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CENTRAL INTELLIGENCE AGENCY
WASHINGTON, D.C. 20505

27 September 1974

MEMORANDUM FOR: The Director of Central Intelligence

SUBJECT : WARSAW PACT JOURNAL: Ways of Increasing the Combat Readiness and the Combat Capabilities of the Equipment of Surface-to-Air Missile Troops

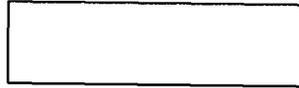
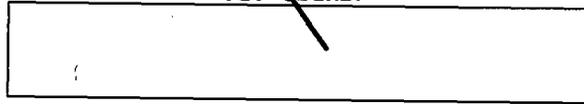
1. The enclosed Intelligence Information Special Report is part of a series now in preparation based on articles from a ~~SECRET~~ Soviet publication called Information Collection of the Headquarters and the Technical Committee of the Combined Armed Forces. This article summarizes the results of a conference held in 1973 by command personnel of the surface-to-air missile troops of air defense of the Warsaw Pact countries concerning the maintenance and repair of the equipment of surface-to-air missile troops. Primary attention at the conference was devoted to questions of further improvements in the combat readiness and capabilities of such equipment. Included in the topics discussed were: ensuring the accelerated transition of surface-to-air missile systems to a state of readiness to conduct fire, shortening the time required for the stockpiling of missiles at launching sites, and modernization of surface-to-air missile systems. This journal is published by Warsaw Pact headquarters in Moscow, and it consists of articles by Warsaw Pact officers. This article appeared in Issue No. 6 for 1974.

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

David H. Blee

Acting Deputy Director for Operations

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Intelligence Information Special Report

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COUNTRY USSR/WARSAW PACT

DATE OF
INFO. 1970 -1973

DATE
27 September 1974

SUBJECT

WARSAW PACT JOURNAL: Ways of Increasing the Combat Readiness and the
Combat Capabilities of the Equipment of Surface-to-Air Missile Troops

SOURCE Documentary
Summary:

The following report is a translation from Russian of an article from a SECRET Soviet publication called Information Collection of the Headquarters and the Technical Committee of the Combined Armed Forces. This journal is published by Warsaw Pact Headquarters in Moscow, and it consists of articles by Warsaw Pact officers. This article was written by Engineer General-Mayor L. Leonov and Engineer General-Mayor O. Telen. This article summarizes the results of a conference held in 1973 by command personnel of the surface-to-air missile troops of air defense of the Warsaw Pact countries concerning the maintenance and repair of the equipment of surface-to-air missile troops. Primary attention at the conference was devoted to questions of further improvements in the combat readiness and capabilities of such equipment. Included in the topics discussed were: ensuring the accelerated transition of surface-to-air missile systems to a state of readiness to conduct fire, shortening the time required for the stockpiling of missiles at launching sites, and modernization of surface-to-air missile systems. This article appeared in Issue No. 6 for (1974)

End of Summary

Comment:

One General-Mayor L. M. Leonov published an article in the Anti-Air Defense Herald concerning "High Qualification of Technical Inspections" (Issue #3, 1971).

One General-Mayor L. Leonov published two articles in the Herald of Air Defense: "The Training of Radar Operators" (Issue 12, 1971, page 64), "Checking State of Equipment" (Issue #8, 1973, page 67).

No information is available on a General-Mayor O. Telen.

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Ways of Increasing the Combat Readiness and the Combat
Capabilities of the Equipment of
Surface-to-Air Missile Troops
(From conference materials of the command personnel of the
surface-to-air missile forces of the Warsaw Pact countries)
by
Engineer General-Mayor L. Leonov
Chief Engineer of Surface-to-Air Forces of Air Defense
of the Country (USSR)
Engineer General-Mayor O. Telen
Department Chief of the Technical Committee
of the Combined Armed Forces

In 1973 a conference was held of the command personnel of the surface-to-air missile troops of the air defense of the Warsaw Pact countries concerning the maintenance and repair of the equipment of surface-to-air missile troops.

Primary attention at the conference was devoted to questions of further improvements in the combat readiness and capabilities of the equipment of surface-to-air missile troops. As is known, by combat readiness we mean the ability of large units, units, and subunits to enter into battle with the enemy in an organized manner in an extremely short period of time, and under any conditions, to carry out an assigned task.

To maintain the combat readiness of surface-to-air missile troops it is very important to ensure a maximum reduction in the time needed to prepare surface-to-air missile systems for the conduct of fire.

In this article, the conference materials on these questions are summarized.

Ensuring the accelerated transition of surface-to-air missile systems to a state of readiness to conduct fire. The time required for bringing surface-to-air missile systems to readiness for the conduct of fire is

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determined by the technical capabilities for attaining normal operating conditions for the equipment of guidance stations and missiles. This time period may be shortened by more efficient methods of preparing equipment for battle (the accelerated switching on of diesel power stations, the non-execution of complete equipment function checks and, in certain cases, the non-execution of all such checks).

In order to speed up the switching-on of diesel power stations, the engine liquid coolant and oil temperatures must be maintained constant and no lower than 37 degrees centigrade. Some armies have built tubular electric heaters (TEN-OZA) into the oil tanks of diesel power stations. When no such equipment is available oil temperature is maintained by periodically switching on a heater, OV-65, powered by an AD-30 unit of a van from the rocket troops or from a repeater substation.

In exceptional cases, starting the diesel engine and bringing the diesel power station up to 100 percent capacity in 40 to 60 seconds may be accomplished when the coolant and oil temperatures are above 20 degrees centigrade. In such cases, it must be remembered that such a highly accelerated starting of a diesel power station causes increased wear on the engine and should be resorted to only when absolutely necessary.

Experience in the maintenance of surface-to-air missile system equipment in the allied armies indicates that reducing the amount of control data facilitates bringing the diesel power station to combat readiness. For example, this allows for a three-fold reduction in the time needed to bring the Volkhov and Dvina surface-to-air missile systems to readiness to open fire when powered by a diesel power station, and a two-fold reduction when powered by electrical transmission lines; and there is a two-fold reduction of time for the Neva surface-to-air missile system equipment when powered by a diesel power station, and a reduction by one and one-half times when powered by electrical transmission lines.

It should be noted that industry is also taking steps to ensure the accelerated preparation of equipment for combat use. For example, the V-755 missiles for the Volkhov systems and the 5V27u missiles for the Neva systems which are presently being supplied to the troops, are capable of being brought quickly to a condition of launch readiness.

Shortening the time required for the stockpiling of missiles at launching sites. Shortening the time required for the stockpiling of missiles at launching sites is of great importance in increasing the combat capabilities of surface-to-air missile troops and ensuring a high degree of

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readiness to repulse massive enemy air attacks.

The experience of air defense forces of several allied armies indicates that this is attained by locating a reserve of missiles, with their warheads and charged with air, in heated structures at or near the launching sites. Such an arrangement is advisable for the following reasons:

- the main missile reserve is located in combat subunits, i. e. , in the surface-to-air missile battalions;
- it eliminates the transport of missiles by road, which, during combat operations, may result in their being put out of action;
- the missile reserve is dispersed over several storage points, thus increasing the viability of groupings of surface-to-air missile troops.
- the time for the preparation of missiles for combat use is reduced overall by expanding the participation by personnel in the work (missiles are readied not only in one subunit, the technical battalion, but simultaneously in all the surface-to-air missile battalions, as well as in the technical battalion).

The accuracy of such assertions is confirmed by the experience in the Vietnam war. When active combat actions began, there were from 12 to 18 fully readied missiles on the launching sites, which ensured the uninterrupted conduct of fire for the repulsion of massive strikes by attacking aircraft. ~~In view of the continuous patrolling by enemy aviation of the deployment areas of a technical battalion, the technological work stream was curtailed and, in a number of instances, was impossible to conduct. Taking into account the considerable distances separating the technical battalion from the surface-to-air missile battalions, as well as the destruction of roads, the problem of supplying missiles to the surface-to-air missile battalions was resolved by setting up reserves near them.~~

It should be noted that storage of missiles in heated structures at the launching sites ensures the following: a longer period for the servicing of missiles; the opportunity to carry out in advance the assembly, warhead installation, and the charging with air by qualified crews of the technical battalion doing high-quality work under favorable conditions; and the reduction to a minimum of the work performed by surface-to-air missile battalion crews (their only responsibility consists of fueling the missile of the Volkhov system with fuel components and connecting the plugs of the igniter squibs in the Nava system):

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It should be particularly emphasized that checks on missiles housed in the surface-to-air missile battalion structures are scheduled so that the missiles may be issued at the launching site with no checks at the control and testing mobile unit.

In surface-to-air missile battalions, the work of preparing missiles stored at missile technical servicing posts (PTOR) takes no more than two hours. In order to reduce this time it is advisable that each surface-to-air missile battalion utilize the maximum number of personnel who have had preliminary training on the technological work stream of the missile technical servicing post.

Experience shows that the optimal organization of the technological stream of the missile technical servicing post is to have two work areas and crews at each of the main launching pads (the two stream version). This arrangement of work areas (wing installation, filling with oxidant and fuel) thus allows for the use of two semi-trailers and simultaneous work on two missiles; and in the reloading area, it is possible to position and prepare one semi-trailer at the same time that work is being performed at the other one.

A current view favors the transfer from the technical battalion of two tractor-trucks to each of the surface-to-air missile battalions for the transport and loading vehicles PR-11A (B). This will eliminate work stoppages at the missile technical servicing posts.

An S-125 surface-to-air missile battalion on combat duty may have eight missiles at the launching site as a first unit of fire.

We must solve the problem of reducing the stockpiling time for the second unit of fire for these systems. Experience shows that this reduction of time is only attained by building heated structures where missiles are stored on PR-11A transport and loading vehicles, or on special racks where missiles can be reloaded without the use of cranes. The reason for this is that all the work in surface-to-air missile battalions in preparing 5V27 missiles for combat use (warhead installation, air charging, connecting the umbilical cords and pyrotechnic cartridges of the sustainer engine) is done in advance, and, therefore, there is no possibility for shortening the missile preparation time by reducing the time spent on technological operations.

A few words about the procedure for the storage of a missile reserve at the missile technical servicing post of a surface-to-air missile

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battalion.

For the Volkhov systems, three types of storage are possible:

--on the PR-11A (B) transport and loading vehicles, the missiles are loaded, mated, and charged with air; they are not filled with oxidant or fuel; launch igniter squibs are installed on the booster engine, and the igniter squib plug is not connected;

--on the TST-115 handling trolleys, the booster engines are charged and connected to the sustainer unit, and wings and stabilizers are installed.

--on special racks, the booster engines are also connected to the sustainer unit; wings, and stabilizers are installed.

For the Nava systems, there are two types of storage:

-- on the PR-14A transport and loading vehicles, the sustainer and booster engines are charged, the missiles are filled with air, the igniter squibs of the sustainer and booster engines are charged, and the sustainer engine plugs are connected; only the plug of the igniter squibs of the booster engine is left unconnected.

--on special racks which resemble the girders of launchers, the missiles are filled with air, they are fully charged and the plugs of the igniter squibs of the sustainer engine are connected.

In order to increase the combat readiness of the surface-to-air missile troops in the Hungarian People's Army, the technical service was reorganized: a technical maintenance unit was added to the regiment and missile preparation groups were created in the surface-to-air missile battalions. Units received the new T-66 device for filling missiles with oxidant (three minutes to fill) and Ch-705 transport vehicles of Hungarian manufacture. Missiles may be stored and transported on this vehicle. For storage, a K-72 trolley was prepared to handle two missiles.

In the Polish Air Defense Forces, in order to eliminate possible interruptions in missile deliveries from technical battalions to surface-to-air missile battalions, there are non-organic, trained combat crews which are capable of preparing missiles (assembly, and filling with oxidant and fuel) at the firing sites of these surface-to-air missile battalions.

Missiles stored in the surface-to-air missile battalions are in a state of full or intermediate readiness. Seventy-five percent of the units of missile fire on the launchers and on the transport and loading vehicles

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are in full readiness, while the remaining units of fire are in the storehouses in a state of intermediate readiness. Special heated structures have been built for such storage in the surface-to-air missile battalions. These structures contain lifting equipment for loading and unloading missiles and racks for storage in assembly stages I and II. Missile wings and stabilizers are assembled in these structures after they are loaded on the transport and loading vehicles.

Upon declaration of full combat readiness, the missile reserve in the technical battalions and on the launching sites is dispersed over an area up to 5 kilometers in radius. To accomplish this, transport and loading vehicles are used, along with special PS-6R transport vehicles, which consist of a semi-trailer and prime mover which also serve as mobile missile storage depots. The latter prevent missile storage under field conditions and in fixed structures without reloading onto racks. Each surface-to-air missile battalion has from two to four PS-6R vehicles.

The final preparation of missiles for combat use consists only of transferring them to the transport and loading vehicle, attaching wings and stabilizers, fueling and connecting the plugs of the igniter squibs of the engine.

To increase the combat readiness and combat capabilities of surface-to-air missile battalions, changes were made in the procedure for the storage and preparation of missiles. Thus, in the air defense troops of several armies, the basic work in the storage and preparation of missiles is concentrated in the technical companies which are part of the complement of the surface-to-air missile battalions and which are located near the firing sites. The allocation of missiles in the technical and surface-to-air missile battalions was changed. Thus, if formerly 20 percent of the missiles were stored in the surface-to-air missile battalions, now the figure is 40 to 60 percent.

The planning and conduct of frequent periodic technical servicing. In the overall framework of measures for maintaining continuous combat readiness of the air defense forces of all the allied armies, special attention is given to frequent technical servicing. The reason for this is that the combat readiness of the missile guidance station, the launch equipment and the system as a whole, and also the preservation of their combat and operating characteristics over an extended period, depend upon such servicing, especially in the mechanical assemblies.

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Frequent periodic technical servicing may be annual, semi-annual, or seasonal. The planning for servicing is done at the formation and large unit level in conformance with the number of surface-to-air missile systems, the climatic conditions, their deployment, the combat firing plan, etc. Depending upon these conditions, a determination is made of the number of surface-to-air missile systems at which semi-annual (annual) periodic technical servicing is to be performed simultaneously. Because the servicing time is limited (for example, for annual work, 35 to 49 hours, depending on the type of system), there must be thorough and comprehensive preliminary preparation.

According to experience, this preliminary phase of periodic technical servicing continues for at least 10 days and includes:

- preparation of work schedules according to systems;
- study by personnel of the technical charts and operating instructions;
- detection of equipment defects, and determination of the necessity for, and the degree of, dismantling of mechanical and electromechanical assemblies;
- preparation of work areas, provision for tools, devices and expendable materials;
- conducting study sessions and testing personnel on their knowledge of operating instructions and technical charts.

While the work is going on, daily results are compiled and assignments made for the following day.

At the end of each working day, the systems are brought to a condition of combat readiness.

When conducting annual (semi-annual) periodic technical servicing, workshop units are brought in and, when necessary, highly qualified officers from other battalions of the unit.

The periodic technical servicing and technical maintenance of the equipment of a technical battalion are carried out according to separate schedules and performed in turn upon each unit of equipment; because of this the combat readiness is assured of at least one technological stream of the technical battalion.

Periodic technical checks of missiles located in long-term storage is organized so that if they have to be delivered to surface-to-air missile

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battalions, their preparation for combat use is carried out without having to check the missile on the control and testing mobile unit.

Work on discovering additional combat capabilities of surface-to-air missile system equipment. The complexity of surface-to-air missile armament, along with its inherent high capabilities, demand continuous creative efforts on the part of the personnel of surface-to-air missile troops in discovering additional combat capabilities in the equipment of surface-to-air missile systems. The surface-to-air missile systems Volkhov and Neva, in particular, have additional capabilities for firing at targets which fly below the level of the launching site.

Training exercise experience has shown that when groupings of surface-to-air missile forces are deployed in mountainous regions and on maritime axes, it is possible to fire upon targets flying at negative sighting angles relative to the launching site: for the Volkhov systems up to minus 3 degrees; and for the Neva systems, up to minus 2 degrees.

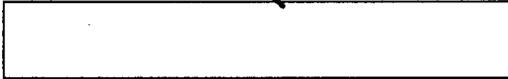
Recently revealed capabilities permit the locating of the surface-to-air missile systems Volkhov and Neva at 450 and 230 meters above ground level respectively. In this way, the entire depth of the low altitude kill zone can be reached while maintaining the present probability of destruction.

To destroy low altitude targets only on the extreme perimeter of the kill zone, and with the present probability of destruction, the systems may be positioned above the ground level: the Volkhov, up to 1300 meters; and the Neva, up to 400 meters.

Modernization of surface-to-air missile systems. Experience in the operation of the Dvina, Volkhov, and Neva surface-to-air missile systems revealed their high reliability and capability for extended use. With a view to expanding their combat capabilities and increasing their combat readiness, modernization of this armament is being carried out. In the process, broad use is being made of the experience of the combat employment of surface-to-air missile systems gained in the Democratic Republic of Vietnam and in the Arab Republic of Egypt, as well as experience in the use of this armament gained by the air defense forces of the Soviet Union and Warsaw Pact countries.

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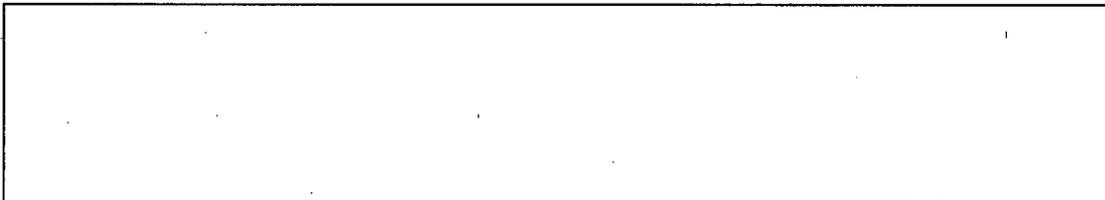
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Modernization of systems may be realized along the following basic lines: expansion of the kill zone as regards depth and altitude; increase in the effectiveness of combat with low-flying targets and in the protection from various forms of radio jamming; deception of the enemy regarding the operating methods of guidance stations at the moment of missile launch; reducing the time required for attaining a state of combat readiness, increasing the reliability of equipment operation; expanding the combat capabilities of a system grouping by maintaining their operation in a system of automatic control of surface-to-air missile systems (ASURK-1 ma); training, and monitoring the training, of operators to work under the complex conditions of modern warfare in which the enemy employs various types of radio jamming.

The conference showed that the surface-to-air missile troops of all the armies of the Warsaw Pact countries are conducting intensive creative work to further increase the combat readiness of surface-to-air missile equipment.



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