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CENTRAL INTELLIGENCE AGENCY

WASHINGTON, D.C. 20505

16 August 1978

MEMORANDUM FOR: The Director of Central Intelligence

FROM : John N. McMahon
Deputy Director for Operations

SUBJECT : MILITARY THOUGHT (USSR): The Organization
of Tank Technical Support in a Front
Offensive Operation

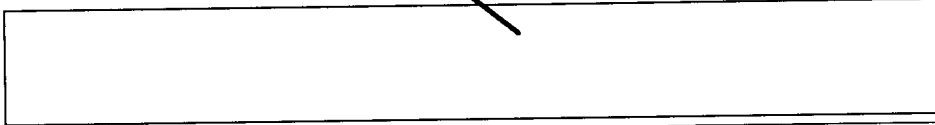
1. The enclosed Intelligence Information Special Report is part of a series now in preparation based on the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal "Military Thought". This article is a review of a book having the same title. Except that several points could have been treated more extensively, the reviewer finds little to disagree with, and his article summarizes and corroborates the main points of the book: the high mileage that tanks and related vehicles run up in an operation will probably cancel out technical improvements, and servicing demands will be as high as ever; providing parts will be a major logistics problem; many times it will not be possible to get repaired vehicles back to their units during the same operation; and recovery is most important lest slightly damaged vehicles be destroyed before being repaired. This article appeared in Issue No. 2 (75) for 1965.

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

JOHN N. MCMAHON

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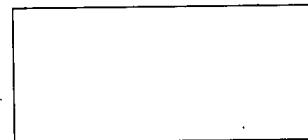
Director, National Security Agency

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Intelligence Information Special Report

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COUNTRY USSR

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DATE OF INFO. Mid-1965

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SUBJECT

MILITARY THOUGHT (USSR): The Organization of Tank Technical Support in a Front Offensive Operation

SOURCE Documentary Summary:

The following report is a translation from Russian of an article which appeared in Issue No. 2 (75) for 1965 of the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal "Military Thought". This article is a review, by General-Major of Engineer-Technical Service S. Marasanov, of a book having the same title. Except that several points could have been treated more extensively, the reviewer finds little to disagree with, and his article summarizes and corroborates the main points of the book: the high mileage that tanks and related vehicles run up in an operation will probably cancel out technical improvements, and servicing demands will be as high as ever; providing parts will be a major logistics problem; many times it will not be possible to get repaired vehicles back to their units during the same operation; and recovery is most important lest slightly damaged vehicles be destroyed before being repaired. End of Summary

Comment:
General Marasanov was identified as a docent at the Frunze Military Academy at the time this article was written and as a member of the Military Collegium of the USSR Supreme Court which presided over the trial of Colonel Oleg V. Penkovskiy. He also wrote "Some Questions Concerning the Control of Technical Support" in Issue No. 3 (91) for 1970

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The Organization of Tank Technical Support
in a Front Offensive Operation
by

General-Major of Engineer-Technical Service S. MARASANOV

A monograph The Organization of Tank Technical Support in a Front Offensive Operation,* by General-Leytenant of Engineer-Technical Service A.S. KARPENKO, has appeared. It examines these problems in the organizing and carrying out of tank technical support: the servicing, repair, and recovery of armored equipment, the supplying of troops with armor materials, and also the planning and organization of control of tank technical support.

As far back as during the Great Patriotic War we had determined the importance of tank technical support, which, in essence, became one of the primary factors determining the survivability of tank troops. It was precisely due to the selfless work of the various technical service organs, and above all of the repair-and-recovery units and subunits, that tank troops were able to advance at high rates uninterruptedly for the entire depth of an operation. The number of tanks and self-propelled artillery repaired during combat actions was at times two to three times as great as the number of combat vehicles available in service at the beginning of the operation.

It is known that in a present-day operation the quantity of armored equipment in a front will be two to 2.5 times as great as it was in the past war and will reach 7,500 to 8,000 items or more. Furthermore, a considerable amount of the combat equipment of the other branch arms includes tanks as mobile mounts: an infantry combat vehicle is being introduced into service that will evidently have much in common with a tank from the point of view of its servicing and repair. All of this is increasing the role of technical support, which is becoming a key operational-technical factor.

* Candidate of Military Sciences, General-Leytenant of Engineer-Technical Service A.S. KARPENKO, The Organization of Tank Technical Support in a Front Offensive Operation, Published by the Military Academy of Armored Troops, 1964, 142 pages and 11 appendices.

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Tank troops will frequently have to conduct combat actions on terrain having high levels of radiation. A characteristic feature, especially for the initial period, will be the conduct of meeting engagements, which are characterized by high mobility, intensity, and fluidity. In the process, in the main theaters of military operations, attacking troops will have to make assault crossings over a considerable number of different water obstacles.

These and other specific characteristics of tank troop actions directly affect all aspects of technical support. There will be an increase in the intensity of actions and in personnel and equipment losses, it will become difficult to restore vehicles within a short period of time, to decontaminate equipment, and to prepare crews and tanks to make underwater assault crossings of rivers, etc.

Special difficulties are created for technical support of tank groupings operating a considerable distance away from the other front (army) forces. This brings up the problem of ensuring the maximum independence of the large units in the performance of certain tasks associated with organizing and carrying out the servicing, repair, and recovery of vehicles and of establishing a reserve of front repair-and-recovery forces and means.

The author of the work has researched all of these problems with adequate completeness, and they are unquestionably of interest.

Organizing the servicing of armored equipment. This organizing, as we know, provides for measures to prepare combat equipment for an operation and for its technical servicing during combat actions. These two important factors are dictated by the intensity with which vehicles are operated in a present-day front offensive operation. There is no doubt that in this case we take into account the nature of the operation, its scale, depth, and rates, the strength of the enemy resistance, the number and quality of enemy missile/nuclear and antitank means, the nature of the terrain, the meteorological conditions, and other factors affecting the technical servicing of combat vehicles.

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The method adopted by the author of calculating the probable intensity of operation of tanks cannot be faulted. True, the value of the coefficient of maneuver of a front on the whole, equal to 1.8 to two at high rates of advance when the march takes up a considerable part of the various types of troop combat activity, may seem somewhat excessive (page 24). But we must not forget that in a modern war, as we have already stated, there will be many meeting engagements. The experience of the Great Patriotic War has shown that, when defeating mobile enemy groups during meeting engagements, the coefficient of maneuver reached 2.5. We must add to this that in a future war, the troops, especially tank troops, will have to frequently go around sectors with high levels of radiation, rapidly concentrate in order to deliver joint attacks, and maneuver to exploit breaches in the operational disposition of enemy troops. Therefore, the value of the coefficient of maneuver may sometimes be even greater.

The author is correct in concluding that the mileage reserve of the main portion of tanks must not be under 2,500 kilometers and that for large units of interior military districts it must be 3,000 to 3,500 kilometers. This is a very serious problem, one which cannot be solved right away for our entire tank inventory and which, for a number of the models of tracked combat vehicles available among the troops, is altogether insoluble. But for the new makes of tanks and for a number of other types of vehicles, this problem has already been solved. The 15 May 1964 order of the Minister of Defense firmly established the mileage reserve until the next scheduled repair at which tanks can be kept. The mileage reserve of almost all vehicles of the combat and line groups ensures the capability of conducting a front operation to its entire depth without labor-consuming repair work during the operation. As concerns the vehicles of the training-combat group, which constitute approximately 10 percent of the overall number of vehicles, here the situation is far more complex, for these vehicles can have the most varied mileage reserves, and part of them may be undergoing medium or major repair, as well as awaiting repair. Evidently, it is necessary to restore the vehicles under running repair and carry out work to increase the mileage reserve of those vehicles which can participate in combat actions. These vehicles should be taken along. But the remaining vehicles, that is, those vehicles with small mileage reserves which require medium and major repair should be transferred on the spot to the front. We agree with



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the author that at times it will be expedient to leave a part of the vehicles of the training-combat complement in place "for subsequent contingents or in order to set up training units based on these vehicles (page 27)."

Tracks are still the "Achilles heel" of a tank and partly because of this, when the most suitable base for a particular type of equipment or special weapon is selected, preference is often given to a wheeled chassis. At the present time, tank tracks work reliably within a range of 2,000 to 2,500 kilometers, and those tracks with double sets of track pins work for up to 3,000 or 3,500 kilometers, that is, half the distance of the other assemblies of the tank.

We know that the tanks of the combat inventory are operated yearly for distances of up to 300 kilometers. It would appear that over a period of over 10 years they should, in terms of mileage reserve, satisfy the requirements made on them and operate without replacement of the tracks or repair. But in practice, over this period of time on all tanks of the combat inventory there occurs a gradual (as they come in) replacement of the tracks. This means that at any given moment of time we will find that on the vehicles of a combat group, having an overall mileage reserve of no less than 3,500 kilometers, there will be tracks which for all practical purposes cannot provide reliable operation to the limits of this running distance. Consequently, on very many tanks the tracks will have to be replaced during the operation or even while the troops are moving up to the combat actions area.

For this reason, tank technical support is faced with extremely complex tasks, in particular, the need to establish sufficient reserves of track and suspension parts and the best placement of these on paths of the probable actions of large tank groupings with due regard for possible situations when it is necessary to simultaneously withdraw many units and large units from battle for mass replacement of tracks; and a goodly amount of transport and personnel will be needed to transport them. Calculations show that, in the offensive operation of a war's initial period, with a total running distance of up to 2,300 kilometers for the tanks, a tank army will require, for the movement up to the front lines and for the conduct of the operation, 2,760 tons of tank tracks alone. There are other

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aspects of this problem which can be solved by way of design and production. For example, by considerably increasing the durability of the tracks up to at least 10,000 kilometers, by reducing their cost, by making repairs easier, etc. Regrettably, none of these problems has been solved in the work being reviewed.

We must remark on the importance of the problem of the technical servicing of vehicles during an operation. Modern T-55 and T-62 tanks considerably surpass in reliability the T-34 tanks and the initial series of T-54 tanks. Whereas, for example, on the initially issued T-54 tanks the air filter had to be cleaned under dusty conditions every 40 to 50 kilometers of running distance, on the T-55 tanks, regardless of operating conditions, this job is done after 1,000 to 1,100 kilometers of running distance. And similarly, the engine oil used to be changed every 1,000 kilometers of running distance, but now it is changed every 6,000 kilometers. All of this has resulted in a considerable reduction in technical servicing time, in an extension of the periods between servicing, and consequently, in an increase in the running distance of the vehicles between the two types of technical servicing.

But in the process, as shown in the work, even for the new vehicles, a crew must spend 45 to 50 hours in servicing its tank during an operation lasting 10 to 12 days. And we know that a tank crew, inside its vehicle 12 to 14 hours a day, needs rest and cannot accomplish all the servicing, especially the labor-consuming work. Obviously, a crew must receive assistance in the performance of technical servicing from repair subunits and units. This must be taken into account when determining the capabilities of repair means.

Labor-consuming work to service tanks and the replacement tracks on a large number of vehicles must be carried out when subunits, units, and large units are withdrawn to the second echelons or reserves and also in the areas which the troops reach after accomplishing the immediate or subsequent tasks of the front operation; individual jobs can be performed when repairs of any type are carried out.

The author correctly remarks that when new tanks are being designed and produced, we must strive for an even greater

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increase in the running distance of the vehicles between scheduled servicing and for a reduction in the time needed to accomplish servicing. This is not a new problem. At many conferences and in a variety of documents, troop representatives have repeatedly brought up this task, but as yet it is far from being accomplished. It seems that the demands on industry in this respect are not being formulated with the same precision and firmness as the demands concerning the principal combat specifications of the vehicles.

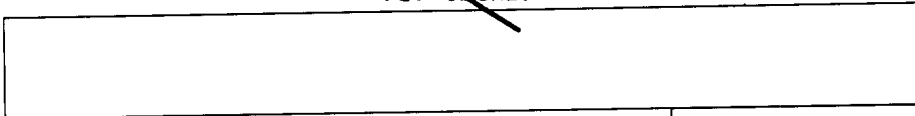
Organizing the repair of armored equipment. The author has examined in detail the causes of the vulnerability of armored equipment and has determined the anticipated breakdown of the vehicles, relying not only on generalized statistical data based on the experience of the Great Patriotic War, but also taking into consideration recent research on the vulnerability of tanks to present-day means.

The author also believes that, for technical reasons, it is now possible that a considerable percentage of the tanks will break down, despite the fact that in operating reliability they are noticeably superior to the tanks of the past war's period. It is difficult, of course, to make a judgement on this, but we must admit that the intensity with which equipment is operated in future operations may outweigh these factors. Experience with the long-distance marches carried out in 1964 in several military districts shows that the breakdown of vehicles for technical reasons was quite perceptible and therefore must be reckoned with.

The quantities of the possible losses in armored equipment from nuclear weapons and from conventional means of destruction are cited in the work: equipment requiring running repairs will range from 40 to 50 percent; requiring medium repair, 20 to 30 percent; major repair, five to ten percent; and irrecoverable losses, 20 to 25 percent (page 51). In this case, during an operation, in the author's opinion, from 14 to 16 percent of the tanks may break down every day while a front's immediate task is being fulfilled, and from eight to ten percent during fulfilment of the subsequent task.

There is no basis for disputing these data. However, we should approach them critically. The fact is that, frequently in

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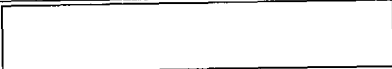
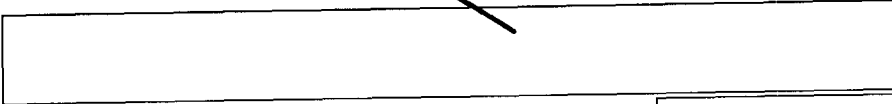


the conduct of exercises, the expected losses in tanks and in other combat equipment are planned beforehand by days of the operation or by tasks and then, during the exercise, the umpires "realize" these amounts in accordance with the operational-tactical situation. And if in the course of the exercise it is discovered that the losses have proved to be "short," then the directing body complicates the situation, which permits making the number of losses fit the average standard, which is usually taken to be 10 to 13 percent per day for tanks in the course of an offensive operation.

In a future war, one of the chief problems of tank technical support will be the repair of vehicles within short periods of time. Under conditions of high rates of advance, those tanks in medium repair for a period of at least two days will in actuality not always be able to catch up with their own units before the operation has ended. And as concerns major repairs, already in the past war they had no appreciable influence whatsoever on the combat effectiveness of the troops in a given operation. As the rate of advance increased, especially in operations of the concluding phase, there arose a need to decisively reexamine the organization of technical support that had developed. Unit and large unit repair means increasingly focused their attention on restoring the tanks in need of running repairs with the least amount of work and especially on providing help to the vehicle crews in performing the technical servicing of the combat equipment. That is why the opinions stated by many specialists concerning the advisability of freeing fronts from the performance of major repairs are not groundless.

As the author correctly states, when an operation is being conducted with a rate of advance of up to 100 kilometers a day, the working time repair means can spend in one spot without the risk of being separated by more than a day's march from the troops may be six to seven hours for regimental means -- which allows them to accomplish running repairs having a labor consumption that does not exceed 30 to 40 man-hours -- and up to 12 or 14 hours for division means. In the course of an offensive operation, divisional means can, without getting separated more than 50 to 60 kilometers from the battle formations, accomplish repairs requiring a labor consumption of up to 75 or 80 man-hours (page 69). In order to function successfully, the division's separate repair-and-rehabilitation battalion must set up





operations at two damaged vehicle collection points. But as we know, given the battalion's current organization, it is difficult to divide it into two technically independent units.

From the data presented it can be seen that, in the course of an offensive, none of the tactical means will be able to accomplish even running repairs that amount to more than 80 man-hours, not to mention medium repairs whose duration ranges from two to four days. Therefore, front repair means will be compelled to perform a considerable part of the running repairs, because at present neither a combined-arms army nor a tank army has its own organic repair means.

In a number of postwar exercises, a frequent practice was that of bringing in front mobile tank repair shops to perform medium repairs during the operation. And this is correct, for, when there are large numbers of tanks requiring medium repairs, it makes no sense at all to engage in major repairs, as this requires an extended time and the tanks will not rejoin the troops during the given operation. At the same time, on the basis of labor consumption, the shops can perform three medium repairs in place of one major repair. It appears all simple and clear.

But the mobile shops, as concerns their technological equipping, are designed to accomplish major repairs only. In our opinion, the organization and equipping of the shops should provide for the establishment of a sufficient number of work brigades capable of doing tank repairs under field conditions. Regrettably, this problem was not adequately worked out in the monograph, either. The author confined himself to merely suggesting that the organic structure of a shop should provide for the detailing of several companies to operate out of contact with it.

The monograph examines thoroughly the composition and capabilities of repair means based on the premise that the latter ensure the restoration during the combat actions of that portion of the damaged equipment which can actually be returned to service during the given operation.

In order to estimate the repair work capabilities of a front, it is suggested that we use a so-called coefficient of



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front repair means support, which, it is recommended, should fall within the limits of $K = 0.022$ to 0.025 for present-day conditions. This value means in practice that a front should possess a productive capacity, taking the mobile shops into account, within the range of 22 to 25 medium repairs per thousand rated items of armored equipment of the front. It should be recognized that the availability of such a coefficient simplifies calculations when an operation is being planned in a short period of time, and it should therefore be recommended for use in actual practice.

In this connection, it is considered that in a front, for each thousand items of armored equipment, rated in terms of medium tanks, given the accepted figures for vehicle malfunction (11 to 13 percent per day), there must be two to 2.5 battalions and one mobile repair shop per 1,500 to 1,800 items (page 65). Thus, when a front has 8,000 items of armored equipment, or approximately 7,300 items rated in terms of medium tanks, there must be, in addition to the repair battalions of the divisions, 15 to 17 front separate tank repair battalions and four to five mobile tank repair shops.

Analyzing the different methods of using front repair means during the past war, the author comes to the conclusion that "the most expedient thing was to set up strong front repair-and-recovery groups or repair centers to support the tank troop actions on the main axes, in conjunction with the operational subordination of a portion of the means to the combined-arms armies operating on other axes" (page 73). Such a center may be made up of two or three separate tank repair battalions, one recovery battalion (OBET), and other auxiliary subunits. Such a group of means must have its own staff with the necessary means of communications, which permits it to utilize to the maximum the units and subunits that are in its complement, increases efficiency, and simplifies control over them.

In connection with the lack in the armies of their own tank repair means, it has become especially important to correctly echelon the repair means of the front. That is why the recommendations presented in the monograph on the utilization of the front repair battalions deserve attention. But several problems remain unresolved.

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While accepting the author's statement that "the procedure for employing the repair battalions detailed to form a part of the groupings of front repair-and-recovery means will depend on the nature of the development of the operation, on the specific features of the terrain, and on the amount of equipment losses" (page 74), the reader would like to pursue this relationship more fully and would like to have recommendations on a number of the most typical variants which could be easily applied in a concrete operational situation. Obviously, it should have been shown what pros and cons the present-day rear services organization of a combined-arms or tank army has, wherein no provisions are made for organic tank repair means. The research we have carried out at the M.V. Frunze Academy in the course of a war game points to the fact that an army should have such means.

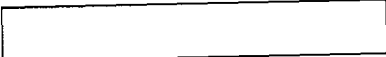
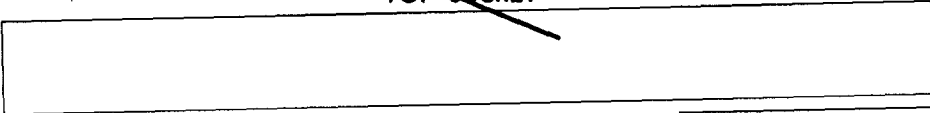
Organizing the recovery of armored equipment. It is well known that the recovery of armored equipment during the past war was one of the weakest points in troop technical support. Only towards the end of the war did it acquire a more or less developed form at all levels, from subunit up to front.

The experience of the war revealed that an insufficiently speedy recovery from the battlefield of tanks with sometimes insignificant damages results in their destruction, leading to an increase in the proportion of irrecoverable losses among the total number of damaged vehicles.

Under present-day conditions, recovery means are confronted with additional tasks -- participation in eliminating the aftereffects of an enemy nuclear attack and removing damaged combat equipment and crews from areas subjected to the effects of means of mass destruction. Here a new problem has arisen which did not exist previously: as a result of an enemy nuclear strike it may turn out that a considerable portion of the tanks are slightly damaged but their crews are completely incapacitated. That is why, as we know, in the postwar structuring of the armed forces, great attention has been focused on the problem of recovery. All types of ground forces formations, from a regiment to a front, have their own organic recovery means -- subunits or units equipped with modern prime movers and trailers.

In the opinion of the author of the monograph, during a front offensive operation, the number of tanks to be recovered

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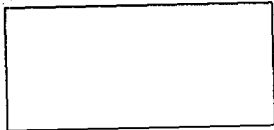


will amount to approximately 40 or 50 percent of the total number of vehicles put out of action, including 25 to 30 percent of the vehicles requiring running repairs, up to 70 percent of the vehicles needing medium repairs, as well as all the tanks requiring major repairs. At the front level, in order to recover the tanks and other tank-based equipment which can be restored during the operation, a front requires one recovery battalion for every 2,000 items of tracked armored equipment. This indicator can be used as a basis for calculations in planning technical support.

The author attempted to examine the recovery procedure at all levels, but has done so very incompletely. The reader will only find recommendations on the necessity for the centralized utilization of the recovery means of the large units and armies and on the possibility of reinforcing divisions by using an army battalion when operating on separate axes (under adverse terrain conditions) and also when division means are put out of action. As concerns the front recovery battalions, their main task will consist in concentrating at their own damaged vehicle collection points the vehicles which are to undergo medium repairs and have not been recovered by army means.

The problems of organizing recovery require further development, especially for the initial period of a war, when we may find ourselves without army or front recovery battalions. According to the experience of a number of postwar exercises, these join the complement of a front in six to eight days, that is, towards the end of the operation. That is why the author suggests that, to avoid the mistakes which occurred in the past war, the materials to equip the recovery battalions of border military districts be kept in long-term storage in the areas of their planned mustering. This will allow us to have quickly, in the very first days of the war, recovery units supporting the combat actions of the tank troops.

Organizing the supplying of the troops with armor materials. Probably it is no exaggeration to state that one of the basic factors which determined the amount of armored and motor vehicle-tractor equipment that was restored during the operations of the past war was the supplying of the troops and repair units with armor materials. This problem will become particularly acute in a future war.



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It should be noted that during the Great Patriotic War the problems of planning the supplying of troops with armor materials were not worked out adequately. And even at the present time these problems are numbered among the least developed aspects of technical support. Regrettably, in many operational exercises the supplying of armor materials is carried out superficially, in a most general manner, and at times merely for form's sake. In so doing, much conventionality is tolerated, as a result of which the genuine difficulties in solving the problem do not become evident. The calculations presented by the author in his work reveal that, in order to support a present-day front offensive operation, approximately 11,000 tons of armor materials are needed, if the replacement of track and suspension parts is taken into account.

In order to ensure rapid maneuver of such enormous reserves of armor materials, the author recommends that both the army depots and also the tank unit and large unit depots have organic truck transport of their own which will permit moving the authorized reserves of materials in a single trip. He also recommends having the necessary organic transport in the front depots.

On the whole, one can agree with this. But the fact of the matter is that, at present, only the motor transport of a regiment or division is capable of hauling all of its materials. Concerning army depots, which have approximately 200 tons of armor materials and up to 100 tons of motor vehicle-tractor materials, these materials can be completely taken only if the army has all of its authorized motor vehicle battalions according to wartime T/O&E. At present, the actual cargo capacity of army transport amounts to 25 or 30 percent of the above. If this situation does not change by the beginning of the war, there will be frequent cases of bringing in troop transport to deliver materials from the army depots and maybe even from the front depots. In our opinion, the problem of providing troops with armor materials, especially in the operations of the initial period of a war, requires a more profound and concrete resolution than the one presented in the monograph.

In conclusion, we would like to express a few wishes concerning the further working out of the problem as a whole and of certain particular questions of troop technical support which,

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in our opinion, have not been dealt with adequately in the work under discussion but which are of great importance in a modern war.

First of all, we should investigate in greater detail all aspects of tank technical support in the initial period of a war, examining them not so much from the point of view of the difficulty of getting them accomplished, but primarily on the plane of seeking realistic ways of overcoming these difficulties. The monograph devotes very little attention to the organization of the repair and recovery of wheeled armored personnel carriers. Regrettably, in most exercises, as in many theoretical investigations, the questions of technical support for this type of equipment are not being adequately worked out, neither along the line of the tank technical service nor the line of the motor vehicle-tractor service. What I have said also applies to a certain degree to the technical support for the various specialized equipment based on the tank (missile launchers, engineer equipment, etc.). There are many uncertainties here, and in exercises efforts are made to bypass them or to mention them only in passing.

The problems of controlling tank technical support means, particularly of organizing communications, especially when repair-and-recovery units and subunits are used in a decentralized manner, the processing of planning documents, including the use of standardized documents, and the utilization of present and future means of mechanization and automation in support of the technical service are examined to a certain degree in the work, but no concrete recommendations have been drawn up for the troops. There are also a number of other questions which await more profound working out: special features in organizing tank technical support under special geographic conditions, support for tanks making the assault crossing of water obstacles on the bottom, organization of the receipt of tank replacements, delivery of repaired vehicles to the units, use of heavy-duty trailers to transport tanks, organization of the fueling of tanks during an operation, etc.

Nevertheless, despite the fact that in this work many problems have not been fully dealt with and that some of them were merely stated, the author has made a good beginning in the field of researching the problem of tank technical support for

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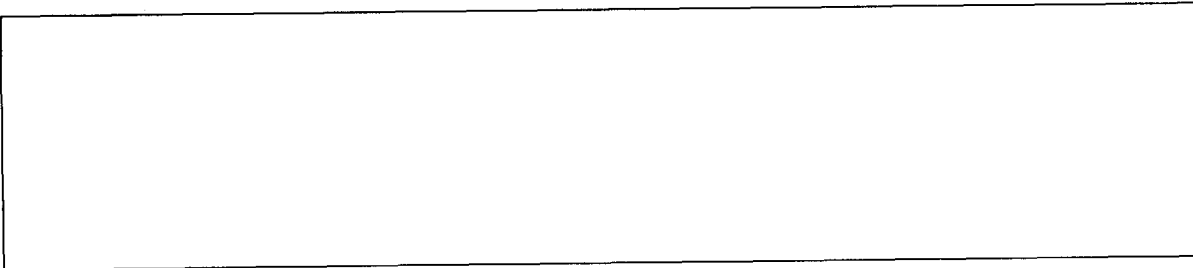
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front troops in a present-day offensive operation. This alone makes this book interesting and useful, not only to officers and generals directly supervising tank technical support, but also to all categories of command personnel of the military districts, groups of forces, and armies.



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