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THE ARMoured CARRIER DRIVER'S SPRING-
TIME TERRAIN PROBLEMS

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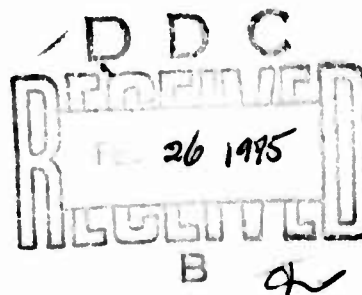
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ABSTRACT: Springtime ice, slush, mud and deeply rutted or uneven road surfaces pose special problems for the armoured carrier driver. Movement over up-grades and downgrades is especially difficult, and it is imperative that the driver have a sound knowledge of the changes in speed, position, tire pressure, etc., that different circumstances require to maximize traction and avoid wheel slippage. Special care must be taken to avoid injury to the gear assembly and other moving parts. Frequent checks should be made for possible needed repairs.

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In the springtime, armoured carrier drivers must be especially cautious and efficient. When the air temperature reaches 0° C., water splashes parts of the wheel suspension and driving gear assembly, forming an ice crust on them. Therefore, it is necessary to remove the ice from the suspension, linkage and driving gear assembly after every hour of use. If this is not done at the proper times, injury to the rubber brake (fluid) and air hoses connecting to the wheel reduction gears may occur, thereby complicating the steering of the armoured carrier.

To begin moving on an ice-crust road, second gear should be used to avoid wheel slippage since, in icy conditions, there is little tractive force. In first gear, it is necessary to move at good speed to insure that the carrier attains a stable position on the road surface. If this is too difficult because of the type of road terrain, or too dangerous because of excessive traffic, lower the tire pressure to 1.5 kg/cm² and proceed at a speed not greater than 25 km/hr.

When there are large snow drifts, it may not be possible to maintain the carrier's position on the road. In this circumstance, do not lose control, turn the steering wheel towards

the snow drift, guide the carrier through the ditch or over the embankment at the side of the road. The main concern is not to let the carrier overturn. On snow-covered dirt roads, wheeled and track-type (caterpillars) vehicles leave deep ruts filled waist-high with water, especially when there are depressions or raised surfaces. If the bottom of the rut is firm, do not decrease the tire air pressure. The carrier should travel over these sections in the highest gear, with axles engaged and throttle reduced. If wheel slippage occurs, cut the throttle, and, then, steadily increase the engine rpm's. Restore ground contact.

Movement by night over snow-covered roads requires the use of second and third gears. This prevents the wheels from striking the walls of the ruts laterally and causing injury to the vehicle's moving parts.

Remember that guiding the carrier out of deep ruts which have curved, ice-covered walls is extremely difficult. Cut the throttle, turn the wheels slightly to the opposite side and, then, at the maximum possible angle, turn the wheels sharply to the exit side. Gradually increasing the throttle, guide the carrier out of the ruts.

For travel over roads with soft surfaces, reduce the tire pressure to $0.5 - 0.75 \text{ kg/cm}^2$, use second and third gears, with the lowest gear in the transfer case engaged. Attempt to maintain a steady speed, and to avoid jerky movements and stops in order to prevent wheel slippage. Otherwise, the surface dirt layer will become compressed and insufficient wheel contact with a hard surface will make it impossible to achieve the required

amount of traction.

Avoid travelling in the tracks created by other vehicles in places where the ground is soft and slushy. If hard stones or boulders, hidden by a layer of dirt or mud, are encountered in route, do not reduce the air pressure in the tires. It should not be less than 1.5 kg/cm^2 since, otherwise, tire damage may occur.

The meshing coefficient for travel over dry summer road surfaces should be 0.6 - 0.8. In the winter, this figure is reduced to 0.2 - 0.4, and, during periods when glare ice or freezing rain occur, 0.1. Correspondingly, the tractive force is also reduced. Therefore, for movement over slick winter roads when snowy conditions exist, the front axles must be engaged and the speed of the vehicle limited to 40-60 km/hr. In these conditions, first reduce engine speed smoothly, and then simultaneously apply the wheel brakes. Throw in the clutch only at the end of the braking operation. When snow drifting is present, release the brake pedal quickly. An effective braking method is to depress the brake pedal repeatedly at short intervals. By releasing the pedal, wheel contact with the road surface is restored and the snow drift is avoided.

Movement over upgrades and downgrades during snowstorms is an especially complicated operation. When a steep upgrade is encountered, stop, observe the road section in order to be able to avoid dangerous spots. The vehicle should assume a position at right angles to the crest of the upgrade. Preferably, this maneuver should be completed without changing gears. By ascending

the upgrade at an oblique angle from the base, the tractive force is reduced and the operating conditions for a snowstorm or even for the overturning of the vehicle are created.

If the upgrade is steeper than 20° , ascend the slope in first gear, with the lowest gear of the transfer unit engaged. The front axles must be engaged at this time. The tire air pressure should correspond to the road conditions. Before ascending the slope, the carrier should increase speed and advance smoothly to the crest of the upgrade. If the speed of the vehicle slackens, do not stop, but quickly change to a lower gear, simultaneously increasing the engine rpm's.

In making descents, special caution must be exercised. The road surface on the downslope of hills is usually rough or uneven and to move the carrier backwards in order to gain momentum is very difficult. Therefore, the ascent should, preferably, be accomplished on the first attempt. Remember that there is another difficulty in accomplishing this maneuver. If the downgrade ends with a steep section, the vehicle may receive sharp blows at high speed, causing damage in the front wheel suspension.

Advance over frozen tank tracks at low speeds since, in this circumstance, the armoured carrier will "copy" the curves or winding pattern of the tracks, and the wheels will strike the suspension laterally with a great deal of force when there are bends. At high speeds, this can lead to damage to the coupling bolt in the front wheels, damage to the suspension brackets, etc.

For travel over snow-covered terrain, follow the rules for winter road conditions. Remember, however, that wet, sticky snow

is rapidly compressed beneath the body of the carrier. This may produce overloading and cause the carrier to become stuck.

Movement over frozen ponds or reservoirs is more complicated in the springtime. The ice is fragile and breaks easily. Once you have chosen a place to cross the ice, do not hurry. The ice must be hard and smooth, and its thickness should not be less than 40-50 cm. To measure the ice thickness, a field blade may be used. Lower the blade through a hole in the ice, extending it to the lowest edge of the ice. Make a mark on the knife handle which will be a measure of the thickness. Having chosen a desirable exit point on the other side of the ice, advance smoothly, without swerving or stopping.

If the thickness of the ice is less than 5 cm., the carrier will break through the ice and must pass through the water. In this circumstance, attempt to maintain a straight directional line. To protect the headlights from injury by ice particles, the wave-deflecting shield should be removed.

Having reached the opposite bank, stop, if possible, to check the condition of the underlying rubber brake and air hoses in the reduction gear assembly.

It is important for the driver to have a good field of vision when driving conditions are difficult. Therefore, it is necessary to open the air vents in the hatch, using them as viewing windows. Warm air from the engine compartment will protect the driver's and commander's viewing windows from fogging and icing.

A few words should be said concerning evacuation procedure when the armoured carrier becomes stuck. In snow and mud conditions

the vehicle must be evacuated by towing. If the carrier has been repaired, it must participate in the evacuation procedure. In order for both vehicles to begin moving at the same time, the driver of the carrier which is stuck, watching the tow line closely to avoid the possibility of wheel slippage by the towing vehicle, must release the clutch evenly, and pull out the throttle when the tow line is nearly taut. This simplifies initial movement of both vehicles and the evacuation procedure.



Do not forget to constantly check the joints and parts of the centralized air regulatory system for the tires, especially the wheel hoses, for possible repairs.

The armoured carrier driver must be circumspect and attentive during springtime slush conditions. This is one of the basic conditions for safe driving and for the successful completion of the assigned task.