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MEMORANDUM FOR: The Director of Central Intelligence

FROM : William W. Wells
Deputy Director for Operations

SUBJECT : MILITARY THOUGHT (USSR): Engineer Support for the Movement of Strategic Reserves from the Interior of the Country to a Theater of Military Operations and Their Commitment to an Engagement

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 examines the organization and conduct of the engineer support measures required at various stages of a long-distance movement of strategic reserves and their subsequent commitment to an engagement. The author emphasizes the need for advance preparation of the routes of movement and crossings over water obstacles, as well as advance planning of measures to be undertaken in a nuclear warfare situation. The engineer support of missile and missile technical units is characterized as a most important activity. This article appeared in Issue No. 3 (76) 1965 [redacted]

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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 [redacted]

[redacted]

William W. Wells

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SUBJECT

MILITARY THOUGHT (USSR): Engineer Support for the Movement of Strategic Reserves from the Interior of the Country to a Theater of Military Operations and Their Commitment to an Engagement

SOURCE Documentary

Summary:

The following report is a translation from Russian of an article which appeared in Issue No. 3 (76) for 1965 of the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal "Military Thought". The author of this article is Colonel General of Engineer Troops A. Tsirlin. This article examines the organization and conduct of the engineer support measures required at various stages of a long-distance movement of strategic reserves and their subsequent commitment to an engagement. The author emphasizes the need for advance preparation of the routes of movement and crossings over water obstacles, as well as advance planning of measures to be undertaken in a nuclear warfare situation. The engineer support of missile and missile technical units is characterized as a most important activity which includes preparing roads, siting areas and helicopter landing strips, and providing camouflage. Other aspects examined include engineer forecasting methods, the calculations required for planning, and reconnaissance activity.

End of Summary

[redacted] Comment:

The author was identified as Chief of the Military Engineering Academy of the Ground Forces from 1961 until 1969. He also wrote "Engineer Support of an Army Defensive Operation" in Issue No. 3 (85) for 1968 [redacted] and "Engineer Support in Negotiating Water Barriers at a Rapid Pace" in Issue No. 1 (62) for 1962 [redacted]

[redacted]

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Engineer Support for the Movement of Strategic Reserves from the Interior of the Country to a Theater of Military Operations and Their Commitment to an Engagement

by

Colonel General of Engineer Troops A. Tsirlin

The conduct of present-day offensive operations to the depth of the entire continental portion of a theater of military operations is inconceivable without the continuous buildup of the efforts of the formations and large units of the various branches of the armed forces, including the ground forces, participating in the operation. The ground forces groupings of the first strategic echelon deployed in advance, for example, in the European Theater of Military Operations, will be reinforced first of all by moving strategic reserves forward from the interior of the country and committing them to the engagement.

Under present-day conditions, organizing and carrying out the movement of large operational formations to the areas of combat actions, improving the methods of providing all-round support, and especially engineer support, for the movement of troops from the interior of the country and their subsequent commitment to the engagement, are questions of the highest importance.

At present, and as corroborated by the experience of many command-staff exercises, the principal method of moving troops over long distances has become movement under their own power by road, using organic means of transportation. The increased scope and rates of speed in regrouping troops from the interior and the growing role of marches have imposed new and unprecedentedly high demands on engineer support for troop movements.

To ensure the movement forward of strategic reserves from the interior of the country to the anticipated areas of military actions and their timely commitment to the engagement from the march, it will be necessary, in advance and in peacetime, to undertake engineer preparation of their zones of movement and areas of commitment to the engagement. The basic engineer measures are organized beforehand by forces and means of the Center, of the military districts, and of the Warsaw Pact countries. But the troops themselves must undergo appropriate prior training in accomplishing extended marches while preserving their combat effectiveness to the maximum so as to participate when necessary in engineer operations

on the routes of movement.

The number of routes of movement for operational formations moving over long distances is determined on the basis of the following needs: two or three through routes (including one alternate) for each first-echelon division; one or two through routes for the missile units, missile large units, and army control posts; and two or three through routes for the front. In total, an army may require five to seven principal through march routes and a front may require 12 to 17 (when there are two armies in the first echelon). These figures have been corroborated by the experience of the troop exercises and command-staff games conducted in recent years in various military districts. In addition, we must prepare lateral routes to support troop maneuvering, particularly when negotiating zones of radioactive contamination, nuclear barriers, and water obstacles, and also routes in the probable rest areas for the troops. The overall length of the roads, for example, when moving a front-line operational formation a distance of 1,300 to 1,500 kilometers, may amount to approximately 30 to 40 thousand kilometers.

An analysis of the condition of the road network reveals that in the zone of advance in the European Theater of Military Operations it is possible to select the required number of routes. However, in most cases there are no dirt roads alongside the principal hard-surface axial roads over which individual through movement of wheeled and tracked vehicles can be organized during the march. Furthermore, axial routes, as a rule, go through major population centers and road junctions which frequently have no bypasses.

Upon evaluating the conditions and capabilities of the troops to cross the numerous water obstacles, it should be noted that the existing number of bridges and crossings also does not fully correspond to the needs of the troops when they are moving up from the interior. Exercise experience has shown that on all routes across water obstacles 80 to 100 meters wide, or wider, it will be desirable to have, in addition to the permanent bridges, approximately the same number of alternate and parallel bridge crossings.

In our opinion, instead of constructing additional permanent bridges which the enemy can discover beforehand and destroy, we should give preference to preparatory measures which will allow us to prepare parallel crossings while the troops are moving up. One of the possible alternatives is to use various barges and obsolete types of pontoon bridge sets while teams are being trained to lay floating bridges and build composite bridges.

Providing crossings will acquire greatest importance at the beginning of war. The overall requirement for crossing and bridging means, including pontoon bridge sets, in order to ensure the forward movement of troops will increase drastically, since at the beginning of war a considerable number of the bridges will be destroyed. At the same time, there will be a requirement to quickly restore the crossings and set up new ones for the purpose of maintaining the vital activity of the national economy. This task may be accomplished in short periods of time by civil defense organs and units, which should be trained for this in peacetime.

A detailed study of the hydrography, a forecast of the possible conditions of the engineer and radiation situation, and a calculation of the composition of the troop groupings to be established for the offensive will allow us to determine the probable requirements in crossing means and pontoon bridge units which will have to be deployed on the given operational or strategic axes. In addition, we must make provisions for a certain reserve of pontoon bridge sets to fully equip the troops of the first strategic echelon during the war.

In our view, and as has been borne out by the experience of military districts and groups of forces, in advance preparation of the zones of forward movement of reserves from the interior of the country, the following basic measures must be carried out: to select and reconnoiter, in accordance with the possible variants of the forward movement of troops, the through axial march routes from the permanent deployment or mobilization expansion sites to the concentration areas, and also the lateral roads; to repair and rebuild existing roads, bridges, and road installations and sometimes to build new ones; to prepare dirt roads parallel to the principal improved axial routes and take this into consideration when constructing new roads; to prepare bypasses around vulnerable installations and also to prepare access roads to probable troop rest areas, crossings, and railroad stations; to select halt and rest areas for advancing troops in areas which are remote from possible targets of enemy nuclear strikes and where the terrain offers camouflage and protection; to maintain the principal axial roads and all types of crossings (bridge, ferry, barge, ford, and, for tanks -- underwater) in good working condition; and to carry out preparatory measures for road maintenance during the forward movement of troops.

Considering that the enemy will probably set up nuclear mine barriers, we must reduce the effect of enemy action against our troop movements as much as possible by carrying out the above-mentioned measures in advance. We must concentrate most of our attention, as shown by the experience of

command-staff exercises and military research games, on finding methods of supporting the negotiation of major water obstacles under conditions of radioactive contamination of terrain and destruction of bridges, or methods of supporting the negotiation of mountainous areas; and we must also concentrate on the advance training of the troops who will have to move over long distances, to negotiate these barrier portions of the terrain using independent actions.

Measures for the advance preparation of transportation lines in the interests of supporting the movement of troops over long distances can be accomplished successfully through the joint efforts of troops and civilian organizations in accordance with a common plan. Therefore, plans for the development of the road network of the rayons, oblasts, and republics through whose territory troop movements may be carried out, to also include the territory of the socialist countries, should approximate wartime requirements to the maximum degree possible.

In the staffs of military districts it is most important to have and systematically keep up maps on the status and development of the transportation lines (on a 1:200,000 scale, and a larger scale on individual water obstacles). All of the problems of road support, particularly of maintaining roads and preparing parallel crossings during troop movement, must be resolved in detail in the military districts in peacetime and must be coordinated through the General Staff with the Warsaw Pact countries.

However, although the prior preparation of the zones of advance is very important, it does not solve all the problems of engineer support for troops on the march. As a result of enemy nuclear strikes against important installations, transportation lines and troops in the zone of advance of strategic reserves, it may be necessary to prepare new routes and crossings or carry out large-scale restoration operations along previously designated and prepared routes.

The staff of the operational formation moving forward will organize support for the transfer of troops to the zone of combat actions. However, the staffs of the military districts from whose complement reserves are drawn, or through whose territory reserves move forward, must participate directly in this support, as will also the staffs of the armies of friendly countries. Upon receiving the directive for the move forward, the chief of engineer troops of the front or army will refine the engineer support plan worked out in peacetime. At this time it will be extremely important to obtain timely data on the condition of the zone of advance from engineer

troops of the country through whose territory the operational formation will advance and from the chief of engineer troops of the front operating forward, and it will also be important to carry out engineer reconnaissance of the zone of advance with forces of the front, armies, and combat large units.

We must not forget that, simultaneously with this, the chief of engineer troops is obligated to direct the deployment and full mobilization of engineer units and large units, to supply engineer equipment and ordnance to the troops from depots and the national economy, and to carry out other measures.

Close support for the movement of troops on the march to the entire depth is carried out by the forces and means of the advancing troops using routes prepared in advance.

Engineer support for the movement of units and large units of front or army subordination having only engineer units deployed according to the peacetime table of organization is a very complex and difficult task. Only individual engineer subunits can be allocated for this purpose; in actual practice a front and armies will be able to prepare only one or two routes for the rocket troops and control organs using their own forces. Therefore, in peacetime it will be necessary to have a certain number of engineer units in constant combat readiness on certain axes and to reduce the time required to fully mobilize deployed engineer units and large units.

At the initiation of forward movement, when there is present in the armies or in the front the full complement of engineer units and large units deployed in accordance with their wartime table of organization, six to eight routes on the average may be prepared using their forces in the zone of advance. In a complex situation, combined-arms large units will be reinforced by the engineer forces of the armies or the front, or the latter may take upon themselves the accomplishment of the most important measures.

Before the movement of the troops begins (if possible, two to three days beforehand), engineer subunits from units and large units of army and front subordination equipped with mechanized road working means, structural elements and materiel, should be sent out to the routes right after the reconnaissance groups for the purpose of eliminating damaged areas and repairing and reinforcing roads. According to the experience of troop exercises, to prepare a single route an engineer road company or an engineer road (engineer-combat engineer) battalion is required.

This procedure for utilizing engineer units corresponds to those circumstances when combat actions have not begun and there is no immediate danger that the enemy will set up nuclear barriers or isolate the engineer units moving up ahead. But in the latter case not more than half of the entire complement of engineer units of army or front subordination should be forward of the main forces.

At the start of a war, or if there is the threat of enemy nuclear strikes against major natural boundaries within one or two day's march, it will not be expedient to send out a large number of engineer troops in advance to prepare roads and crossings. The experience of military research games has shown that under these conditions not more than a third of all engineer troops of army and front subordination should be sent forward, and these should be kept close to the heads of the march columns of the first-echelon large units. The remaining two-thirds of the engineer troops are best dispersed throughout the depth of the troop march columns behind the first-echelon regiments, behind the first-echelon divisions, or in front of the columns of the main forces of the second-echelon divisions.

Close support for the march of the troops is accomplished by the movement support detachments of units and large units, including rocket troop units and large units, by engineer troop subunits distributed throughout the depth of the march columns, and also by the forces of the subunits and units of the branch arms.

We should emphasize the importance of the purposeful distribution, backed up by calculations, of engineer subunits throughout the entire depth of the march formation of the troops. One of the significant deficiencies noted in several exercises was the fact that the majority of engineer units and subunits were allocated to the movement support detachments sent ahead of the combined-arms large units at distances of up to a day's march. At the same time, there frequently were no engineer subunits in the troop march columns.

As is known, the maintenance of roads and crossings is accomplished within the overall system of the road traffic control service, which is organized using the forces and means of the military districts, allied states, and also of the advancing troops themselves. It is not advisable to include engineer troops in the complement of the traffic control areas, since they cannot be retained in these areas for an extended period of time.

The chiefs of the engineer troops of a front and armies should coordinate with the chiefs of the rear and of the military transportation service concerning the actions of engineer and road troops to maintain roads and crossings; this coordination should involve the precise places, times and tasks.

The most important task is that of providing engineer support to troops making water crossings. It is hardly possible to accomplish this without the participation of the advancing troops themselves, particularly when the enemy has destroyed the crossings. Therefore, insofar as possible, the floating means (including written-off pontoon bridge sets) and bridge structural elements that have previously been prepared and concentrated at the water crossing sites, should be used. For the purposes of reducing the number of pontoon units from the complement of the advancing forces and the time they are detailed at the crossing sites, it is very important to secretly increase the number of parallel crossings in the period of threat.

When the enemy has destroyed the permanent bridges, the forces and means of large units can support troop crossings over narrow obstacles (these constitute 80 to 90 percent of all obstacles). In order to cross wide, and in some cases medium-width, water obstacles it will be necessary to allocate the forces and means of the advancing operational formations. In doing so, the involvement of assault-crossing and pontoon units of front and army subordination should be planned ahead of time and they should be focused on those lines where insufficient forces and means may have been allocated by a military district or allied state. However, these units should not be committed to action hastily, but only when there is a threat the crossing will be disrupted or slowed down.

As indicated by the experience of operational command-staff exercises and military research games, we must be prepared for the fact that crossings, even across a major water obstacle, will have to be supported by the forces and means of the advancing troops alone. Therefore, for troops traversing long distances, it will be necessary to have as one of the variants a calculation of the crossing of each medium and wide water obstacle utilizing only their own organic crossing means.

An extremely critical task is engineer support for troops crossing zones of radioactive contamination, which will obviously be carried out primarily by the forces of the combined-arms formations. An army or front may provide assistance in amplifying radiation situation data and the forecast. If wide and medium water obstacles are encountered while

bypassing contaminated zones, then an army or front may deliver road and bridge structural elements and other means to the troops using helicopters and aircraft. The principal efforts of the engineer troops of operational formations obviously should be concentrated on supporting the negotiation of zones of contamination and destruction by rocket troop units and large units, control posts, and large units moving in the second echelon.

It is necessary to take into account that when negotiating broad zones of radioactive contamination, troops will first of all look for the axes with the lowest levels of radiation and prepare new routes on these axes. Most often these routes will not coincide with the routes of march previously selected and prepared. Therefore, for the first-echelon large units the most critical engineer task may be the preparation of routes on new axes since an army will not always be able to provide timely assistance in this respect.

In examining the question of engineer support in negotiating the obstructions and areas of destruction which there may be on the routes of troop movement, it is necessary to comment on the deficiencies of our road vehicles. Except for bulldozer and crane equipment, they do have attachments for breaching obstructions and areas of destruction. For these vehicles (or on the special vehicles for preparing breaches in obstructions and areas of destruction) we must have attachments for widening the breaches, cutters made of metal, timber saws with vertical and horizontal positions, etc.

Organizing engineer support for the movement of missile and missile technical units and large units has its own distinctive features. These result from the methods of moving and deploying rocket troops, who, to ensure the timely delivery of strikes against the enemy when operational formations are being committed to an engagement, will usually move at the level of the large units designated to operate in the first operational echelon. For these purposes, it will be desirable to allocate independent routes that have been given better engineer preparation to the missile brigades, separate missile battalions, and mobile missile technical bases.

Engineer reconnaissance and the final preparation of routes for the movement of rocket troops is an army and front task and should be accomplished by the forces of the engineer troops of an army and front. Furthermore, the march columns of missile units must have their organic engineer-combat engineer subunits act as movement support detachments.

To deliver missiles, warheads, and missile propellant to the missile units in a timely manner requires that the deployment areas of the mobile missile technical bases be given engineer preparation while the rocket troops are completing their march. For this purpose it is important to provide for and organize beforehand the movement of engineer troop subunits and units with representatives of the missile technical units to the designated areas. Engineer reconnaissance should be conducted at the same time and, when necessary, routes should be given final preparation for the delivery of missiles from the deployment areas of the bases to the siting areas of the missile units.

When missiles are delivered by air it will be necessary to prepare landing strips for helicopters and points for transferring the missiles from airfield-depot dollies to ground transporters in the deployment areas of the missile technical bases, in the siting areas of the missile battalions, and at the technical positions of the missile brigades. These airstrips and roads can be prepared by the subunits which are preparing front and army roads, and also by those allocated to prepare the deployment and siting areas of the rocket troops.

During the forward movement of reserves from the interior of the country, engineer troops are assigned especially important tasks: to ensure that the troops not only advance continuously at high rates of speed, but also that they arrive on time in the theater of military operations in a combat-effective status. In this connection, when organizing the technical support of engineer troops, in particular their engineer equipment, provision should be made to conserve their mileage reserves as much as possible for the fulfilment of their principal task -- supporting the actions of troops after they have been committed to the engagement.

Therefore, the further development of engineer equipment should proceed by way of increasing the mileage reserves on the engines and tracks. It also is important that when the principal types of tracked engineer vehicles make long distance moves, they be transported on heavy-load trailers. For the sake of the troops designated to advance to the zone of combat actions, this task must be accomplished in peacetime by fully equipping engineer units with the appropriate trailers.

As the troops approach the area of combat actions, engineer measures should focus on supporting their commitment to the engagement from the march and their subsequent offensive actions. It is a very complex matter in modern warfare to commit major operational formations to an engagement after they have moved forward from the interior. This is an

operational-strategic task requiring the thorough organization of engineer support. This being the case, we should take into consideration possible changes in the situation and be guided by the results of engineer measures carried out according to the General Staff plan by the forces of a front itself and the troops operating forward. All of these measures should be purposeful and bound together by a single concept.

The successful organization of engineer support for the commitment of major operational formations to an engagement requires that engineer measures be carried out not only during the time of commitment, but even before the main forces of the advancing troops arrive in the theater of military operations. In doing so, it is very important to organize cooperation on matters of engineer support with the troops operating forward.

In peacetime, border military districts or groups of forces have an opportunity to study the nature of the terrain and the engineer preparation of the operational axes throughout the depth of an impending operation, and the grouping and possible operating methods of enemy troops, as well as an opportunity to plan and accomplish engineer measures in advance in the interests of supporting the deployment of their own troops. But strategic reserves moved forward from the interior of the country are in fact deprived of these opportunities until they arrive in their area in the theater of military operations. At the same time, no one doubts that these measures must be carried out at least partially before initiating the commitment to the engagement.

It is important for troops arriving in a front or army theater of military operations to know, before they are committed to the engagement, the trafficability conditions of the terrain in the deployment area, the prepared routes and crossings and who maintains them, and many other things. If the move forward is accomplished before a war begins, then some engineer measures can be carried out before the operational formations arrive in the theater of military operations. To do this, the engineer forces and means of the group of forces are allocated and the results of engineer measures they had carried out previously to prepare the territory of the theater are utilized fully. But under conditions of a war that already has begun, most of the engineer measures will have to be accomplished primarily during the forward move of front and army troops by allocating only their own forces and means.

When troops operating forward are present in the area of the commitment to the engagement, engineer subunits and units from their

complement may be called upon to inspect the terrain for mines (if the area had been occupied by the enemy), to cover flank large units with obstacles, to maintain crossings over water obstacles on those axes where the committed troops are not able to carry out crossings themselves, and sometimes also to provide engineer preparation of the terrain to support the deployment of rocket troops.

At present, and based on the experience of several operational war games and command-staff exercises, it is our practice to set up operations groups and when troops begin their move forward, to send them to the area of commitment to the engagement. Having arrived in this area two to three days before the first-echelon large units, the operations group establishes communications with the troops operating forward, clarifies the operational and engineer situation, and organizes measures ensuring contact with the advancing troops and their deployment. Naturally, the chief of engineer troops must detail one of his officers to this group.

It is very important that the chiefs of engineer troops of the operational formations moving forward from the interior (several words missing) of the engineer measures already accomplished and planned by the troops operating forward.

But the experience of exercises and games shows that under all circumstances most of the engineer measures to support the commitment to the engagement will be accomplished by the operational formations during their move forward, as they arrive in the commitment area, and right at the time of deploying and being committed to the engagement.

In the brief period of time preceding their commitment to the engagement, the advancing troops hardly will be able to obtain by their own forces alone adequately complete data on the terrain and enemy engineer measures in the area of commitment to the engagement and to a depth of several days of the operation (first-echelon divisions -- for the depth of a day of battle). Therefore, it would be advisable for the staffs of the troops operating forward, including the directorates and departments of the chiefs of engineer troops who have these data available, prepared in peacetime and drawn up on topographic maps, in notebooks, and in the form of reference tables, to pass these data on to the troops being committed to the engagement. Naturally, this will require a considerable amount of advance work by staffs, directorates, departments, and unit engineers of the troops in constant readiness located in the territories of the socialist countries or military districts bordering with countries of the enemy coalition. However, the time, efforts, and means expended will be

fully justified.

The work of commanders, staffs, unit engineers, and the chiefs of engineer troops of the operational formations moving forward will be extremely important concerning the study in advance of the nature of the operational axes on which actions by troops of border and internal military districts are probable at the beginning of a war. This is a certain kind of engineer forecasting.

In this connection it should be noted that engineer forecasting means to us a scientific foresight, which constitutes a part of the assessment of the situation from the engineer standpoint. Its purpose is to obtain information on the possible engineer situation and on the conditions for carrying out engineer support based on the comparative analysis of a large number of objective indices.

Forecasting, as shown by the experience of war games, includes an analysis of approximately the following fundamental questions: the military-engineer characteristics of an operational axis; the possible nature and aftereffects of the employment of nuclear weapons by the enemy in the assumed zone of action of our troops; their effect on the fulfilment of the task and on the actions of the engineer troops; and the capabilities of enemy engineer troops to set up obstacles and areas of destruction in the assumed zone of the offensive.

Mathematical statistics and methods of probability and logic are widely used to forecast the engineer situation.

When analyzing the military-engineer characteristics of an operational axis, attention is devoted mainly to selecting and determining the condition of roads and crossings, to studying water obstacles, and to refining data on local crossing means, construction materials, etc.

The possible nature and aftereffects of the enemy employment of nuclear weapons are forecast by making a preliminary assessment of the most probable lines for the establishment of obstacle barriers. The chief of engineer troops can obtain these data at the staff of the operational formation if these questions are resolved there in the course of forecasting the overall situation, or else he can determine these himself. Next, a tentative determination is made of the probable aftereffects of the employment of those nuclear strikes which will affect the organization of engineer support. Calculation is made of the possible radiuses of the zones of destruction, obstructions and fires, and also a forecast of the

radiation situation on the principal axes of troop actions.

A forecast of the enemy's capabilities to establish obstacles and areas of destruction by engineer means on the assumed axes of troop actions is accomplished on the basis of the actual grouping of enemy engineer troops and current views on the employment of these troops for these purposes.

Based on a forecast of the engineer situation and taking into consideration data of a military-engineer nature, we project the most advisable axes for troop actions, the routes of march, and the advantageous variants for organizing engineer reconnaissance, accomplishing tasks, and for employing engineer troops in combat.

A more specific forecast of the engineer situation can be made during combat actions, especially after the enemy delivers his nuclear strikes, when the targets, warhead types, and yields of these strikes will become known, as will the actions of enemy engineer troops. Under these conditions, forecasting should also be an integral part of the assessment of the situation from the engineer standpoint and should provide basic data for organizing the engineer support of troop actions in a particular phase of the operation.

One of the most important phases in the work of the chief of engineer troops of an operational formation moving forward from the interior will be that of planning engineer support for the commitment to the engagement and conduct of the offensive at high rates of speed, or else that of refining a previously formulated plan of engineer support. This work obviously will be carried out during the move forward based on the data obtained, the forecast of the engineer situation, and the assessment of the engineer situation.

The successful solution of these problems in short periods of time by the chief of engineer troops, and also by the commanders of engineer units and large units, cannot be carried out without the advance preparation of preliminary calculations on the fulfilment of various types of engineer support tasks. Although these problems in themselves are not new, experience indicates that certain aspects are somewhat vague. First of all, how can military-engineer calculations be defined?

In our view, we should distinguish between calculations made by chiefs of engineer troops and unit engineers and the calculations of the commanders of engineer units and large units. The first of these must be

standard calculations, primarily on the fulfilment of the principal tasks of engineer support for formations (large units): for example, on engineer support for the deployment of troops when they are being committed to an engagement and for the assault crossing of water obstacles under different variants for reinforcement with crossing means; on the engineer preparation of troop concentration areas and control posts; on the construction of obstacles while temporarily going over to the defense or to cover the deployment of troops; and on the engineer preparation of the zones of defense.

The commanders of engineer large units and units can have standard calculations for the different variants of organization to accomplish engineer tasks and work as required by the combat assignment of the unit or large unit. In an engineer-combat engineer brigade or regiment this will be the preparation of routes by an engineer road company or battalion, the preparation of a concentration area (siting area) by an engineer position preparation company or battalion, the setting up of obstacles by an engineer obstacle battalion, and the inspection of the terrain for mines by an engineer-combat engineer company, and so forth.

It would be desirable for the commander of a pontoon bridge regiment to have standard calculations of engineer operations for the preparation and maintenance of bridge and ferry crossings by a pontoon company, battalion, and regiment; for the construction of low-level and composite bridges by subunits of a battalion or regiment; for the preparation of dummy bridge crossings; for the construction of anti-mine fences, and so forth. Commanders of other engineer units might have similar standard calculations. It would be desirable for the appropriate chiefs of engineer troops to have them also.

The aforementioned calculations are neither all-purpose nor alike for all military districts and groups of forces since the substance and organization of engineer support will be affected to a large degree by the nature of the theater of military operations and other conditions which should be taken into consideration in specific calculations.

Based on forecasts of the engineer situation and on the advance preparation of standard military-engineer calculations for different variants for organizing the accomplishment of engineer tasks and operations under present-day conditions, it will be possible to plan successfully and in short periods of time the engineer support and the accomplishment of engineer tasks, not only when reserves moving forward from the interior are committed to the engagement, but also during their subsequent actions.

At the same time, the availability of previously prepared and adequately complete data and appropriate plans does not relieve advancing troops of the necessity of refining some of these, particularly those on the nature of the terrain, upon arriving in the area of commitment to the engagement. The most efficient methods of refining these are by means of aerial photography and aerial reconnaissance. Based on these, we can most purposefully organize final reconnaissance of the concentration areas, if these are designated, and of siting areas and movement routes to the commitment lines. The experience of command-staff exercises has revealed that to accomplish the principal engineer reconnaissance tasks of significance to an army may require no less than six to eight engineer reconnaissance groups, with three to four of these on helicopters. Front requirements are approximately the same. When there are not enough reconnaissance subunits, we should allocate combat engineer subunits, which must be trained for this in peacetime.

A task of paramount importance is engineer support for the actions of missile and surface-to-air missile units when the troops are being deployed and committed to the engagement. This task includes the preparation of routes and crossings for the movement of units and large units out into their siting areas, preparations within the areas themselves, and engineer preparation there including camouflage measures. In principle, this task is accomplished by front engineer units before the rocket troops arrive, which is more practical, or by the organic engineer subunits of the rocket troops with a subsequent final preparation of the areas by the personnel of the missile units and large units. Calculations indicate that to support the deployment of the rocket troops of front subordination, based on the establishment of minimal protective conditions, one engineer road battalion and one engineer-position preparation battalion must be allocated for two days.

When there is an engineer-combat engineer brigade in the complement of a front that is moving forward, these battalions must be moved to the siting areas intended for the rocket troops at least one to two days before the rocket troops arrive. Reconnaissance groups from the rocket troops also must be at the siting areas by this time.

Engineer measures to support the deployment of ground forces groupings and their commitment to the engagement may include preparing concentration and waiting areas, preparing routes to them from the principal routes of march and from detraining stations, from concentration (waiting) areas to the lines of deployment and commitment to the engagement, and preparing these lines.

Under present-day conditions, when arriving large units will often be committed to the engagement from the march, the basis of engineer support for them will primarily consist of the preparation of routes and crossings on the axes leading to the deployment lines. Therefore, when selecting the area for committing troops to the engagement, we should take into consideration the development of the road network, the trafficability of the terrain away from the roads, and the presence of natural camouflage factors, since the time in which to accomplish engineer tasks supporting deployment and commitment to the engagement may be extremely limited.

The grouping of engineer troops of the armies and front, established to prepare and maintain routes during a march, must focus on the preparation of routes for the commitment of troops to the engagement, but with the understanding that it should continue to carry out work on the routes along its assigned axes right up to the lines of deployment and commitment of the large units.

In the sum total of engineer tasks which are accomplished while supporting the deployment and commitment of the reserves to the engagement, it will be necessary to provide for measures supporting the actions of the units and large units designated to cover the deployment of the troops. Among these measures are those of supporting the move of covering forces to specific lines and installations designated to be held during the deployment of the main troop grouping, of using obstacles on the axes where the enemy will conduct offensive actions, and also of preparing the occupied lines and installations from the engineer standpoint. The accomplishment of engineer measures supporting the actions of covering forces should be organized by the appropriate chiefs of engineer troops of the armies being committed to the engagement.

The combat readiness of our Armed Forces will be increased to a significant degree by further study of the problems of engineer support for the move forward of strategic reserves from the interior of the country and for their commitment to an engagement, by testing our fundamental tenets in troop exercises and war games, and also by implementing appropriate measures within the troops.