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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 of an Army Defensive Operation

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 is a review of the problems related to engineer support of army defensive operations which can occur during a front offensive or at the national border. Engineer support will assume the major burden of terrain preparation, with its component problems of reconnaissance and construction of versatile field fortifications, defensive lines and switch positions. Time may be saved by equipping combat and transport vehicles with light entrenching means, and some engineer operations may be fully mechanized. The obstacle system, mainly antitank mixed minefields, must be geared to mobile troop actions and the fire system. Operational camouflage is implemented by non-linear disposition and simulations. This article appeared in Issue No. 3 (85) 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. For ease of reference, reports from this publication have been assigned

William W. Wells

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Summary:

The following report is a translation from Russian of an article which appeared in Issue No. 3 (85) for 1968 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 is a review of the problems related to engineer support of army defensive operations which can occur during a front offensive or at the national border. Engineer support will assume the major burden of terrain preparation, with its component problems of reconnaissance and construction of versatile field fortifications, defensive lines and switch positions. Time may be saved by equipping combat and transport vehicles with light entrenching means, and some engineer operations may be fully mechanized. The obstacle system, mainly antitank mixed minefields, must be geared to mobile troop actions and the fire system. The author also covers operational camouflage, the grouping of engineer forces, measures to eliminate the aftereffects of nuclear strikes, and engineer operations carried out while the defense is in progress.

End of Summary

[redacted] Comment:

The author was Chief of the Military Engineer Academy of the Ground Forces from 1961 to 1969. [redacted]

[redacted]

Engineer Support of an Army Defensive Operation

by

Colonel General of Engineer Troops A. Tsirlin

The problem of engineer support for a defensive operation basically amounts to carrying out in a limited period of time a group of engineer measures aimed at increasing the aggressiveness and stability of the defense and at creating conditions for a subsequent going over to the offensive. These measures consist principally of engineer preparation of the terrain. Based on maximum utilization of natural features and skilful employment of engineer forces and means, this preparation should ensure the swift formation of a defensive grouping of troops and their protection, paralyze an enemy maneuver, promote an increase in the effectiveness of the fire system and bold, decisive maneuvering by the second echelons and reserves in the tactical and operational depth of the defensive zone not only of the army but also, as was shown by the experience of the DNEPR exercise conducted in September 1967, on the scale of the front.

The proportion of engineer measures, their sequence, and the thoroughness and time limits for carrying them out depend directly on the nature of a given operation, and particularly on the goals of and conditions surrounding the going over to the defense, on whether the belligerents are employing nuclear weapons, and on whether the army and the front go over to the defense at the beginning of the war or while it is in progress.

In this article we shall principally examine problems related to engineer support of an army defensive operation.

At the beginning of a war, the routes by which the troops move to and deploy in the designated defensive zones and areas acquire particular importance. After the troops have moved into these zones and areas, measures taken to ensure that the most important and advantageous lines on the threatened axes are firmly held play an increased role. This applies primarily to the preparation of positions for the conduct of fire, especially antitank fire, and the setting up of a reliable obstacle system.

The importance of engineer tasks in support of aggressive actions by troops on the defensive increases sharply during a defensive engagement. During the preparation for a defense, engineer measures to prepare the terrain are carried out, as a rule, by all branch arms. With the beginning

of a defensive engagement -- when it is an indispensable condition that the troops be ready to carry out decisive counterattacks and counterthrusts -- missile and tank large units will have to be relieved of this work as much as possible; it is turned over mainly to the engineer troops.

The moment the enemy delivers a counterattack during a front offensive operation, even if the operation began with the employment of conventional means of destruction, the threat of nuclear strikes against army troops will increase sharply. The successful repelling of such a counterattack will depend primarily on the readiness of the army to employ nuclear weapons, and on its ability to quickly form a defensive grouping after forestalling the movement of the enemy to advantageous lines, and to provide protection for its personnel and equipment. When the army goes over to the defense in such a difficult situation, engineer measures must not only promote rapid regrouping but also the timely fortification of the terrain, thus making up, as it were, for the comparatively low density of the troops that are subjected to the first enemy strikes.

In the short period of time that is allotted to the preparation of a defensive operation, it is practically impossible to organize a continuous defense along the entire front and, moreover, there is no need to do so. Combat actions, obviously, will be based on strong defense of only the most important axes, coupled with extensive movement of forces and means to the threatened sectors. This gives rise to the need for an individual approach to the engineer preparation of the terrain in an army defensive zone depending on the operational importance of a particular axis.

Reconnaissance of the army defensive zone is of great value in making a correct determination of these axes and the nature of their preparation and in choosing advantageous lines, areas, and positions for the troops.

When the defense is being organized along the state border, such reconnaissance presents no special difficulty. The army commander personally conducts it with the assistance of the chiefs of the branch arms and services while it is still peacetime. Those lines which large units and units have been assigned in advance to defend will also be reconnoitered by the commanders of those large units and units together with the chiefs of the branch arms and services; they will determine the sectors and areas of the defense and even the most important strong points, the disposition of fire means, and the places where engineer obstacles are to be erected. The defensive lines and switch positions which the reserves are to occupy during the course of the engagement may be determined by groups that have been specially allocated for this purpose and are headed

by officers from the army staff. March and deployment routes for the troops and positions for the covering units should be reconnoitered with particular care.

When the army goes over to the defense during the course of a front offensive operation, even under the most favorable conditions (when helicopters are employed), it will be possible to fully reconnoiter only some of the most important axes and areas, as, for example: siting areas for the missile units and large units; sites for army control posts; concentration areas for the second echelon; deployment lines and movement routes to be used when delivering the counterattack; and individual sectors of army defensive lines and switch positions. Obviously, only subunit and unit commanders can carry out detailed reconnaissance. Topographic maps containing data on the protective features of the terrain will prove extremely useful under these conditions as a means of appraising and selecting the areas that are most protected against the effects of nuclear weapons. The employment of helicopters and aircraft will prove to be of great assistance, as will advance aerial photography of the proposed army defensive zone.

Fortification work is the most labor-consuming part of engineer preparation of the terrain. The problem is to find possible ways of reducing the time needed to perform this work while simultaneously increasing its effectiveness. Obviously this problem can be solved only by considering it as part of the whole.

When solving it the nature of the preparation of the defensive zones, positions, and areas of the army troops should be considered first of all. Under present-day conditions, company and platoon strong points should be prepared with pits for armored personnel carriers, infantry combat vehicles, and other attached fire means. Pits for combat vehicles will be linked by trenches and communication trenches only within the limits of the platoon and company strong points. This makes it possible to set up strong points in battalion defensive areas in a short period of time.

An analysis of the conditions of modern armed combat demonstrates that when the protection of the troops is at issue, some measures should not be preferred a priori to others without a detailed evaluation of their effectiveness in the given situation. The defense should consist of the optimum combination of various operational-tactical and technical measures designed to decrease the vulnerability of the troops and increase the reliability of their use of armament, as well as provide comprehensive protection as a whole.

The dispersal of troop battle formations during the defense continues to be one of the essential factors ensuring their protection even in a non-nuclear period. However, in order to create the density of fire necessary to repel enemy attacks, it is necessary to make the battle formations of regiments and battalions more compact by decreasing the distance between battalion defensive areas and company strong points, and to provide them with dense cover by means of fire and obstacles. This gives rise to the requirement that subunits take full advantage of the microrelief of the terrain and that they erect such fortification works in defensive areas as would ensure the conduct of fire and aid in protecting personnel and equipment against conventional and nuclear means of destruction.

When combat actions employing nuclear weapons are conducted and troop vulnerability sharply increases, protective measures against nuclear attack, taken on an operational scale and based on a more comprehensive prediction of the possible development of the defensive engagement, play a greater role. The army commander and staff will have to quickly decide on the most important means and methods for the comprehensive protection of the troops, with due regard for their role and tasks in the defensive operation, and correctly select lines, positions, and areas. At the same time, this does not in the least decrease the role of measures taken on a tactical scale. In particular, the protection of the troops with fortifications will be more effective if it is combined, first of all, with protection of the weapons themselves and their crews.

If we take an individual approach to the problems of field fortifications in an army defensive zone, then these fortifications are most urgently needed, in the interests of comprehensive protection against nuclear attack, by the personnel and equipment of air defense units, missile troops, control posts and second echelons, as well as first-echelon divisions that are defending the most threatened axes. In connection with this, obviously the engineer forces and means will first have to reinforce those units whose defensive sectors are situated on terrain that has unfavorable natural protective features. Under all circumstances they should endeavor to build field fortifications in defensive areas at the same time as the defensive grouping is being formed and the fire system is being set up.

In order to counteract any enemy attempt to envelop and surround the main grouping of the defending army, and in order to create the conditions for destroying enemy forces that have broken through by using all available fire means, nuclear strikes and air strikes, counterattacks and

counterthrusts, it is essential to have in the operational depth of the defense fully reconnoitered defensive lines and switch positions which, when located on the most important axes, have been given engineer preparation. Their preparation and equipping have always been the concern of the army staff and the chief of the engineer troops of the army. Occasionally during exercises this task is turned over to second-echelon divisions and engineer position preparation units, but this cannot be considered advisable. They are able to prepare only individual fully reconnoitered sectors of lines and positions under the supervision of a representative of the army staff.

In deciding the question of the nature of the engineer preparation of such lines, we should not predetermine in advance the structure of the battle formations of large units and units that may occupy them only during the course of a defensive engagement. In a number of situations it obviously is advisable to set up multipurpose positions on these lines that are equally suited for use by motorized rifle, tank, and artillery subunits either to repel an enemy offensive or to deliver a counterattack. At one time the effectiveness of preparing multipurpose positions for the purpose of reducing the amount of time needed for engineer preparation of the defense was repeatedly substantiated in our periodical press. It obviously is not necessary to raise this issue again.

A further reduction in the amount of time needed to prepare the field fortifications of an army defensive zone may be achieved while simultaneously improving the protection of the troops by equipping combat and transport vehicles with light and effective entrenching means. This would enable each unit to use the horsepower of the combat and transport vehicles to prepare the terrain; at the present time the majority of the pits and shelters for these vehicles must be excavated by hand. The scientific research institutes of the Ministry of Defense are successfully carrying out work along these lines.

At the same time new designs for pits and shelters must be developed and introduced. The resulting structures should be simple, should permit the maximum possible use of the combat capabilities of the troops' armament, should have very good protective features, and should require a minimum expenditure of labor so that the units and large units can build them quickly, using their own forces and means. Accordingly, we consider fully justified the trend toward equipping units and large units with the minimum necessary quantity of special engineer means that would promote the timely completion of tasks to furnish protection against conventional and nuclear weapons, provided that personnel are well trained in the methods

and procedures of building field fortifications and entrenching means are extensively used.

A substantial portion of these specialized means consists of the highly efficient excavation machinery in service with engineer units. It is able to completely mechanize the digging of trenches and sharply reduce the amount of time needed for the engineer preparation of siting areas for rocket troops and surface-to-air missile troops and of areas where the control posts of the army, large units and units are to be located. However, they must be correctly used. This requires sound knowledge of their tactical characteristics and specifications, and necessitates taking into consideration specific soil conditions, operating procedure, and the procedure for the various relocations when determining output and the amount of time needed for the completion of the fortification work. We would recall that a reduction in the amount of time needed can be achieved only if there is integrated mechanization of all types of work: the excavation of trenches, the assembling of structures, and their covering and camouflage.

The use of prefabricated structural components makes it possible to greatly reduce the amount of time needed to build shelters. However, their relatively high cost and the large number of motor vehicles needed to transport them compels us, for the time being, to use them primarily in the siting areas of missile and surface-to-air missile troops and at control posts. We have every reason to assume that in the near future these structures will be widely employed by all branch arms.

A large number of firing emplacements and shelters for personnel in defensive zones and areas are still being built of timber. The availability of large tracts of forest in the European theaters of military operations ensures that the timber needed by the army can be procured, and the use of mechanized means makes it possible to accomplish this task in a short period of time. However, the need for camouflage must not be forgotten when selecting logging areas, organizing their clearing, transporting timber, and operating timber mills.

As regards the nature of field fortifications in an army defensive zone, we must point out that versatile types of field fortifications of the terrain must be used and that the range of them should be sufficiently great. They must meet the requirements of troop defensive combat actions as fully as possible, especially those related to the preparation of main and alternate areas for the location of the second-echelon large units and the reserves of the army, and of lines for their deployment to deliver a

counterattack.

Since the second-echelon large units and the reserves of the army are dispersed, camouflaged and sheltered in their areas, they are able to use a portion of their forces to prepare the terrain so as to more effectively meet the enemy with fire from fixed positions should his armored groupings penetrate the depth of the army defense. It may not prove necessary to reinforce these units and large units with engineer forces and means for this purpose; it will be sufficient to allocate to them the sectional structural components needed to erect the most important structures. At the same time as the main disposition areas are being prepared, it is advisable to reconnoiter alternate areas, and their preparation may be begun after the deployment lines for the counterattack have been prepared.

The decisive role in an army defensive engagement belongs to troop maneuvering and aggressive troop actions. To ensure the extensive maneuvering of troops who, thanks to a high level of motorization, may to a large degree be dispersed into the depth, a well-developed network of routes is essential. This makes it possible to quickly and secretly change the positions not only of large units and units, but of subunits as well.

The preparation of an army counterattack deserves special attention. For a continuous advance by the counterattack grouping from its disposition areas and for its deployment from the march, the required number of routes -- particularly crossings over water obstacles and through almost impassable sectors and defiles -- must be laid in advance, marked, and maintained. Also, provision must be made for the troops to negotiate obstacles and various obstructions and for the use of minefields to cover the flanks of the units deploying to deliver a counterattack.

In addition to the organic engineer units of the second-echelon large units themselves, units of engineer troops subordinate to the army are allocated to carry out measures in preparation for the counterattack. Provision usually is made for reinforcement from the engineer reserve. In the complex situation which may arise in the zone of the army when the counterattack is delivered, special attention must be given to organizing cooperation between the engineer troops and units of the branch arms, particularly when they are negotiating engineer obstacles previously set up by our own troops and by the enemy.

Under modern defensive conditions, the system of engineer obstacles should be subordinated to the concept of aggressive mobile troop actions. It must be set up during the preparation for, and the course of, a

defensive engagement with regard for the possible variants in the development of the combat actions of our troops and those of the enemy. It should take advantage of natural obstacles, and should be closely coordinated with planned counterattacks and with the fire of conventional means of destruction, especially antitank means. Consequently, the use of engineer obstacles at all levels should constitute the prerogative of the combined-arms staffs, and not the task of the engineer chiefs alone.

The need for obstacles arises the moment the army goes over to the defense, when it is necessary to ensure the stabilization of the front by covering those axes on the line of contact with the enemy that are accessible to tanks. At the same time, an obstacle system in the depth of the defense is planned with regard for the probable or already apparent axes of the enemy offensive. Its main function is to counteract the organized deployment, commitment to battle, and advance into the depth of new enemy large units and to contain their maneuvering, and not merely to cover the defensive lines and positions occupied by our troops. Once the path of the enemy armored groupings has been blocked, the task is to help to concentrate them within a limited area where they can be completely destroyed by nuclear strikes, aviation and artillery fire, and by counterattacks and a counterthrust. Consequently, it is now especially important that the obstacle system be coordinated with the fire system in its widest possible sense and that it contribute to increasing the effectiveness of our strikes.

As formerly, the most effective type of obstacle continues to be the antitank mixed minefield. However, the extent to which antipersonnel obstacles are used has been substantially reduced in comparison with the last war. This is primarily due to the extensive motorization of troops. Antipersonnel obstacles are needed in the European theaters only on axes that are inaccessible to tanks and in sectors difficult of access for combat vehicles, and to supplement the system of antitank obstacles and areas of demolition. Moreover, the appropriate mechanized means for the emplacement of antipersonnel obstacles are lacking. However, these are not adequate grounds for rejecting this type of obstacle. Even in the European theaters of military operations, the areas where the possibilities for using armored personnel carriers and tanks will be limited constitute a total of about one-third of the territory. In other theaters the proportion of them will be considerably higher.

As the experience of many exercises shows, favorable results can be achieved during the course of a defensive engagement only by the massed and surprise employment of obstacles. Consequently, the norms for mine

distribution that have been accepted in practice, according to which one-third of the total number is emplaced in advance, must not be viewed as standard. The number of obstacles to be set up in advance must be determined each time on the basis of specific conditions, keeping in mind that capabilities for setting up obstacles while a battle or engagement is in progress are limited. An increase in these troop capabilities would promote a reduction in the number of obstacles set up in advance on both the tactical and the operational levels.

As formerly, it is advisable that first-echelon regiments, which have a relatively small depth of defense and fewer capabilities at their disposal for maneuvering their obstacle means, set up the majority of their minefields prior to the beginning of the defensive battle. The latter will also be typical of an obstacle system that is set up in the forward security zone. Certain areas of it that are on axes where no aggressive troop actions are planned can be turned in advance into zones that are inaccessible to the enemy, and structures located at bottlenecks and defiles on the main roads can be destroyed. In this case it is better to move our subunits along prepared dirt roads and cross-country routes, avoiding paved roads.

When the going over to the defense is done on a state border, obstacles and areas of demolition are set up first in front of the positions of the covering units and in the depth on the axes that lead the enemy to the movement and deployment routes of the main army grouping. Most of them can be prepared while it is still peacetime. The mine and explosive means needed for this work should be concentrated in advance on the appropriate axes. These preparatory measures, when coupled with extensive minelaying using mobile means, especially helicopters, will make it possible to substantially increase the effectiveness of the obstacles and reduce the expenditure of manpower and time in setting them up when combat actions begin.

When the army goes over to the defense while a front offensive operation is in progress, the task is not merely that of quickly covering a captured line with obstacles on the axis on which the enemy will most probably deliver his counterattack. In our opinion, after this axis and the deployment line for the counterattack grouping have been correctly ascertained, in a number of cases it will be possible to inflict considerable damage on the enemy by using obstacle means, provided that helicopters and aircraft are used to set them up, thus gaining the time needed to organize the defense more systematically.

An obstacle system in the depth of the defense usually includes: installations that have been readied for demolition on the axes where the enemy offensive will most probably take place; centers of obstacles covering important strong points, major bridges, and key sectors of the transportation lines; and, occasionally, zones of obstacles of varying width and depth and consisting of minefields and areas of demolition on several road axes. In order to expand obstacles early in a defensive engagement, the necessary forces and means must be provided for at the very same time the grouping of engineer troops is formed. For this purpose, in addition to mobile obstacle detachments, it is best to allocate engineer-combat engineer units of army subordination that are engaged in tasks in the vicinity of the installations or areas where centers and zones of obstacles are to be set up.

This, of course, does not mean that the army will assume direct responsibility for organizing the setting up of all obstacles from the time the defensive engagement begins. While the battle is in progress, regiments and divisions set up obstacles in their own defensive sectors and zones in close coordination with the fire system and the plan for conducting the defensive battle. The army organizes the destruction of important installations located within the obstacle system that are of operational and, in some cases even strategic, importance, as well as the demolition of structures and mine laying in the operational depth on axes where large enemy armored groupings are operating. This applies particularly to those centers and zones of obstacles where nuclear mines can be emplaced. The staff of the army must also plan to allocate engineer forces and means to set up engineer obstacles during the operation on the routes where enemy airborne landing forces are operating.

Modern mechanized means of mine laying -- minelayers, mechanical minelayers, and helicopters -- make it possible to set up an obstacle system on known axes of the enemy offensive in a relatively short period of time. Minelayers of the tracked minelayer type are able to quickly lay mines in the ground. They have cross-country capability and armored protection. As compared with other methods of mine laying, the use of helicopters greatly simplifies the process of transporting mines and setting up minefields. They do not leave the give-away signs typical of mines laid by hand or by minelayers. Helicopters constitute an indispensable means in areas of radioactive contamination when covering breaches formed by the bursts of nuclear weapons. As a result, the effectiveness of engineer mixed minefields will, obviously, be much higher than it was during the last war.

When determining what density of engineer obstacles is necessary on any given axis, the following factors should be taken into consideration: the balance of forces of the belligerents; the probable nature of enemy troop actions, and enemy capabilities for clearing obstacles; and the extent of the sectors or zones that are accessible to tanks and within which it is anticipated that the enemy tank large units and units will concentrate their efforts. The more reliably these factors are determined when the staffs of combined-arms large units and armies predict the situation, the greater the effectiveness of the obstacles will be.

Operational camouflage measures, as the experience of the last war demonstrates, help to make troop resistance on certain sectors of the defensive lines, aviation and artillery strikes, counterattacks and counterthrusts come as a surprise to the enemy. When means of mass destruction are employed, nuclear strikes that take the enemy by surprise can sometimes decide the outcome of a defensive engagement.

When preparing for an operation on a state border, the concept for operational camouflage may provide for misleading the enemy as to: the forces allocated for covering; the disposition of the defense on especially crucial axes; the disposition areas of missile units; army control posts and large units of the second echelon; and the axes for carrying out the army counterattack. This concept can be successfully implemented only if a number of preparatory measures are carried out in peacetime. Included among them are: supplying the units with table of equipment camouflage means; using designated dummy areas for conducting various troop exercises; manufacturing, storing, and maintaining an adequate quantity of equipment for mock-ups and other camouflage means. Also, an advance determination must be made as to which units and subunits are to conduct each of the measures, including the simulation of: the concentration areas of large units of the second echelon and missile units, the system of control posts, and the axes of the counterattacks.

The basic method of concealing the defensive disposition is to set up a non-linear defensive disposition and set up throughout the entire depth of the defense a system of engineer preparation of the terrain that will confuse the enemy. The existence of a large number of defensive areas and zones of varying shapes and of dummy installations can impede the detection by the enemy of the actual grouping of forces and induce him to deliver nuclear strikes against simulated installations. It is advisable that engineer camouflage measures carried out during a defensive engagement be aimed primarily at concealing the actual counterattack grouping of the army and displaying the simulated one.

Operational camouflage usually is planned by the front staff. However, if the army is independently carrying out the task of destroying an attacking enemy in its zone on the state border, then by agreement with the front staff it may plan and carry out operational camouflage measures. The army will also have to do a great deal along these lines independently should it go over to the defense during a front offensive operation. Specifically, the army commander and staff determine which camouflage measures must be carried out in the divisions of the first and second echelons, and where to simulate the location of the second echelon and the reserves, and the siting areas of the missile troops and control posts.

Engineer support in preparing for and conducting an army defensive operation on a state border, like the operation as a whole, is usually planned in peacetime. This plan should embrace all engineer measures carried out in support of troop actions, beginning with the advance of covering units and the deployment of the main forces of the army. It should precisely set forth the set of measures that should be carried out in peacetime. In our opinion, it is essential that this be regulated by a special plan that has been worked out in greater detail. The fact that the engineer units will have a minimal amount of time to carry out measures in direct support of the movement forward of the troops and the defensive operation must be taken into account. Consequently, it is desirable that they be sent to the areas where they are to carry out their tasks at the same time as the units that have been allocated for covering the border. It is also advisable to distribute the mine and explosive means at that time, having formed established forward branches of an army engineer depot for this purpose.

When the army goes over to the defense during a front offensive operation, engineer support for the defense, as a rule, is planned within a very limited period of time. Under these conditions, the grouping of engineer troops that is to support the army defensive is formed gradually. The initial engineer measures are carried out by an already operating grouping. In the majority of cases the regrouping of engineer troops will take place while a captured line is being secured. Engineer troop units that previously had been part of the engineer reserves of the army can play an important role during this period.

Regardless of the conditions under which a defensive operation is prepared and conducted, the main forces of the engineer troops are massed on the decisive axes and provide the capability for stepping up efforts on the main axis throughout the entire defensive operation. This makes it necessary for the army to have an engineer reserve strong enough not only

to actively affect the course of engineer support if there is an enemy breakthrough into the depth of the defense, but also to provide reliable support for troop actions during the delivery of an army counterattack and in going over to the offensive.

In the event the belligerents employ nuclear weapons, the engineer troop grouping must be capable of carrying out engineer measures to eliminate the aftereffects of enemy nuclear strikes, and first and foremost to restore the combat readiness of the units of the branch arms that were subjected to these strikes. The engineer reserve of the army and other units of engineer troops of army subordination can be allocated to carry out such measures as: restoring mixed minefields and laying new mixed minefields; making important sectors of defensive zones and lines combat-ready; rebuilding destroyed roads and bridges and removing obstructions on them; and -- in certain instances -- laying new sections of routes to bypass zones of radioactive contamination, helping to extinguish and localize centers of fires, rescuing casualties, and recovering combat equipment.

The availability of an engineer reserve in the army and maneuvering of the engineer units subordinate to the army can ensure the swift elimination of the aftereffects of a nuclear attack and restoration of the engineer preparation of the terrain, primarily where this is necessitated by the conditions of the situation. It is essential that the plan for engineer support of a defensive operation provide that such a reserve be allocated mainly from engineer-combat engineer units and engineer position preparation units. They are responsible for carrying out the most complex engineer measures, entailing the use of appropriate equipment. Mass work to eliminate the aftereffects of enemy nuclear strikes will be carried out by the troops themselves.

An army mobile obstacle detachment and the engineer units subordinate to the army which have been allocated to set up the obstacle system during a defensive operation will be able to set up obstacles designed to box in the enemy in areas that have been subjected to nuclear strikes and in which the enemy offensive will most probably take place.

How promptly all engineer measures are completed in areas that have been subjected to nuclear strikes will depend on the speed with which the situation is ascertained. The employment of helicopters with engineer reconnaissance subunits for this purpose can expedite the acquisition of data on the status of positions, routes, obstacles, etc.

When planning engineer support, great emphasis is placed on the conduct of active engineer measures during a defensive operation. It is extremely important that the forward detachments defending the forward security zones and approaches to the army's forward edge of the defense systematically reconnoiter the probable movement routes of the enemy and the areas where his nuclear means of attack may be located. It is essential that engineer reconnaissance subunits take part in this in order to ascertain what methods and means are being employed by the enemy to negotiate obstacles and obstructions. On the whole, engineer reconnaissance efforts should be focused on detecting what engineer measures the enemy is carrying out to support his high-speed offensive.

During a defensive operation, too, engineer preparation of the terrain will be resolutely expanded on the detected axes of the enemy offensive. It will be of urgent importance that engineer position preparation units and subunits be skilfully maneuvered, concentrated on decisive axes, and given precise tasks regarding the setting up of positions having a certain degree of protection against nuclear attack. No less important will be engineer troop actions related to the development of a system of engineer obstacles and areas of demolition.

If counterpreparation fire is conducted, engineer support will first be required for artillery, missile units, and the tanks belonging to the second echelons of the army which are being allocated to neutralize and destroy the enemy. In accordance with the variants employed for conducting the counterpreparation fire, prepared routes and prepared, camouflaged positions for missile units, artillery and tanks will play an important role. Routes will have to be prepared in advance in the road network system so that, after the counterpreparation fire, artillery and missile units can return quickly to their main positions, and the tanks to their areas. After the counterpreparation fire, the engineer troops must be prepared in certain cases to ensure the passage of our tank troops, who are delivering an attack in front of their own forward edge of the defense, through the obstacles.

During a defensive operation, timely engineer support of the maneuvering of troops out of sectors that have not been subjected to nuclear strikes for the purpose of closing gaps in the disposition of the troops and carrying out counterattacks and counterthrusts against enemy airborne landing forces and armored troops, acquires great importance. The crossings, defiles, and road junctions on the routes along which the troops are moving will be especially vulnerable points. It is therefore advisable, already from the moment of going over to the defense, to

stockpile repair and reconstruction materiel, such as prefabricated sections of bridges and road surfaces, for use in urgent reconstruction of maneuver routes.

During a defensive operation, engineer troops will also have to quickly restore sections of obstacles destroyed by enemy strikes and activate controlled minefields. At the same time they will have to swiftly build up the strength of minefields on the detected axes of operations of the main enemy grouping. In a number of cases new obstacle zones must be set up, especially when nuclear mines are used for this purpose. The efforts made by the mobile obstacle detachments of divisions and armies can turn out to be clearly insufficient. It will become necessary to deploy larger engineer forces in order to erect obstacles that are echeloned in depth on these axes within a short period of time.

One of the most important operational measures to be taken during a defensive operation will be the delivery of a counterattack in order to wipe out an enemy grouping that has made a penetration. It is extremely important that provision be made for engineer measures in close support of the advance of the second echelon of the army under these circumstances. It is advisable to form a detachment to support the movement of the troops of the second echelon and the reserves of the army simultaneously with going over to the defense.

Under all circumstances, in order to deliver a surprise counterattack, engineer forces and means must be provided for in the battle formations of the second echelon. The commanders of the units and large units that are delivering the counterattack must have information on the obstacles that were placed by our troops on the territory occupied by the enemy grouping that has penetrated or broken through.

Thus, we have arrived at the conclusion that questions relating to the engineer support of an army defensive operation are acquiring great importance under present-day conditions and require thorough research.