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TRANSLATION

Amphibious Vehicle

The winters in the Carpathians are capricious. One can never guess what tomorrow will bring -- whether it will be snow or rain. But regardless of the weather the rumble of engines and the noise of departing tanks can be heard.

At the command to move out, the loader, Private V. Kusok, and I switch on the storage batteries and the mechanic-driver, Sgt. A. Grechuk, prepares the heating unit for starting. He removes the hatch cover in the overhead of the motor compartment and sets the distributor cock in the "All Tanks Open" position. He then places the crank handle in the sprocket wheel of the chain drive and begins to turn it. But there is no flame. Grechuk, perplexed, looks at me.

"Check the spark", I prompted him.

By this time the mechanic-driver remembers that in his haste he did not engage the bobbin. It seems only a trifle, but a lot of time is spent correcting this negligence. We drain the fuel from the boiler and engage the bobbin. There is a spark, but the fueld does not ignite.

"No air coming in", surmises Grechuk.

It was necessary to remove the tubethrough which air is inducted into the boiler. It happened to be filled with fuel also. The reason was simple: not having turned on the ignition, the mechanic began to pump fuel into the boiler. On filling the boiler the fuel went into the air manifold. When we engaged the bobbin, the air forced the fuel into the boiler and quenched the flame.

An unpleasant occurrence, but we learned a valuable lesson from the experience. It established the following rule: The chain drive sprocket wheel should not be turned without first checking the spark.

One often hears the following question from youthful mechanic-drivers: "Why lose time warning up if thetemperature is not below zero?" One time, Sgt Ruban

... his engine without warming it up. He observed smoke in the exhaust but padd no attention to it. The hatch cover of the compartment above the power transmission was open. Glancing inside, he noticed that the crankshaft was turning over with great difficulty. "If only the oil doesn't start gumming up", he quickly thought. Descending into the drivers compartment, he depressed the gas pedal and increased the engine speed to 1800 rpms. The thermometer crept upward -- from 50° to 9.° Centigrade. The engine then operated more smoothly -- the smoking and gumming ceased.

We never had gumming in our tank. The secret for this is simple. We warm up the engine two or three times, each time bringing the temperature of the fluid up to 90° C. Following this we have an interval of five to seven minutes. We complete the warming process when the oil pressure reaches 90° C. following a single depression of the pump button.

In the winter season our rivers do not freeze over; we have amphibious crossings throughout the entire year. Every tank trooper remembers his first winter crossing; I remember it too.

Sgt. Grechuk carefully brought the machine up at right angle to the edge of the river bank. Soon the tank was afloat. Suddenly everything was enshrouded in a pall of black smoke. The engine had begun to misfire.

I asked the mechanic for the temperature and got the reply that it was 50°C while the oil showed 40°C. I called for an increased in engine speed and clo... the butterfly valve. The mechanic carried out the order and the engine began to ...te more smoothly. We became convinced through personal experience that when afloat in cold water the engine speed should be kept down to a speed of 1,000-1,200 rpm. In addition, the butterfly valve should be closed.

The knack of driving a vehicle is not acquired immediately. It is necessary to study and practice painstakingly each day. In preparing a worthy present for the 45th Anniversary of the Soviet Army, we assumed the obligation of helping a young mechanic, Private V. Bortnik, to get a one step promotion in his classification. We decided never to permit engine stoppages because of mechanical malfunctions. The commission gave us a rating of "excellent" for converting the tank to winter operation.

Sgt. A. Dozorov

Nuclear weapons are currently viewed as the primary means of destroying military equipment, arms and personnel. However, they are not the only means. Considerable importance is attributed to the ground troops who are responsible for completing the destruction of the enemy and occupying his territory. An especially vital role is allocated to the armored forces. They are considered to be the most effective for operations under conditions of nuclear warfare and the most capable for the quick performance of missions involving the routing of an enemy force. This is due mainly to the combat qualities of tanks, which favorably combine fire power with high maneuverability. In addition, tanks are quite resistant to nuclear explosions and provide good protection for their crews.

The destructive factors of nuclear weapons are, as we all well know, the blast, flash, penetrating radiation, and radioactive contamination. The first three factors occur within an interval of a few seconds and cause almost instantaneous, and, usually a combined type of destruction effect on an object. The latter factor, radioactive contamination, persists for a long period of time. It is capable of dispersion over an extensive portion of an area in the form of radioactive clouds and is prevalent in the vicinity of the burst.

The blast wave, into the formation of which goes almost half the energy of a nuclear explosion, produces the most destructive action, causing both direct and indirect physical damage. The blast wave is highly compressed air expanding from ground zero in all directions at ultrasonic velocity. For example, in a low-power nuclear explosion the wave front hits objects located within a kilometer of ground zero in less than two seconds, and it strikes objects two kilometers distant after approximately five seconds. The wave velocity then decreases sharply; it changes into a sound wave and loses its impact effect.

Direct damage occurs as a result of excessive (above atmospheric pressure which is applied on each object. Indirect damage is a consequence of objects being shifted, overturned, or hurled. Moreover, they are subject to the effects of "secondary missiles" -- various solid objects (small articles, debris, stones, etc) -- hurled at tremendous speeds by the shock wave.

A tank is capable of resisting tens and hundreds of tons of pressure from a shock wave and, therefore, is virtually not vulnerable even at those distances from ground zero of an aerial burst where the excess pressure may register several kilograms per square centimeter. Since the crew and the ammunition, fuel, instruments, and equipment are covered by armor, they are protected from the effects of this great pressure. Despite its many openings the tank would have an internal pressure that would be several times less than that at the front of the shock wave. A tank for its size is quite heavy and this, consequently, greatly reduces the possibility of its being overturned or tossed about. The removal or damage of the outer equipment by the blast wave or "secondary" missiles likewise does not affect the combat efficiency of a tank. All this is evidence that a tank is extremely resistant to the effects of a blast wave, the most destructive feature of nuclear weapons.

The flash of a nuclear blast is capable of blinding a person, causing severe burns, charring or igniting combustible materials, and causing decomposition or melting of non-combustible substances. It consists of a stream of visible, infrared, and ultraviolet rays emanating from the fire ball. The flash of a low power nuclear explosion last two or three seconds. The degree of its destructive force is determined by its pulse value (the amount of light energy falling on a square centimeter of an area) and the physical and chemical characteristics of the object. For instance, a light pulse with a value of 8-12 cal cm^2 is capable of charring or igniting uniforms, canvas, and wooden parts of weapons and equipment. A light pulse of several tens or hundreds of calories per square centimeter can melt metallic parts and cause thin sheets of metal to burn. Pulses of this type may reach a distance of several hundred meters from fround zero.

Owing to its strong armor covering, a tank sustains practically no damage from light radiation. On the portion of its surface exposed to the explosion, the paint will be scorched and the rubber tires of the road wheels may ignite, but this would not cause a fire since the erupting flame would be extinguished by the shock wave. The fuel in the outer fuel containers likewise would not catch fire. The thick armor would adequately protect the crew from the light pulses and the reduced light intensity inside the fighting compartment would cut down the blinding glare. Hence, light radiation is not harful to tanks nor dangerous to the crew.

Penetrating radiation, consisting of gamma rays and neutrons, is a specific destructive factor of a nuclear blast. Neutrons act for a fraction of a second at the beginning of a blast, while gamma rays are effective for 10 - 15 seconds and cause ionization of a medium. Ionization of human tissue causes radiation damage and, in large doses, radiation sickness. The effect of penetrating radiation has absolutely no effect on a tank's combat efficiency. Inasmuch as the body and interior equipment considerably reduce the penetrating radiation, the dose received by the crew is much less in comparison to that received by an exposed individual. For practical purposes, the armor of a madium tank reduces the radiation dosage. Thus it can be seen that a tank also protects its crew to a high degree from penetrating radiation.

Radioactive contamination can harm people through radioactive substances entering into an organism as well as penetrating through the skin. Particularly high levels of radiation are present in the immediate area of a ground burst and in areas where particles descend from radioactive clouds. A tank markedly attenuates the effect of radioactive contamination on the crew and, hence, it is less dangerous for tank crews to cross contaminated zones than is true of infantry units. This enables armored personnel to operate effectively on terrain with intensive radioactive contamination.

Thus, troops have an undisputed advantage while in tanks over other ground force personnel in conditions of nuclear weapons employment. They are the best adapted for operations under such conditions, which, in conjunction with their other high combat characteristics, renders them a formidable force on the field of battle and determines their leading role in modern warfare.

Colonel A. Kuptil

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