

Analysis of transport and its cargo processes

*Nurillo Ikromov**, *Sherali Temirov*, *Isroiljon Kuchkorov*, *Vokhidjon Juraev*, and *Javoxirbek Xalimov*

Andijan Mechanical Engineering Institute, Andijan, Uzbekistan

Abstract. This article includes basic and auxiliary work for the transportation of goods, as well as preparation of goods for transportation, loading and unloading of goods on vehicles, and sometimes storage works for a certain period of time in warehouses. When preparing for transportation, the cargo is placed in a certain order, sorted and divided into transportation routes: the cargo is weighed on a scale, then it is marked with certain signs, packaged, transportation documents are drawn up, etc. Loading and unloading operations are carried out with the help of mechanisms, taking into account the characteristics of the loads. In this case, it is necessary to pay attention to the fact that the rolling stock does not exceed the norm during loading and unloading operations.

1 Introduction

Increase of the volume of cargo transportation in automobile transport and the provision of traffic safety depends on the condition of the roads. When the car moves on an uneven road, the speed decreases, and fuel consumption, freight costs and the number of traffic violations will increase. In addition, as a result of the increase in the technical failure of the car, the repair costs increase. At present, the national economy needs good highways that allow vehicles to travel at high speeds in various weather conditions. It is necessary to carry out the following main and auxiliary work for cargo transportation: preparation of cargo for transportation, loading and unloading of cargo on vehicles, and even storage for a certain period of time in warehouses, etc. When preparing for transportation, the cargo is placed in a certain order, sorted and divided into transportation routes: the cargo is weighed, then it is marked with certain signs, packaged, transportation documents are drawn up, etc. Loading and unloading operations are carried out via mechanisms, considering the characteristics of the loads. In this case, it is necessary to pay attention to the fact that the rolling stock does not stand more than the norm during loading and unloading operations. The work done by transport when cargo is transported over a certain distance is called the transportation process. As a unit of the transportation process the traffic is accepted. Traffic refers to a set of completed transportation processes, including loading, transporting, unloading, and emptying. The implementation of transport processes depends on the selection of rational routes of transport, the rolling stock suitable for the characteristics of the load and the conditions of its use, implementation on the basis of graphs in a specific direction. If the above-mentioned is carried out accurately, the cost of transportation will be reduced. When

* Corresponding author: isroilkuchkorov11@gmail.com

storing cargo in warehouses, it is necessary to pay attention to carrying out work inside the warehouse via mechanisms, so that the quality of the cargo is not damaged.

Economic reforms are being carried out in our country, and large-scale measures are being taken to increase their efficiency. The gradual implementation of the reforms with the social protection of the population allows further strengthen the stability and harmony of the citizens. Expropriation and privatization of enterprises are being carried out rapidly. Reducing the number of loss-making enterprises, ensuring profitability in all types of transportation transferred to contractual tariffs, and social protection of employees remain the main tasks. It is known that there was a big change in its social-economic and political directions after the independence of our country. The process of transition to a market economy created a completely new system of economic management in one of the leading sectors of the national economy, as in industry, construction and transport. In a short period of time, our country gained the ability and power to produce products for the world market. We can see this in the example of the “UzDaewoo” automobile enterprise, which was created in Asaka in cooperation with Korean automakers, and the “SamKuchavto” JV in Samarkand, which continues its activities in cooperation with Turkish businessmen [1].

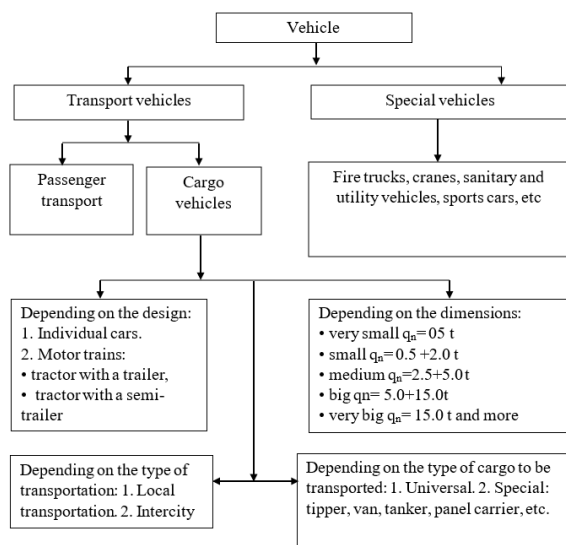


Fig. 1. Classification of rolling stock of vehicles.

Connection between the types of transportation of our republic has been established. The concept of “unified transportation system” represents the socio-economic unity and uniform development of transport types. The unified transport system includes the following types of transport: railway, water, road, pipeline and air. In railway transport, cargo is transported over long distances, at high speed throughout the year, day and night. 50% of the goods exported from Uzbekistan and imported from abroad are transported through the roads that are already in use, and the rest through new routes. The economic reforms carried out in our country are aimed at improving the railway system, creating the legal basis for the operation of the national railway company in market conditions, and ensuring its coordination with the international communication system. In general, new rational railways and highways are being built in our country.

Airlines in our republic connect the capital – Tashkent city with the centers of all regions and more than 100 countries.

Comparing road transport with rail and water transport, it has the following advantages: high maneuverability, fast and cheap transportation over long and short distances: it is possible to transport cargo from the warehouse of the sender to the warehouse of the receiver; There are cars made up of different types of rolling stock. Its disadvantages include the following: small load capacity per unit of rolling stock; high cost of transportation; a large amount of metal consumption for the preparation of rolling stock (taking into account that it corresponds to 1 ton of load capacity). Through this route, it is possible to go to ports in the Yellow, East China and South China seas. According to international experts, if the project is quickly implemented by 2011, the corridor's capacity will reach 12-14 million tons, excluding internal cargo transportation. Water transport is used in the transportation of various cargo of national economy in Amudarya and Syrdarya and is characterized by seasonality of transportation. This type of transport is new in our republic, and now river port units have been established (Fig.1). In pipeline transport, oil, oil products and gases are transported over long distances through pipelines with high efficiency [2].

2 Problem statement and research methods

Cargo transportation in the pendulum direction is carried out between loading points located on the same route. Pendulum directions are divided into three types.

1. A route with a load on one side and no load on the way back
2. A route in which cargo is transported in one direction and a part of the distance covered on the way back.
3. The direction of cargo transportation in both directions. Circular routes are organized in order to reduce the distance of rolling stock without load during cargo transportation.

Vehicle transport companies are organized to carry out transportation. In public transport management regional production system is used. In the management of vehicle transport enterprises, the following should be ensured: - execution of the transportation process; - planning of technical and economic indicators; - organization of labor and wages; - accounting and financial activities; - material and technical supply; - gathering and training of specialists; - general administration and household work. In order to solve these issues, regulatory, technical and planning-economic services are organized at the automobile company (Fig. 2). The organizational structure of the automobile enterprise depends on the type and composition of transportation, the number and type of rolling stock, the form of maintenance and repair, the technical equipment of the automobile enterprise, etc. [3].

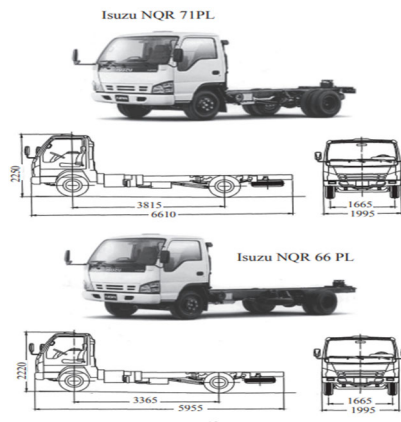


Fig. 2. Base of Isuzu truck.

Important tasks are to improve the activity of automobile enterprises, to increase the number of rolling stock, and to reduce the managerial links. The rolling stock of road transport includes cars and road trains (cars, trailers, semi-trailers and extended trailers). Depending on their use, trucks are divided into transport vehicles and special vehicles (Fig. 2 and 3). Special types of rolling stock are widely used in the national economy. The main dimensions of rolling stock are defined on the basis of traffic rules, that is: - maximum height of 3.8 meters with cargo; - 2.5 meters wide; - the length of a single car is no more than 12 meters; - with two or more trailers, maximum 24 meters (Fig. 3). The main operating quality indicators of trucks are as follows: - load carrying capacity; - remote access; - speed; - safe movement; - fuel economy; - can be used for a long time [4].

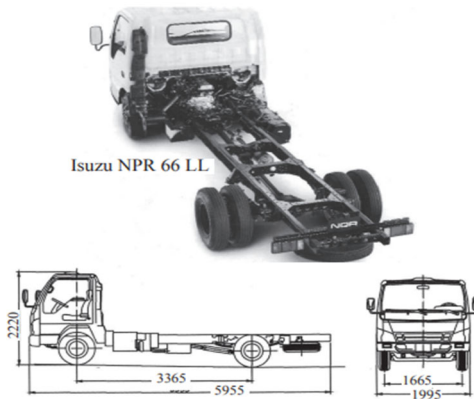


Fig. 3. Base of Isuzu truck.

Public road transport is tasked with carrying out centralized cargo transportation. Public transport vehicles transport the cargo of organizations and enterprises, regardless of the branch they belong to. Network road transport belongs to a certain sector - companies and associations, and serves the constructions of enterprises and organizations of this sector (Fig. 4). It carries out all types of technological and economic cargo transportation of enterprises, organizations and constructions belonging to this sector.

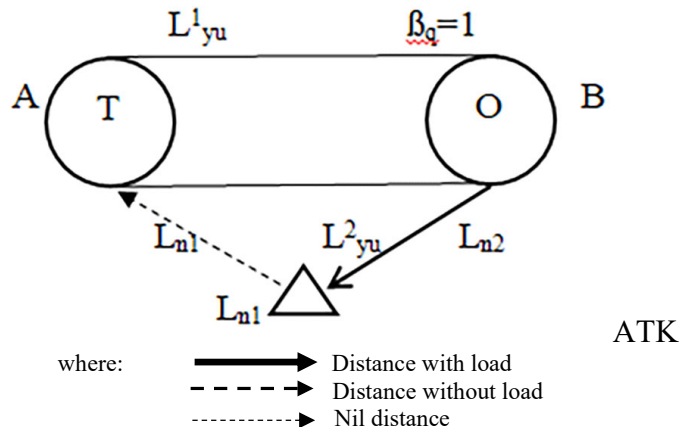


Fig. 4. The direction of traffic with loads in both directions.

3 Results and discussion

Choosing the type of rolling stock means determining the most appropriate one from several different vehicles to work on the traffic. The rolling stock is selected according to the following characteristics.

- the nature of the cargo being transported;
- road and climatic conditions;
- type and capacity of loading and unloading mechanism;
- the cost of transporting goods;
- rolling stock productivity.

In some cases, the type of rolling stock is selected depending on the distance where the performance of the selected rolling stock is the same (Fig. 5).

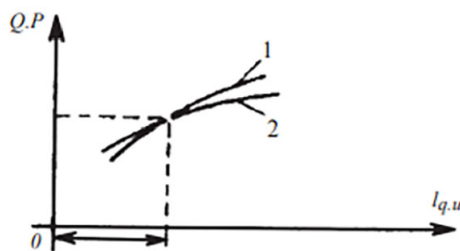


Fig. 5. Chart of rolling stock selection: 1- flatbed vehicle; 2-overturned vehicle.

Uzbekistan will have three alternative corridors that will ensure access to world ports in its foreign economic relations. The first corridor is the European-Caucasus-Asia route, the western transport corridor within the framework of the TRACEKA program supported by the European Union (Tasis). Trains departing from our country along the TRACEKA route go to the ports of Poti and Batumi on the Black Sea and through them to Europe. The second corridor is the Southern, that is, Turkmenistan-Iran route. In 1996, the Tijen-Serekhs-Mashhad railway was completed and put into use. Along this route, cotton fiber, etc. is located on the Iranian coast of the Persian Gulf is exported to the Bandar-Abbas port and through it to the countries of South-East Asia. The third corridor is the Eastern, that is, Uzbekistan-Kyrgyzstan-China route. This corridor, designed on the basis of the contract signed in April 1997, connects Andijan with Osh of Kyrgyzstan and Koshgar of China. Through this route, it is possible to go to ports in the Yellow, East China and South China seas. [5].

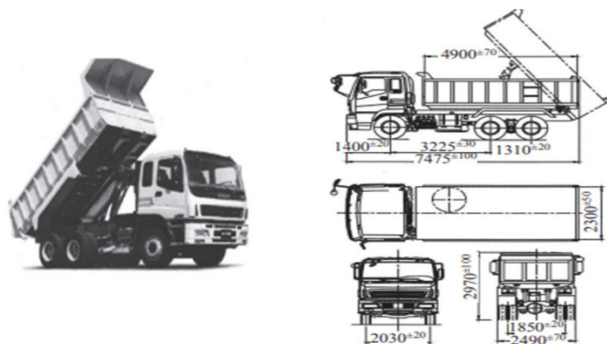


Fig. 6. CYZ 51 K1 dump truck.

According to international experts, if the project is quickly implemented by 2011, the corridor's capacity will reach 12-14 million tons, excluding internal cargo transportation. Water transport is used in the transportation of various cargo of national economy in Amudarya and Syrdarya and is characterized by seasonality of transportation. This type of transport is new in our republic, and now river port units have been established (Fig. 6). In pipeline transport, oil, oil products and gases are transported over long distances through pipelines with high efficiency.

In order to improve the work of road transport, the following measures should be implemented: use of advanced forms and methods; reduction of the unproductive downtime; reduction of the distances from the car factory to the first loading point and from the last unloading point to the car factory and without cargo; improving the routing of rolling stock and the use of trailers; the wide introduction of centralized cargo transportation, strengthening control in the work of cars; wide application of electronic computing techniques and economic-mathematical methods. Public road transport is tasked with carrying out centralized cargo transportation. Public car transport transports the cargo of organizations and enterprises, regardless of the branch they belong to. Network road transport belongs to a certain sector - companies and associations, and serves the constructions of enterprises and organizations of this sector (Table 1). It carries out all types of technological and economic cargo transportation of enterprises, organizations and constructions belonging to this sector. Motor transport enterprises are organized to carry out transportation [6,7].

Table 1. Characteristics of trucks.

No.	Brief description	Trucks		
1.	Type, model of the vehicle power, horse power/KWt Combustion chamber volume, cm ³ Fuel tank volume, liters Mass, kg - complete - chassis mass Chassis dimensions, mm -length - width -height	NPR 66LL	NPR 66PL	NQR 71PL
2.	Diesel engine	4HF-1	4HF-1	4HG-1
3.	Power, horse power/kwt	78/104 3200 rpm	104/78 3200 rpm	121/89 3200 rpm
4.	Number of cylinders	4	4	4
5.	Volume of the combustion chamber, cm ³	4334	4334	4551
6.	Volume of the fuel tank, liters	100	100	100
7.	Mass, kg - whole - mass of the chassis	7000 2310	7000 2330	8000 2405
8.	Dimensions of the chassis -length -width -height	5955 1995 2220	6610 1995 2220	6610 1995 2250

4 Conclusion

Realization of transport processes depends on the selection of rational routes of transport, the rolling stock suitable for the characteristics of the load and the conditions of its use, implementation on the basis of graphs in a specific direction. If the above-mentioned is carried out accurately, the cost of transportation will be reduced. When storing cargo in warehouses, it is necessary to pay attention to carrying out work inside the warehouse via mechanisms, so that the quality of the cargo is not damaged. It is known that there was a big change in its social-economic and political directions after the independence of our country. The process of transition to a market economy created a completely new system of economic management in one of the leading sectors of the national economy, as in industry, construction and transport. In a short period of time, our country gained the ability and power to produce products for the world market.

In order to improve the work of road transport, the following measures should be implemented: use of advanced forms and methods; reduction of the unproductive downtime; reduction of the distances from the car factory to the first loading point and from the last unloading point to the car factory and without cargo; improving the routing of rolling stock and the use of trailers; the wide introduction of centralized cargo transportation, strengthening control in the work of cars; wide application of electronic computing techniques and economic-mathematical methods. Public road transport is tasked with carrying out centralized cargo transportation.

In some cases, the type of rolling stock is selected depending on the distance where the performance of the selected rolling stock is the same (l_{um}). For example, when choosing a flatbed vehicle and tractor, if ($l_{ut} < l_{qu}$), if flatbed vehicle has ($l_{ut} < l_{qu}$), and dump truck has ($l_{ut} < l_{qu}$), it is necessary to choose flatbed vehicle. The volume of transported cargo cannot give a full picture of the productivity of transport work, because the size of the cargo transported at a certain time depends on the transportation distance. It is appropriate to express the work of transport through work productivity measured in ton-kilometers, considering the volume and distance of cargo transportation.

References

1. N.A. Ikromov, S.S. Isroilov, A.S. G'iyosiddinov, S.M. Rakhmatov, M.M. Ibrokhimova, Asian Journal of Multidimensional Research (AJMR) **9(3)**, 188-198 (2020)
2. Sh.A. Temirov, International Journal of Innovations in Engineering Resarsch and Technology – ISTC – 2K20 **29(9)**, 5870-5875 (2020)
3. Sherali Temirov, Chain transmissions Education News: Research in the 21st century **2(14)**, 117-131 (2023)
4. X. E. Xalilbek, World scientific research journal **18(1)**, 110-115 (2023)
5. Sherali Temirov, World scientific research journal **18(1)**, 136-141 (2023)
6. B. Kholmurodov, M. Dzhuraeva, U. Sharafutdinov, E. Kuznecov, E3S Web of Conferences **278** 01025 (2021). <https://doi.org/10.1051/e3sconf/202127801025>
7. Isroiljon Kuchkorov, Oriental Renaissance: Innovative, educational, natural and social sciences **2(10)**, 537-542 (2022)