

Russian WWII Evaluation Report of the AEC 2 Armored Car For possible Lend/Lease Acquisition (CAMD RF 38-11358-405)

Summary:

- The AEC armoured car is built using production tank and automobile parts.
- The side of the car does not correspond to its combat ability.
- The design of the hull and turret, as well as the thickness of the armour, do not match modern requirements.
- The design and combat performance of the AEC is not of interest to us.

Conclusions:

- The AEC MkII armoured car is built using production tank and automobile parts.
- The engine of the armoured car is a four-stroke AEC engine and does not differ from the one used in English Valentine III tanks.
- The armament and turret are used from the English Valentine I and early Churchill tanks.
- The transmission and suspension consists of components used in heavy trucks. Parts of this design include the front wheels (drive wheels) constantly being in gear and pneumatic brakes.
- Using mass production components makes the design more complicated, and placement difficult (the engine is tilted in two axes), and led to an increase in dimensions, especially height.
- The design of the hull is obsolete. The armour plates are horizontal, except in the front.
- The mass of the armoured car is 12.2 tons, which is too high for its combat performance. This is explained by its large size and using heavy tank components.
- The vehicle is armed with a 57 mm gun MkV and a BESA 7.92 mm machinegun. This assembly has no elevation mechanism. The elevation is changed with the gunner's shoulder. There is a brake for fixing the gun in a certain position.

The downsides of this design include the lack of balance in the oscillating section of the gun and a poor telescopic sight. It is immobile and has a monotonous scale, which makes aiming difficult.

- The ammunition rack is poorly designed. Shells get stuck in their slots and decrease rate of fire.
- The armour of the vehicle (maximum 25.4 mm) is insufficient.
- The unusual always on front wheels and controllable rear wheels does not decrease maneuverability due to a balance between the axles, but results in more complicated front wheels, as they both turn the car and are drive wheels.

Mobility Trials Results:

- The maximum speed is 78 kph, which is good for a 12.2 ton armoured car.
- Medium speeds:
 - Highway: *[illegible]* kph
 - Stone-gravel road: 30 kph
 - Dirt road: 13 kphare satisfactory.

The relatively low speed across a dirt road is explained by the stiff suspension, as well as that the trials were held on a road previously traversed by tanks. The difference in width and necessity to brake before bumps led to the inability to use the full engine power of the vehicle.
- Fuel consumption for 100 km:
 - Highway: 29 L
 - Stone-gravel road: 34.7 L
 - Dirt road: 48.5 Lis low. These figures demonstrate the the engine is economic and that the gear ratios were picked well.
- The range is high:
 - Highway: 600 km
 - Stone-gravel road: 500 km
 - Dirt road: 360 kmdue to the economical engine and relatively large fuel tank (175 L).
- Temperature measurement showed that the temperature of the coolant stabilized at 75-80 C and oil pressure at 40-45 psi (3.1-3.2 kg/cm²).

The stable temperature shows that the engine power and transmission ratios were chosen well and that the oil and cooling systems work flawlessly.
- The vehicle can climb 30 degree slopes, descend on 30 degree slopes, and tilt up to 22 degrees, which is enough for a wheeled vehicle.
- The minimum turning radius is 16 meters, and is caused by the large length of the car.
- Accelerating the car to 45 kph takes 250 meters. This is a good distance for a 12 ton car and shows that the engine is of good quality.
- When driving at 64 kph, it takes 28 meters to brake. This demonstrates that the vehicle has reliable brakes, and is safe to use in a column or in a city.

Gunnery Trials Results:

- The average deviation of the gun at 1000 meters is 0.19 horizontally and 0.18 vertically, and matches norms for the domestic 57 mm ZiS-2 gun (0.18 and 0.20 respectively).
- The gun hits targets at 700 meters directly 100% of the time.
- The odds of hitting the target from short stops at 400-700 meters decrease to 85%, and further decrease to 8% when shooting on the move.

The decrease in chance to hit from movement or short stops is explained by

large oscillations of the wheels during motion and their slow damping, as well as the poor telescopic sight.

- Practical rate of fire:
 - Stationary: 5.2 RPM
 - From short stops, including movement between stops: 2.5 RPM
 - On the move: 4.6 RPMWhich is insufficient for a 57 mm gun.
The reasons for low rate of fire include
 - Poor ammunition rack design with jamming shells.
 - Poorly balanced oscillating part of the gun.
 - Poor telescopic sight.
 - Large and long oscillations of the hull and the high mass of the gun system make aiming difficult.
- The gas concentration with a working engine and fans is 0.64 mg/L, and is within acceptable limits.