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CENTRAL INTELLIGENCE AGENCY
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13 May 1976

MEMORANDUM FOR: The Director of Central Intelligence

FROM : William E. Nelson
Deputy Director for Operations

SUBJECT : MILITARY THOUGHT (USSR): Engineer Support for the Assault Crossing of Water Obstacles in Army Offensive Operations

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 equipment and engineer requirements and capabilities for an assault river crossing and negotiation of smaller obstacles by combined-arms and tank armies on the basis of training exercises in the Carpathian Military District. Three tables are provided to illustrate the amount of crossing equipment required for one trip, its hourly performance, and the amount of time required for an army to cross on amphibious carriers and ferries. The author makes allowance for other variants to incorporate underwater tank crossings, and floating and low-level bridges, with the other equipment used in different combinations. This article appeared in Issue No. 2 (84) for 1968. [redacted]

[redacted]

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 E. Nelson

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Intelligence Information Special Report

COUNTRY USSR

DATE OF INFO. Mid-1968

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SUBJECT

MILITARY THOUGHT (USSR): Engineer Support for the Assault Crossing of Water Obstacles in Army Offensive Operations

SOURCE Documentary

Summary:

The following report is a translation from Russian of an article which appeared in Issue No. 2 (84) for 1968 of the SECRET USSR Ministry of Defense publication Collection of Articles of the Journal "Military Thought". The author of this article is General-Mayor of Engineer Troops I. Zhemchuzhnikov. This article examines equipment and engineer requirements and capabilities for an assault river crossing and negotiation of smaller obstacles by combined-arms and tank armies on the basis of training exercises in the Carpathian Military District. Three tables are provided to illustrate the amount of crossing equipment required for one trip, its hourly performance, and the amount of time required for an army to cross on amphibious carriers and ferries. The author makes allowance for other variants to incorporate underwater tank crossings, and floating and low-level bridges, with the other equipment used in different combinations. An amphibious-ferry crossing is considered less vulnerable than a bridge crossing, although bridges are more effective from the technical standpoint.

End of Summary

[redacted] Comment:

General-Mayor of Engineer Troops I. I. Zhemchuzhnikov has been identified as Chief of Engineer Troops of the Carpathian Military District. The SECRET version of Military Thought was published three times annually and was distributed down to the level of division commander. It reportedly ceased publication at the end of 1970.' [redacted]

ENGINEER SUPPORT FOR THE ASSAULT CROSSING OF WATER OBSTACLES IN ARMY OFFENSIVE OPERATIONS

by
General-Mayor of Engineer Troops I. Zhemchuzhnikov

One of the conditions for the successful development of an offensive in modern operations is, as is known, engineer support for the assault crossing of water obstacles. Considerable importance has been attached to a study of this problem in the Carpathian Military District; it is being worked out in many command-staff exercises and exercises with troops.

In this article we should like to present, on the basis of the experience of a front command-staff exercise, some comments regarding possible variants of calculations in expanded form for a crossing by combined-arms and tank armies of a water obstacle 400 meters wide in the course of an offensive operation during the low water level period.

In keeping with the overall operational situation, one combined-arms army and one tank army advanced in the first echelon of the front. On the average, they had to make an assault crossing of two rivers (one wide and one of medium width) during each 24-hour period; the rivers were separated by over 50 kilometers. Many additional small water obstacles also had to be negotiated. The combined-arms army consisted of three motorized rifle divisions and one tank division; the tank army had four divisions. In both armies, three divisions made the assault crossing of the river. In the interests of maintaining the set rate of advance, the forward detachments consisting of reinforced motorized rifle or tank regiments had to be moved across within an hour and a half, and the main forces of the motorized rifle and tank divisions had to be moved across within four to five hours. The amount of equipment moved across in the reinforcement units amounted to about 20 percent of the equipment in each echelon. When the speed of the current was 1.5 meters per second, trips across lasted 15 minutes on K-61 amphibious carriers and PTS amphibious carriers, and 20 minutes on GSP

tracked self-propelled ferries and ferries. The number of crossing means required to move the divisions across in one trip which we used in calculating the combat equipment is shown in Table 1.

In our calculations we assumed that the following number of means were available to the troops:

tank division: six K-61's, six PTS's and six GSP's;
motorized rifle division: four K-61's, four PTS's, one quarter of a TPP heavy pontoon bridge set;
army assault crossing battalion: 18 K-61's, 18 PTS's, 18 GSP's.

Table 2 gives the hourly performance of these means in the amphibious-ferry variant.

Table 3 indicates the amount of time (in hours) in which the crossing of an army can be ensured in the amphibious-ferry variant based on these data and the use of the crossing means of the second-echelon division (when it begins to cross) and half of the 50 to 60-ton ferries available for tanks.

The technical calculation, which was made without taking losses of crossing means into account, shows that in the amphibious-ferry variant a 400-meter-wide river can be crossed by the tanks of a combined-arms army in 11 hours on the army's organic means, and that the rest of the equipment (not including rear units) can cross in 20 hours on PTS's, K-61's, and one-quarter of the ferries from the PMP and TPP pontoon bridge sets. However, if the enemy employed two or three nuclear warheads in the army zone against the areas of the crossings for the purpose of disrupting the assault crossing (which is feasible from an analysis of his capability), then up to 20 to 30 percent of all the crossing means could be put out of commission during the assault crossing by the first echelon. At such a time the total crossing time for the tanks of the main forces of the army could take up to 15 hours, and for the rest of the equipment, up to 27 hours on K-61's, PTS's and ferries from the PMP and TPP pontoon bridge sets. These times, however, urgently require that composite bridges or low-level bridges be put into use in a timely manner.

If conditions permit the preparation of six routes for underwater driving of tanks (two routes per division in the first echelon) in the zone of the combined-arms army within 1.5 hours, then the crossing of the units of the tank division can be made in 4.5 hours, and that of the tanks of the motorized rifle divisions in three hours, provided GSP's are used for the forward detachments. On the whole, large units of the first echelon of the army will arrive on the opposite shore in six to seven hours from the time the assault crossing is initiated. In this case all the army's other equipment can be moved across in 13 to 15 hours on K-61's (PTS's) and 50-to 60-ton ferries (with 20 to 30 percent loss of these means taken into account). The tanks belonging to the division in the second echelon of the army will be taken across by GSP's and by means of the underwater routes prepared by the divisions of the first echelon, or on bridges.

If, in place of the ferries, the army can set up a 60-ton floating bridge consisting of two PMP sets within 1.5 hours after the initiation of the assault crossing, then the crossing can be accelerated by two to three times, but there is increased danger of casualties to the troops being moved across and destruction of the pontoon bridge means by the enemy. For this reason, laying a single floating bridge longer than 400 to 500 meters is not always advisable. It is more advantageous, in our opinion, to lay two or three composite bridges within five or six hours after the initiation of the assault crossing by extensively employing low-level trestles on pile supports for this purpose. An army that uses three or four bridge-building rigs for each bridge erected in the assault crossing sectors of a wide river can ensure the construction of two or three low-level bridges or trestles for composite bridges at a rate of 20 linear meters per hour and more if it has at least half of the required number of portable ready-to-assemble structural components for the low-level bridges.

At the same time we must point out that the crossing of troops, particularly of the second echelons of the divisions and army, on amphibious means and ferries is not the best solution. This requires the wide dispersal of the troops along the assault crossing front, complicates the organization and control of the crossings and troops, breaks up their march and battle formations, and slows down the movement of the troops into the assigned areas for the accomplishment of combat tasks. For this

reason, whenever the conditions of the situation and the availability of crossing means permit, bridge crossings, particularly for 60-ton loads, must be prepared in all cases, especially composite bridges.

Because of the peculiarities of the assault crossing of a water obstacle by a tank army, as compared with a combined-arms army, the following must be pointed out. It will take about 14 hours for a crossing by tanks on tracked self-propelled ferries and half of the 50 to 60-ton ferries from the PMP and TPP pontoon bridge sets (possible losses of crossing means not taken into account). This time, however, can be cut to one-half or one-third if a 60-ton bridge is laid within 1.5 hours after initiation of the assault crossing. This is more advantageous, but more dangerous from the point of view of vulnerability to enemy strikes.

Thus, when crossing means are maneuvered skilfully along the front and from the depth, when all available methods of moving troops across are employed, and when pontoon bridge sets are freed in a timely manner by the construction of low-level bridges and the utilization of captured enemy crossing means, the organic crossing means of divisions and of a combined-arms (or tank) army primarily can ensure the assault crossing of one wide water obstacle as well as the negotiation of the small obstacles on the approaches to it -- which are spanned by vehicle-mounted treadway bridges and bridges made from local materials -- within a 24-hour period. For the subsequent assault crossing of a second medium-width river along a broad front, the army must be reinforced by a minimum of one pontoon bridge battalion with a PMP set, a company of tracked self-propelled ferries and a company of amphibious carriers. If the tanks can be driven underwater, a combined-arms army and a tank army will be able to make an assault crossing of two rivers (including one wide river) independently by maneuvering the crossing means and making extensive use of low-level bridges and trestles.

Regarding the capabilities of organic crossing means, we must also take the following into account. If an extensive network of roads is already present -- as, for example, in the Western Theater of Military Operations where for each 100 square kilometers of terrain there are 75 to 125 kilometers of roads -- a great many column routes need not be laid on the approaches to

water obstacles, since the troops can comparatively easily circumvent destroyed sections of roads and contaminated zones, except in mountainous areas. On the routes by which troops are moving toward the assault crossing sectors, primarily the negotiation of streams and shallow rivers, over which the bridges may be destroyed, must be ensured. The troops will negotiate such small water obstacles by fording or by means of organic bridge-laying tanks, vehicle-mounted treadway bridges and bridges built from local materials.

Experience in the use of crossing and bridging means in 1964-1967 exercises with the troops of the Carpathian Military District shows that in a 24-hour period of the offensive the MTU bridge-laying tanks and the TMM vehicle-mounted heavy bridges (or KMM vehicle-mounted treadway bridges) can be used two or three times, whereas one-quarter of the TPP heavy pontoon bridge set and half of the PMP pontoon bridge set can be used only once or twice. In this case, if a combined-arms army with four divisions (one a tank division) has 18 MTU's, 14 KMM's, 12 TMM's, and three-quarters of a TPP set, while a tank army of four divisions has 24 MTU's, eight KMM's, and 12 TMM's, the negotiation from the march of any small water obstacles, up to 70 meters wide, encountered on the routes for moving the troops to wide rivers can be guaranteed. However, in order to ensure the timely movement of these means to the next rivers, the troops require an increased number of TMM's, which must be distributed one set to each regiment or brigade in place of the KMM's, as well as two sets of TMM's in the combat engineer battalion of each division.

In planning the assault crossing of water obstacles we must remember that organic and attached table of equipment crossing means can be used at full rated capacity under specific conditions only for a short time. Local materials and means (timber, ready-to-assemble structural components, enemy pontoon bridge sets, ferries, barges) should be used along with these means to prepare crossings; this was done extensively during the last war.

In order to guarantee the survivability of the crossings (for the purpose of camouflage) the forces and means of all the bridge-building subunits must construct, from local materials, main, alternate and dummy trestles for low-level bridges along the entire front of the assault crossing.

The assault crossing of several water obstacles from the march in the course of an operation at a rate close to the rate of advance of the troops can be guaranteed only if all forms and methods of crossing, primarily bridges, are used skilfully and if tanks are driven under water.

Bridge crossings are most effective from the point of view of technical capabilities. However, in view of the limited number of pontoon bridge sets in the armies at the present time, the erection of bridges over rivers that are 400 meters or more wide will not be done frequently, particularly bridges with a load capacity of 60 tons. Moreover, the threat of enemy use of nuclear weapons makes it more difficult to ensure survivability and maintain the bridges. For this reason, during the assault crossing of wide rivers, an amphibious-ferry variant is best for the first echelons of the armies. For the second echelons bridge crossings in the form of composite bridges will be built with the floating portion committed for short periods of time, preferably during hours of darkness or under other conditions of limited visibility.

As far as the crossing of tanks under water is concerned, this method has been well mastered during recent years and is employed on a large scale by the troops. Moreover, it has been determined that the routes for driving tanks under water can be completely reconnoitered and prepared even in sections of wide rivers. For example, on the Rhine River during the low water level period such routes can be tentatively reconnoitered west and south of Mainz, south of Gernsheim, Worms and Germersheim. In the flood period, however, when the rate of current, depth and width of the rivers in the Western Theater of Military Operations increase sharply, in most cases it is impossible for tanks to cross under water.

In view of this, a crossing by troops must be planned in several variants: an amphibious-ferry-bridge variant (with tanks driven under water); an amphibious-ferry variant (with or without underwater crossing by tanks), with subsequent employment of composite bridges not later than five or six hours after the assault crossing of the river is initiated.

In conclusion, it must be said that increasing the capabilities of combined-arms and tank armies to conduct engineer

reconnaissance of water obstacles and a troop crossing requires speeding up the development of vehicles for reconnoitering rivers and obstacles on the shore and in the water. Motorized rifle and tank divisions should have in their tables of equipment half of a PMP set, and each pontoon bridge regiment should contain six pontoon bridge companies with three PMP sets. Moreover, engineer bridge-building subunits should have for each bridge-building rig two or three heavy-load trucks with trailers for transporting prefabricated bridge structural components. This will give armies the ability to independently make an assault crossing of one wide and one medium-width river in succession within a 24-hour period without being reinforced with means from the front (or with little reinforcement).

Table 1

Echelons of the combined-arms army to be moved across	Total pieces of equipment	Required crossing means, by types			
		K-61 amphibious carriers	PTS amphibious carriers	50-60-ton ferries	GSP tracked self-propelled ferries
First echelon (two motorized rifle divisions and one tank division with means of reinforcement)	6,653	2,060	3,060	555	978
Second echelon (one motorized rifle division with means of reinforcement)	2,334	740	1,100	192	302
Army rear units	1,300	200	1,000	100	---
Total:	10,287	3,000	5,160	847	1,280

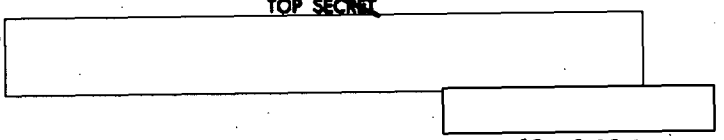

Table 2

Army echelons to be moved across	PTS amphibious carriers and K-61 amphibious carriers	50-60-ton ferries	GSP tracked self-propelled ferries
First echelon	256 pieces of equipment weighing five to ten tons	78 tanks or 276 other pieces of equipment	72 tanks
Second echelon and the rear units	288 pieces of equipment weighing five to ten tons	87 tanks or 294 other pieces of equipment	72 tanks

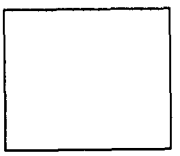

Table 3

Army echelons to be moved across	By K§61, PTS, and one-quarter of the ferries from the PMP pontoon bridge set and TPP heavy pontoon bridge set	On one-quarter of the ferries from the PMP and TPP pontoon bridge sets	On GBP and one-half of the ferries from the PMP and TPP pontoon bridge sets
First echelon	5,120:325 = 15.4	535:69 = 8.0	978:(72+32)=9.4
Second echelon	1,840:362 = 5.1	192:73 = 2.5	302:(72+39)=2.6
Rear units	1,200:362 = 3.3	100:73 = 1.4	---
Total:	23.8 hours	11.9 hours	12.0 hours