



## THE USE OF AEROSOLS, FORCE PROTECTION MEASURE IN THE DEFENCE OPERATION OF THE LARGE TACTICAL UNIT

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During the preparation and conduct of defence operations, the use of aerosol missions should be well planned and executed in a logical sequence and continuously. Smoke operations should lead to increase stability defence and reduce enemy opportunities to prepare and conduct offensive operations, being fully informed and having a clear conception.

**Keywords:** large tactical unit; defence operation; aerosols; force protection.

In modern warfare conditions, smoke has a special role both in masking combat actions of forces and objectives deployed in the country, and in thwarting the action of the enemy's reconnaissance and fire means, helping to reduce the losses of own forces.

All analyses performed with computer based applications and "war games" showed that the appropriate use of masking smoke, both in defence and offensive operations, reduces losses in forces and means by about 25% and reduces the effectiveness of the opponent's armament by 50%, particularly high percentages in the current conditions of endowment with technique and armament in modern armies.

The complex and complete accomplishment of the disinformation and masking actions can contribute to the secret fulfillment of the preparation of some military operations, to providing the surprise character of these activities and to the use of military technique with maximal efficiency.

### **The use of aerosols in the defence operation of the major tactical unit**

The art of hiding and deceiving is universal, it has its origins in the early days of the primary history of armed conflicts, and it will be needed as long as conflicts exist.

In general, "to mask" means to hide something from people's eyes, to hide from sight or to conceal, to use a mask<sup>1</sup>.

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Defensive operations delay the enemy, gain time, the enemy's access to an area is delayed, and attacking forces are destroyed or defeated. The use of masking aerosols multiplies the commander's ability to disrupt enemy attacks, take the initiative and fighting power at the critical time to defeat the enemy. The use of aerosols for masking will support any type of defensive operation. Used wisely, aerosols can combat any initial advantage of the attacker.

At the same time, masking is seen as "an action or a series of actions (measures, procedures) that aim to hide the troops (actions, objectives) from the reconnaissance of any kind performed by the enemy and deceive it with respect to the real actions (formation, objectives)"<sup>2</sup>.

In order to successfully carry out aerosol missions, during the preparation and conduct of the defence operation, they must be well planned and carried out in a logical and continuous sequencing.

Military experts argue that, in the end, the use of aerosols must increase the stability of the defence and reduce the enemy's chances of preparing and conducting offensive combat actions in full situational awareness and in a coherent conception.

During World War II, a huge area masked by smoke blocked the German observation process for the correction of indirect fire on the 5<sup>th</sup> US Army at Anzio. The 24<sup>th</sup> DECON Company landed at Anzio area on D day, equipped with M 1 type smoke generators, M 4 smoke grenades and eight Besler type smoke generators used by the US Navy. On its first night on land, the unit masked with aerosols the beaches and the anchorage area. In two days, the

unit created a smokescreen about 3 km long. As the landing forces expanded, other smoking structures, including a British unit and the 179<sup>th</sup> Smoking US Company, moved to Anzio to increase the size of the smoke cloud.

Initially, smoke masking from Anzio was intended as part of the anti-aircraft masking system. This also included night-time masking actions, for example, when the rockets fired from airplanes seemed to go out as they entered the smoke blanket.

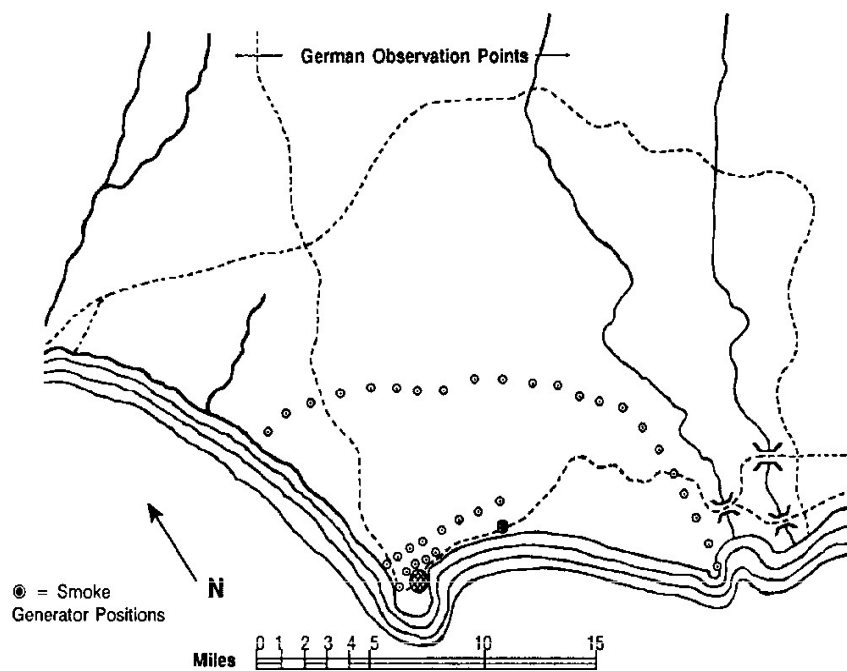
The 6<sup>th</sup> Corps of the 5<sup>th</sup> Army undertook an unsuccessful action. The Germans held the bridgehead from its inception on January 22<sup>nd</sup>, 1944 until the Allies forced its reduction in May<sup>3</sup>.

Experience has shown that a favorite tactic of the enemy was to attack at low altitude with bombers

to the mountainous area nearby, allowing them to set targets and streamline long-range shooting. Although the entire bridgehead was within enemy range, the Allies failed to completely mask the bridgehead in January and February.

Commanders of the air defence, artillery and naval forces feared that the smoke masking of the bridgehead would disrupt the observation for the execution of friendly fire and the unloading of ships in the anchorage area. From January 22 to February 10, the Allies had an average daily loss of almost 28 tons of ammunition due to the execution of long-range fire and enemy bombing.

To reduce these losses, CBRN staff officers at the Corps level, along with chemical unit commanders, with the approval of 6<sup>th</sup> Corps Commander-in-Chief



**Figure 1** The positions of the smoke structures at the head of the Anzio bridge after 18<sup>th</sup> March 1944<sup>A</sup>

at dawn and dusk. Therefore, it has automatically become a standard practice to provide smoke masking of the harbor at dawn and dusk, as well as during air defence alerts. The German army carried out at least one raid every night until mid-February, when the artillery fire increased in intensity.

The Allies used 203 mm howitzers to demolish buildings suspected of housing German observers. They realized smoke blinding with the support of chemical launchers and small-caliber artillery from nearby ridges and towers.

However, German observers had an unrestricted observation of the entire harbor due

Lucian K. Truscott, developed a new technique for using smoke generators.

The technique used consisted of producing a thin fog between the port and the front lines. The opacity was designed well enough to allow normal operations within it and thick enough to prevent the observation of German forces from the heights.

On March 18, 1944, the US 179<sup>th</sup> Smoking Company moved from the harbor to advanced positions. The line of smoke formed an arc of a circle of about 25 kilometers around the harbor (Figure 1), with 22 possible positions on land. Taking into consideration the wind direction, 19



of the 22 positions were supported with smoke generators.

Two generators were also installed on naval patrol boats in the harbor area. The smoke generators were located at intervals of about 1000 meters, just beyond the anti-aircraft positions of the port and beyond the artillery observation posts. The latter action prevented the observation of the enemy on the flanks of the harbor.

The smoke subunits began aerosol masking operations half an hour before dawn which went on until after sunset, for about 14 hours each day, from March 18 until the May 1944 forcing. During this period, (Allied) troops at Anzio were able to unload an average of 3,500 tons of support material each day.

In the defence operation, the masking aerosols were to be used to hinder the opponent's activities, ensure the protection of friendly forces and increase their own possibilities of action on the battlefield in order to disorganize the enemy's offensive and promote the destruction of his forces.

The actions for the use of masking aerosols will aim at:

- masking the positions of own forces;
- interdicting activities and actions for preparation of the offensive operation by the enemy;
- preventing and delaying the enemy's units and large units to go on the offensive;
- ensuring the smoke masking of the regrouping, the withdrawal of some units and large units and taking of new defence positions;
- thwarting the maneuver of enemy forces and means in order to encircle, turn and invest their own forces and provide sally from the encirclement;
- ensuring the masking with smoke of some dams and obstacles executed on the advancing directions of the enemy;
- masking the evacuation actions of weapons and combat equipment damaged on the battlefield;
- camouflaging the maneuvers of the tank, infantry and artillery subunits;
- concealing engineer activities against the observation and reconnaissance of the enemy;
- concealing the replacement of the units from the first echelon, during normal visibility conditions;
- masking the approach of the subunits for the execution of a counterattack;

- ensuring the flank and the maneuver security at the interval between units;

- misleading the opponent on the position of the second echelon, of the reserves and of the planned counterattack directions;

- hiding the withdrawal of outposts;

- countering reconnaissance, surveillance and targets acquisition and reduction of the effectiveness and trajectory control of weapon systems with opto-electronic self-guidance to target;

- protecting targets against laser lighting (use of laser transmitters);

- blinding of observation posts, fire management posts and advanced observers;

- hiding the engineering operations to create corridors through the mine fields;

- aerosol masking of the movement of main columns of the second echelons and reserve during the arrival at the mandatory crossing points, as well as during their development on different alignments in order to execute some counterattacks;

- holding-up the advance of the enemy and ensuring the preparation and concealed passage of their own forces to the offense;

- preventing maneuvers and the use of communications by the enemy;

- maintaining the fighting capacity of own subunits for the accomplishment of the missions.

The use of masking aerosols supports the achievement of the tactical objectives of the defence by:

- selective concealment of air and ground research routes;

- forcing the enemy to group in small formations, thus becoming vulnerable targets.

Aerosol masking actions for preparation of the defence are performed both when the own forces are in direct contact and without contact with the enemy.

When the defence preparation is carried out in contact with the enemy, provisions are made that units and subunits especially designed to ensure concealing of taking defence positions, artillery fire, transportation of combat equipment and ammunition, and other important in depth objectives. At the same time, the aviation and helicopters, using modules and smoke bombs, perform aerosol blinding actions on the enemy's positions, in order to prevent the movement and concentration of reserves and the second echelon,



the setting-up of firing positions of nuclear weapons and artillery, as well as takeoff and landing of aviation on airfields.

When the preparation of the defensive operation is carried out without contact with the enemy, with the organization of an security strip, it is demanded to conduct aerosol curtains on successive phase lines by the infantry and tanks units aimed to fight in the security strip.

As the enemy approaches the Forward Line of Own Troops (FLOT), artillery comes into action, firing smoke projectiles at the enemy's direct-fire artillery and at its artillery groups firing positions.

Military experts say that the aerosol curtains in front of FLOT must be achieved from the moment the enemy began fire and aviation preparation of the offensive and cease at the moment of the attack beginning.

If the enemy has breached the defence system and continues to advance in depth, the retreat of units and large units is performed by infantry subunits and tanks intended for this purpose, using grenades and firing smoke projectiles.

In order to avoid the encirclement, roadblocks and obstacles that are concealed with aerosols are planned and executed on the flanks on the main directions of attack of the enemy.

When it is found that the enemy's assault has lost intensity, measures are taken to execute layers of blinding aerosols on the main directions of attack of the enemy in order to thwart and stop its advance and conceal the actions of its own regrouping forces to realize the adequate structure to shortly proceed to attack.

Blind aerosol curtains are realized directly in front of the opponent's front or directly upon its positions, in the areas of observation posts, command-observation points, fire points to suddenly decrease its visibility and thus prevent the observation and execution of fire by direct sighting, disorganization of attack formations and making it difficult to lead the troops.

In order to achieve maximum efficiency, blinding aerosol curtains must be realized simultaneously on all observation posts and fire points or on the entire attack formation of the opponent's subunits acting in that direction.

Blind smoke curtains are created with the support of projectiles, bombs, grenades and smoke candles; the dimensions of the aerosol curtain

must ensure complete blinding of the objective throughout the execution of the maneuver by its own forces.

It turns out that, as a rule, the blinding smoke is made with the help of aviation and artillery, and complementary with grenades and smoke candles used by the fighting units in contact.

Masking blankets are made to hide the maneuver of the own units performed in order to take new combat positions.

Also, masking sprays will be used when crossing critical areas and on the flanks to limit the opponent's observation possibilities and reduce its chances of engaging in combat, in front of the units in the security strip to allow them to break the fight and perform maneuvers, and in the rear to hide the arrangement and composition of the support elements.

Protective aerosol blankets are used to disrupt an opponent's weapon systems with directional energy and consist of creating aerosol blankets around their own forces to mitigate the effects of these weapons.

Therefore, protective aerosol blankets are used to mask armored combat equipment.

The marking smoke is used to mark the targets and to identify the position of the own forces, being realized with the smoke grenades with different colored smoke and with the artillery projectiles.

False smoke (for deception) will be used to distract the opponent from the main defence effort regarding the areas where the counterattack is being executed or those of small/unimportant areas for the defence operation.

Deception smoke can also be used in defence operations to hide the real positions and to deceive the enemy with respect to the actions of own forces.

In this situation, the size of the smoked area/line must be close to the real ones in order to be realistic.

Regardless of the way to go on defence, the units of the first echelon use grenades and smoke candles in front of FLOT in order to blind the means of observation and enemy shooters, for protection of the technique against anti-tank missile systems, to mask movements, exits/ regrouping and supporting actions to deceive the enemy; marking smoke is used by artillery and aviation; smoke modules are used by special purpose



helicopters, usually at the level of large units in the second echelon for masking and protecting their maneuvers (movements) and mandatory crossing points in the area of responsibility, as well as for misleading (deception) of the enemy.

The nature of the action to be performed by the large tactical unit determines the type of aerosol masking blankets, which can be linear and for areas.

Linear smoke curtains (frontal, oblique and flanking) are made in order to conceal the combat formation, maneuver and actions of the forces from ground observation of the enemy<sup>5</sup>.

An important moment of the defensive operation of the large tactical unit is the counterattack carried out with its second echelon for the restoration of the previous FLOT.

For this moment, the large units from the first echelon provide the linear aerosol masking of the counterattack line with smoke candles for 15-20 minutes.

The period of the aerosol masking of this line is based on the time elapsed from the moment of forming the second echelon columns and the time of the beginning of the movement from the area until their arrival on the ordered line to carry out the mission.

The smoke curtains to the surface at the level of the large tactical unit are made with smoke modules for 10-20 minutes, for the benefit of the second echelon, at the exit of the counterattack disposal area, combined with false aerosol masking missions. When the large tactical unit moves from the rear to the front, it can perform aerosol masking missions at the exit of the large units from the concentration area and at the crossing of the mandatory points on the approach routes.

From the aspects presented above, it results that at the level of the major tactical unit, the use of aerosols ensures the blinding, masking, protection and deception of the enemy, usually in the visible and near infrared spectrum.

If the aerosols are composed of phosphorus of different types and dust, the masking spectrum will include the medium and far infrared range, and aerosols based on phenolic, polyester, silicone or urethane resins disrupt the operation of radar stations.

The conclusion that emerges is that in the current conditions, in the defence of the large tactical unit smoke is used to ensure blindness, masking, deceit in the near visible and infrared spectrum and less protection of the means of combat.

## Conclusions

In the current context, in which military operations take place in an extremely complex operational environment, characterized by ambiguity, volatility and hybridity, the question arises whether smoke operations are still relevant. This is also debatable from the perspective of the Romanian Army disbandment of the smoke subunits, which a few years ago still existed at the level of CBRN defence battalions.

Our approach to address the issue of the use of masking smoke in military operations, especially at the tactical level, is in the context of concerns that exist globally, which is why we believe that it is necessary to have masking structures at the level of the Romanian armed forces, which we consider that aerosol masking subunits should also be part of. Moreover, in modern armies there are such structures, which act independently or together with DECON units, as is the case with the United States Army.

## NOTES:

- 1 *Mic dicționar enciclopedic*, Stientific and Enciclopedic Publishing House, Bucharest, 1978, p. 591.
- 2 *Lexicon militar*, Military Publishing House, Bucharest, 1980, pp. 437-438.
- 3 FM 3-50, *Smoke Operations*, Washington DC, 1996, p. 36.
- 4 *Ibidem*, p. 37.
- 5 Ion Mitulețu, Alexandru Herciu, *Apărarea CBRN în operația brigăzii mecanizate*, "Carol I" National Defence University, Bucharest, 2014, p. 98.

## REFERENCES

- \*\*\* *Doctrina Armatei României*, Bucharest, 2012.
- \*\*\* SMG-3, *Manualul de planificare a operațiilor*, Bucharest, 2016.
- \*\*\* *Manualul de luptă al diviziei de infanterie*, (proiect), Bucharest, 2006.
- \*\*\* C-25, *Instrucțiuni privind cunoașterea și folosirea materialelor chimice de instrucție*, Comandamentul Trupelor Chimice, Bucharest, 1979.
- \*\*\* *Memorator asupra cunoașterii și întrebuințării fumului de mascare, în acțiunile de luptă, în concepția forțelor armate ale țărilor membre NATO*, Bucharest, 1973.
- \*\*\* *Lexicon militar*, Military Publishing House, Bucharest, 1980.



\*\*\* *Mic dicționar enciclopedic*, Stientific and Enciclopedic Publishing House, Bucharest, 1978.

\*\*\* FM 20-3, *Camouflage, Concealment, and Decoys*, Washington DC, 1999.

\*\*\* FM 3-50, *Smoke Operations*, Washington DC, 1996.

\*\*\* FM 3-6, *Field Behavior of NBC Agents (Including Smoke and Incendiaries)*, Washington DC, 1986.

\*\*\* AAP-2/2007, *Glosar NATO de termeni și definiții*.

Herciu Alexandru, *Sprijinul CBRN în operațiile intermediare ale diviziei*, "Carol I" National Defence University, Bucharest, 2017.

Mitulău Ion, Herciu Alexandru, *Apărarea CBRN în operația brigăzii mecanizate*, "Carol I" National Defence University, Bucharest, 2014.

Plotuna Gheorghe Petre, „Metode moderne de realizare a camuflării”, *Romanian Journal of Optoelectronics*, no. 1/2006.

Popescu E. George, *Întrebuințarea fumului pe câmpul de luptă*, Bucharest, 1927.

[http://www.scoalanbc.ro/continut/scdra/revista\\_files/rev\\_6](http://www.scoalanbc.ro/continut/scdra/revista_files/rev_6).