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CENTRAL INTELLIGENCE AGENCY
WASHINGTON, D.C. 20505

19 January 1978

MEMORANDUM FOR: The Director of Central Intelligence
FROM : John N. McMahon
Deputy Director for Operations
SUBJECT : MILITARY THOUGHT (USSR): Operational
Calculations for the Use of Nuclear Weapons

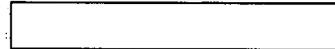
1. The enclosed Intelligence Information Special Report is part of a series now in preparation based on the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal "Military Thought". This article describes in general terms the types of calculations involved in the use of nuclear weapons and how and by whom they are performed. The author makes a distinction between operational and special calculations and suggests that the time spent on them could be reduced by using summary tables, display panels and computers, and by setting up special staff groups to handle calculations on nuclear weapons use. This article appeared in Issue No. 1 (77) for 1966.

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. For ease of reference, reports from this publication have been assigned

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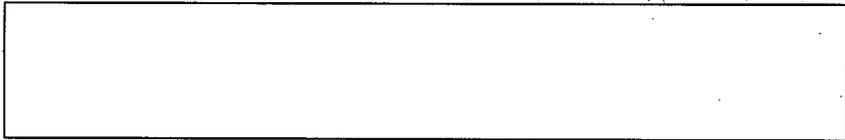
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Intelligence Information Special Report

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COUNTRY USSR



DATE OF INFO. Early 1966

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SUBJECT

MILITARY THOUGHT (USSR): Operational Calculations for the Use of Nuclear Weapons

SOURCE Documentary



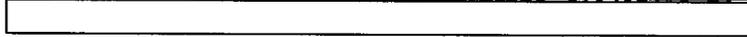
Summary:

The following report is a translation from Russian of an article which appeared in Issue No. 1 (77) for 1966 of the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal 'Military Thought'. The author of this article is General-Mayor P. Aitukhov. This article describes in general terms the types of calculations involved in the use of nuclear weapons and how and by whom they are performed. The author makes a distinction between operational and special calculations and suggests that the time spent on them could be reduced by using summary tables, display panels and computers, and by setting up special staff groups to handle calculations on nuclear weapons use.

End of Summary

Comment:

The SECRET version of Military Thought was published three times annually and was distributed down to the level of division commander. It reportedly ceased publication at the end of 1970.



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Operational Calculations for the Use of Nuclear Weapons

by

General-Mayor P. ALTUKHOV

The adoption of a decision on the use of nuclear weapons and the planning and execution of nuclear strikes involve the necessity of performing a large number of calculations. These usually are subdivided into operational or operational-tactical and special (technical).

The operational calculation is a rough calculation based on the average norms of the requirement in forces and means for hitting the main enemy targets. It is based on a comprehensive analysis of the targets of destruction, the combat properties of nuclear warheads, the tactical-technical characteristics and combat capabilities of the means of delivering them to the target, and on an analysis of the conditions of the employment of nuclear weapons and of the possibility of opposition on the part of the enemy. Such a calculation usually is performed by the operations directorate (department) of the staff of the front (army). However, if necessary, it can also be done personally by the commander or the chief of staff.

The special (technical) calculations are done by the appropriate chiefs of branch arms and special troops and by the commanders of the missile, air, and technical large units, units, and subunits. They usually are required for refining some of the data of the operational calculation and in the process of the immediate preparation of each nuclear strike against targets on the basis of the decision of the commander of the front (army).

In speaking of the roughness of operational calculations, one must not consider them purely approximations. In order to ensure the effective use of nuclear weapons, the calculations must be maximally precise, simple, and convenient to use.

The volume of operational calculations will depend primarily on the scale of the employment of nuclear weapons in the operation and on the conditions of the situation.

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The experience of scientific research games conducted in the General Staff Academy in 1964 to 1965 shows that the total number of enemy targets to be hit at the time of the first nuclear strike, as this applies to the Western Theater of Military Operations, will be approximately around 280, and sometimes more. According to the distance from the national frontier, they may be distributed in the following manner: for the distance up to 30 kilometers, 18 to 21 targets; from 30 to 100 kilometers, about 80 targets; from 100 to 250 kilometers, 98 to 101 targets; from 250 to 500 kilometers, 78 to 80 targets and up. These data testify that it is impossible to hit all the targets in the zone of the front with one strike or with nuclear weapons alone. It will be necessary, on the basis of the importance of the targets and the possible time of their commitment to action, to establish a definite sequence for the delivery of strikes on them with nuclear weapons, for the use of conventional weapons, as well as for the actions of troops. Besides that, it is necessary to take into account the expected enemy opposition and the results of the use of nuclear weapons and other means according to the plan of the higher level: for a front, the results of employing the Strategic Rocket Forces and Long Range Aviation and, sometimes, also naval forces; and for an army, the results of employing the rocket troops and aviation of the front and, in many cases, also strategic means (especially for a tank army). Therefore, in respect to these means, it is necessary to know in advance the strike targets, the number and yield of the nuclear warheads to be employed, the types of bursts, and the time of the strikes. As for the expected results, they can be calculated personally by the commander and staff of the front (army) or given out by the higher command-staff level, especially when surface nuclear bursts of high yield are to be employed. To ensure the secracy of preparation of the strikes the higher staff can limit itself to only the data about targets in the zone of the front (army) which are to be hit according to its plan and about what results are expected. But in this case the operational calculations will be incomplete and the planning of the use of the forces and means of the front (army) will be encumbered.

In principle, to make a well-founded decision on an operation, it is necessary for the commander to: assess the enemy capabilities and determine the time of commitment to action of the various forces and means of the enemy; calculate his own capabilities for hitting enemy means of nuclear attack, aviation on airfields, groupings of ground forces, control posts and means, air defense forces and means, and important rear installations cumulatively for the whole period of conduct of the operation and for the fulfilment of the immediate and subsequent tasks with due regard for the arrival time of nuclear warheads; determine the tasks for nuclear weapons and the possible sequence of employing them (in the initial

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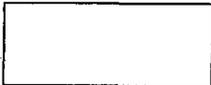
nuclear strike, during fulfilment of the immediate and subsequent tasks); distribute the allocated number and the yields of nuclear warheads according to tasks; determine the means of delivery in accomplishing each of the tasks of the operation and establish the procedure for using them; distribute the available nuclear warheads according to targets and types of delivery vehicles; determine the types of nuclear bursts; organize cooperation among the various delivery vehicles, nuclear strikes, and troop actions; and stipulate the measures to ensure the safety of his own troops.

In connection with this, we should like to say the following. In our view, the requirement that the commander personally determine the targets // of destruction, the yields of nuclear warheads, the types of bursts, and the means of delivering the nuclear warheads by no means implies that he must actually perform all the operational and technical calculations himself. In this work a large role goes to the staff of the front (army) and primarily to the operations directorate (department), the chief of rocket troops and artillery, and the commander of the air army. Therefore, for timely performance of the necessary calculations pertaining to the use of nuclear weapons, the staff and the indicated persons responsible must know the content of the task received and the general outlines of the possible concept of the operation. They can be familiarized with this as soon as the commander of the front (army) clarifies the task and determines the procedure of work to prepare the operation. Only under such conditions can one speak of the possibility of preparing the necessary calculations for making a decision and planning an operation.

Another question arises: How is such a large volume of calculations to be performed in a short time?

Some calculation tasks, which have been spoken of above, can be fulfilled with the aid of the Reference Manual for Calculating the Destruction of Targets with Nuclear Weapons and Assessing the Radiation Situation and a special rule and other instruments.

In war games in the General Staff Academy, for instance, they have used tables for determining the yield of nuclear warheads necessary for hitting enemy targets, the P-1 chart for assessing the effectiveness of nuclear warheads, and a chart for determining the extent of damage to enemy targets by operational-tactical missiles with nuclear warheads, etc. But use of the reference manual and charts ensures quick preparation and analysis of data for making a decision only on the employment of single and grouped nuclear strikes. As far as making a decision on the employment of nuclear weapons in the operation as a whole and planning and delivering



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massed nuclear strikes are concerned, it is nearly impossible with the aid of this kind of reference materials to prepare the necessary calculations in a short time, since their use requires the performance of a mass of individual computations, which increases the time required for the work and hinders the selection of the optimum variant of the decision with due regard for the extent of enemy opposition during the accomplishment of any one task.

Therefore, these tasks can now be accomplished more successfully with the availability of preprepared summary tables presented on paper or specially prepared boards (display panels).

The summary table on damage to enemy targets can be worked out both overall for all types of targets and separately for each group -- means of nuclear attack, a grouping of armored (tank) and infantry (motorized infantry) troops, control posts and means, aviation on airfields, air defense forces and means, and rear installations. In a group of targets, the most characteristic ones (Sergeant or Pershing battalions, motorized infantry and tank divisions, corps or army command posts, etc.) are singled out, opposite each of them is made a calculation of the most advantageous degree of damage, and the number and yield of nuclear warheads required for this are correspondingly determined.

The table also indicates what type of delivery vehicle it is advisable to employ when hitting this or that target on the basis of its characteristics (mobile, stationary, point-type, linear, or area target, extent of coverage by air defense means, etc.). Such calculation data the staff of the front (army) can constantly refine and work over in peacetime, using calculating equipment and taking into account the available means of destruction and the new ones coming into service, and the changes in the strength of forces and the nature of targets of the probable enemy. In this connection, each staff must in advance prepare not abstract data on the destruction of enemy targets, but data applicable to the tasks which may confront the formation in the event war breaks out, taking into account the possible opposition on the part of the enemy.

It is necessary for the commander and staff to have constantly with them the reference data which characterize the position, condition, and capabilities of their own and the enemy's troops and permit the necessary operational calculations for the use of nuclear weapons, other means of destruction, and troops to be performed quickly. Therefore, their work spaces must be equipped with special display panels on which are represented all the enumerated data, depending on the availability and

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arrival of nuclear warheads and the specific tasks confronting the troops of the front (army), and on which the readiness status of the available nuclear weapons delivery vehicles are also represented.

With the adoption of a decision the staff of the front (army) carries out more detailed planning of the use of nuclear weapons; it refines the main and alternate targets of nuclear strikes during the fulfilment of each task and the necessary degree of damage to them; the number and yield of nuclear warheads required to achieve the intended degree of damage to each target; the types of nuclear bursts and the sequence and times of delivery of nuclear strikes or of readiness for them; who is charged with the accomplishment of the tasks of hitting the intended targets; the number and yield of nuclear warheads which it is necessary to allocate to armies (divisions) and what to leave in reserve; the procedure for reconnaissance and final reconnaissance of the targets of destruction; measures to ensure the safety of their own troops, and other matters.

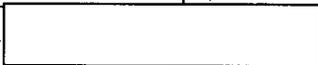
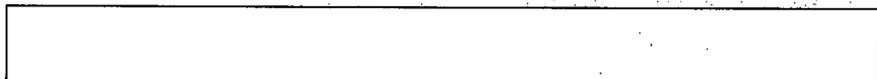
The main executor of this work is the operations directorate (operations department), all officers of which must know how to perform all the necessary calculations. However, regardless of this, in our opinion it is necessary to have within the operations directorate (department) a special group of officers whose main duty is to collect and process all the data connected with the use of nuclear weapons. Naturally, representatives of the staffs of the rocket troops and artillery, the air army, as well as officers of other directorates (departments) may take an active part in the solution of these questions.

The methods of performing the calculations will depend chiefly on the availability of time. At the present time the calculation tasks are accomplished not only with the aid of the various types of reference tables, rules, and charts which were mentioned above, but also with the use of calculators and electronic computers.

Acquiring great importance, therefore, is the development of methods of accomplishing integrated calculation tasks which would permit issuing recommendations based not only on the capabilities of the nuclear warheads and the general characteristics of the means of delivering them to targets, but also on an estimate of such elements as enemy opposition, the conditions of combat actions of the various forces and means participating in the accomplishment of the operational task, etc. One of

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As for analysis of the data of the radiation situation and determination of the possible effect of radiation contamination on personnel, these tasks, in our opinion, are satisfactorily accomplished with the aid of existing tables.

The degree of damage to enemy targets. The degree of damage to each of the groupings of troops and individual installations of the enemy will be determined on the basis of their operational importance under the specific conditions of the situation, their ability to withstand nuclear bursts, and the possibilities of restoring combat effectiveness after the delivery of nuclear strikes against them. Therefore, it is important each time to establish what it is advantageous under the given conditions to take as a criterion of the achievement of the determined degree of damage to targets -- personnel or technical means.



Enemy means of nuclear attack unquestionably must be hit with a high degree of reliability. This being the case, it obviously will be advisable to make the calculation for damage to the personnel servicing these means and simultaneously to the launchers (guns) and technical means of support. Serving as the justification for this is the fact that the loss of the main part of the crew with simultaneous damage (even though incomplete) to the materiel makes a given missile system combat ineffective, and the enemy will not have enough time to restore it given the high rates of advance of our troops, since the siting areas of the missile units, and especially of atomic artillery, are located at a relatively short distance from the line of armed contact of the sides. Besides that, when calculating for the damage to personnel, the yield requirements for nuclear warheads are reduced roughly two- to threefold. The degree of damage to personnel, as calculations show, must reach 80 to 90 percent.



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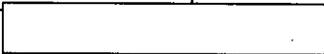
As for the groupings of combined-arms large units of the enemy, it is necessary to deliver a strike first against those divisions which at the moment can affect the fulfilment of the next task of the front (army). Constituting an exception are the large units and units positioned near areas of an intended landing of airborne or amphibious landing forces, which must be hit as first-priority targets.



Having great importance is an estimate of the time the enemy will require to restore the combat effectiveness of troops subjected to nuclear strikes. Thus, let us say, if an equivalent strike is delivered against divisions positioned in the first echelon and in the reserve of an army group, then they supposedly should incur approximately equal losses and their combat effectiveness will be reduced to an equal extent. However,



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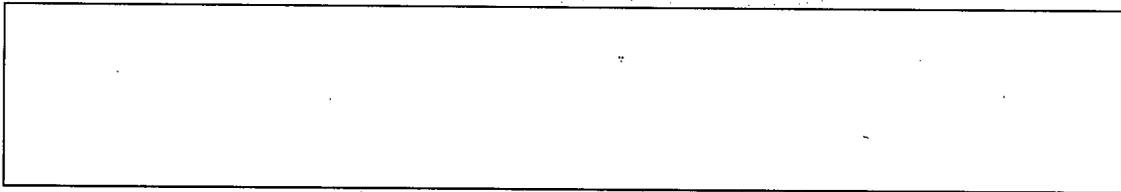


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each of them will offer opposition to the advancing troops of the front (army) quite differently -- the division which was in the first echelon will offer less, that which was in the reserve of the army group, more.

As we have already said, when deciding the question of the degree of damage to troops it is important to determine correctly what to take as the criterion -- personnel or combat equipment and weapons. Thus, for instance, let us take the radius of the zone of medium damages to tanks by the shock wave of the low-altitude air burst of a nuclear warhead with a yield of up to 500 kilotons and a 50 percent probability of destruction. Let us compare it with the distance from the ground zero of a burst at which tank crews will get a cumulative dose of 200 roentgens of penetrating radiation, with losses in combat effectiveness of up to 50 percent during the first day. We will see that the radiuses of damage to tank crews considerably exceed the radius of the zone of damages to the tanks themselves. For low-yield warheads (around eight kilotons) this excess will be approximately three- to fivefold. Consequently, as the criterion of the degree of damage to this or another division, it is necessary to take personnel; for, left without crews, combat equipment is no obstacle to advancing troops. In view of this, it obviously will be adequate to plan a degree of damage to first-echelon divisions of not more than 50 to 60 percent, and to army corps and army reserve divisions of up to 60 or 70 percent.

Such are a few of our observations about operational calculations for the use of nuclear weapons. Undoubtedly, they need further working out and testing in practice in the work of staffs.



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