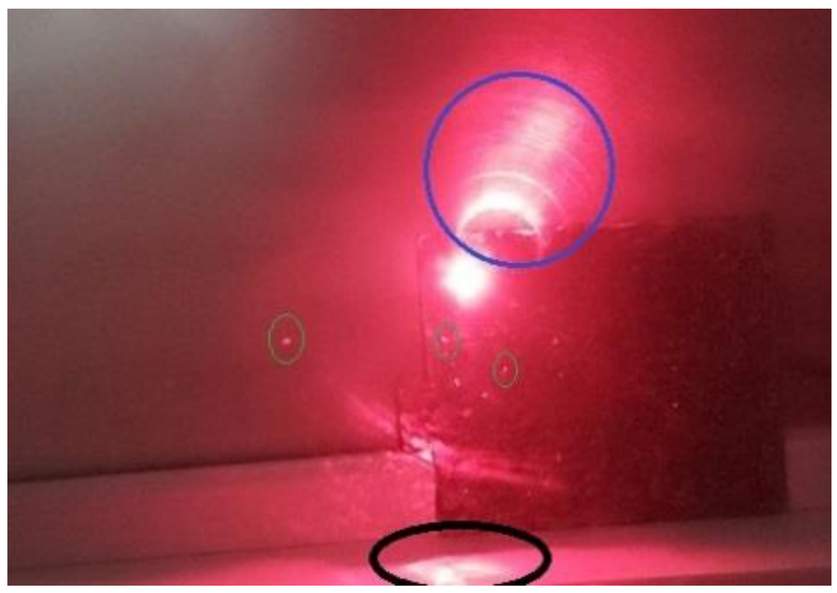

Fig. 3. Distortion of laser beam reflection (author's development):
- concentrated scattering behind (blue circle);
- intense reflection in front (black oval);
- chaotic points of intense reflection (green ovals).

2. Blindness by low-frequency flicker (Fig. 4).

Fig.4.Three frames of flicker (author's development).

Advantages of the project

Comprehensive counteraction to missile guidance systems:
- distortion of laser beam reflection;
- blinding of the operator in the optical range.

Conclusions

Theoretical positions of wave optics (diffuse reflection, refraction, and absorption of light) and medical studies of the Bucha effect became the basis for the creation of new means of protection of armored vehicles, which have shown their effectiveness.

Perspectives

- creating a sample of protection with using high-strength fiberglass material;
- measurement of the protective properties of such a sample in counteraction of the real high-precision laser weapons.

REFERENCE

Fedorov, B.F. (1988). Lazery. Osnovy ustrojstva i primenenie [Lasers. Basics of the device and application]. Moscow: DOSAAF. [in Russian].