

ANALYSIS OF THE TECHNICAL-TACTICAL CHARACTERISTICS OF THE IVECO LORRY EUROCARGO MODEL WITH REGARD TO MEETING SOME OF THE OPERATIONAL REQUIREMENTS FOR SPECIFIC MISSIONS

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Abstract: *Currently, the force and logistic structures are going through a process of replacing the old equipment, physically and morally worn, and the new ones that have been bought or which are going to be selected must meet a series of operational requirements imposed by the beneficiary and through which the missions in which they will participate can be carried out. Such an analysis of the main technical and tactical features of the equipment is beneficial to users because the results of the calculations and assessments will enable command and decision makers to provide the most rational solutions from a technical and economical point of view in order to solve and perform the logistical tasks. On the other hand, thorough military knowledge of the technical and tactical possibilities of the equipment will allow the integrated planning of strategic and operative level actions, for which this equipment will be successful. In this article, the author analyzes the technical-tactical characteristics of a modern IVECO lorry, EUROCARGO 15 To 4x4 model, using as a research method the comparison of specific characteristics and sizes with the values recommended in the specialized literature and those expressed in the requirements of the beneficiaries.*

Keywords: lorry, characteristics, Iveco, logistics, missions

1. Introduction

The process of equipping the structures of the Romanian armed forces with modern equipment is an ongoing process, an important direction being the endowment of the modern, performing and cost-efficient transport formations reported to the budgets allocated for this purpose.

From the offered choices, the solution is established so that it satisfies the operational requirements of the beneficiaries, namely those that meet the destination criteria, strategic, operative and tactical mobility, safety of the movement and protection of the environment.

As a result, the destination of trucks for the military system refers to the execution of

those missions and tasks for the purpose of logistically assuring the fighting forces on all three above-mentioned levels and of solving the related problems deriving from the main purpose: recovery, evacuation, maintenance.

The specific tasks to be performed by this category of vehicles are the following:

- transport of material goods for the logistics of current activities and military actions, individually or in convoys on or off the road communications;
- transport of soldiers by complying with the regulations regarding the transport of persons by means of vehicles;
- with legal additional technical equipment, they can be used as vehicles designed to

teach driving in order to obtain the driving license category “C”;

- evacuation and recovery of other vehicles stuck on the battlefield or in other situations;

- when needed, in the absence of specialized technical means, they can also participate in special actions, for the transport of wounded persons, personal escorts, mobile maintenance, etc.

Consequently, in order to accomplish these missions, the vehicles must meet the aforementioned operational requirements. For a purchased vehicle type, some of the requirements will be discussed in the following paragraphs.

2. The analysis of the technical tactical characteristics of the IVECO lorry EUROCARGO 15 To 4x4 model

This model of lorry (Figure no.1) has recently come in the provision of transport assurance formations, being considered by the specialists a model that corresponds to the current technical tactical requirements regarding the conduct of the training, the accomplishing of logistical missions and tasks, the cost of acquisition and the

maintenance on life cycle of the product.

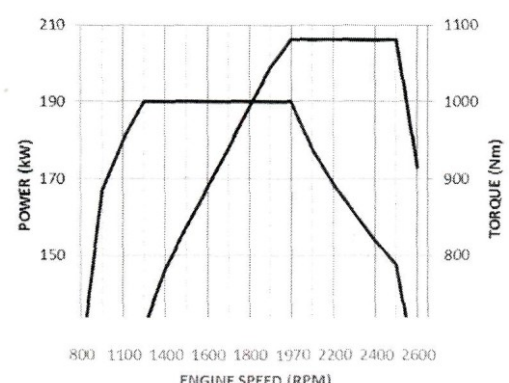



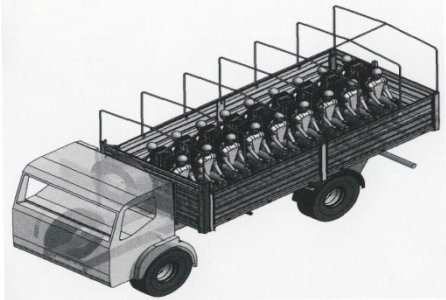
Fig. 1. Overview of the IVECO lorry EUROCARGO 15 To 4x4 model

This truck is a medium-size type, with its own mass of $m_p = 8,350$ kg, and the weight of the load is 6,650 kg. It has an increased capacity for crossing to off road, and for the evacuation of other vehicles it is equipped with a winch at the front. The analysis of the main technical-tactical characteristics is made in table no. 1.

Table no. 1 The main characteristics of IVECO lorry EUROCARGO 15 To 4x4 model

Characteristic/Size	Real value	Recommended value/Comments
Length Width Height	7.47 m 2.49 m 3.45 m	With these dimensions, the truck can be embarked on strategic airplanes, by rail and by sea, and on the road it is considered to be an ordinary vehicle without oversized dimensions that would require additional accompaniment.
Wheelbase	4.15 m	The 4.15 m is an acceptable value, being a compromise between the need to easily enclose the bends and avoid the vehicle's pitching movements, especially when loaded, and the center of gravity rises.
Gauge	2.08 m	The value of 2.08 m satisfies the need to maintain lateral stability in lateral corners / slopes and to make a re-ribbon gauge (Re-Ri) convenient for turning.

The angle of attack	27°	It is relatively small due to the winch in front of the vehicle and can cause obstructions when ramps climb or downhill slopes, but current military actions are usually carried out near land-based communications.
Ground clearance (minimum ground clearance)	0.390 m	Recommended value: 0.3-0.5 m There is a sufficient distance to cross heavy obstacle, marshy, turbulent or even mountainous land. It also contributes to the achievement of large angles of attack and clearance, which are beneficial for crossing major obstacles or ramps.
Autonomy of functioning	800 km	Recommended value: 800-1000 km The engine of the vehicle, with a cubic capacity of 6728 cc, consumes an average of 25 l/100 km and the capacity of the fuel tank is 200 l.
Specific power	$P_{sp} = \frac{P_m}{m} = \frac{280}{15} = 18,66 \text{ hp/t}$	Recommended value: 12-24 CP/t The calculation was made at the total mass of m=15 t. The powerful 280 hp engine will achieve good traction and mobility qualities, with the overall engine power for this vehicle category being between 200-300 hp.
Maximum power	$P_{max}=280 \text{ hp}$ (207 kW) At the maximum speed of $n=2500 \text{ rot/min}$	 <p>The maximum torque lies on a range of over 700 rpm due to the electronic fuel injection equipment.</p>
Torque or maximum engine torque	$M_{max}=100 \text{ daNm}$ on the speed line 1250-1970 rpm	
The maximum moment on the wheels of the truck	$M_r = M_{max} \times i_T \times \eta_t = 100 \times 46.91 \times 0,9 = 4422 \text{ daNm}$ (in the first level of the gearbox)	The 4422 daNm of the wheel torque is very high due to the significant reduction of the speed in the transmission components, which will result in a high wheel drive force, thus a good vehicle progress in the field.

The dynamic range of the wheels of the truck	$r_r=0.6 \text{ m}$	The truck is equipped with classical tires for this category of vehicles, respectively 14.00R20 Tubless. A major inconvenience is the lack of tire inflating equipment, which affects the ability to move in heavy terrain.
The traction force on the wheels of the vehicle	$Fr = \frac{M_r}{r_r} = \frac{4422}{0.6} = 7370 \text{ daN}$	This traction force on the wheels of the vehicle will overcome the inertia force of the vehicle and other strength forces (rolling, starting, downhill, air, hook).
Winch with electric drive 24 V (motor electric de 7.8 CP)	Load capacity 5897 kg Towing cable length 30 m Control with radio control	
Removable seat system for military transport	18 places Seats, seat belts and head restraints comply with UNECE Regulations 14, 16, 17	

3. Conclusions

In paragraph 2, only a part of the technical and tactical characteristics of IVECO EUROCARGO lorry 15 To 4x4 model were analyzed, for reasons of space. A thorough approach could lead to an ample study of operating and maintenance staff. It is certain that the items analyzed are high-performance and determine the availability of the whole system – the vehicle.

Specific conclusions from the analysis:

-the dimensions of the vehicle and the

performance of the motor-transmission-propulsion assembly make it possible to achieve high pass-through capacity in cross-country terrain;

- the additional equipment meets the military requirements for missions;
- high reliability of the components.

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