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CENTRAL INTELLIGENCE AGENCY

WASHINGTON 25, D.C.

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MEMORANDUM FOR: The Director, Defense Intelligence Agency

SUBJECT : ARTILLERY COLLECTION: "Principles of Combat Utilization of Atomic, Heavy Rocket, and Missile Artillery in an Offensive Operation of an Army"

1. Enclosed is a verbatim translation of an article which appeared in Issue 46, 1958 of a Soviet Ministry of Defense TOP SECRET publication called Information Collection of the Artillery (Informatsionnyy Sbornik Artillerii).

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FOR THE DEPUTY DIRECTOR, PLANS:

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RICHARD HELMS

Enclosure

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Original: The Director, Defense Intelligence Agency

cc: Military Assistant to the President

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COUNTRY : USSR

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Following is a verbatim translation of an article entitled "Principles of Combat Utilization of Atomic, Heavy Rocket, and Missile Artillery in an Offensive Operation of an Army" which appeared in Issue No. 46, 1958 of the Soviet military publication Information Collection of the Artillery (Informatsionnyy Sbornik Artillerii). This publication is classified TOP SECRET by the Soviets and originates with the Artillery Headquarters of the Ministry of Defense. According to its preface, it is designed for generals and officers from commander of artillery of a corps, commanding officer of an artillery division (commanding officer of an engineer brigade), and higher. (See CSDB-3/648,696 for further details on the preface.)

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Principles of Combat Utilization of Atomic, Heavy Rocket, and Missile Artillery in an Offensive Operation of an Army

The extensive development of atomic weapons and means of using them, the increase in the power and range of modern means of destruction, together with the complete motorization and mechanization of troops, have resulted in drastic changes in both the nature and methods of organizing and conducting a modern offensive operation.

The utilization of atomic weapons in an operation makes it possible to develop it at high tempos and obtain decisive results in a shorter period. At the same time the zones of operations of troops are becoming wider.

The missions of troops in an operation and their methods of operations are determined not only by the goals of the operation, but also by the nature of the enemy's defense and the methods of operation of his troops in defense.

Defense, in the view of our probable enemies, will be established in different ways, often in greater depth than heretofore and in wider zones, with a considerable reciprocal distance between defense zones and positions. Troops in defense are dispersed both along the front and in depth, so the main forces very often will be located in the depth of the defense.

For instance, according to variants being worked out by the U.S. Army, the depth of the first zone of defense may reach 16-32 kms, and the depth of the whole tactical zone - 50-70 kms, with a corresponding increase in the depth of disposition of the reserves.

At the same time, reserves may be located in concentration areas outside the defense positions in readiness for counterattacks (a counterstrike) or for taking up defense in prepared zones (positions).

The enemy's artillery means of atomic attack, including missile launchers of the "Honest John", "Corporal", and "Redstone" types are echeloned in depth from 8-10 kms up to 100-120 kms.

On analyzing such defense, it may be concluded that it is based mainly on destroying an attacking enemy with atomic strikes followed by powerful counterattacks and counterstrikes.

It follows from this, that in order to ensure the carrying out

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of the tasks of an army in an offensive operation, it is essential to neutralize the enemy throughout the depth of his disposition, and first of all his means of atomic attack and armored troops, which are the foundation of counterstrike (counterattack) groupings.

The development and introduction of atomic, heavy rocket, and missile artillery permit this problem to be solved both during the period of artillery preparation for the assault and offensive and during the course of an offensive operation.

Atomic, heavy rocket, and missile artillery, armed with artillery systems of various ranges of fire and missiles with special and conventional charges, is capable of striking at enemy objectives located both in the immediate vicinity of our troops and in considerable depth.

The introduction into the composition of the artillery of new types equipped with atomic ammunition increases considerably its fire capabilities and raises its role in an operation to a still greater extent. Artillery is becoming capable of delivering mass atomic strikes and causing decisive defeat of the enemy in a short time by its fire, which ensures high speeds of an offensive and assures the troops of an army of attaining the goals of an operation in the shortest possible period of time.

In order to use these new artillery capabilities fully and effectively, it is essential for their operation to be correctly organized and supported in conformity with the decision of the combined-arms commander and with the missions of the artillery in the operation.

The organization of combat operations of artillery, especially that of atomic, heavy rocket, and missile artillery, in an offensive operation is a great, complicated and truly creative function of artillery commanders and staffs.

An especially complicated and responsible part of the work of artillery commanders and staffs is the immediate organization and carrying out by the artillery of atomic strikes.

Undoubtedly this work can be successful only if the technology of the new types of artillery, its combat capabilities, and methods of combat employment are thoroughly understood.

The present article deals with some basic principles of organizing

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the combat utilization of atomic, heavy rocket, and missile artillery during an offensive operation of an army. The aim of the article is to explain the method of work of artillery commanders (commanding officers) and staffs and to bring out basic data on which they should rely when planning and organizing the combat utilization of artillery.

Missions of Atomic, Heavy Rocket, and Missile Artillery in an Offensive Operation of an Army

In an offensive operation of an army the atomic, heavy rocket, and missile artillery may accomplish the following missions: destruction of enemy means of atomic attack, enemy storage depots and assembly shops for atomic ammunition, combat with his artillery and radar facilities, destruction and neutralization of manpower and fire means located in defensive positions (zones); destruction of reserves in concentration areas when they are being moved up for a counterattack (counterstrike) and at lines of deployment; destruction (neutralization) of enemy aircraft on airfields, and the disruption of the control of troops and of the work of the enemy rear.

During the course of the operation it may also support by its fire the commitment into battle of second echelons and reserves, the rapid forcing by troops of water lines from the march, the operations of troops during the encirclement and destruction of enemy groupings, and support the combat operations of airborne landing forces.

The main objectives for destruction by atomic and heavy rocket artillery may be the enemy's means of atomic attack and artillery, manpower and fire means in battalion centers and company defense areas, divisional reserves, command posts of divisions of the first echelon, radar centers and counterattack and counterstrike groupings of the enemy.

Heavy rocket artillery of type III may also be called upon for striking at corps reserves, corps command posts, depots and assembly shops for atomic ammunition, and the nearest airfields and objectives of the rear.

The most typical missions of missile artillery will be the destruction of long-range means of atomic attack, atomic ammunition depots and assembly bases located in the deep rear, the destruction (neutralization) of operational reserves in concentration areas and in loading and unloading places, of command posts of operational formations, destruction (neutralization or immobilization) of rail

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centers and railheads, seaports, and other installations of the operational rear.

During the period of preparation for an operation, atomic, heavy rocket, and missile artillery may carry out the mission of providing cover for the concentration, moving up, and deployment of troops of an army by destroying the means of atomic attack and artillery of the enemy. During that period the most important mission of the artillery will be its participation in the frustration of possible enemy counter-preparation.

Heavy rocket and missile artillery may carry out missions with warheads both with special and with conventional charges.

It should be borne in mind that when heavy rocket and missile artillery uses ammunition with conventional charges, it is not advisable to assign it the task of destroying an objective, as this would require a considerable expenditure of ammunition and of time, especially when firing at concealed targets.

Nevertheless, a mass and timely prepared fire by shells (missiles) with conventional charges may be very effective, especially when firing at personnel and equipment located in the open. It is advisable, and in many cases even necessary, to use these shells (missiles) to destroy the enemy's means of atomic attack, for instance, when it is not possible to neutralize them with atomic strikes.

The fire of heavy rocket and missile artillery with warheads with conventional charges on deeply located objectives acquires importance in circumstances when the operations of our aircraft are hampered by a well-organized enemy antiaircraft defense and artillery is in fact the only means of neutralizing the depth of the enemy's defense on behalf of the troops of the army and of neutralizing the means of antiaircraft defense on behalf of friendly aircraft.

When allocating missions (objectives for destruction) among atomic, heavy rocket, and missile artillery it is essential to take into account the exact tactical-technical characteristics of the systems (projectiles) of each of these types of artillery. In this, of determining significance will be the range of fire, dispersion characteristics, the yield of the atomic projectile available for a given system, and the time needed for preparing to open fire.

During the course of an operation great significance is acquired

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by the capacity of each type of artillery for maneuver and the time for preparing to open fire from new fire positions.

As it stands, tube atomic artillery possesses the greatest accuracy, but a relatively short range of fire, and needs less time to get ready to open fire (provided an atomic shell has been prepared beforehand and is available at the position or in the immediate vicinity). For this reason it should be used primarily for the destruction of enemy installationslocated near our troops and objectives of small size.

Heavy rocket artillery is not as accurate and to a certain degree not as quick in getting ready to open fire as tube artillery, but it surpasses it in range of fire, which gives it the ability to destroy the enemy throughout the tactical depth of the defense.

Missile artillery has a long range of fire and is capable of striking at the enemy throughout the depth not only of an army, but also of a front offensive operation. When determining its mission it is essential to take into account the comparatively high dispersion of missiles and their low maximum rate of fire.

A Brief Characterization of Probable Targets for Atomic, Heavy Rocket, and Missile Artillery

Planning for the combat utilization of atomic, heavy rocket, and missile artillery is carried out on specific enemy objectives, both for firing with atomic ammunition and ammunition with conventional charges. Planning for atomic strikes by artillery is especially important. It consists basically of the designation of enemy objectives to be destroyed by an atomic strike and the timing of its delivery, the allocation of objectives among atomic, heavy rocket, and missile artillery, the selection of an appropriate atomic charge (yield of the projectile), determination of the ground zero (epitsentr) of the burst and safe distance for friendly troops, type and height of the burst (for an air burst), and also the determination of expected enemy losses resulting from the atomic strikes.

The most important condition of correct planning of atomic strikes is a careful analysis of the objectives selected for destruction by atomic ammunition. The object of this analysis is to determine the characteristics of a given objective, which in turn will determine its degree of vulnerability to the action of the various destructive factors of an atomic burst, and in accordance with this, to select

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the necessary quantity and yield of atomic ammunition, fix the ground zero, type and height of burst (bursts), and time of delivery of the atomic strike.

To achieve this, it is necessary to know the nature, dimensions, and configuration of the objectives, their exact location, the nature of the terrain at the location of the objective, the nature and degree of engineer preparation, and the probable length of stay in the given area of disposition.

On the basis of the missions which are assigned to the atomic, heavy rocket, and missile artillery during an army offensive operation, its main objectives for destruction could be: the enemy's means of atomic attack, manpower and fire means in defense areas (strongpoints), reserves, command posts, important radar centers, airfields, rail centers, loading and unloading stations, supply points, warehouses, and other important objectives of the operational rear.

Let us examine briefly the characteristics of some of the most probably enemy objectives.

Atomic artillery, depending on its assigned missions, may occupy firing positions at a distance of 7-12 kms from the main line of resistance of friendly troops (203.2-mm guns - 7 to 9 kms, 280-mm guns - 9 to 12 kms).

Battalions (division) of atomic artillery, as a rule, occupy firing positions by battery. The intervals between batteries may be: in battalions of 203.2-mm guns - 800-1000 m; in battalions of 280-mm guns - 3 kms and above.

Battalions (or batteries) of free rockets of the "Honest John" type, before opening fire, are usually located in waiting areas set up at a distance of 3-11 kms from the firing positions. Firing positions (two-three and more) are set up in the zone of operations of an army corps (division), not nearer than 8 kms from the main line of resistance of friendly troops. As a rule, a battalion occupies an area of 1000 X 1500 m, a firing battery - 1000 X 600 m. A firing battery, operating independently, may occupy an area 1000 X 1000 m., a firing platoon (vzvod) acting independently of the battery - 500 X 600 m., and a firing section (sektsiya) - 200 X 600 m.

Launch sites of guided missiles of the "Corporal" type are set up in the defense at a distance of 40-60 kms from the main line of

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resistance. Taking into account the location of the radiotechnical equipment, the command post, the depot for charges, and the parking spaces for motor vehicles, firing batteries occupy an area of 1500 X 2000 m. Launchers and radiotechnical equipment for launch control are located in an area of about 1 km^2.

Subunits of atomic artillery and of launchers of the "Honest John" and "Corporal" types are usually located in waiting areas and occupy firing (launch) positions immediately before firing.

Firing positions of a battalion of guided missiles of the "Redstone" type, located at a distance of 80 kms and above from the main line of resistance occupy an area of not less than 4 kms^2.

Launch pads of "Matador" cruise missiles are located at a distance of 60-120 kms from the main line of resistance and occupy an area of up to 15 kms^2 (4-5 along the front, 3-4 kms in depth). The launching zone usually includes pads for launchers, storage areas for the cruise missiles, radar stations for guidance, and shelters for personnel. At a distance of 2-3 kms from the launching zone is a preparation zone measuring 1-1.5 kms by 1.5-2 kms, which includes pads for assembling and checking the cruise missiles, storage depots, etc.

Launch sites of "Nike" antiaircraft guided missile battalions include 4 firing pads and radar equipment positions. The site of a battery occupies an area of up to 1-1.5 kms^2 and is located at a distance of 10-20 kms from the main line of resistance and deeper.

The battle group in defense occupies an area of 3.6-5.4 kms along the front and 2.5-4.5 kms in depth, in which are located the company defense areas and fire means of the group (the latter as a rule outside the company defense areas).

The company defense area (company strongpoint) occupies an area of 1-1.5 kms^2 (1300 X 1000 m) and is provided with trenches, communication trenches, and shelters of the field type. The gaps along the front between company defense areas may reach 1000 m. The second line of company defense areas is set up at a distance of 3-4 kms from the first.

Divisional (divizionnyy) reserves (one or two battle groups, a tank battalion) are located at a distance of 15-25 kms from the main line of resistance each one in an area of 2-4 kms^2.

Corps reserves (an infantry or armored division-diviziya) are

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located at a distance of 50-60 kms, and army reserves (up to an army corps) - at a distance of up to 150 kms from the main line of resistance.

A division (infantry and armored) occupies an area of up to 100-150 kms^2 and is located in dispersed order by battle groups (battalions-batalon); the distance between them may reach 3-4 kms.

Concentration areas of reserves are usually provided with field-type installations (slit trenches, open trenches, blindages, etc.)

Command posts of divisions, corps and field armies are located in areas of 1-2 kms^2 having, as a rule, a high degree of engineer preparation. The distances of command posts from the main line of resistance are as follows: infantry divisions - 15-25 kms, army corps - 40-50 kms, field army - 90-120 kms.

Airfields occupy large areas. Their size reaches 12-16 kms^2 for fighter-bomber aircraft. Aiming at dispersal, the Americans propose to base not more than 1-2 squadrons on each airfield. As a rule an airfield has a runway, squadron aircraft stands at a distance of 2-2.5 kms from each other, shelters for personnel, storage depots for fuel and lubricants (goryucheye i smazochnoye maslo -- GSM) and ammunition. The data given in brief analyses (kharakteristika) of objectives certainly do not give the exhaustive target analysis which is carried out during the planning of artillery fire. In each concrete case a number of other questions may arise which are of importance for assessing a given target as an objective for an atomic strike.

After the analysis of the objective it is possible to determine all the necessary data for destroying it by an atomic strike.

Choice of Atomic Ammunition for Destroying Enemy Objectives

The required yield of an atomic charge is determined according to the nature and dimensions of the target, the required degree of destruction of the target, and also by the accuracy of fire of the system designated for destroying a given target (the dispersion and accuracy of preparation for firing).

It is always necessary to strive for achieving certain destruction of the target with one shot.

Determining the required yield of an atomic charge for the certain

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destruction of a small (point) target with one shot may be carried out by the following means:

1. Work out the required radius of the destruction zone R_{ZN} (zona porazheniya) of an atomic burst which would ensure the certain destruction of the target with one shot, by the following formula:

$$R_{ZN} = 3 V_p \qquad (1)$$

Where V_p is the greater calculated probable error: Vd_p or Vb_p (if $Vd_p > Vb_p$ then $V_p = Vd_p$; if $Vb_p > Vd_p$ then $V_p = Vb_p$)

The degree of probable error is determined according to tables drawn up for the particular type of shell (missile) or according to the formulae:

$$Vd_p = \sqrt{Vd^2 + E_D^2} \qquad (2)$$

$$Vb_p = \sqrt{Vb^2 + E_D^2}$$

2. By the size of the required radius of the destruction zone R_{ZN} one determines the necessary atomic charge required for the size and nature of the target, by using the Manual on the Combat Properties of Atomic Weapons, figures 114, 115, 116, 117 or previously prepared tables (Table 1).

Characteristics of Zones of Destruction for Shells with Special Charges (for air burst).

TARGETS	Yield of projectiles in thousand T.					
	7	10	15	20	30	40
Personnel in the open	1.35 / 5.72	1.50 / 7.06	1.60 / 8.04	1.85 / 10.75	2.10 / 13.85	2.30 / 16.61
Personnel in trenches	0.82 / 2.11	0.90 / 2.54	1.00 / 3.14	1.10 / 3.80	1.25 / 4.91	1.35 / 5.72

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Personnel in tanks	0.68 1.45	0.74 1.72	0.83 2.16	0.90 2.54	1.00 3.14	1.10 3.80
Personnel in blindages	0.38 0.45	0.44 0.61	0.49 0.75	0.54 0.92	0.60 1.13	0.65 1.33
Personnel in shelters	0.32 0.32	0.36 0.41	0.40 0.50	0.44 0.61	0.50 0.78	0.56 0.98
Heavy & medium tanks & assault guns	0.38 0.45	0.43 0.58	0.50 0.78	0.54 0.92	0.60 1.13	0.68 1.45
Light tanks and artillery	0.48 0.72	0.54 0.92	0.60 1.19	0.68 1.45	0.78 1.91	0.85 2.27
Trucks	0.98 3.02	1.10 3.80	1.25 4.91	1.40 6.15	1.60 8.04	1.75 9.62

Notes: 1. In the numerator - the radius of the zone R_{ZN} (in kms)

2. In the denominator - area of the zone S_z (in kms^2)

3. The table is made up on the basis of graphs contained in the Manual on the Combat Properties of Atomic Weapons.

Example. Target - an atomic cannon. Determine the yield of the atomic charge required for the destruction of the target with one shot, if the accuracy of fire is characterized by probable errors V_{dp} = 0.2 kms, and V_{bp} = 0.25 kms.

Solution.

1. Since $V_{bp} > V_{dp}$ then $V_p = V_{bp} = 0.25$ kms.

2. We substitute $V_p = 0.25$ kms in formula (1) and determine $R_{ZN} = 3.0 \cdot 25 = 0.75$ kms.

3. By size $R_{ZN} = 0.75$ kms we consult Table 1 and determine that the required atomic charge is $q_N = 30{,}000$T.

1. [redacted] Comment: These formulas use both the Cyrillic and Roman alphabets. Transliterated Cyrillic letters are underlined. For an explanation of these terms, see Department of the Army Technical Manual TM . 30-544, appendix II.

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