

# Snorkeling Russian Tanks Across Rivers

by retired LTC (Dr.) Lester W. Grau

Russian equipment was designed for use in large expanses of woodland and tundra, intersected by broad rivers and massive swamps. Russia is a northern country where severe winter weather is a normal training and combat condition. Large rivers, canals and lakes dominate Eurasia and serve as major arteries of commerce and industry, defensive barriers, lines of communication and avenues of advance.<sup>1</sup>

In Central and Eastern Europe, an advancing or withdrawing force can expect to encounter a six-meter-wide water obstacle every 20 kilometers, up to a 100-meter-wide water obstacle every 35-60 kilometers, a 100- to 300-meter-wide obstacle every 100-150 kilometers and a water obstacle more than 300 meters wide every 250-300 kilometers.<sup>2</sup> Crossing water obstacles is a recurring mission for military forces in Central and Eastern Europe. Getting combat power across quickly is key. Airmobile forces are great for river crossings, but if they are opposed by armored forces, serious reinforcement with tanks and artillery is needed almost immediately.

## Building on Soviet-era equipment

The former Soviet Union developed the light amphibious T-40 tank in 1939. It had a two-man crew and carried a 20mm cannon and a 12.7mm heavy machinegun or a 12.7mm and 7.62mm machinegun.<sup>3</sup> In 1951, the Soviets followed up with the light amphibious PT-76 tank. It had a three-man crew and carried a 76.2mm cannon with a 7.62mm coax machinegun.<sup>4</sup> Today's Russian army has the amphibious 2S25 Sprut-D vehicle, which has a 125mm turret mounted on a *Boyevaya Mashina Desantnika* (amphibious Russian air-droppable vehicle) chassis. This swimmer has a three-man crew with an autoloader capable of firing four to six armor-piercing, fin-stabilized discarding sabots; high-explosive fragmentation ammunition; high-explosive anti-tank; and anti-tank guided missiles (ATGM) per minute.<sup>5</sup>

All the Russian infantry fighting vehicles and personnel carriers are swimmers, so their ATGM can cross rivers quickly. Real tanks, however, still require river fords, ferries or a bridge to cross. A Russian maneuver brigade can ferry a tank battalion across a medium-sized river in 30 minutes. A pontoon bridge will take an hour to construct, and pontoon bridges are susceptible to artillery fire. There is a last option. If your tank cannot swim, why not drive it across the river bottom to the other side?

One of the unique features of Soviet-era and Russian tanks is their ability to snorkel tanks across river bottoms. All Soviet and Russian tanks since the introduction of the T-54A in 1952 have had snorkels. Even the 52-ton T-10 Heavy Tank had a snorkel.<sup>6</sup>

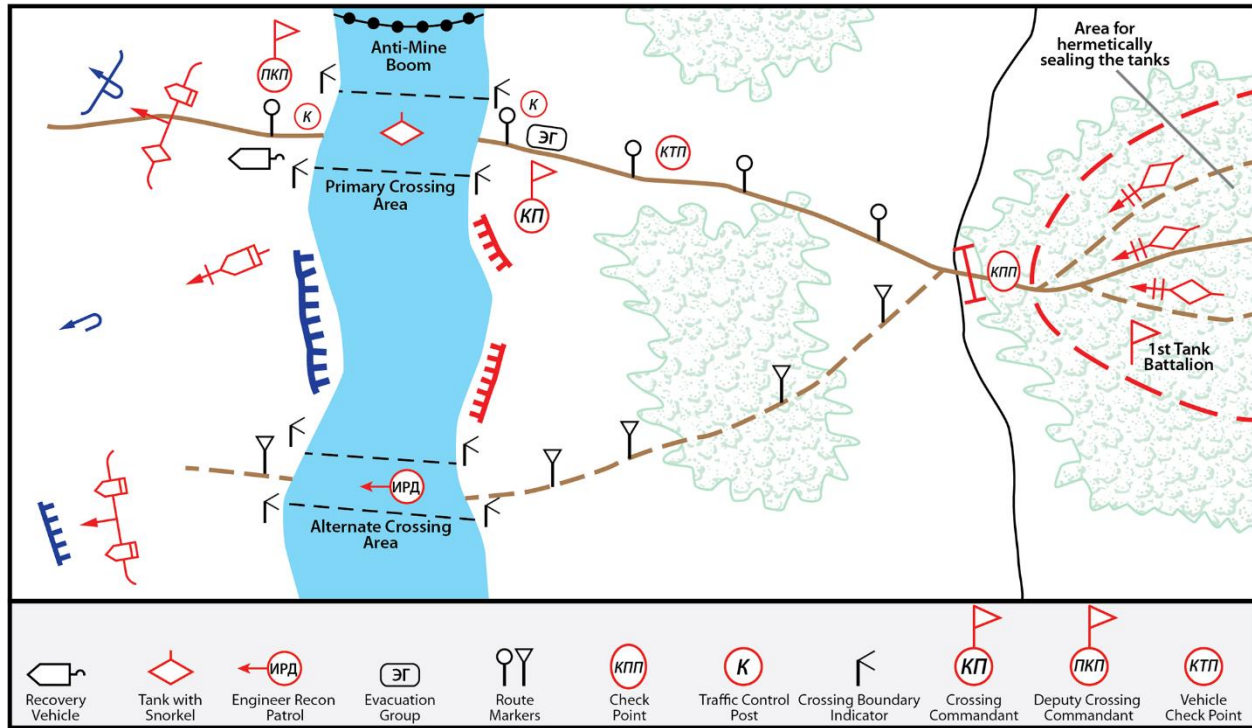
Naturally, there are qualifiers to using a tank snorkel. The river depth at the crossing site cannot exceed five meters. The river bottom has to be suitable (sand, pebbles) so the tank will not get stuck; the river cannot be more than a kilometer in width; and the current has to be two meters/second or less. The entry and exit banks cannot exceed 25 degrees and the river bottom slope cannot exceed 15 degrees.<sup>7</sup> Some tanks have one snorkel for the crew compartment and another for the engine, while others run both through a single snorkel. There is even a training snorkel that allows the crew to exit the tank without having to open a hatch underwater.

## Engineer support

Engineers play a significant role in supporting tank snorkeling. First, they check the designated crossing area for obstacles on the route to the entry and exit points. Second, they conduct a crossing reconnaissance, usually with an Engineer Reconnaissance Vehicle (IRM). Two divers and a sapper scout, equipped with a mine detector, mine probes and explosive charges detect mine obstacles and determine the quality of the suitability of the riverbed bottom and banks in that section of the river. The remaining team located in the IRM uses a sonic depthfinder and other instruments to create and record a profile of that river section, as well as to detect and record pits, craters, boulders and underwater obstacles. Third, they construct entry and exit points on the river. Fourth, they mark the approach route, the direction of approach to the river and the boundaries of the crossing site. Fifth, they construct shelters for the traffic controllers, lifeguard and evacuation personnel.<sup>8</sup>

Tanks aid the engineers in preparing the crossing site. A tank with a mine flail clears routes and assembly areas, while tanks with the TBS-86 dozer blade prepare the routes and crossing sites. They also help dig the emergency shelters for the traffic controllers, evacuation group and crossing commander.<sup>9</sup>

Figure 1 shows the layout of a tank snorkeling site.



**Figure 1. Layout of tank snorkeling site.** (Graphic by Charles K. Bartles)

On the right hand side of Figure 1, Russian motorized rifle forces have crossed the river by swimming their *Boyevaya Mashina Pehoti* (Russian mechanized-infantry vehicle) and are calling in artillery and clearing the retreating enemy from the beachhead. The engineers have created a primary tank-crossing site to the north and a reserve crossing site in the south. The first tank battalion is concealed on the right getting ready for crossing the river. They are busy unstrapping their on-board snorkels and erecting them and hermetically sealing their vehicles for the crossing.<sup>10</sup> They are doing radio checks and confirming their crossing azimuth. When ready, they began moving by platoons in a single file with ample space behind the vehicle in front. They are released by platoon by the traffic regulating post (KPP) and follow the marked route to the vehicle checkpoint (KTP). Here, the communications and waterproofing are checked.

The tanks move slowly forward, maintaining 50 meters between tanks to avoid underwater collisions. As a tank enters the water, the driver loses visibility through his vision blocks due to the dirt particles and debris in the water. It is dark and floating objects may bounce against the hull. The drivers don't change gears and maintain their steady azimuth so that they don't get lost on the river bottom. As they emerge on the other side, a traffic controller directs the tanks to an assembly area, where the platoon may take off and stow the snorkels and unseal their vehicle. The tank-platoon leader is now in charge.

In case the tank gets stuck or the engine quits, each crew member has a small scuba system and a life vest. After opening the hatch underwater, the crewmembers swim to the surface. Lifeguards in a boat are on standby. A heavy evacuation vehicle is prepared to haul the tank out. If this involves too much time, the tanks are diverted to the reserve crossing site. A boom is usually constructed upriver to stop floating mines, heavy logs and other debris from impeding progress. Still, the first time underwater in a tank likely gets the heart rate up.

## Training for crossing

The first time a tank crew snorkels across a river should not be in combat. The Russians train tank crews to snorkel in military-district training centers as part of crew certification. One such training center is Prudboy Range, located west of Volgograd (Stalingrad of World War II fame) between the Don and Volga Rivers. Prudboy Range is located on the Karpovka River and offers all sorts of live-fire and electronic-warfare training opportunities. Last training year, the range trained more than 1,000 tankers from the Southern Military District in underwater driving and tank gunnery. The underwater driving facility includes a water-obstacle training area with concrete pools, concrete ramps and clear water for the first experience of driving underwater in a tank.



**Figure 2. A T-90 tank with its wading snorkel erected enters a concrete pool at a Russian training site. (Photo by Serguei S. Dukachev)**

What if, in real life, the tank breaks down and water starts leaking into the tank? In the scuba-diving training classroom, the tankers familiarize themselves with the IP-5 self-contained breathing protective mask, safety requirements in working with it, and the procedure for its preparation and use underwater. In the pool of the scuba-diving training classroom, there is a training simulator using a mockup of a tank that can be flooded. A new emergency water discharge has been installed on the simulator. While previously it took 15 seconds to drain the body of this armored vehicle, it now takes three.<sup>11</sup>

The servicemen first “become accustomed” to the IP-5 (the hot air coming from the regeneration cartridge is initially uncomfortable). Then they orient themselves underwater with limited visibility. Finally, they learn to function in the submersible tank mockup. These practical skills can come in handy should the tank break down or get stuck underwater, and the crew has to come to the surface on their own.

After passing a series of tests, the tankers move to the water-obstacle training area, where they take the main exam – driving across a water obstacle underwater.<sup>12</sup>

Traditionally, the tank battalion commander is always the first in the water during all stages of this training, and his tank is first. It is a short ride, but it is necessary.

The unit conducts other tank training while at the range. The Karpovka River is fordable at spots and must be snorkeled at others. There are opportunities to gain more confidence and skills.



**Figure 3. A T-72 tank fully submerged during snorkeling training uses the training snorkel. The crew can exit through this large snorkel, but it is not used in combat. (Photo courtesy Wikimedia)**

This experience is also ongoing in the Russian Far East where “in the Republic of Buryatiya more than 600 tankers from Eastern Military District tank subunits undergo scuba-diving training, entailing the use of self-contained oxygen masks and practice escaping flooded vehicles.”<sup>13</sup> Training is conducted at two ranges: the Tsugol Range in Transbaikalia and the Sosnovyy Bor Range in Buryatiya. During the training, the tank crews learn how to move correctly underwater and how to act in the event of the loss of oxygen.

Tank-crew members conduct up to 10 dives in submersed simulators. The scuba-diving training of the crews ends with the crossing of a water obstacle and underwater driving of T-72B tanks at the water range of an Eastern Military District combined-arms combined formation, and the tankers from the Eastern Military District tank formation located in Buryatiya will carry out a forced crossing of the Onon River in Transbaikalia in the course of upcoming exercises.<sup>14</sup>

## Takeaways

1. Russian tanks have three-man crews, lower silhouettes, less top-attack armor and weigh in the 46-ton range. Russian military ferries and pontoon bridge sets can handle their tank’s weight, as can many highway bridges in Eastern Europe. Fording is often an option. Snorkeling (deep fording) gives them yet another option.
2. River current can take a tank off course and that is why the driver keeps a constant speed and steers to stay on azimuth. Radio communications are possible but are an electronic giveaway as to what is going on if not encrypted. A strong current and the buoyancy of the tank lifts the tank off the bottom so that the driver often doesn’t feel the treads turning. The treads are propelling the tank through the water and the tank is indeed swimming.
3. Initial training for underwater driving is done in clear-water conditions; however, field conditions will engulf the crew in a brown or green soup, which causes a loss of orientation. Staying on azimuth and maintaining constant speed are essential.

4. Abrupt turns and stops are anathema in this maneuver. This is why a tank underwater driving course and scuba school are essential before snorkeling. It reduces fear, provides experience and becomes an anticipated adventure and tale of daring-do.
5. Snorkeling is not a far-flung possibility but a skill the Russian army regularly trains to conduct.

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## Notes

<sup>1</sup> Lester W. Grau and Charles K. Bartles, **The Russian Way of War: Force Structure, Tactics and Modernization of the Ground Forces**, Fort Leavenworth: FMSO, 2017, <https://community.apan.org/wg/tradoc-g2/fmso/p/fmso-bookshelf>.

<sup>2</sup> Ibid.

<sup>3</sup> G. L. Khol'yavskiy, *Энциклопедия Танков: Полная Энциклопедия Танков Мира 1915-2000 г.г.* [**The Encyclopedia of Tanks: The Complete Encyclopedia of the Tanks of the World 1915-2000**], Moscow: Harvest, 2000.

<sup>4</sup> Ibid.

<sup>5</sup> Grau and Bartles.

<sup>6</sup> Khol'yavskiy.

<sup>7</sup> D.V. Shun'yakov, O. N. Bondarev, D. N. Bagin and S. Fokin, Ministry of Education and Science of the Russian Federation, *Переправы {Crossings}*, Ekaterinburg: Ural University Press, 2017.

<sup>8</sup> Ibid.

<sup>9</sup> Ibid.

<sup>10</sup> The sealing is done primarily around the hatches using a clay-like "glop." It takes about 15 minutes to prepare a tank.

<sup>11</sup> Yu. Borodin, "Along the River Bed as on Dry Land," *Армейский Сборник [Army Digest]*, April 2019.

<sup>12</sup> Ibid.

<sup>13</sup> Eastern Military District Press Service, "In Buryatiya More Than 600 Eastern Military District Tank Crew Members Begin Scuba-Diving Training," Ministry of Defense of the Russian Federation, <http://www.mil.ru>, June 24, 2019.

<sup>14</sup> Ibid.

## Acronym Quick-Scan

**ATGM** – anti-tank guided missile

**FMSO** – Foreign Military Studies Office

**IRM** – Russian acronym for their Engineer Reconnaissance Vehicle



**Figure 4. A tank commences snorkeling operations.**