ANALYSIS OF SCIENTIFIC STUDIES ON THE METHOD OF SHOOTING AT MOVING TARGETS

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Shooting training is one of the factors that determine the combat potential of military personnel. Therefore, military educators are obliged to do ongoing research on the teaching of shooting during the training process in military educational institutions in order to strengthen the fighting potential of military personnel.

The effectiveness of shooting depends on many parameters, for example: the rate of fire, the type of weapon, the type of trajectory, the distance to the target, the nature of the impact of the bullets on a certain target, the accuracy of the bullets, the combat condition of the weapon and the level of training of the shooter. It is considered high if the target is eliminated in the quickest length of time using the least quantity of ammunition. The degree of fire training of military personnel is critical for achieving a high level of fire efficiency. Effective shooting ability is influenced by a variety of criteria for military personnel. The target's movement in relation to the shooter -- forward, backward, and left, right -- is one of the most crucial of these. The reason behind this is that in combat scenarios, the opponent is always moving (e.g., walking, running). This makes hitting the target very difficult for the shooter.

Therefore, presently, it is necessary to carry out scientific research on the issues related to military personnel's training, experience, and improvement of abilities in accordance with the modern requirements.

A number of scientific research studies on the training of military personnel to fire at moving targets have also been conducted in other countries.

Researcher O.Y. Ilyakhina[1] in her scientific research discovered the indicators that determine the effectiveness of the process of training shooters to fire at moving targets. These include: precision aiming skills among gunners; good mastery of synchronization of breathing and aiming at moving targets; the ability to smoothly maintain the front sight while moving the weapon behind a moving target; the ability to aim and slowly press the trigger at the right moment. At the same time, the importance of completing each action accurately and with a high level of concentration, as well as having a solid understanding of the techniques for holding breath during the preparation and execution of shooting has been observed.

[1] Иляхина О.Ю. Модель тренировки стрелков из винтовки по движущейся мишени на основе синхронизации навыков дыхания и прицеливания: Автореф. дис. ...канд. пед. наук. – Санкт-Петербург: Белгородский государственный национальный исследовательский университет, 2020. – 5-6 с.

Another researcher, E.Y. Domrachyova[2], undertook her scientific study in order to empirically establish and create the technology of raising the quality of training with shooters at moving targets based on the gradual mastery of integrated movements, taking the following examples into account. The scientific novelty of the research consisted in the scientific justification and development of pedagogical technologies to improve the quality of training with shooters at moving targets based on the gradual mastering of a three-stage integrated movement.

Improving the quality of training shooters to fire at a moving target is one of the key aspects of the military training process, according to researchers E.Y. Domracheva and O.Y. Ilyakhina[3] A model was created to train shooters how to fire at a moving target in order to tackle this challenge. The capacity of shooters to aim at a moving target, the substance of the shooting skills development approach, and the activities of shooting instructors and athletes in training and competitions have all been proven to play a significant role in this model.

It can be seen from the work of the above scientists that it is necessary to pay attention to the issues of preparing military personnel for effective firing at moving targets from short distances.

A group of researchers O.S. Balandin, A.S. Nerubenko, Y.V. Vetrova, D.V. Oleynik[4] discussed the issue of ensuring the personal safety of law enforcement officers in situations involving the use of firearms.

Typically, shooters avoid firing at moving targets because the probability of reaching the target decreases and at distances greater than 400 meters, there is a significantly lower chance of hitting the target on the first shot. As a result, it is underlined that it is preferable to wait for the target to stop, even for a split second, and then shot as soon as the opportunity arises. This rule, however, does not apply in close-range encounters. This is due to the target's ability to flee and hide behind an obstruction, or to approach the person considerably closer.

Basic shooting manuals provide guidelines for shooting at moving targets, primarily those that apply to targets that are moving 90 degrees to the left or right. When firing at moving targets at long distances, targets moving fully forward or backward are of little importance. For targets moving diagonally to the left and right, it is sufficient to use half the value obtained for firing at targets in full motion.

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[2] Домрачёва Е.Ю. Технология повышения качества тренировочных занятий со стрелками из винтовки по движущейся мишени на основе поэтапного усвоения целостного действия: Автореф. дис. ...канд. пед. наук. – Санкт-Петербург: Белгородский государственный национальный исследовательский университет, 2020. – 5-6 с.

[3] Е.Ю.Домрачева, О.Ю.Иляхина, модель подготовки стрелков из винтовки по движущейся мишени. Ученые записки университета имени П.Ф. Лесгафта. – 2019. – № 3 (169). Ст 1-5.

[4] О.С. Баландин, А.С. Нерубенко, Ю.В. Ветрова, Д.В. Олейник Повышение эффективности обеспечения личной безопасности сотрудниками полиции в ситуациях с применением огнестрельного оружия / Вестник Санкт-Петербургского университета МВД России № 4 (80) 2018. 151-160 с.

A target that moves completely to the right and left has the most influence on the outcome of a given shot. The results of firing at their level are likewise influenced by targets moving obliquely in these directions. The visible presence of both arms is the easiest method to determine if someone is slouching obliquely. In a person moving perpendicularly, one arm is covered by the body, while in a person moving obliquely, the opposite arm is at least partially visible. Targets moving back and forth will further reduce firing time. Because, at short distances it is required military personnel to maneuver quickly when firing against moving objects. Therefore, to improve military personnel's ability to fire at moving targets, it is required to teach them employing improved moving target firing techniques.

D.I. Kozlov's[5] manual for training shooting at moving targets provides general information on making corrections for moving targets and crosswinds, based on the following assumptions:

- if the average wind speed is 4 m/s;
- if the shooting plane is at an angle of 90°;
- if the speed of moving targets is 3 m/s.

It is not possible or necessary to memorize the correction table values for all shots. In real-world battlefield conditions, the wind speed and direction, as well as the target speed, are determined by sight, and the shot is fired based on skill and experience.

Through his investigation, researcher A.V. Khrushchev[6] has produced the following results. The following was his finding after experimenting with the target's movement duration. 10 meters were covered by participants in the scientific experiment in an average of 2.2 to 2.5 seconds. In other words, the target is moving at 4 m/s. This means that firing requires fewer than 2 seconds inputting initial data, aiming, and firing.

The continuous change in the position of the moving target relative to the target complicates shooting, especially at high speeds, as the target moves to another place during aiming and firing, which leads to ineffective firing.

Khrushchev described two methods for firing at moving targets:

1. The shooter aims the gun at a point in front of the target, and the shot is fired when the distance between the shooting point and the targeted point is equal.
2. The weapon is moved in the direction of the target movement, and the trigger is slowly pulled without stopping the weapon's movement (holding the lead).

It is highlighted that when firing at moving targets, the following considerations should be made:

- the requirement for constant target monitoring;

[5] Козлов Д.И. Обучение стрельбе по движущимся целям. – М.: Воениздат, 1970.127 с.

[6] Хрущев А.В. Особенности обучения стрельбе по движущимся целям. «Научно-практический электронный журнал Аллея Науки» №8(24) 2018 Alley-science.ru

- taking into account the speed of movement;
- determining the expected impact point;
- paying attention to the speed of fire.

Picture 1. Target point

Target point:

1. At a distance of 20 m; aiming at the front shoulder of the target;
2. At a distance of 40 m; aiming at the outstretched arm;
3. At a distance of 60 m; aiming the opponent's pistol at the top.

The analysis of the research studies taken into account for this paper's analysis reveals that there are primarily two types of aiming methods for shooting at moving targets in the horizontal plane:

(1) the first is the method of firing ahead of the target's movement in that direction;

(2) the second is the method of following the target's movement and firing when it reaches a specific point.

In conclusion, it can be said that the attention to learning the methods of shooting at moving targets is very high around the world. This is effective in gaining experience in this direction and developing the field.