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NVA TROOP ANTIAIRCRAFT DEFENSE

by

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EDITED TRANSLATION

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ABSTRACT: With the rapid development of various types of military aircraft, the demands have increased for more responsive antiaircraft equipment with a higher degree of maneuverability, greater range, accuracy, and dependability. Following a listing of requirements of improved antiaircraft artillery to match new developments in aircraft speed, high- and low-altitude flight, and maneuverability, a detailed description is given of the following equipment: (1) 14.5-mm-Fla-MG-Vierling, with a quadruplet-barrel turret, (2) 23-mm-Zwillingsflak, a twin-barrel flak gun, (3) 57-mm Flak, and (4) 100-mm-Flak. For each weapon, data include range, accuracy, and group maneuverability. Orig. art. has: 7 figures.

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NVA TROOP ANTIAIRCRAFT DEFENSE

W. Schäfer

The rapid development tempo of military aviation keeps placing higher requirements on antiaircraft measures. Observation balloons and barrage balloons for protection from air attacks sufficed at the beginning of World War I, thus today there is the task of protection against any air attacks with all available means at one's disposal. The fact alone that any suddenly appearing hostile flying body can be a carrier of nuclear weapons emphasizes this necessity.

The main task of the troop antiaircraft defense consists in dependable protection and the concealment of troops and military installations against the enemy in the air. By means of the modern antiaircraft equipment and its manifold employment compared with World War II a completely new quality of antiaircraft defense became necessary.

1. Requirements on the Troop Antiaircraft Defense

The enemy's tactical air forces operate first-rate at low altitudes (as a rule below 1000 m) and at high velocities. This places especially high demands on the antiaircraft defense of troops in that their target is located only for a short time in the radar station's finding range or in the line of sight. Thus the antiaircraft means have to be in firing position after detecting and identifying the target and must possess high directional and starting speeds in order to combat the target with the highest possible fire density. Directional velocities are required which are between 20 and 60 °/s. The high fire density

is attained by means of the high rate of fire and the use of multi-barrel systems, especially in the case of the Fla MG. It is similar to the antipersonnel guns. In addition, they are concentrated in trains and batteries.

Even when these demands are met, air targets cannot yet be effectively combatted if the appropriate aiming mechanisms of the Fla MG and guns do not make accurate detection, sighting and tracing of the target possible. Aiming media such as a ring sight or the front and rear sights are no longer capable of this task. Modern sighting systems have replaced them. In their construction and function they resemble analog computers with which the angle of elevation and the drift angle are automatically computed from the airspeed, the azimuth of target and the slant range to the target. The gunners now aim indirectly at their target. Optical apparatuses with a high sighting field serve them in this. With higher calibers, firing control results by means of modern radar stations as panoramic stations and aiming stations as well as control devices. They have the task of detecting and tracing the target. All values necessary for effective firing are computed by the control set and transmitted to the guns, which are then aimed together synchronously. The electric or electrohydraulic devices necessary for this guarantee an automatic aim with a high aiming speed and aiming precision.

The barbaric terror of the bombs of the USA in Vietnam elucidates how necessary an antiaircraft defense equipped with all means is. Information from press and film reports show how effective the Vietnamese antiaircraft defense operates against the most modern American airplanes. The flak artillary has a special advantage because of its high firing power (before long 2200 rounds will be attained). That is the best proof of its efficiency. But also the successful charge from light machine guns shows how efficient a high fire density is in practice.

By their achievements the workers of the German Democratic Republic have made it possible for the NVA to have the most modern technical combat means at their disposal from the time of their existence. Under this also come entire complexes of flak artillery.

This process is far from being closed and is being accelerated by the technical revolution. However, it should be shown at this point concerning widely disseminated false assumptions that the future will belong to rockets alone. The task still stands for the air defense troops as before: combatting targets from low to medium altitudes. For this purpose an accurately staggered system of all air defense means is required.

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Fig. 1. 14.5-mm Fla MG four-barrel gun, an automatic weapon with high firing rate for combatting low-level targets.

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Fig. 2. 14.5-mm Fla MG four-barrel gun during night bombardment on ground targets.

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Fig. 3. Gun motor carriage with two 57-mm flaks.

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Fig. 4. Loading the 100-mm flak (Photos: MED/Frobus and AR/Gebauer).

2. Several Weapon Systems of the NVA's Air Defense Troops

2.1. 14.5-mm Fla MG Four-Barrel Gun. The 14.5-mm Fla MG is an automatic weapon operated by recoil from the system. The reactive force of the powder gas is used for releasing and cocking the weapon and for feeding the cartridges.

Barrel blocking occurs by turning the mushroom head. In this manner the breech axis slides in the slanting recesses of the weapon housing. At the end of the blocking process the shot is fired by the rigid firing pin.

The feeder is moved during recoil and counter recoil of the locking device. The cartridges in the belt are fed in this manner. A high theoretical firing rate is attained for all four barrels by means of the slight masses which have to be moved during this. Only a sustained fire can be shot with the weapon. On account of the necessary recharge with the empty cartridge bolt there results an accordingly lower practical firing rate. The high initial velocity (v_0) of the shot guarantees high penetration force and the efficient combatting of air targets at low altitudes. The true elevation of the shot is greater by far. But in order to keep up a high accuracy of fire, only the linear part of the flightpath is used.

It is of great advantage that the barrels of the weapon can be changed after warming in the shortest possible time. A longer time for shooting is possible with the MG by this means. The Fla MG is equipped with an automatic aiming mechanism with which the rapidly flying targets can be hit at a high angle of inclination and a high climbing angle. High lateral and altitude aiming speeds enable a rapid detection and safe trace of the target. The gun mount is constructed in such a manner that it can be shifted from the parade position to the firing position in the shortest time possible with a slight effort. In addition, firing from a short halt is possible. The stability of the gun mount permits forward speeds which guarantee a constant accompaniment of the unit to be covered.

2.2. 23-mm Twin Flak. We are likewise concerned here with a recoil operated weapon and an automatic weapon as we were with the

14.5-mm Fla MG. It has several important advantages which put it in the classification before the 14.5-mm Fla MG according to combat value. Its theoretical and practical firing rate is higher for every barrel.

It is equipped with a drop wedge locking mechanism. Since the feed lever moves considerably faster than the relatively heavy lock frame, the locking motion can be kept very short. In addition, longitudinal grooves are worked in the cartridge chamber which relieve pressure in the shell case during extraction. The high rate of fire of this gun results from these two facts.

The feed of the weapon is constructed so that firing is automatically interrupted when only one shell is in the feed. After the removal of the empty belt casing and its replacement by a full one, the front end of the belt is pressed by a lever so far into the feeder that the connection is made at the last cartridge casing of the last belt. After that the triggering mechanism is cleared again. In the 14.5-mm Fla MG the belt must be loaded again, and the weapon must be cocked again. This time expenditure is no longer necessary.

While the realms of operation of the aiming mechanism are the same as in the 14.5-mm Fla MG, the aiming velocities are considerably higher. The gun carriage is equipped with a reversible hydraulic system, which enables the transfer from the parade position into the firing position within the shortest time possible without great bodily effort by two gunners. When the gun is being moved they serve as shock absorbers. Firing from a short stop is possible in all barrel positions (see also mt 7/65, p. 271).

2.3. 57-mm Flak. The high maneuverability of the 57-mm flak makes a reliable troop cover possible against hostile air attacks, especially on the march and while overcoming water barriers. By means of its high marching speed it can accompany its own troops continuously.

The 57-mm flak is an automatic weapon. All facilities of the weapon are moved by the recoil force. During the barrel recoil, the breech mechanism is cocked by an accelerator, and the feeder moves

over a curved section. The forward motion is caused by a spring. A rotary locking head bolts the barrel with a bolting cam.

Despite the huge mass to be moved, a firing speed and a v_0 are attained which are higher than with field guns. In this manner the shell cartridges are moved directly from the feeder to the breech head, where they are gasped by the extractor hooks.

The automatic sighting mechanism allows combatting air targets from low to medium altitudes. By means of a hydraulic lifting and lowering mechanism the gun can be lowered and lifted very rapidly from the parade position to the combat position or from the combat position to the parade position with the slightest physical effort of the servicing personnel.

The 57-mm flak is equipped with an electric drive. It consists of a measuring device, an amplifier, a driving device and a stabilizer. With the aid of a synchro receiver on the gun and synchro transmitter in the control device the angle of deviation between both is measured. The deviation is transformed into a control voltage, and this is again amplified so much in the amplifier that the drive motors can be provided with the necessary voltage for operation.

An advantage of the electric drive consists in the fact that it is capable of operation a few seconds after being switched on and can be used under any meterological conditions.

The system of the 57-mm flak is also like its 57-mm Fla SFL twin in application with the NVA's antiaircraft defense of troops. Two weapons are located in the turret of one SFL. By means of electro-hydraulic arrangements, considerable aiming speeds are gained. The weapons are no different one from the other. Also, the working ranges of the sighting mechanism are maintained. An essential advantage of this system is its greater maneuverability in rough terrain and its greater firing density by reason of its multiple barrel system.

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Fig. 5. 23-mm flak combats lightly armored ground targets.

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Fig. 6. 57-mm antiaircraft guns in firing position.

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Fig. 7. 23-mm flak shooting at air targets.

2.4. 100-mm Flak. The 100-mm flak is in the position to combat air targets at medium altitudes. Since cartridges with delayed action caps are shot for combatting air targets, the gun is equipped with an automatic fuse setter.

While discharging a shot, the gun works in the following manner: The loader lays a cartridge shell on the loading tray. After the activation of a trip lever the fuse from the automatic fuse setter is set at the figure prescribed by the command set and driven by an electric motor. After that, the load tray is tipped over, and the shell cartridge is pushed into the chamber by the hydropneumatic feeder. The breech mechanism locks, the loading tray returns to its original position, and the shot is fired. During the barrel counter

recoil the breech mechanism is opened by its semiautomatic device, and the fired cartridge case is ejected. Furthermore, feeder cocking results during the barrel counter recoil. In contrast to the 57-mm flak, the 100-mm flak is equipped with an electrohydraulic drive. But its principal mode of operation is the same.

The weapon systems introduced and their properties demonstrate that the NVA's antiaircraft troops are equipped with the most modern weapon systems which fulfill their original set requirements to the greatest extent. Furthermore, it is of great significance that ground targets can also be combatted with all these weapons (Figs. 2 and 5).

In the coming years the antiaircraft artillery will further maintain, indeed even increase its current significance in the antiaircraft defense of troops, especially in combatting air targets up to altitudes of 4000 m.