



Keeping NBC Relevant

Flame Weapons in the Russian Armed Forces

CHARLES BARTLES

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Introduction

The Russian Nuclear, Biological, And Chemical (NBC) Defense Troops are tasked with identifying NBC threats in the environment, performing decontamination of troops and equipment, and most interestingly, employing aerosols and flame weapons to engage the enemy.¹ In most militaries, flame weapons have traditionally belonged to the NBC Troops. The popularity of such weapons has waned significantly throughout the world, but not so in the Russian Armed Forces. While the utility of NBC Troops in today's asymmetric warfare is questioned in other armies, Russian NBC Troops firm grasp of flame weapons keeps them relevant, engaged, and makes them an important asset in the Russian maneuver commander's toolbox.

Flamethrower technology...

The term "flamethrower" itself conjures ideas of the Second World War, with soldiers carrying backpack mounted aerosol tanks spewing flame from hand held wands, or the M-67 flame throwing tank that was utilized by the U.S. Army and Marine Corps in Vietnam. In current Russian military parlance the term "flamethrower" usually refers to projectile launched thermobaric weapons.² Thermobaric, or fuel-air, weapons cause casualties in a fundamentally different way than conventional high explosives. Conventional high explosives are composed of approximately 25% fuel and 75% oxidizer, this mixture explodes causing a tremendous amount of force. Thermobaric weapons

are almost completely fuel, and work by creating a fuel-filled aerosol cloud of either volatile gases, liquids, or finely powdered explosives.³ This cloud is then ignited at the center of the cloud, the ignition of the cloud draws oxygen out of the surrounding area to cause a powerful burn. Although a thermobaric weapon produces a powerful burn in relation to similarly sized charge of high explosives, the primary cause of damage is caused by the vacuum created by the sucking of the oxygen out of the area, and the overpressure caused from the blast.⁴ These pressures can collapse lungs and cause severe internal injuries. The fuel-filled aerosol cloud essential for the effective operation of the thermobaric weapon can be negatively affected by environmental conditions that hamper the formation of the aerosol cloud. For this reason thermobarics are not suited for all environments, and are best employed in enclosed or semi enclosed environments, such a subterranean areas, in buildings, urban areas, and in the mountains.⁵

Development of Personnel Carried Flamethrowers

The Soviet experience in the Second World War taught that mechanized and tank units were extremely vulnerable in urban combat environments. Urban environments not only restricted maneuver, but also negated the advantages of artillery which could not be employed in close proximity to friendly forces. This lesson was reinforced by the Russian Army's experience in the first Chechen War when tanks of the 131st Motorized Rifle Brigade and the 81st Motorized Rifle Regiment were bottled up, and decimated by rocket propelled grenade launch operators on the streets of Grozny. Urban warfare degrades maneuver and firepower capabilities for conventional armies, while defenders and/or insurgents find a favorable environment for maximizing personnel and armored vehicle losses. Urban Warfare also ties the hands of the maneuver commander by not allowing him to employ his full arsenal, as the plight of the civilian population is often exploited in the media by

defenders and/or insurgents. The conduct of urban warfare is long, tedious, and bloody. The commander must advance building, to building, clearing each from top to bottom.⁶

Doctrinally, The Soviets and Russians avoid urban combat environments when possible, but when not possible they have found flame weapons especially useful. In the Soviet/Russian experience, flame weapons have proved very reliable for filling a niche for a capabilities gap that is created when artillery and mortars are not able to be effectively employed in urban environments. Flame (especially thermobaric) weapons can promptly clear a building, and be used in close proximity to friendly troops. In addition, in more conventional settings, flame weapons prove useful for such activities as bunker busting and clearing light infantry armed with anti-tank weapons in preparation for an armored assault.

The Soviet Union's first post Second World War flamethrower was developed and fielded in 1950. The LPO-50 (Light Infantry Flamethrower) is a pack worn flamethrower with three pressurized fuel containers. The LPO-50 is operated by the discharge of fuel from the pressurized containers, which is ignited by electrical charge at the tip of a hand held flame wand. The discharge lasts from 1.5-2.0 seconds and extends 20-70 meters depending on fuel type and atmospheric conditions. The LPO-50 was effective, but had significant problems. A fully loaded LPO-50 weighs 23 kilograms, a hefty weight considering the device could only be fired three times before requiring refueling. The LPO-50 was excellent for the destruction wooden buildings, but was ineffective against the adobe and clay buildings, and in mountainous conditions that the Soviets encountered in Afghanistan.⁷ The weight, range, and discharge capacity led Soviet designers to take another look at the back mounted flamethrower, and try a different technology to achieve a comparable effect. The RPO *Rys*, Russian for "Lynx", was the Soviet Union's first attempt at a rocket propelled thermobaric grenade launcher. The *Rys* was fielded in 1975 and was used in the Afghan War. Although the *Rys*

was an improvement over the LPO-50, the Rys was bulky and still had some difficulty destroying clay and adobe structures, both flamethrowers were used simultaneously in the early years of the Afghan War.⁸

Characteristics of Russian Rocket Propelled Flame Throwers⁹

	RPO <i>Rys</i>	RPO <i>Shmel</i>	RPO <i>Shmel-M</i> (RPO PDM)	MRO <i>Boradach</i>
Caliber	110.5 mm	93 mm	90 mm	72.5mm
Weight of Launcher (w/rocket)	12.6 kg	11 kg	8.8 kg	4.7 kg
Weight of Rocket	3.2 kg	2.1 kg	3.3 kg	1.3 kg
Length	1440 mm	920 mm	940 mm	900 mm
Maximum Range of Direct Fire	190 m	200 m	300 m	90 m
Maximum Effective Range	????	300 m	600 m	300 m
Maximum Range	400 m	1000 m	1700 m	450 m

The Rocket Propelled Infantry Flame Thrower (RPO)

The Rocket Propelled Infantry Flame Thrower (RPO), colloquially known as the *Shmel*, Russian for bumblebee, is a family of multi-use firing devices that fire expendable rocket-assisted projectiles, but with a substantially different design than the *Rys*. The RPO *Shmel* was first fielded in the 1980s, and proved to be a great improvement over both the *Rys* and the LPO-50, both of which the *Shmel* quickly replaced. The *Shmel* is lighter, has a longer range, and packs far more of a punch than the *Rys*. The RPO *Shmel* proved very effective while being deployed in urban and mountainous terrain, and even earned the nickname “Satan Pipe” among the Afghan Mujahe-



(Above) *Shmel*

deen. The thermobaric warhead of the *Shmel* was expected to kill all personnel within a 50 meter radius in an open area, and within an 80 cubic meter area in a closed structure. Due to the thermobaric properties of the warhead and is estimated to have about the same amount of energy as a 107 mm artillery shell on impact. The RPO *Shmel* is capable of firing three types of munitions. The RPO-A is thermobaric, and is most often used for the destruction of buildings, bunkers, and personnel in enclosed areas. The RPO-Z is an incendiary munition, and the RPO-D is for smoke. The RPO *Shmel* was used extensively in the First and Second Chechen Wars, and its performance was much lauded. In 2003, The RPO *Shmel-M* entered service, the *Shmel-M*, also known as the RPO PDM (Increased Range and Lethality), has improved characteristics (weight, range, strength of blast, etc.), reportedly having about the same amount of energy as a 152 mm artillery shell on impact, and is replacing the RPO *Shmel* as inventories are depleted.¹⁰ The newest addition to the family is the MRO *Borodach*, (Small Caliber Infantry Flamethrower), which was fielded in 2013 and has reportedly seen service in Eastern Ukraine. The *Borodach* is not replacing the *Shmel-M*, but instead is likely to be a special version of the RPO family designed for urban warfare. The *Borodach* is smaller and lighter than both the *Shmel* and the *Shmel-M*, has a much shorter range, causes less blast damage, and has a different, easier to use, optical system. In terms of munitions, the projectiles are similar to the rest of the family: thermobaric (MRO-A), incendiary (MRO-Z), smoke (MRO-D), smoke/incendiary (MRO-DZ).¹¹

Employment of the RPO

The Russian Federation believes that rocket propelled flamethrowers are best employed by NBC troops. Although promotional materials for these weapons tout them as “easy to use,” there is apparently a great deal of training provided to their operators, including a virtual training simulator, the 9F700-2M. The conditional usage of the thermobarics may be another reason they are used almost exclusively by the NBC troops, although Russia does field thermobaric munitions for other rocket propelled grenade systems. A Russian motorized rifle brigade typically has one flamethrower platoon in its NBC Defense Company. Flamethrower platoons usually consist of three six man squads mounted on specialized BMP-2 (BMO-1) or T-72 (BMO-T) chassis transport vehicles capable of carrying their 6 man squad (vehicle driver included) and 30-60 *Shmel* or *Shmel-Ms*.¹² Depending on circumstances, the platoon may be attached as a platoon, squads, or as individual members as needed to the supported unit, usually a motorized rifle battalion. A common scenario



Combat Vehicle for Flamethrower Operators (BMO-T)

for the employment of flamethrowers against a entrenched conventional enemy would involve a flamethrower platoon being attached to a motorized battalion, the flamethrower platoon advancing to within 1.5 to 2.0 km of the enemy line, dismounting and with each soldier carrying two RPOs, advancing to within 600 meters of enemy positions (the maximum effective fire range within the *Shmel-M*), discharging their weapons, and then returning to their vehicles for replenishment. Aside from the flamethrower platoons found in the motorized rifle brigades, the Russian Federation also has flamethrower battalions in NBC Defense Brigades and Regiments. These assets can be attached as needed to support maneuver units and would almost assuredly be assigned (if available) to any maneuver commander expecting urban warfare.¹³

Heavy Flame Thrower System

The Heavy Flame Thrower System (TOS-1), colloquially known as the *Burantino*, Russian for Pinocchio, was the Soviets first attempt to field a heavy flamethrower system in the 1980s. The TOS-1 is a heavy flamethrower system that consists of two different vehicles (a launcher and support vehicle), but in common usage, the launch vehicle itself is often referred to as the “TOS-1.” The TOS-1 system consists of a Combat (launch) Vehicle (BM-1/Object 634B) equipped with 30, 220mm rocket tubes mounted on top of a T-72 tank chassis, and a Transport-Loader Vehicle (TZM-T), also on a T-72 chassis, that carries an additional set of rockets and a loading boom. Doctrinally, the TOS-1 was envisioned to decimate a large area, by charging ahead, while under the protection of tanks, launching its rockets in rapid succession (all 30 rockets in 7.5 seconds), and then returning to the rear for rearmament and redeployment. The TOS-1 has a much shorter range (approximately 3.5km), and its rockets were substantially less accurate than conventional artillery systems, but the combined blasts of the thermobaric rockets produce mutually reinforcing shockwaves that have an

impressive effect that has been described as appearing as a nuclear explosion. The TOS-1 saw its first action in Afghanistan, where it was very effective in mountainous terrain, as gorges and valleys are favorable environments for the use of thermobarics.¹⁴

During combat actions in Afghanistan, some deficiencies were identified with the TOS-1. The 30 barrel rocket housing proved vulnerable to rocket propelled grenades, a dangerous proposition considering the volatile cargo, so the employment of the TOS-1 always required a substantial covering force. To correct this deficiency, Russia developed a second version of the TOS-1, the TOS-1A *Solntsepek*. The TOS-1A has an added heavy housing to protect the rocket tubes from premature detonation; this armor has reduced the rocket capacity from 30 to 24 rockets. In order to increase mobility, the T-72 chassis has an upgraded engine that produces 800 more horsepower than the TOS-1. The TOS-1A saw combat in Chechnya, its performance was well lauded in mountainous and urban environments alike.¹⁵ Organizationally, the TOS-1 series of heavy flamethrowers are organized in a similar fashion as Russian artillery units, batteries generally consisting of six TOS-1 or TOS-1As (six BM-1s launch vehicles and six TZM-T support vehicles), with each battalion having three batteries.¹⁶ In general, the TOS-1 or TOS-1As fills the same niche as the RPO series flamethrowers, but on a much larger scale. They will most often be utilized in urban warfare settings, bunker busting, and clearing light infantry.

The Future of Flame and NBC Defense Troops

From a Russian military perspective, flamethrowers are not seen as weapons simply to be handed out to the rank-and-file for any *ad-hoc* use, but instead are seen as a mature weapon system that fills specific capabilities gaps in the Russian Armed Forces force structure. While maneuver units do have limited flamethrower assets in their NBC defense units, all heavy flamethrowers and flamethrower battalions reside in NBC Defense Regiments and Brigades. At a time when other armies are reevaluating the role of NBC troops in their militaries, the Russian NBC Troop's monopoly on flame, and its usefulness for urban and mountain warfare, bunker busting, and clearing light infantry has required the expansion of NBC troops in the Russian military with the creation or reconstitution of at least four NBC Defense Regiments in 2014.¹⁷ As Russia experiments with “new forms and methods” of war, or “hybrid war” as defined in the West, in Eastern Ukraine, urban warfare will likely continue to be a high priority for development, and so will Russia's flame wielding NBC Defense Troops.¹⁸



END NOTES

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6. Top to bottom clearing is best since inexperienced defenders put their main efforts into preparing the bottom floors.
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