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CENTRAL INTELLIGENCE AGENCY
WASHINGTON, D.C. 20505

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6 November 1973

MEMORANDUM FOR: The Director of Central Intelligence

SUBJECT: MILITARY THOUGHT (USSR): The Improvement of Antitank Weapons

1. The enclosed Intelligence Information Special Report is part of a series now in preparation based on the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal "Military Thought." This article discusses the capabilities and limitations of existing Soviet antitank artillery, particularly the T-12 antitank gun, and makes suggestions for improvements. The primary innovation recommended is development of a self-propelled gun which can fire nuclear missiles and conventional rounds. This article appeared in Issue No. 2 (84) for 1968.

2. Because the source of this report is extremely sensitive, this document should be handled on a strict need-to-know basis within recipient agencies.

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William E. Nelson
Deputy Director for Operations

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DIRECTORATE OF OPERATIONS

Intelligence Information Special Report

COUNTRY USSR

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DATE OF INFO. Mid-1968

DATE 6 November 73

SUBJECT

MILITARY THOUGHT (USSR): Ways of Developing Antitank Artillery Weapons

SOURCE Documentary

Summary:

The following report is a translation from Russian of an article which appeared in issue No. 2 (84) for 1968 of the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal "Military Thought". The authors of this article are Engineer-Colonel N. Skvortsov, Colonel Yu. Sergeyev and Engineer Lieutenant-Colonel N. Korolkov. This article discusses the capabilities and limitations of existing Soviet antitank artillery, particularly the T-12 antitank gun, and makes suggestions for improvements. The primary innovation recommended is development of a self-propelled gun which can fire nuclear missiles and conventional rounds. Better night-firing devices and greater armor-piercing capability are also considered necessary.

End of Summary

[redacted] Comment:

Eng. Col. N. Skvortsov is a regular lecturer on military topics; he wrote an article on parts standardization in Tekhnika i Vooruzheniye, No. 6, 1966. Col. Korolkov is a military correspondent for Krasnaya Zvezda; in the 24 February 1972 issue he had an article on the Southern Group of Forces. No information has been found to firmly identify Sergeyev. Military Thought has been published by the USSR Ministry of Defense in three versions in the past -- TOP SECRET, SECRET, and RESTRICTED. There is no information as to whether or not the TOP SECRET version continues to be published. The SECRET version is published three times annually and is distributed down to the level of division commander.

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Ways of Developing Antitank Artillery Weapons

by

Engineer-Colonel N. Skvortsov, Colonel Yu. Sergeyev
and Engineer Lieutenant-Colonel N. Korolkov

As is known, armored troops are most suitable for conducting combat operations under modern conditions. For this reason, the task of combatting tanks will be one of the main tasks of a battle or an operation.

Tanks can be defeated by nuclear weapons, aerial bombing assault strikes, artillery, and the fire of tanks, and special antitank means in conjunction with antitank mixed minefields.

Without attempting an analysis of all the methods and means of combatting tanks, we shall examine the possibilities and ways of further increasing the combat effectiveness of antitank artillery means.

The permanent requirement confronting antitank artillery is the defeat of attacking tanks at the greatest possible distance from the forward edge, before they have reached their effective firing range. This substantially facilitates combatting them and increases the viability of antitank weapons and, at the same time, of antitank defense as a whole. In the future, the main combat tanks in the arsenal of the armies of the leading capitalist countries in the 1970's will combine guns and guided missiles. The United States has developed an experimental model of the M60A1E1 tank on which is mounted a 152-mm weapon with the capability both of launching the Shillelagh antitank guided missile at a range of up to three kilometers and of firing standard artillery munitions.*

If we consider the range from which individual tanks can effectively fire on antitank means and other individual targets during an attack, the likely distance the fire

*Foreign Military Affairs, 1967, No. 4

positions our antitank guns will be from the forward edge of our troops, and the nature of the terrain (line-of-sight conditions), it is possible to conclude that antitank guns must be able to reliably hit enemy tanks from a distance of up to 3500 meters. At present, only antitank guided missiles are able to combat tanks effectively at these distances. Tube artillery guns are ineffective at ranges of more than 1500 meters.*

Research by the Military Artillery Academy has demonstrated that the BS-3 100-mm guns are able to combat modern enemy tanks successfully only when they are in an oblique or flank position (from an angle of approach of no less than 30°). In this situation the guns achieve some superiority over enemy tanks that are within a firing range of under 1100 meters.

The T-12 100-mm antitank guns are able to hit enemy tanks regardless of their angle of approach. They achieve substantial superiority (a hit probability of at least 70 to 80 percent) over enemy tanks at a range of up to 1500 meters.

The principal reasons for the low effectiveness of fire of the BS-3 100-mm gun, and for the significant lowering of the effectiveness of fire of the T-12 100-mm antitank gun at ranges exceeding 1500 meters, are: the weak armor-piercing effect of the BS-3 shell at all ranges; the low armor-piercing effect of the T-12 armor-piercing sub-caliber shell at ranges over 1500 meters; and the low accuracy of fire at ranges greater than 1000 to 1500 meters.

The accuracy of fire of antitank guns is affected not only by design and ballistic factors, but also by the following: low accuracy in determining the distance to the target prior to firing; errors made in laying and in technical preparation; and failure to allow for weather and ballistics firing conditions when determining the amount of deviation of the projectile from the point of aim. The effect of the above factors can be decreased by equipping each gun with a combined rangefinder and sight, a device that determines the lead and corrections necessary for the firing conditions and that determines the deviation of the projectile from the point of aim after firing.

*The direct fire range of the BS-3 100-mm gun is 1100 meters; that of the T-12 100-mm antitank gun is 1080.

In addition, it is possible to increase the effectiveness of antitank gunfire at ranges over 1500 meters by increasing the muzzle velocity of the projectile. This can be accomplished by employing light gases (H_2,He, and others) together with the powder charge, or a mixture of them that has a substantially greater store of specific internal energy than powder gases at the same temperature.

However, one must realize that even when guns with high muzzle velocities are fired there will be errors in each round; this will make it difficult to fulfil the task of hitting enemy tanks with the first rounds at a range beyond two kilometers.

Antitank guided missiles are good antitank weapons, but they have a comparatively large "dead zone", which reaches 500 to 600 meters.

In light of the above, it appears advisable to create an antitank gun the barrel of which can be used to launch guided missiles. By employing conventional fragmentation or hollow-charge fragmentation shells and also by launching antitank guided missiles, this gun can hit open targets, personnel, fire means, and also tanks and other armored targets within all the required ranges. A high level of effectiveness is ensured when guided missiles with nuclear warheads are employed at the same time as guided missiles with hollow-charge warheads. Initially, the guidance system for guided missiles launched from a gun may be semiautomatic (in which the function of the gunner in guiding the missile is merely to match the aiming marks of the sight with the point of aim and to hold them in this position until the missile makes contact with the target); subsequently, it may be automatic (in which the function of the gunner is merely to match the aiming marks of the sight with the point of aim during launch.) Economy in the expenditure of munitions used to carry out tasks can be ensured by using conventional shells to hit targets within their capabilities and guided missiles only when necessary.

One of the most important characteristics of antitank missiles is their armor-piercing capability. The general

trend in tank-building in the major capitalist countries for the immediate future is to decrease the thickness of armor while sharply increasing the slopes of armor plating in the hull and turret, thus increasing the horizontal protective armor thickness to 300mm, and eventually to 500mm.

At present, only the hollow-charge fragmentation BKZ shell fired from a T-12 100-mm gun is capable of piercing armor that is 350mm thick. The other shells (with the exception of the antitank guided missile) are not able to do this. For this reason artillery shells (guided missiles) capable of piercing high-strength armor with a thickness of up to 500mm must be provided.

In the future, antitank guns must have the capability of engaging in aimed fire both by day and by night, as well as under conditions of poor visibility (fog, smokescreens, etc.). Our antitank guns are equipped with APN-5 night sights for use in firing at night. However, the use of these sights entails a number of difficulties. After firing, the mechanism that shields the sight from the flame of its own firing precludes observation through the sight for two to five seconds. Since, for example, the flight time of the BM1 and BM2 rounds fired from the T-12 100-mm gun at a range of 2000 meters is a total of 1.4 seconds, one can assume that the gunner will not be able to observe the results of the round for the purpose of making corrections in the following round. Also, these gun commanders have no special devices to enable them to observe the results of the round (when the area is not artificially illuminated) and they are consequently forced to use the night sight of the adjacent gun as an observation device. It is essential that gun commanders be furnished special devices that enable them to observe the battlefield and the results of firing under night conditions. Antitank guns must also be equipped with special devices that make it possible to engage in aimed fire when area visibility is obscured by a smokescreen or fog.

In view of the conditions under which combat with tanks is conducted, it is essential that antitank guns have an all-around fire capability. Since the gun is rotated by shifting the trails, it is not always possible to shift fire quickly against tanks that have great maneuverability. Existing models of antitank guns do not satisfy the

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requirement. Moreover, because of their great weight (3050 to 2680 kilograms) it is difficult for the crew to shift the guns by the trails to a different direction.

Towed antitank guns also do not fully satisfy modern requirements from the point of view of mobility and protection. In regard to maneuverability and mobility, artillery lags behind the motorized rifle and tank forces which are equipped with armored personnel carriers and tanks that are capable of engaging in combat actions in all types of terrain. The problem of improving the maneuverability and protection of antitank guns can best be solved by creating new self-propelled models that provide swift maneuverability on the battlefield even when roads are non-existent or impassable and when there is extensive devastation; decreased vulnerability and increased protection for the crew, equipment, and gun mechanisms from bullets, shell fragments, and the destructive effects of a nuclear burst; and better conditions for the automation of the loading process and the laying of the gun on the target.

Equipped with the appropriate devices, dual-purpose self-propelled antitank guns will be a highly effective means of combatting tanks.

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